

**YELM ENGINEERING SPECIFICATIONS AND STANDARD
DETAILS**

CHAPTER 6 RECLAIMED WATER

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CHAPTER 6.00 RECLAIMED WATER

6.00.010 General

Any extension of the City of Yelm Class 'A' reclaimed water distribution system must be approved by the Public Services Department (PSD). All extensions and uses must conform to the Water Reclamation and Reuse Standards published by the Department of Health (DOH) and the Department of Ecology (DOE) and Chapter 13.24 of the Yelm Municipal Code.

In designing and planning for any development, the developer must show in the proposed plans how reclaimed water will be supplied and, as required by the City, whether adequate water pressure and volume will be available to meet the demand requirements. An analysis of the existing reclaimed water system may be required to determine adequacy of pressure and volume.

Anyone who wishes to extend or connect to the City's reclaimed water system shall contact the Public Services Department for appropriate approvals and a connection fee estimate. This is an estimate of the costs due the City for a reclaimed waterline extension or connection.

Within the corporate City limits where a public reclaimed water utility is available it must be used for irrigation of open space areas. Where public reclaimed water is not available within the City limits, connection is required if the subject property is within 200 feet of a public reclaimed water utility, as measured from the lot line closest to the existing reclaimed water utility. Within a Master Planned Community (MPC) regardless of distance from a public reclaimed water utility, connection shall be required to the public reclaimed water utility for irrigation of open space areas.

All construction plans shall be reviewed and approved by DOH, DOE and the City of Yelm prior to construction.

Prior to the release of any reclaimed water meters, all Public Works improvements must be completed and approved, including the granting of any right-of-way or easements and Special Power of Attorney for Annexation, if required, and all applicable fees must be paid.

Class A reclaimed water shall be discharged to the sanitary sewer system in order to remain in compliance with Yelm's State Reclaimed Water Permit. Where sanitary sewers are not accessible, de-chlorinated Class 'A' Reclaimed Water may be discharged to the stormwater system with approval from DOE. This includes any reclaimed water from blow-offs, line flushing and/or line breaks.

6.00.020 Design Standards

The design of any reclaimed water extension/connection shall conform to City Standards and any applicable standards as set forth herein and in Section 1.00.010 YDS.

The layout of reclaimed water main extensions shall provide for the future continuation of the existing system. Reclaimed water mains shall be sized to provide adequate pressures throughout the system and to accommodate any future extensions. Looping of the reclaimed water system may be required to provide adequate pressures and volume. Specific looping requirements shall be determined during plan review by the City Engineer. In addition, main extensions shall be extended as required in Section 1.00.095 YDS.

Where a reclaimed water system is installed for future use but supply is not yet available, the reclaimed main may be supplied from the potable water main using an approved Backflow Assembly upon approval of the City Engineer and/or Public Service Director. At such time that the reclaimed supply becomes available, it shall be the developer's responsibility to disconnect from the potable water supply and make the connection to the reclaimed water supply. There shall never be any physical connection between a reclaimed water main and a potable water main at the same time without the use of an approved Backflow Assembly. The connection to reclaimed water and the abandonment of the connection to the potable water main shall be coordinated with and witnessed by the City.

All new reclaimed water piping and appurtenances shall be purple (Pantone 512/522) in color and have the words "RECLAIMED WATER DO NOT DRINK" printed in black lettering at intervals no greater than 3 feet along the pipe. Lettering shall be a minimum of 1.5 inches high. Spacing between the individual words of the message shall not exceed 3 inches.

The General Notes on the following page shall be included on any plans dealing with reclaimed water system design.

