Chapter 6
DRINKING WATER

6.010 General

Any extension of the Olympia water system must be approved by the Public Works Department, and all extensions must conform to Department of Health and the Coordinated Water System Plan 2009-2014, City of Olympia Water Comprehensive (Master) Plan, and Olympia Fire Department requirements.

In designing and planning for any development, it is the developer's responsibility to see that adequate water for both domestic use and fire protection is attainable. The developer must show in the proposed plans how water will be supplied and whether adequate water volumes at acceptable pressure and velocity will be attained in case of fire. An analysis of the system may be required if it appears that the system might be inadequate.

Anyone who wishes to extend or connect to the City's water system should contact the Community Planning and Development Department for a water extension/connection fee estimate. This fee estimate is an estimate of the costs due the City for a waterline extension or connection.

Water meters will be released at the same time the building permit is issued. In new plats, prior to the release of any water meters, all Public Works improvements must be completed and approved, including granting of right-of-way or easements, record drawings submitted and accepted, or bonded for in accordance with Chapter 2 of these Standards, and all applicable fees must be paid.

And issuance of building permits for new construction of single-family subdivisions will not occur until the Director of Community Planning and Development or their designee has given final approval of the water system. Issuance of building permits for commercial projects will not occur until the required fire protection facilities, minimum required fire flows and emergency access, meeting the International Fire Code Requirements are completed and accepted. A construction completion surety, in accordance with Chapter 2 of these Standards, may be required for the remaining public works improvements.

Certificate of Occupancy for new commercial development s will not be issued until the Director of Community Planning and Development or their designee has given final approval for all public infrastructure improvements by being either constructed and complete or an acceptable completion surety is in place for the improvements.

GENERAL NOTES (WATER MAIN INSTALLATION)

1. All workmanship and material will be in accordance with the *City of Olympia Engineering Design and Development Standards* and the most current copy of the *State of Washington Standard Specifications for Road, Bridge and Municipal Construction*; Washington State Department of Health (DOH) regulations; City of Olympia Water System Plan 2009-2014 and American Water Works Association standards.

2. A preconstruction meeting will be held with the City prior to the start of construction.

3. All lines will be chlorinated and tested in conformance with the above-referenced specification (Note 1).

4. The contractor will provide traffic control plan(s) as required in accordance with the current WSDOT Specifications and MUTCD.

5. All water mains will be staked for grades and alignment by an engineering or surveying firm capable of performing such work. Staking will be maintained throughout construction.

6. All water system connections to serve buildings or properties with domestic potable water, fire sprinkler systems, or irrigation systems will comply with the minimum backflow prevention requirements as established by the Washington State Department of Health and the City of Olympia in its Cross Connection Program.

7. Call Underground Locate at 1-800-424-5555 a minimum of 2 business days before commencing any excavation. Underground Utility locates will be preformed once. It is the responsibility of the requestor to maintain the markings after the initial locate in accordance with RCW 19.122.

8. The City requires 10 working days written notice following application at the Community Planning and Development Department to schedule shutdowns . The written notice will be coordinated with the City Inspector. The City of Olympia Drinking Water Operations or City Inspector will perform the shutdown.

9. At any connection to an existing line where a new valve is not installed, the existing valve must be pressure tested to City standards by the contractor prior to connection. If an existing valve fails to pass the test, the contractor will make the necessary provisions to test the new line prior to connection to the existing system or install a new valve.

10. At any water main tap to existing City mains where the contractor encounters a coupling or existing assemblies, the contractor will provide a minimum of 18 inches of clearance from coupling or assemblies to edge of tapping sleeve.

11. Any water main tap or connection will be blocked according to the City of Olympia Standard Plans.

12. Any excavation that exposes an asbestos cement water main or the City 36 inch water transmission main shall be bedded with Controlled Density Fill (CDF) pursuant to the WSDOT specifications for CDF. As an option the contractor may choose to replace the asbestos pipe at any crossing with ductile iron pipe benched into both trench walls. The contractor will coordinate with the City Inspector to have a City of Olympia Drinking Water Operations staff member on site before construction begins.

13. Before cutting or removing any existing asbestos pipe the contractor will supply the City of Olympia Inspector a copy of the workman's certifications to work with asbestos pipe. The contractor will conform to all regulations and guidance related to asbestos work provided by the Olympic Region Clean Air Agency.

6.030 Main Line

A. Water mains will be sized to provide adequate domestic plus fire flow at the required residual pressure. Fire flow requirements will be determined by the Olympia Fire Department; however, the quantity of water required will in no case be less than 1000 gpm at 20 psi residual pressure.

   The minimum water main size will be 6 inches diameter where looped. Dead-end mains will be 8 inches diameter to the last fire hydrant. Larger-sized mains are required in specific areas outlined in the current City of Olympia Water System Plan. Nothing will preclude the City from requiring the installation of a larger-sized main in areas not addressed in the City of Olympia Water System Plan 2009-2014 if the City determines a larger size is needed to meet fire protection and domestic requirements or for future service.

   If approved by the City of Olympia, existing 2-inch main lines may have a maximum of 10 residential units on a dead-end line and a maximum of 20 residential units on a looped line.

   All water mains that may be extended or looped will end with an approved gate valve and MJ plug.

B. All water main pipe will have flexible gasketed joints and will comply with one of the following types:

   2-inch Water mains will be HDPE meeting the requirements of AWWA Class 200, C901, and C906, or Class 200 PVC.

   All water main 4-inch to 10-inch diameter will be ductile iron pipe and will conform to AWWA C151, Class 50, or HDPE pipe meeting the requirements of AWWA Class 200, C901, and C906.

   All water main 12-inch diameter and larger will be ductile iron pipe and will conform to AWWA C151, Class 50.

   All fire service connections 4-inch diameter and larger will be ductile iron pipe and will conform to AWWA C151, Class 52.

   All sizes of ductile iron pipe will be cement mortar-lined thickened conforming to AWWA C104.

   All pipes will be joined using nonrestrained joints that will be rubber gaskets, push-on type or mechanical joint, conforming to AWWA C111.

   HDPE Pipe: All HDPE pipe will conform to the latest revision of AWWA C906-99.

