

## CHAPTER 2 WATER

### 2.01 General

Any extension of the City of Centralia Water System must be approved by the City of Centralia Public Works Department. All extensions must meet or exceed the requirements of the Washington State Department of Health, the adopted City of Centralia Water Comprehensive Plan and the Riverside Fire Authority.

It is the developer's responsibility, as part of designing and planning for any development, to ensure that adequate water for both domestic use and fire protection will be provided. The developer must show, on 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 engineering analysis will be required if it appears that the system might be inadequate.

Anyone who wishes to connect to the City's water system should contact the Public Works Department for a water connection fee estimate. The estimate will show the approximate cost that will be due to the City for a water line connection.

Before any water meters will be put into service, all public works improvements must be completed and approved, including the granting of right-of-way or easements, as-built drawings submitted and accepted, and all applicable fees must be paid.

Issuance of building permits for new construction of single-family subdivisions shall not occur until final City of Centralia Public Works Department approval is given. For commercial projects, building permits may be issued upon completion and acceptance of the required fire protection facilities. A construction bond, in accordance with Section 1.14 of the Guidelines, will be required for the remaining public works improvements. Certificate of Occupancy will not be issued until final City of Centralia Public Works Department approval is given for all improvements.

### 2.02 Design Standards

The design of any water extension/connection shall conform to City standards and any applicable standards as set forth herein and in Sections 1.02 and 1.06.

The layout of extensions shall provide for the future continuation and/or "looping" of the existing system as determined by the City. In addition, main extensions shall be extended as required in Section 1.18.

The "General Notes" found in the Standard Detail Section shall be included on any plans dealing with water system design.

## 2.03 Main Line

- 2.03.1 Water mains shall be sized to provide adequate domestic plus fire flow at the required residual pressure. Fire flow requirements will be determined by the Riverside Fire Authority. However, the quantity of water required will in no case be less than 750 GPM at 20 psi residual pressure.

The minimum water main size where a fire hydrant is required shall be 6 inches in diameter where looped and 8 inches in diameter to the last fire hydrant where not looped, as long as fire flow and domestic requirements can be met. Larger size mains are required in specific areas outlined in the Centralia Water Comprehensive Plan. Nothing shall preclude the City from requiring the installation of a larger sized main in areas not addressed in the Water Comprehensive Plan if the City determines a larger size is needed to meet fire protection and domestic requirements or for future service.

All water mains 6 inches in diameter and larger which may be extended or looped, will end with an approved gate valve and blind flange, so as to not interrupt service when further extension work takes place.

- 2.03.2 All pipe for water mains shall have push-on type flexible gasketed joints and shall comply with one of the following types:

Ductile Iron Pipe: Shall conform to AWWA C151 Class 52 and have a cement mortar lining conforming to AWWA C104. All pipes shall be joined using non-restrained joints which shall be rubber gaskets, push-on type, conforming to AWWA C111. Ductile iron pipe is required for all new water mains 12 inches in diameter and larger, and for all fire hydrant laterals.

PVC Pipe: Sizes from 4 to 10 inches in diameter shall meet AWWA C900 standards. No solvent weld joint pipe will be allowed in the City system.

- 2.03.3 All fittings for ductile iron pipe or PVC pipe shall be ductile iron compact fittings conforming to AWWA C153 or AWWA C110 and C111. All shall be cement mortar lined conforming to AWWA C104. All fittings shall be connected by flanges or mechanical joints. Where required, mega-lug retainer glands shall be used. In special cases on steep slopes pipe restraints may be required as directed by the City Engineer. If required the pipe restraint system will be a 600 series as manufactured by Romal Industries, Inc.
- 2.03.4 All ductile iron pipe shall have brass wedges inserted at all joints for continuity to allow surface tracing by pipe locator.

All PVC pipe shall have a toning (tracer) wire installed with it. The wire shall be 12 gauge coated copper wire and shall be taped to the top of the pipe to prevent movement during backfilling. It shall be laid loosely enough to prevent stretching and damage, and shall be brought up and tied off at the valve body or meter setting.

2.03.5 The minimum cover for all water mains from top of pipe to finish grade shall be 30 inches or as approved.

## **2.04 Connection to Existing Water Main**

The developer's engineer shall be responsible for determining the scope of work for connection to existing water mains. A minimum of ten working days' notice is required to schedule taps, or cut-ins. A right-of-way permit is required prior to connection to an existing main.

It is the contractor's responsibility to field verify the location and depth of the existing mains and the fittings required to make the connections to the existing mains.