GENERAL NOTES

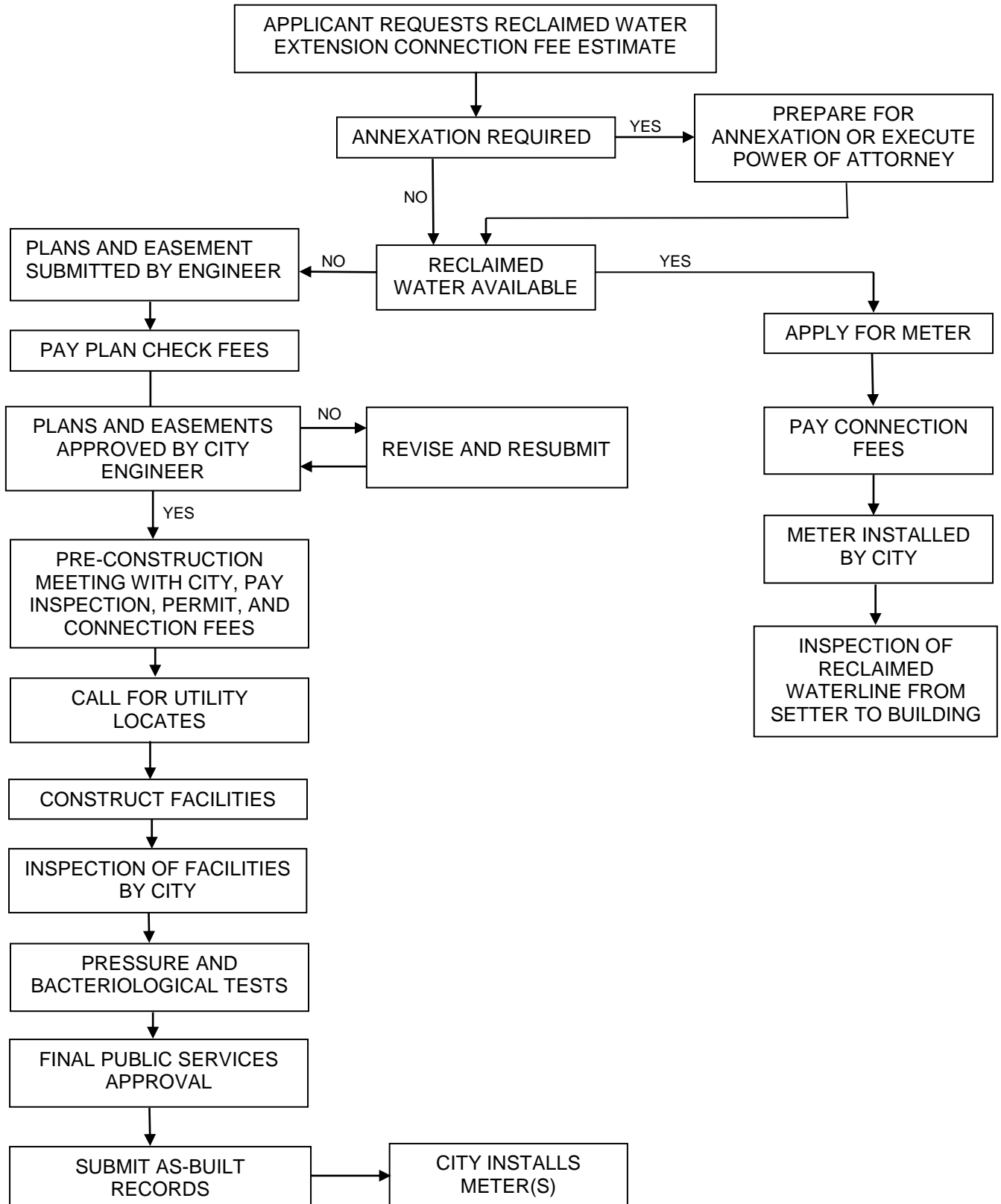
(RECLAIMED WATER MAIN INSTALLATION)