C. All fittings for ductile iron pipe or HDPE pipe will be ductile iron compact fittings conforming to AWWA C153 or AWWA C110 and C111. All fittings will be cement mortar lined conforming to AWWA C104. Plain-end fittings with mechanical joint retainer glands installed on the plain ends will be ductile iron. All fittings will be connected by flanges or mechanical joints. Where required, mega-lug retainer glands will be used.

D. All pipe and services will be installed with continuous tracer tape installed 12 inches to 18 inches under the final ground surface. The marker will be plastic non-biodegradable metal core or backing marked water that can be detected by a standard metal detector. Tape with the Terra Tape D or approved equal. In addition to the trade tape, blue toning (tracer) wire will be installed over all pipe and services. Toning wire will be UL listed, Type UF, 14-gauge coated copper taped to the top of the pipe to prevent movement during backfilling. The wire will be laid loosely enough to prevent stretching and damage. The wire will be brought up and tied off at valve body or meter setter with the end of the wire accessible to hook up to a locator (2 feet of slack).

A 1-pound magnesium anode will be buried with the wire and every 1,000 linear feet thereafter for cathodic protection of the toning wire. All toning wire splices and connections will join wires both mechanically and electrically and will employ epoxy resin or heat-shrink tape insulation. Toning wire will be tested prior to acceptance of the pipe system. A written notice from the contractor to the City two working days prior to the test is required. The contractor will call one of the City of Olympia approved locating companies to perform the testing. All cost incurred for the testing will be the responsibility of the contractor. Contact the Drinking Water Operations Section at (360) 753-8333 for the list and a copy of the City of Olympia Toning Wire Test Form.

E. The minimum cover for all water mains, from top of pipe to finish grade, will be 30 inches for ductile iron, 36 inches for HDPE. The maximum cover for all water mains, from top of pipe to finish grade, will be 60 inches for all materials, unless otherwise approved by the City of Olympia..

F. Where required by the City, Station Guard XLT Water Quality Sample Station from Koraleen Enterprises sampling stations will be installed (See City of Olympia Standard Plans).

G. Water mains will be looped where feasible to ensure improved water quality and provide redundancy. The water main will be designed not to exceed velocities of 7 feet per second during any flow condition to reduce the chance of water hammer. Pressure of 45 to 60 psi will be maintained at the main during peak-day demands. A pressure of 45 psi provides adequate pressure at all the fixtures, and pressure above 65 psi results in excess water usage and is above the target level set in the City of Olympia Water Conservation Program.

When pressures reaches 80 psi or above during static conditions, a pressure-reducing valve is required on the customer's side of the meter.

The *Uniform Plumbing Code* requires the installation of a pressure-reducing valve (PRV) on new construction when pressures exceed 80 pounds per square inch (psi). The pressure-reducing valve shall reduce the pressure to 60 psi or no less than 45 psi.

Static pressure shall be used to determine the need for a pressure reducing valve. The pressure shall be measured at the customer side of the meter by a licensed plumber.

If the pressure is measured by the licensed plumber to be 80 psi or greater, the City will do one of two things:

1. If the City changes the water system operations which causes the pressure to rise to 80 psi or greater, the City will install a PRV at the homeowner's request. The homeowner is required to make the request for installation of the PRV within one year from the pressure change and will be responsible for maintaining the PRV.

2. The City will not install or maintain a new PRV at any residence connected to the system after 1978 (except under the condition in item 1). Any existing PRVs will be the homeowner's responsibility to maintain. Any home connected to the system prior to 1978 that does not already have a PRV will not be supplied a PRV by the City (except under the condition in item 1).

6.040 Connection to Existing Water Main

The developer's engineer will be responsible for determining the scope of work for connection to existing water mains. See City of Olympia Standard Plans (Chapter 6 Drawings). A minimum of ten working days' notice following application at the Community Planning and Development Department is needed to schedule shutdowns. The City of Olympia Drinking Water Operations will be consulted regarding fittings or couplings required.

It will be the contractor's responsibility to field-verify the location and depth of the existing main and the fittings required to make the connections to the existing mains. All excavation, connections, piping, tapping, valve fittings, services, anchors, blocking, bedding, backfill, compaction, restoration, or other labor and materials required will be furnished and placed by the contractor.

Any new connection to an existing City of Olympia water main will require backflow protection. A double-check assembly shall be installed between the new main and existing main for flushing and filling and shall remain in place until the new main is approved.

A list of City of Olympia-approved tapping contractors can be obtained at the Community Planning and Development Department. The City of Olympia Drinking Water Operations will be notified 48 hours (two working days) prior to the contractor performing the tap.

The City of Olympia Drinking Water Operations will make all shutdowns on existing mains. The contractor may operate the valve under the immediate supervision of a Drinking Water Operations Supervisor.

6.050 Service Interruption

Following application at Community Planning and Development Department for connection to the existing water main, the contractor will give the City a minimum of ten working days' notice of any planned connection to an existing pipeline. This includes all cut-ins and live taps. Notice is required so any disruptions to existing services can be scheduled. The City will notify customers involved or affected of the water service interruption 48 hours in advance. The contractor will make every effort to schedule water main construction with a minimum interruption of water service. In all situations, the City will dictate scheduling of water main shutdowns so as not to impose unnecessary shutdowns during specific periods to existing customers. The contractor is responsible for providing the necessary excavation and shoring to provide access to the existing water main for the City to make the tap. The excavating and shoring will conform to Labor and Industries (L&I) standards for worker safety.

6.060 Hydrants

A. The lead from the main to the fire hydrant will be ductile iron cement mortar-lined Class 50, and no less than 6 inches in diameter and a maximum of 50 feet in length. Greater than 50-foot lengths will require oversizing, as designed by an engineer.

B. Fire hydrants will have two 2 ½-inch outlets and one 4-inch pumper port outlet with PCT threads and 5-inch Storz adaptor, Style 5-37 w/sc cap. All 2 ½-inch outport threads will be National Standard thread. The valve opening will be 5 ¼-inch diameter. The hydrant will have a positive and automatic barrel drain and will be of the safety or breakaway style.