## **2.05 Service Interruption**

The contractor shall 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 that any disruptions to existing services can be scheduled. The City will notify customers involved or affected 24 hours in advance of the water service interruption. The contractor shall make every effort to schedule water main construction with a minimum interruption of water service. In all situations, the City shall 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 shall conform to L & I standards for worker safety. In the event the contractor does not have shoring conforming to L & I standards, the City will shut the job down until such shoring is in place.

## **2.06 Hydrants**

2.06.1 The lead from the service main to the fire hydrant shall be ductile iron cement mortar lined Class 52, 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.

2.06.2 Fire hydrants shall have two, 2.5-inch outlets and one 4.5-inch pumper port outlet. Threads shall be #498. The valve opening shall be 5.25-inch diameter. The hydrant shall have a positive and automatic barrel drain and shall be of the "safety" or breakaway style. A Storz coupler shall be provided for the pumper port.

Hydrants shall be Dresser M & H Reliant Style 929 or Mueller Centurion. All hydrants shall be bagged until the system is approved.

2.06.3 The Public Works Department and Riverside Fire Authority work together to insure that adequate hydrant spacing and installation are achieved.

Unless otherwise required by the governing authority, the following guidelines shall apply for hydrant number and location:

1. At least one hydrant shall be installed at all intersections.
2. Hydrant spacing of 250 feet shall be required in all areas except single-family and duplex residential areas.
3. Hydrant spacing shall be as required by the International Fire Code.
4. When any portion of a proposed building is in excess of 150 feet from a water supply on a public street, on-site hydrants shall be required. Such hydrants shall be located per the Riverside Fire Authority and easements for such hydrants shall be granted to the City.

2.06.4 Fire hydrants shall be set as shown in standard detail number 2-12.

2.06.5 Requirements regarding use, size and location of a fire department connection (FDC) and/or post indicator valve will be determined by the Riverside Fire Authority. Location of FDC's shall be shown on water plans.

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

## **2.07 Valves**

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

Valves shall be installed in the distribution system at sufficient intervals to facilitate system repair and maintenance, but in all cases there shall be at least one valve every 600 feet. Generally, there shall be two valves on each tee and three valves on each cross. Specific requirements for valve spacing will be made at the plan review stage.

2.07.1 System Gate Valves, 4 to 12 inches: The design, materials and workmanship of all gate valves shall conform to AWWA C515, latest revision. Gate valves shall be resilient wedge non-rising stem (NRS) with two internal O-ring stem seals. Gate valves shall be Mueller, M & H, Waterous, Kennedy, or American AVK.

Gate valves shall be used on all 2 to 10 inches in diameter lines.

- 2.07.2 Butterfly Valves: Shall conform to AWWA C504, Class 250, with ductile iron short body and O-ring stem seals. Butterfly valves shall be Mueller, Dresser, Pratt, or American Darling.
- 2.07.3 Valve Box: All valves shall have a standard R 910 ductile iron water valve box set to grade, with a 6-inch ASTM 3034 SDR 35 PVC riser from valve to within 4 to 6 inches of valve box. If valves are not set in paved area, a 3-foot by 3-foot by 4-inch concrete pad shall be set around each valve box at finished grade. In areas where valve box falls in road shoulder, the ditch and shoulder shall be graded before placing asphalt or concrete pad. Valve box lids shall be ductile iron and marked "water". See standard drawing 2-09.
- 2.07.4 Tapping Valves: All tapping valves shall be resilient seal, full open models manufactured by Mueller, Kennedy, or Clowe.

## **2.08 Casing**

Steel casing pipe shall be schedule 20 steel or equal. Casing pipe and spacers shall be sized for pipe being installed. The casing pipe shall be sand-packed after the water pipe is installed.

## **2.09 Air and Vacuum Release Valve**

Air and vacuum release valves (ARV) shall be APCO 147C or Clay valve combination air release valve. Installation shall be as shown on standard drawing 2-13.

The installation shall be set at the high point of the line when required. Where possible, pipes are to be graded to prevent the need for an ARV. ARV's may not be required when services are in the vicinity.

## **2.10 Blowoff Assembly**

If a fire hydrant is not located at the end of a dead end main, a blowoff assembly is required. On water mains which will be extended in the future, the valve which operates the blowoff assembly shall be the same size as the main and provided with a concrete thrust block. The pressure rating for blowoff assemblies shall be 200 psi. Adequate drainage must be available for use of the assembly under operating conditions. Installation is to be as shown on standard drawing 2-08.

## **2.11 Backflow Prevention**

All water system connections to serve buildings or properties with domestic potable water which have a private well, fire sprinkler or fire service system, or irrigation system on site shall comply with the minimum backflow prevention requirements as established by the Washington State Department of Health (DOH) and City of Centralia, Centralia Municipal Code (CMC). Other potentially hazardous situations not listed here but covered in these regulations must also comply.