1. All workmanship and material shall be in accordance with City of Yelm standards and the most current copy of the State of Washington Standard Specifications for Road, Bridge and Municipal Construction.
2. All work within a public right-of-way requires a permit from the City of Yelm. Prior to any work commencing, the general contractor shall arrange for a preconstruction meeting to be attended by all major contractors, representatives of involved utilities, and the City of Yelm. The Contractor is responsible to have a set of approved plans at the meeting.
3. Reclaimed water mains up to 12 inch shall be Pantone 512/522 AWWA C900 DR 14. Reclaimed water mains larger than 12 inches shall be Pantone 512/522 AWWA C905 DR 18. See Section 6.030B for more detailed pipe specifications.
4. Gate valves shall be resilient wedge, NRS (Non Rising Stem) with O-ring seals. Valve ends shall be mechanical joint or ANSI flanges. Valves shall conform to AWWA C-515 latest revision. Valves shall be Mueller, M & H, Kennedy, Clow R/W, Waterous Series 2500, EJ Flowmaster or American AVK. All valves shall be Pantone 512/522 in color. Existing valves shall be operated by City employees only.
5. All valves shall have a standard EJ or Olympic Foundry VB 950 water valve box set to grade with a 6-inch ASTM 3034 SDR 35 PVC riser from the valve to within six inches of the valve box top. The valve box and lid shall be per the detail at the end of this chapter.
6. All pipe and services shall be installed with continuous tracer tape installed 12" to 18" under the final ground surface. The marker shall be purple plastic non-biodegradable, metal core backing three inch wide marked "CAUTION RECLAIMED WATER LINE" that can be detected by a standard metal detector. In addition to tracer tape, install direct bury, U.S.E. 12-gauge purple-coated copper wire, wrapped around or taped to the pipe, as shown on the detail. Low voltage grease-type splice kits shall be used on tracer wire.
7. Commercial grade concrete shall be installed one foot around all valve boxes 8 inches thick. A concrete pad per the reclaimed water detail shall be installed around all valve boxes and blow-offs that are not in a pavement area.

8. At any connection to an existing line where a new valve is not installed, the existing valve must be pressure tested to City standards prior to connection. If an existing valve fails to pass the test, the contractor shall make the necessary provisions to test the new line prior to connection to the existing system or install a new valve.
9. The minimum burial depth of all reclaimed water lines shall be 72 inches.
10. It shall be the contractor's responsibility to field verify the location and depth of the existing main and provide the fittings required to make the connection to the existing main.
11. When an existing City reclaimed water main is to be abandoned, it shall be the developer's responsibility to coordinate and abandon the existing main. It shall also be the developer's responsibility to install and transfer existing reclaimed water services to the new main.
12. Sand shall be placed around and under service lines by hand to a height of 6 inches above and below the line(s). There shall be a minimum of 1 foot of sand placed around the entire meter box.
13. The reclaimed water main, appurtenances, and service connections to the meter setter shall be tested in sections of convenient lengths under a hydrostatic pressure equal to 150 psi in excess of that under which it will operate. In no case shall the test pressure be less than 225 psi.
14. All new reclaimed water piping and appurtenances shall be purple (Pantone 512/522) in color and have the words "RECLAIMED WATER-DO NOT DRINK" printed in black lettering at intervals no greater than 3 feet. Lettering shall be a minimum of 1.5 inches high. Spacing between the individual words of the message shall not exceed 3 inches.
15. Class A reclaimed water shall be discharged to the sanitary sewer system in order to remain in compliance with Yelm's State Reclaimed Water Permit. This includes any reclaimed water from blow-offs, line flushing and/or line breaks.
16. To lower the risk of contamination, standard tapping practices used for potable water mains shall be followed when connecting to a reclaimed water main. See Water Chapter 4.00.120 Service Connection for specific requirements.
17. Provide a traffic control plan(s) as required in accordance with MUTCD.
18. All reclaimed water mains shall be staked for grades and alignment by an engineering or surveying firm capable of performing such work.