   Hydrants will be Dresser M&H Reliant Style 929, Clow Medallion, Waterous Pacer 250, Mueller Centurion, or AVK. All hydrants will be bagged until the system is approved. Developments being served by existing hydrants will be required to upgrade the hydrants to these standards.

   Hydrants will be painted with Parker Paint Marathon Enamel Safety Yellow paint or equal, except the AVK hydrant, which comes pre-coated. All chains between caps and hydrant shall be removed.

C. Unless otherwise required by the Olympia City Engineer, the following guidelines will apply for hydrant number and location:

   1. At least one hydrant will be installed at all intersections.

2. Hydrant spacing of 300 feet will be required in all areas except single-family and duplex residential areas.

3. Hydrant spacing of 600 feet will be required for single-family and duplex residential areas.

4. When any portion of a proposed building is in excess of 150 feet from a water supply on public street, on-site hydrants will be required. Such hydrants will be located pursuant to the Olympia Fire Department, and easements for such hydrants will be granted to the City.

D. Fire hydrants will be set as shown in the City of Olympia Standard Plans (Chapter 6 Drawings).

E. Requirement regarding use, size, and location of a fire department connection (FDC) and/or post indicator valve will be determined by the Building Official and the Olympia Fire Department. Location of the FDC will be shown on the water plans.

F. Where needed, the Public Works Department or Olympia Fire Department may require hydrants to be protected by two or more posts, each 4 inches in diameter by 5 feet in height, made of either reinforced concrete or steel.

G. Fire hydrants must be installed, tested, and accepted prior to the issuance of a building permit.

H. Fire hydrants shall be abandoned by removing the 6-inch fire hydrant assembly back to the main. A blind flange shall be placed on the TEE. If existing fittings are lead-in, the old TEE shall be cut out and a new section of pipe installed.

I. Fire Hydrants will not be installed over areas being used for underground stormwater treatment storage.

6.070 Valves

All valves and fittings will be ductile iron with ANSI flanges or mechanical joint ends. All existing valves will be operated by City employees only.

Valves will be installed in the distribution system at sufficient intervals to facilitate system repair and maintenance, but in no case will there be less than one valve every 600 feet. There shall be 3 valves on all TEES and 4 valves on

all crosses in each intersection. Specific requirements for valve spacing will be made at the plan review stage.

A. System gate valves will be resilient wedge, NRS (Non-Rising Stem), with O-ring seals. Valve ends will be mechanical joint or ANSI flanges. Valves will conform to AWWA 509-80 or AWWA C-515. System gate valves will be M&H, Kennedy, AVK, Meuller, or Clow.

   Gate valves will be used on all 2- to 10-inch lines. Gate valves may be used on 12-inch lines.

B. Butterfly valves. Butterfly valves will conform to AWWA C504-87, Class 150B, with cast iron short body and O-ring stem seals. Butterfly valves will be Mueller, M&H, Clow, Kennedy, or American Flow.

   Butterfly valves may be used for 12-inch lines and will be used on all lines 14 inches and larger.

C. Valve box. All valves will have a standard Rich 950 ductile iron water valve box set to grade. If valves are not set in a paved area, a 1-foot by 6-inch-thick circular concrete pad shall be placed around the valve box. In areas where the valve box falls in the road shoulder, the ditch and shoulder will be graded before placing asphalt or concrete pad. Valve box lids will be ductile iron, shall be anti-kickout, and marked "City of Olympia Water." See City of Olympia Standard Plans.

   Valve marker post. Valve marker posts will be 4-inch carsonite CWV-116 posts stamped with "Caution Water Valve." See City of Olympia Standard Plans.

6.075 Meters

All meters 6-inch and larger will be Neptune with a remote automated encoder-based meter reading system. Meters must be totally field programmable, including meter number. See City of Olympia Standard Plan.

6.080 Casing

Steel casing pipe will be Schedule 20 steel or equal. Pipe spacers will be Cascade Style CC5 with 8-inch runners as available from Cascade Waterworks or approved equal. Casing pipe and spacers will be sized for pipe being installed. Install minimum of three spacers per section of pipe. The casing pipe will then be sand-packed.

6.090 Air and Vacuum Release Valve

Air and vacuum release valves (ARV) will be APCO 147C or Clay valve combination air release valve. Installation will be as shown on City of Olympia Standard Plans.

The installation will be set at the high point of the line when required. Where possible, pipes are to be graded to prevent the need for an air release valve. Air release valves may not be required when services are in the vicinity.

6.100 Blowoff Assembly

If a fire hydrant is not located at the end of a dead-end main, a blowoff assembly will be required. On water mains that will be extended in the future, the valve that operates the blowoff assembly will be the same size as the main and provided with a concrete thrust block. The pressure rating for blowoff assemblies will be 200 psi. Installation will be as shown on City of Olympia Standard Plans.

6.105 Sampling Station

The number of sampling stations required for subdivisions will be determined on a case-by-case basis by the Water Quality Program. A stainless steel water quality sampling station manufactured by Koraleen Enterprises is the City's standard. See City of Olympia Standard Plans for details.

6.106 Fire Service Line

The City shall maintain the fire service line from the connection at the main to the valve. Property owners shall maintain the fire service line from the valve to and within the building. The fire service line valve shall be located one foot (1') inside the right-of-way line. Toning wire shall be installed on all fire service lines.

6.110 Backflow Prevention

All water system connections to serve buildings or properties with domestic potable water, fire sprinkler systems, or irrigation systems will comply with the minimum backflow prevention requirements as established by the Washington State Department of Health and the City of Olympia in its Cross Connection Program (Olympia Municipal Code Title 13.04.110).

The installation of required backflow devices is necessary to protect the existing water system and users from possible contamination. All backflow prevention assemblies will be of a type and model pre-approved by the Washington State Department of Health or the City.

No cross connections will be created, installed, used, or maintained within the City of Olympia water service area.

Approved backflow prevention assemblies will be installed at the expense of the user, either at the service connection or within the premises, as determined by the City of Olympia Public Works Cross Connection Specialist in each of the following circumstances:

A. If the nature and extent of any activity on the premises, or the materials used in connection with any activity on the premises, or materials stored on the premises could contaminate or pollute the potable water supply.