The installation of required backflow assemblies and/or air gaps is vital to protect the existing water system and users from possible contamination. All backflow prevention assemblies shall be of a type and model approved by DOH and/or the City and shall be installed as required.

The City shall have the authority to perform inspections on all backflow prevention assemblies connected to the City's water system and shall be provided access to the premises to inspect.

The owner of the property is required to submit the results of the initial and annual thereafter tests/inspections of all assemblies, made by a state-certified Backflow Assembly Tester, promptly to the Water Utility. All assemblies not passing a test must be repaired immediately. Water service may be disconnected for failed tests, failure to test as required, improper installation or by-passing an assembly or air gap.

The Water Utility (Centralia Public Works) shall receive the certificate for testing of all backflow prevention assemblies before the certificate of occupancy is released on any building. A list of approved testers may be obtained from DOH or the City.

Riverside Fire Authority will test the fire line and obtain the certificate for underground piping. The Riverside Fire Authority will under no circumstances test their portion of underground until the Centralia Public Works has observed test and approved their main up to the fire line.

## **2.12 Service Connection**

2.12.1 All service connections relating to new development shall be of the appropriate size and installed by the developer at the time of main line 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 only be set after the entire system is inspected and approved.

2.12.2 When water is desired to a parcel fronting an existing main but not served by an existing service, 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 and box.

2.12.3 Service lines shall be domestic, type K soft copper tubing, minimum pressure class 200 psi, grade SIDR 9 copper tube size. HDPE Class 200 psi CTS ( $\frac{3}{4}$ -inch and 1-inch services only) may be used. Services larger than 1-inch diameter may be Schedule 40 PVC. Service lines shall be installed a minimum of 45 degrees off the main. Tracer wire (12-gauge coated wire) shall be installed on HDPE and PVC service lines as described in Section 2.03.4.

Service saddle shall be ductile iron with double stainless steel straps. All clamps shall have a rubber gasket.

Corporation stops shall be all U.S. brass and shall be Ford or Mueller with cc threads conforming to AWWA C800 unless using a service saddle. If using a service saddle, threads will be I.P.T. Stainless steel inserts shall be used with compression grip nut.

- 2.12.4 Single water meters will not be allowed for service to more than one building. An approved backflow prevention system must be installed in conjunction with any master meter. Any deviations from this must be granted by the City Engineer and Centralia Public Works Director.
- 2.12.5 Services larger than 2-inch shall contact the Centralia Water Department to determine the appropriate vault size for the meter.
- 2.12.6 All facilities listed on the Department of Health Cross Connection Control Table 9 are required to have backflow prevention devices on the service line.

## **2.13 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.

- 2.13.1 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 2-1 of Standard Plan 2-19.
- 2.13.2 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 upon approval by the City Engineer 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 water tightness prior to backfilling. Adequate restraint should be provided to allow testing to occur.
  3. Additional mitigation efforts, such as impermeable barriers, may be required.
  4. The sanitary sewer may not be placed closer than 5 feet from a water line.  
See Figure 2-2 of Standard Plan 2-19.

### 2.13.3 Vertical Separation (Perpendicular):

The contractor shall maintain a minimum of 18 inches of vertical separation between sanitary sewers and water mains. If minimum vertical separation is not met, then standards for water-sewer separation in Department of Ecology's Criteria for Sewage Works Design shall apply.

The longest standard length of water pipe shall be installed so that the joints will fall equidistant from any sewer crossing. In some cases where minimum separation cannot be maintained, it will be necessary to encase the sewer line in ductile iron pipe. See water main general notes Number 14.

## 2.14 Irrigation

All irrigation systems shall be installed with an approved backflow prevention assembly approved by DOH and/or City of Centralia.

Irrigation sprinklers shall be installed so as not to wet any public street or sidewalk.

## 2.15 Staking

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

A pre-construction meeting shall be held with the City Engineer before staking has ~~is~~ begun. All construction staking shall be inspected by the City Engineer prior to construction.

The minimum staking of water lines shall be as follows:

2.15.1 The centerline alignment shall be staked 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.

2.15.2 The location of all fire hydrants, hydrant flanges elevations, tees, water meters, and other fixtures shall be staked within the cut or fill to finished grade.