19. All service line locations shall be marked on the face of the curb with an embossed "R" 1/4 inch into concrete.
20. Call Underground Locate at 1-800-424-5555 a minimum of 48 hours prior to any excavations.
21. The City shall be given 72 hours notice prior to scheduling a shutdown. Where connections require "field verification", connection points will be exposed by contractor and fittings verified 48 hours prior to distributing shut-down notices.
22. At any connection to an existing line where an existing valve is used and a new valve is not installed, the existing valve must be pressure tested to City standards prior to connection. If an existing valve fails to pass the test, the contractor shall make the necessary provisions to test the new line prior to connection to the existing system or install a new valve.
23. After completion of all items shown on these plans and before acceptance of the project, the contractor shall obtain a "punch list" prepared by the City's Inspector detailing remaining items of work to be completed. All items of work shown on these plans shall be completed to the satisfaction of the City prior to acceptance of the reclaimed water system and provision of reclaimed water service.
24. A copy of the approved plans and specifications and applicable City Engineering Specifications and Standard Details shall be onsite during construction.
25. Any revisions made to these plans must be reviewed and approved by the developer's engineer and the City of Yelm prior to any implementation in the field. The City shall not be responsible for any errors and/or omissions on these plans.

PROCESS TO OBTAIN RECLAIMED WATER SERVICE



6.00.030 Main Line

- A. Reclaimed water mains shall be sized to provide adequate flow at the required residual pressure. The minimum main size shall be 6 inches diameter. Nothing shall preclude the City from requiring the installation of a larger sized main.
- B. All pipe for reclaimed water mains shall comply with one of the following types:
 - 1. All pipes joined using non-restrained joints shall be rubber gaskets, push on type or mechanical joint, conforming to AWWA C 111. When pipe joint restraints are required, the pipe shall be Certain Teed Certa-lok C900/RJ DR 14.
 - 2. PVC Pipe: All piping shall be PVC with a minimum cover of 72 inches. The PVC pipe shall be purple (Pantone 512/522) in color and conform to the latest revision of AWWA C900 DR 14 standards.
- C. All fittings shall be compact ductile iron fittings conforming to AWWA C 153. All shall be cement mortar lined conforming to AWWA C 104. Plain end fittings shall be ductile iron if mechanical joint retainer glands are installed on the plain ends. All fittings shall be connected by flanges or mechanical joints. All retaining follower glands shall be ductile iron.
- D. All pipe and services shall be installed with continuous tracer tape installed 12 to 18 inches under the final ground surface. The marker shall be purple plastic non-biodegradable, metal core or backing which can be detected by a standard metal detector. In addition to tracer tape, install 12 gauge, solid, direct bury, U.S.E. purple coated copper wire, wrapped around or taped to the top of pipe, brought up and tied off at valve body as shown on the reclaimed water detail.
- E. The minimum cover for all reclaimed water mains from top of pipe to finish grade shall be 72 inches unless otherwise approved. If the pipe is offset to the edge of the road, the actual roadway cross grade shall be projected out and used to measure cover to top of pipe. This will require more fill over the pipe in a fill section but allows the pipe adequate cover in the event of future roadway cuts or widening. If the pipe is located under a ditch, or on the "downhill" slope of the roadway cross section, the minimum cover over the pipe shall be 72 inches regardless of projected grades.
- F. When minimum cover of the reclaimed water main is in conflict with other utilities, the engineer shall be required to provide the top and bottom elevations of the pipes in conflict. The adjustment of elevation

when the minimum cover cannot be met shall be as directed by the City Engineer.

- G. When designing a reclaimed water main through an unimproved area the engineer shall provide a future design of the area to prevent design/construction of shallow mains. The design shall include elevations of the top of pipe at 25- foot intervals.

6.00.040 Connection to Existing Reclaimed Water Main

The developer's engineer shall be responsible for determining the scope of work for connection to existing reclaimed water mains. See reclaimed water details.

It shall 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 fittings shall be approved by the Sewer Department prior to installation.