B. On premises having one or more cross connections.

C. Internal cross connections that are not correctable or intricate plumbing arrangements that make it impracticable to ascertain whether or not cross connections exist.

D. A repeated history of cross connections being established or reestablished.

E. Unduly restricted entry so that inspections for cross connections cannot be made with sufficient frequency or with sufficient notice to assure that cross connections do not exist.

F. Materials of a toxic, objectionable, or hazardous nature, either liquids, solids, or gases being used such that if back siphonage should occur, a health hazard could result.

G. Any mobile apparatus that uses the City of Olympia system or water from any premises within the City of Olympia system.

H. All uniform plumbing codes (UPC) must be maintained.

I. Assemblies installed at the point of delivery or on the internal plumbing system of any building shall not have galvanized piping attached to the inlet side of the assembly. Rigid piping, such as brass or copper, is allowed on the inlet side.

J. On any premise where installation of an approved backflow prevention device is deemed to be necessary to accomplish the purpose of these

regulations in the judgment of the City of Olympia Certified Cross Connection Specialist.

K. Any use of radiant heat will require the installation of a reduced pressure (RP) backflow assembly at the meter.

L. A reduced pressure (RP) backflow assembly is required at all new commercial buildings and will be required to be installed when a change of use occurs at a commercial building. The RP device shall be installed at the meter.

M. On any premise where an appropriate cross-connection report form has not been filed with the office of the City of Olympia Public Works Department Water Quality Program.

N. On any premise where a bypass arrangement is installed around a backflow assembly, a second backflow assembly of equal protection shall be installed on the bypass piping.

The City will have the authority to perform regular inspections on all backflow assemblies, both inside and outside any building connected to the City's water system and will be provided access to the premises to inspect.

The Public Works Department must receive and approve the test results of any backflow prevention assembly before releasing the Certificate of Occupancy on any building.

Backflow Prevention Assembly Testers shall hold a current Washington State Department of Health Backflow Assembly Tester Certification.

The Olympia Fire Department will test the fire line and obtain the certificate for underground piping. In any situation, the Olympia Fire Department will not test the fire line until Public Works has tested and approved the main up to the fire line. Backflow assemblies for fire protection shall have integrated shutoff valves approved as part of the assembly and shall be separate from any post indicator valve installed on the fire service line. Double-check detector assemblies shall be required on all fire lines.

6.111 Backflow Prevention Assemblies

Double-Check Valve Assembly (DCVA). The term "double-check valve assembly" will mean an assembly composed of two independently acting approved check valves, including tightly closing shutoff valves attached at each end of the assembly, and fitted with properly located test cocks. This assembly will only be used to protect against non-health hazards.

Double-Check Detector Check Valve Assembly (DCDA). The term "double-check detector check valve assembly" will mean a specially designed assembly composed of a line-sized approved double-check valve assembly with a specific bypass water meter and a meter-sized approved double-check valve assembly. The meter will register accurately for only very low rates of flow and will show a registration for all rates of flow. This assembly will only be used to protect against a non-health hazard. This assembly will be used on all fire protection lines rated as a non-health hazard.

Reduced Pressure Principle Backflow Prevention Assembly (RPBA). The term "reduced pressure principle backflow prevention assembly" will mean an assembly containing two independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The unit will include properly located test cocks and tightly closing shutoff valves at each end of the assembly. This assembly is designed to protect against a health hazard.

Reduced Pressure Principle Detector Assembly (RPDA). The term "reduced pressure principle detector assembly" will mean a specially designed assembly composed of a line-sized approved reduced pressure principle backflow prevention assembly with a specific bypass water meter and a meter-sized approved reduced pressure principle backflow prevention assembly. This assembly will be used on all fire protection services rated as a health hazard.

The meter will register accurately for only very low rates of flow and will show a registration for all rates of flow.

Pressure Vacuum Breaker (PVBA). The term "pressure vacuum breaker" will mean an assembly containing an independently operating, internally loaded check valve and an independently operating loaded air inlet valve located on the discharge side of the check valve. The assembly is to be equipped with properly located test cocks and tightly closing shutoff valves attached at each end of the assembly. This assembly is designed to protect against a health hazard under a back siphonage condition only.

Spill-Resistant Pressure Vacuum Breaker. The term "spill-resistant pressure vacuum breaker" shall mean an assembly containing an independently operating, internally loaded check valve and independently operating loaded air inlet valve located on the discharge side of the check valve. The assembly is to be equipped with a properly located resilient-seated test cock, a properly located bleed/vent valve, and tightly closing resilient-seated shutoff valves attached at each end of the assembly. This assembly is designed to protect against a high health hazard under a back siphonage condition only.

Existing backflow devices that are no longer on the state-approved list of backflow assemblies will be allowed to remain in service provided they pass the annual testing requirements. Backflow assemblies that are no longer approved and do not pass the required testing shall be replaced with a new Washington State approved assembly commensurate with the degree of hazard.

6.112 Installation Requirements

Fire suppression systems connected to the potable water system shall be protected by an approved double-check detector check valve assembly as minimum protection. Fire systems using chemicals shall be required to install a reduced pressure detector assembly as minimum protection.

Horizontal and vertical assemblies must be approved by the Washington State Department of Health and the City of Olympia at the time of installation.

To ensure proper operation and accessibility of all backflow prevention assemblies, the following requirements will apply to the installation of these devices:

A. No part of the backflow prevention assembly will be submerged in water or installed in a location subject to flooding.

B. Assemblies must be installed at the point of delivery of the water supply, before any branch in the line, downstream of any pressure reducing valve on private property, in a location approved by the Public Works Cross Connection Specialist.

C. The assembly must be protected from freezing and other severe weather conditions.

D. All backflow prevention assemblies to be installed will be of a type and model pre-approved by the State of Washington State Department of Health (Washington Administrative Code 246-290-490) and the City of Olympia Public Works Cross Connection Specialist.

E. Only assemblies that have been approved for vertical installation by the Washington State Department of Health and the City of Olympia Public Works Cross Connection Specialist shall be used when necessary.

F. The assembly will be readily accessible with adequate room for maintenance and testing. Devices 2 inches and smaller will have at least a 6-inch clearance on all sides of the assembly. All assemblies larger than 2 inches will have a minimum clearance of 24 inches on the back side, 24 inches on the test cock side, 12 inches below the device, and 36 inches

above the device (refer to City of Olympia Standard Plans). A strainer shall be installed immediately upstream of the assembly.