## **2.16 Trench Excavation**

- 2.16.1 Clearing and grubbing where required shall 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 shall be disposed of by the owner or contractor in accordance with the terms of all applicable permits and/or regulations.
- 2.16.2 Trenches shall be excavated to the line and depth designated by the City to provide a minimum of 30 inches of cover over the pipe. Except for unusual circumstances where approved by the City, the trench sides shall be excavated vertically and the trench width shall be excavated only to such widths as are necessary for adequate working space as allowed by the governing agency. The trench shall be kept free of water until joining is complete. Surface water shall be diverted so as to not enter the trench. The developer/contractor shall maintain sufficient pumping equipment on the job to insure that these provisions are carried out.
- 2.16.3 The contractor shall perform all excavation of every description and whatever substance encountered and boulders, rocks, roots, and other obstructions shall 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 shall be backfilled to grade with material satisfactory to the City and thoroughly compacted.
- 2.16.4 Trenching and shoring operations shall not proceed more than 100 feet in advance of pipe laying without approval of the City, and shall be in conformance with Washington Industrial Safety and Health Administration (WISHA) and Occupational Safety and Health Administration (OSHA) safety standards.
- 2.16.5 The bottom of the trench shall 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 shall be excavated with hand tools to sufficient size to make up the joint.
- 2.16.6 The contractor shall 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.

## **2.17 Thrust Blocking**

Location of thrust blocking shall be shown on plans. Thrust block concrete shall be Class B poured against undisturbed earth. A plastic barrier shall be placed between all thrust blocks and fittings. See standard drawings number 2-10 and 2-18 for thrust block locations and calculations.

## **2.18 Backfilling**

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

Backfilling and surface restoration shall 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 shall 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 shall be compacted to 95 percent of the maximum density in traveled areas, 90 percent outside traveled areas. Where governmental agencies other than the City have jurisdiction over roadways, the backfill and compaction shall be done to the satisfaction of the agency having jurisdiction. If suitable backfill material, as determined by the City, is not available from trenching operations, the City may order the placing of bedding conforming to WSDOT/APWA Standard Specifications Section 9-03.15 around the water main and gravel base conforming to Section 9-03.10, same document, for backfilling the trench. At the conclusion of each day the trench shall be totally backfilled or steel plates shall be used so that no open excavation is left overnight.

## **2.19 Street Patching and Restoration**

See Sections 4.15 and 4.16 for requirements regarding street patching and trench restoration.

## **2.20 Hydrostatic Tests**

Prior to the acceptance of the work, the contractor shall conduct a hydrostatic test on the installation in accordance with Section 7-09.3(23) of the current version of the Washington State Department of Transportation Standard Specifications. Any leaks or imperfections developing under said pressure shall be remedied by the contractor. The main shall be tested between valves. Insofar as possible, no hydrostatic pressure shall be placed against the opposite side of the valve being tested. Test pressure shall be maintained while the entire installation is inspected by the City.

The contractor shall provide all necessary equipment and shall perform all work connected with the tests. Tests shall 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 shall perform the test to assure that the equipment to be used for the test is adequate and in good operating condition and that the air in the line has been released before requesting the City to witness the test. Only authorized personnel shall operate isolation valves.

See Section 2.11 for testing responsibilities for backflow prevention devices.

## **2.21 Sterilization and Flushing**

Sterilization of water mains shall be accomplished by the contractor in accordance with the requirements of DOH and AWWA standards and in a manner satisfactory to the City. At no time shall chlorinated water from a new main be flushed into a body of fresh water. This is to include lakes, rivers, streams, drainage ways, and any and all other waters where fish or other natural water life can be expected.

When proper chlorine concentration has been established throughout the line, the valves shall be closed and the line left undisturbed for 24 hours. The line shall then be thoroughly flushed. Water samples will then be taken by the contractor in the presence of the City's Inspector, at least 24 hours after the flushing. Should the initial treatment result in an unsatisfactory bacteriological test, and/or the water in the new line(s) fail to hold a chlorine residual, the chlorination procedure shall be repeated by the contractor until satisfactory results are obtained. Samples can only be taken on Mondays, Tuesdays, and Wednesdays until noon, due to lab scheduling constraints. Testing and sampling shall take place after all underground utilities are installed and compaction of the backfill within the roadway section is complete. The developer/contractor is responsible for the cost of all testing.

## **2.22 Pump Station**

When a pump station is required to provide the necessary flows for a new development, the developer shall construct and be responsible for all cost of the pump station. The new pump station shall be designed by a licensed engineer to City of Centralia standards. The standards will be provided to the developer at the time of design. A pump station will only be allowed when there is no gravity alternative. The City will make the final determination on whether a pump station will be allowed.

## **2.23 Electrical**

All electrical and housing for electrical equipment used for storage and/or distribution shall be designed to Centralia Public Works Development Standards at the time of development. The standards will be provided by the City.

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**CHAPTER 2: WATER**

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