At the City's request, the contractor shall install a temporary 2-inch brass blow off for flushing. The blow off shall be constructed with a standard 2-inch tapping saddle and Ford brass corporation stop with 2-inch brass pipe extended up to finished grade. When flushing is completed, the 2-inch pipe shall be removed. The corporation stop shall be shut off and capped tight with threaded brass plug.

It shall 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.

A City representative shall be present throughout the entire connection or tapping procedure.

6.00.050 Service Interruption

The contractor shall give the City a minimum of 72 hours notice of any planned connection to an existing pipeline. This includes all cut-ins, live taps and extensions. Notice is required so any disruptions to existing services can be scheduled. The City will notify customers involved or affected by the service interruption. The contractor shall make every effort to schedule main construction with a minimum interruption of reclaimed water service. In certain situations, the City may dictate scheduling of reclaimed water main shutdowns so as not to impose service interruptions during specific periods to existing customers. Interruptions to service of the reclaimed water system shall be treated as if it were potable water.

6.00.060 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 no case shall there be less than one valve every 1000 feet. Generally, there shall be three valves on each tee and four valves on each cross. Valves installed with tees and crosses shall be flanged together. All valves shall open counter-clockwise. Specific requirements for valve spacing will be made at the plan review stage.

- A. Gate Valves, see requirements.
- B. Reclaimed water valves shall be affixed with warning tags. Tags shall be securely fastened with a zip tie to the tracer wire at the top of the valve box in a manner that ensures visibility. Reclaimed water valve tags shall be inert polyethylene plastic that is impervious to all known alkalis, acids, chemical reagents and solvents likely to be encountered in the soil. The tags shall be 3" x 5 ¾" minimum size. Tags shall be purple and shall have the words, "CAUTION: RECLAIMED WATER-DO NOT DRINK" printed in black lettering. The lettering shall be a minimum of ½ inch high.
- C. Valve Box: All valves shall have a standard EJ or Olympic Foundry VB-950 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 top. Commercial grade concrete shall be installed one foot around all valve boxes eight inches thick. If valves are not set in paved area, a 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. See reclaimed water detail.
- D. Valve marker post: Valve marker posts shall be 4 inch x 4 inch reinforced concrete or schedule 40 steel posts 5 feet long stamped with "R" and distance to valve in white. Posts shall be painted with one base coat and two coats purple oil base enamel. The need for valve marker posts will be determined during plan review. See reclaimed water detail.

6.00.070 Bend Markers

Bend markers are required when reclaimed water lines are located outside the right-of-way. When the direction of a main changes due to a bend, a bend marker is required. See reclaimed water details.

6.00.080 Casing

The casing shall be as follows: one-quarter inch wall seamless steel casing pipe or ductile iron Class 52. Casing spacers are required. A minimum of three sets of spacers are required per 20 feet of pipe. Spacers shall be as manufactured by UniFlange, Calpico Inc. or approved equal. No more than one inch of clearance is allowed between the top of the spacers and the inside top of the casing pipe. Approval of products requires research and therefore may be time consuming.

The joints of the transmission pipe within the casing pipe shall be restrained with a restraint system approved by the City of Yelm. Restrained joints shall be required on the transmission line one pipe length past either end of the casing pipe. Additional restraints may be required by the City.

6.00.090 Air and Vacuum Release Valve

Air and vacuum release valves (ARV) shall be installed behind the sidewalk on the property line. For mains up to 12 inches diameter ARV's shall be as shown on reclaimed water standard detail. The engineer shall size the ARV for mains 14 inches diameter and larger.

ARV's shall be installed in a manner that will not create a cross connection condition, with measures provided to prevent backflow, cross connections, and contamination of the City system.

The installation shall be set at the high point of the line when required. ARV's shall not be installed in areas subject to high ground water or flooding. Where possible, pipes shall be vertically aligned to prevent the need for an air release valve.

6.00.100 Blowoff Assembly

A blowoff shall be required at the end of all dead end mains. The blowoff assembly shall be as shown on the standard details. The working pressure rating for blowoff assemblies shall be 200 psi.