G. If written permission is granted by the Public Works Cross Connection Specialist to install the backflow assembly inside of the building, the assembly will be readily accessible during regular working hours of 8:00 a.m. to 5:00 p.m., Monday through Friday.

H. If, after receiving written permission by the Public Works Cross Connection Specialist, an assembly is installed inside the premises and is 4 inches or larger and is installed 4 feet above the floor, it must be equipped with a rigidly and permanently installed scaffolding acceptable to the City of Olympia Public Works Cross Connection Specialist. This installation must also meet the requirements set out by the US Occupational Safety and Health Administration (OSHA) and the State of Washington Occupational Safety and Health Administration (WISHA).

I. Reduced pressure principle assemblies may not be installed in a vault underground or anywhere it may be subject to flooding. All installations of reduced pressure principle assemblies shall be above ground with insulated enclosures where needed.

J. An approved air gap will be located at the relief valve orifice. This air gap will be at least twice the inside diameter of the incoming supply line as measured vertically above the top rim of the drain and in no case less than 1 inch.

K. Where a backflow device is deemed necessary, the assembly and installation plans will be submitted to the City of Olympia Community Planning and Development Department for approval prior to installation.

L. Upon completion of installation, the City of Olympia Public Works Cross Connection Specialist will be notified, and all devices must be inspected and tested. All backflow devices must be registered with the City of Olympia Public Works Department Water Resources. Registration with all the required information shall be submitted within five days of installation. Forms must be completed in ink, legible and be an original copy.

M. The City of Olympia Public Works Cross Connection Specialist reserves the right to reject test reports that are not complete and accurate. Submittal of inaccurate test reports shall result in denial of report forms and a requirement to retest the backflow assembly.

N. Any variances from these installation requirements will be requested in writing by the owner and approved by the City of Olympia Public Works Director, or his/her designee, prior to the device installation.

O. No field modifications shall be made to an approved backflow assembly that will change its configuration or function.

P. An approved certificate for verification of accuracy from an approved calibration laboratory or agency shall be provided to the City of Olympia on an annual basis for approved backflow testing equipment used in the protection of the City of Olympia water system. All testing equipment shall be in good working order and be either hydraulic or electronic in nature. All electronic testing equipment capable of producing printed test strips at the time of testing an assembly shall be sent to the City of Olympia along with a completed assembly test report.

Q. Failure to follow any of the preceding requirements regarding backflow assembly testing may result in the test report being rejected and the assembly being retested in the presence of the City of Olympia Cross Connection Specialist.

6.113 Backflow Prevention – BAT Form Requirements

The following information is required on all test report forms submitted to the City. Items A through L are standard information required on all forms. Item M is specific to the type of value that you are testing.

A. BAT Certification Number.

B. Name: name of business or property owner.

C. Address: your building or residence street address.

D. Device Location: please give the physical location of the device, such as next to meter, west wall of room 102, 15 feet SW of building, etc.

E. What the Cross-Connection Hazard is: backflow devices isolate such things as irrigation systems, carbonation machines, boilers, etc.

F. Size/Type: size and type of backflow preventer, such as ½ inch DCVA.

1. Manufactuer
2. Name, Serial Number: be accurate. Include alpha prefixes, such as A120220.
3. Model Number/Model: Use complete model number, such as 009M2QT or 950XLT.

G. Proper Installation Annotation: forms must note if the assemblies were installed in accordance with the installation requirements. If the assembly does not meet these requirements, the discrepancy must be recorded in the remarks section.

H. Remarks Section: record any comments or discrepancies in this section. For example, if an assembly does not meet the proper installation requirements, note the reason in this section.

I. Test results: to include the following:

1. Values required for each check valve tested.
2. Repair information and details.
3. Final test results.

J. Test Equipment Information: record the gauge, make, model, serial number, and verification of accuracy date.

K. Certified Tester Information

1. Important note: the report form must include the signature of the person performing the test, a certification number, and the date of the test.
2. All test reports must include legibly printed tester's name, telephone number, certification number, test completion date, gauge serial number, and gauge accuracy.

L. Person Repairing Assembly: printed or typed name of person repairing assembly.

M. Information on Type of Valve Tested: the information below must be provided for every valve tested.

Contact Information: learn more about the City of Olympia's backflow assembly testing requirements, or contact us by telephone, mail, or e-mail. Please note, we cannot accept test report forms via e-mail or fax as a signature is required.

City of Olympia, Public Works Department
Attention: Steve Coke
P.O. Box 1967
Olympia, WA 98507-1967
Telephone: (360) 753-8161

For questions regarding the Public Works Department call (360) 753-8588 or contact via email at publicworks@ci.olympia.wa.us.

6.114 Access to Premises

Authorized employees of the City of Olympia Public Works Department Water Quality Program with proper identification will have access during reasonable hours to all parts of a premise and within the building to which water is supplied. However, if any water user refuses access to a premise or to the interior of a structure at reasonable times and on reasonable notice for inspection by the Cross Connection Specialist appointed by the City of Olympia Public Works Director, a reduced pressure principle assembly will be required to be installed at the service connection to that premise.

6.115 Annual Testing and Repairs

All backflow assemblies installed within the City of Olympia water service area will be tested immediately upon installation by the City of Olympia Cross Connection Specialist and annually thereafter by a Washington State certified tester or City of Olympia Cross Connection Specialist. All such devices found not functioning properly will be promptly repaired or replaced by the water user within five (5) working days. If any such device is not promptly repaired, replaced, or tested annually, the City of Olympia may deny or discontinue water to the premise. All testing and repairs are the financial responsibility of the water user.

All testers shall use test procedures approved by the Washington State Department of Health.

6.116 Costs of Compliance

All costs associated with purchase, installation, inspections, testing, replacement, maintenance, parts, and repairs of the backflow device are the financial responsibility of the water user.

6.117 Termination of Services

Failure on the part of any customer to discontinue the use of all cross connections, except in accordance with the Standard, or failure to test annually, is sufficient cause for the immediate discontinuance of public water service to the premises (Washington Administrative Code 246-290-490). The City at its discretion will install the appropriate backflow prevention assembly at the owner's expense.

6.120 Service Connection

A. All service connections relating to new development will be of the appropriate size as determined by industry standard and approved by the City of Olympia and installed by the developer at the time of mainline construction. After the lines have been constructed, tested, and approved, the owner may apply for a water meter. The City will install a water meter after the application has been made and all applicable fees have been paid. Water meters will be set only after the system is inspected and approved.

B. When water is desired to a parcel fronting an existing main but not served by an existing setter, an application must be made to the City. Upon approval of the application and payment of all applicable fees, the City will tap the main and install the meter, box, and setter.

C. Service lines will be domestic, high-density polyethylene pipe, minimum pressure, Class 200 psi, Grade PE 3408 copper tube size. Glued joints will not be accepted. Service lines will be installed a minimum of 45 degrees off the main. Tracer tape and 14-gauge blue-coated wire wrapped around the pipe will be installed on all service lines.

   Service saddle will be ductile iron with double stainless steel straps. All clamps will have rubber gaskets. Service saddles shall have tapped IP threads.

   Corporation stops will be ball valve all US brass and will be Ford, Mueller, or AY McDonald with IP threads conforming to AWWA C800. Stainless steel inserts will be used with pack joints or Mueller 110 compression joints and polyethylene pipe.

D. Specifications for meter setters will be as shown on the City of Olympia Standard Plans.

E. Specifications for meter boxes will be as shown on the City of Olympia Standard Plans.

F. Master service type meters will not be allowed for use in the City of Olympia water system.

6.130 Required Separation Between Water Lines and Sanitary Sewers

The basic separation requirements apply to all gravity and pressure sewers of 24-inch diameter or less; larger sewers may create special hazards because of flow volumes and joint types and accordingly require additional separation requirements. The special construction requirements given are for the normal

conditions found with sewage and water systems. More stringent requirements may also be necessary in areas of high groundwater, unstable soil conditions, and so on. Any site conditions not conforming to conditions described in this section will require assessment and approval of the appropriate state and local agencies.

A. Horizontal and vertical separation (parallel). A minimum horizontal separation of 10 feet between sanitary sewers and any existing potable water line and a minimum vertical separation of 18 inches between the bottom of the water line and the crown of the sewer shall be maintained. The distance shall be measured edge to edge. See Figure 6-1 below.

B. Unusual conditions (parallel). When local conditions prevent the separations described above, a sewer may be laid closer than 10 feet horizontally or 18 inches vertically to a water line provided:

   1. It is laid in a separate trench from the water line.

   2. The elevation of the crown of the sewer line must be at least 18 inches below the bottom of the water line. When this vertical separation cannot be obtained, the sewer shall be constructed of materials and joints that are equivalent to water main standards of construction and shall be pressure tested to ensure watertightness prior to backfilling. Adequate restraint should be provided to allow testing to occur.

   3. If sewers must be located in the same trench as a potable water line, special construction and mitigation is required. Both water lines and sewer lines shall be constructed with a casing pipe of pressure-rated pipe material designed to withstand a minimum static pressure of 150 psi. The water line shall be placed on a bench of undisturbed earth with the bottom of the water pipe at least 18 inches above the crown of the sewer and shall have at least 5 feet of horizontal separation at all times. Additional mitigation efforts, such as impermeable barriers, may be required by the appropriate state and local agencies. See Figure 6-2 below.

Figure 6-1
Required Separation Between Water Lines and Sanitary Sewers, Parallel Construction

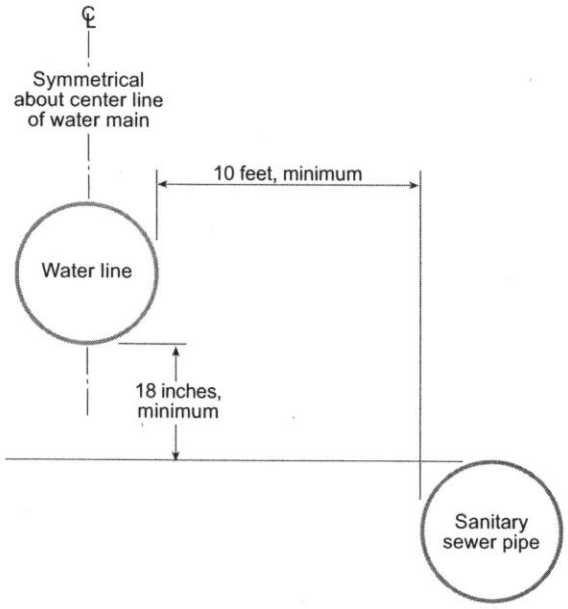
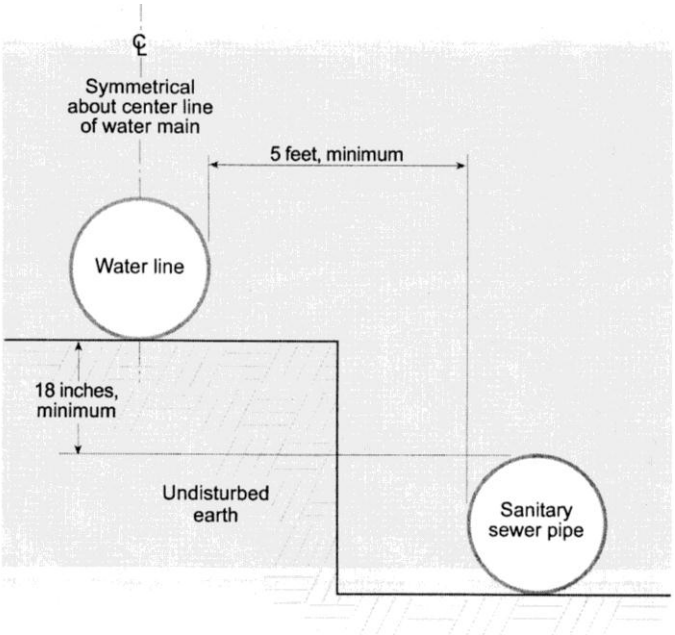


Figure 6-2
Required Separation Between Water Lines and Sanitary Sewers, Unusual Conditions Parallel Construction



C. Vertical separation (perpendicular). Sewer lines crossing water lines shall be laid below the water lines to provide a separation of at least 18 inches between the invert of the water line and the crown of the sewer.

D. Unusual conditions (perpendicular). When local conditions prevent a vertical separation as described above, construction shall be used as follows:

1. Gravity sewers passing over or under water lines. These gravity sewers shall be:

   a. Constructed of material described in Table 1. The one segment of the maximum standard length of pipe (but not less than 18 feet long) shall be used with the pipes centered to maximize joint separation.

   b. Standard gravity sewer material encased in concrete or in a ¼-inch-thick continuous steel, ductile iron, or pressure-rated PVC pipe with a dimension ratio (DR) (the ratio of the outside diameter to the pipe wall thickness) of 18 or less, with all voids pressure grouted with sand-cement grout or bentonite. Commercially available pipe skids and end seals are acceptable. When using steel or ductile iron casing, design consideration for corrosion protection should be considered.

   c. The length of sewer pipe shall be centered at the point of crossing so that the joints will be equidistant and as far as possible from the water line. The sewer pipe shall be the longest standard length available from the manufacturer.

Table 1: Water Main Standard Pipe Material

Type of Pipe	AWWA (ASTM) Standard		
	Pipe	Joint	Fittings
Ductile Iron	C 151 and C 104	C 111	C 110
HDPE 3408	C901 and C 906	Fused per C901 and C 906	C901 and C 906

* Pipe spec C900 for pipe up to 12 inches in diameter; C905 for pipe more than 12 inches in diameter.

2. Water lines passing under gravity sewers. Water lines shall be protected by providing:

   a. A vertical separation of at least 18 inches between the invert of the sewer and the crown of the water line.

b. Adequate structural support for the sewers to prevent excessive deflection of joints and settling on and breaking of the water lines.

c. The length of sewer pipe shall be centered at the point of crossing so that the joints will be equidistant and as far as possible from the water line. The sewer pipe shall be the longest standard length available from the manufacturer.

d. A water line casing equivalent to that specified above in D(1) above.

6.140 Irrigation

All irrigation systems will be installed with backflow prevention assemblies approved by the Washington State Department of Health, and in accordance with City of Olympia installation guidelines. The backflow prevention assembly must be located next to the meter, unless otherwise approved by the City of Olympia Cross Connection Specialist.

Irrigation sprinklers will be situated so as to not wet any public street or sidewalk.

6.150 Staking

All surveying and staking will be performed by an engineering or surveying firm capable of performing such work. The engineer or surveyor directing such work will be licensed by the State of Washington. Staking will be maintained throughout construction.

A preconstruction meeting will be held with the City prior to commencing staking. All construction staking will be inspected by the City prior to construction.

The minimum staking of waterlines will be as follows:

A. Stake centerline alignment every 25 feet (50 feet in tangent sections) with cuts and/or fills to bottom of trench, maintaining 36 inches of cover over pipe. Centerline cuts are not required when road grade is to finished subgrade elevation.

B. Stake location of all fire hydrants, hydrant flange elevations, tees, water meters, setters, and other fixtures with cut or fill to finished grade.

6.160 Trench Excavation

A. Clearing and grubbing where required will be performed within the easement or public right-of-way as permitted by the City and/or governing agencies. Debris resulting from the clearing and grubbing will be disposed of by the owner or contractor in accordance with the terms of all applicable permits.

B. Trenches will be excavated to the line and depth designated by the City to provide a minimum cover of 30 inches. Except for unusual circumstances where approved by the City, the trench sides will be excavated vertically and the trench width will be excavated only to such widths as are necessary for adequate working space as allowed by the governing agency. All necessary shoring operations will be performed to ensure that the excavation can be carried out in accordance with WISHA and OSHA safety standards. The trench will be kept free of water until joining is complete. Surface water will be diverted so as not to enter the trench. The contractor will maintain sufficient pumping equipment on the job to ensure that these provisions are carried out.

C. The contractor will perform all excavation of every description and whatever substance encountered, and boulders, rocks, roots, and other obstructions will be entirely removed or cut out to the width of the trench and to a depth 6 inches below water main grade. Where materials are removed from below water main grade, the trench will be backfilled with material satisfactory to the City and thoroughly compacted.

D. Trenching and shoring operations will not proceed more than 100 feet in advance of pipe laying without approval of the City and will be in conformance with WISHA and OSHA safety standards.

E. The bottom of the trench will be finished to grade with hand tools in such a manner that the pipe will have bearing along the entire length of the barrel. The bell holes will be excavated with hand tools to sufficient size to make up the joint.

F. The contractor will maintain the presence of a "competent person", as defined by the Washington State Department of Labor and Industries, when any trench excavation and backfill work is being done at the project site.

6.165 Thrust Blocking

Location of thrust blocking will be shown on the plans. Thrust block concrete will be Class B poured against undisturbed earth. A plastic barrier will be

placed between all thrust blocks and fittings. See City of Olympia Standard Plans for thrust block locations and calculations.

MJ Mega Lug retainers are the preferred method of thrust blocking. Restraining rods, or Romac Grip Ring Retainers can also be used in lieu of concrete thrust blocking.

6.170 Backfilling

Backfilling will not commence until the pipe installation has been inspected and approved.

Backfilling and surface restoration will closely follow installation of pipe so that not more than 100 feet is left exposed during construction hours without approval of the City. Selected backfill material will be placed and compacted around and under the water mains by hand tools to a height of 6 inches above the top of the water main. The remaining backfill will be compacted to 95 percent of the maximum density in traveled areas and 90 percent outside traveled areas. Where governmental agencies other than the City have jurisdiction over roadways, the backfill and compaction will be done to the satisfaction of the agency having jurisdiction. Suitable backfill material, as determined by the City, shall conform to the current WSDOT/APWA Section 7-09 with the exception of gradation of the bedding material to be a maximum size of 1-inch.

6.175 Street Patching and Restoration

See Chapter 4 for requirements regarding street patching and trench restoration.

6.180 Hydrostatic Tests

Prior to the acceptance of the work, the installation will be subjected to a hydrostatic pressure test by the contractor of 225 psi for 15 minutes. See Section 7-09.3(23) Hydrostatic Pressure Test in the current addition of the WSDOT Standard Specifications for Road, Bridge, and Municipal Construction for more detail. Any leaks or imperfections developing under said pressure will be immediately remedied by the contractor. The main will be tested between valves. Insofar as possible, no hydrostatic pressure will be placed against the opposite side of the valve being tested. Test pressure will be maintained while the entire installation is inspected by the City. See Section 7-09, Water Mains, of the current WSDOT Standard Specifications for Road, Bridge, and Municipal Construction for more detail.

The contractor will provide all necessary equipment and will perform all work connected with the tests. Tests will be made after all connections have been made and the roadway section is constructed to subgrade. This is to include any and all connections as shown on the plan. The contractor will perform a test to assure that the equipment to be used for the test is adequate, in good operating condition, and the air in the line has been released before requesting the City witness the test. Only authorized personnel of the City of Olympia Public Works Department will operate isolation valves.

See Section 6.110 for testing responsibilities for backflow prevention devices.

6.190 Sterilization and Flushing

Sterilization of the water main will be accomplished by the contractor in accordance with the requirements of the Washington State Department of Health and AWWA Standards and in a manner satisfactory to the City. At no time will chlorinated water from a new main be flushed into a body of water. This includes lakes, rivers, streams, drainage ways, Puget Sound, and any and all other waters where fish or other natural water life can be expected. All dechlorination procedures will meet all local, state and federal regulations. The contractor will provide the City of Olympia inspector a written copy of their plan or procedures to be used prior to the sterilization process.

The new line will be super-chlorinated, valves closed and the line left undisturbed for 24 hours. The line will be thoroughly flushed and filled with system water, valves closed and left undisturbed for another 24 hours. The City of Olympia Inspector will submit a New Construction Sample Request Form to the Water Quality Program. Twenty-four to 48 hours after the request is received from the City of Olympia Inspector, the sample will be collected. If the initial sample fails and bacteria are present, the disinfection procedure will be repeated, starting with super-chlorinating the line. This procedure will continue until the sample passes with no bacteria being present. In addition, if the system water in the line has an elevated pH or free chlorine residual above the expected levels in the distribution system, the sample will not be collected and the line will need to be flushed, valves closed and left undisturbed for another 24 hours. A fee will be charged for each additional visit to the sample collection site after the initial visit. The sample can be collected Monday through Thursday at the discretion of the sampler. Testing and sampling will take place after all underground utilities are installed and compaction of the backfill within the roadway section is complete.

6.200 Abandonments

At time of abandonment for any service line, the corporation shall be removed and a full circle stainless steel repair band shall be installed.

When a main line or hydrant is abandoned, the abandonment shall occur back to the closest tee or cross, removing the valve and installing a blind flange or plug. In areas where the tees are lead-in fittings, the whole tee will be removed along with a small section of main.

6.300 Groundwater Monitoring Wells

Requirements for installing a long-term groundwater monitoring well will be determined by Community Planning and Development Department in coordination with the Public Works Groundwater Protection Program during plan review stage. The installation shall be performed by a state-licensed contractor and overseen by a state-licensed hydrogeologist. City of Olympia Groundwater Protection Program staff must be consulted on well site location and City of Olympia Water Quality Program staff must be on site for well installation.

The well should be completed in compliance with WAC 173-160, using a 6-inch-diameter, steel casing. The location of the well shall be surveyed after installation. Elevations at the top of the well casing, and the ground surface shall also be surveyed. Survey information shall be provided to the Water Quality Program or the Groundwater Protection Program.

Depth and location of the monitoring well will be determined based on the site specific conditions. Screening should be continuous wire wrap stainless steel. The length of the screened section and the slot size should be determined based on the nature of the soils encountered during drilling. Similarly, the sand filter pack should be selected based on the soils and well screen. The well should be developed after construction. This should involve using a combination of surging and bailing until the water is clear.

See City of Olympia Standard Plans for detailed requirements.

Appendix 1: List of Standard Plans

Title	Drawing No.
Single Service Connection 1" Diameter to ¾" Setter	6-1A
Single Service Connection 1" Diameter to 1" Setter	6-1B
Single Service Connection for Residential 1" Diameter Fire Sprinklers	6-1C
Double Service Connection ¾" Branch Service	6-2
Double Service Connection 1" Residential Fire Sprinklers	6-2B
1½" and 2" Standard Setter with Bypass	6-3
Typical Meter Placement	6-7
Hydrant Assembly	6-8
2' Air and Vacuum Release Valve	6-9A
2" Blowoff Assembly for Dead End	6-10
2" Temporary Blow-Off Assembly Type "A" and "B"	6-10B
Connection to Existing Main	6-11
Standard Valve Box	6-12
Valve Marker Post and Hydrant Bollard Detail	6-13
Standard Blocking Detail	6-14
Thrust Loads	6-15
Blowoff Sizes for Flushing Pipelines	6-17
Sampling Station	6-18
Compound Water Meter with Bypass for 6" and 8" Size	6-19A1
Material List for Compound Water Meter with Bypass for 6" and 8" Size	6-19A2
Water Meter Manifold for 3" Size	6-20A
Water Meter Manifold for 4" Size	6-20B
Material List for Manifold Water Meters 3" and 4" Size	6-20C
2½" and Larger Double Check Valve Assembly	6-21
Double Check Valve Assembly 2" and Smaller	6-21A
2" and Smaller Reduced Pressure (RP) Installation	6-22
Reduced Pressure Backflow Assembly 2 ½" and Larger	6-22B
Pressure Vacuum Breaker Assembly	6-23
2 ½" and Larger Double Check Detector Check Valve Assembly	6-24
Temporary Residential Construction Water Hookup	6-25
Spill Resistant Pressure Vacuum Breaker Assembly	6-26
Resource Protection – Monitoring Well Design	6-27
Near Building Residential PRV Assembly	6-28
Near Street Residential PRV Assembly	6-28A

6-29	2" Air and Vacuum Release Valve ***DELETED***	02/26/2013
6-30	AC Water Main Restoration Bedding ***DELETED***	02/26/2013