6.00.110 Sample Stations

A sample station may be required on any reclaimed water main extension for testing. The requirement for the location of the sample station will be determined by the City during the plan review. Sample stations shall be located behind the walk, in an open space, or in a utility easement whenever possible and shall generally be centrally located in the project at a low point if possible.

6.00.120 Service Connection

A. Service connections on reclaimed water for new developments shall be installed as part of the mainline construction. After the system has

been accepted by the City and approval has been given, the owner may apply for a reclaimed water meter. The City will install a reclaimed water meter after the application has been made, the work completed (including the backflow assembly installation), accepted, and all applicable fees have been paid.

- B. When reclaimed water is desired to serve 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 applicant shall hire a contractor to tap the main and install the service in accordance with Chapter 6.00.40.

Domestic or reclaimed water irrigation meters 2 inch or larger in size must be ordered through the City by the contractor/developer 10 weeks in advance of the installation date.

When applicable, conduit or casing is required by Thurston County for services crossing perpendicular to the roadway centerline outside the City limits but within the City of Yelm reclaimed water service area. The applicant is responsible for this work. Contact Thurston County for the required right-of-way permit(s) and restoration requirements, if any. If Thurston County allows trenching, conduit shall still be required.

- C. Service lines shall be as specified herein. Service lines shall be a one piece purple (Pantone 512/522) polyethylene plastic pipe from the reclaimed water main to the setter. Service lines shall be as specified herein. No glued joints will be accepted. Service lines shall be installed perpendicular to and 22½ degrees above horizontal of the main. Purple warning tracer tape and wire wrapped around the pipe shall be installed on all service lines. When connecting to an existing system where the roadway cannot be cut, a casing shall be required.

One and one-half to two inch diameter service lines shall be NSF Approved, PE3408 purple polyethylene pipe manufactured from virgin materials. Pipe shall meet the following specifications:

- ANSI/AWWA C901
- ASTM D1248, ASTM D 3350, ASTM D 2239, ASTM D 3035 and ASTM D 2737,
- Pressure Class 200, SIDR-7 (Standard Inside Dimension Ration-Pressure Rated),
- Cell classification 345464C,

Pipe shall be manufactured by Interstate Plastics, Philips Driscopipe, Eagle Pacific, Superlon Plastics, and U.S. Poly or approved equal.

Service saddles with stainless steel straps shall be as shown on the details or approved equal. All clamps shall have rubber gasket and iron pipe threaded outlets.

Corporation stops shall be as shown on the appropriate detail or approved equal with iron pipe threads conforming to AWWA C 800. Stainless steel inserts shall be used with pack joints and polyethylene pipe.

6.00.130 Marking Service Lines

The location of all service lines shall be marked on the face or top of the cement concrete curb with an "R" 3 inches in height and 1/4 inch into the concrete. When asphalt rolled curb is allowed, the water shall be marked with a tag secured with a "PK" nail one foot toward centerline from the gutter. The tag shall be a minimum 1-1/4 inch diameter, 0.050 inch thick aluminum disk stamped "R" or an unstamped purple plastic equivalent.

6.00.140 Water Main/Sanitary Sewer, and Reclaimed Crossings

The Contractor shall maintain a minimum of 18 inches of vertical separation between sanitary sewers/reclaimed water and water mains. To accommodate crossings, the minimum cover for reclaimed water main of 72 inches may be reduced upon approval by the City to provide for as much vertical separation as possible. When a reduced depth is allowed, approved alternate backfill material may be required by the City. See 8.080 for casing specifications.

Reclaimed water shall only be installed under water lines and shall be above sewer lines. The vertical separation of 18 inches shall be at a minimum of 10 feet on either side of the crossing. The longest standard length of pipe shall be installed so that the joints will fall equidistant from any sewer or water crossing. In some cases, where minimum separation cannot be maintained, it may be necessary to encase the reclaimed water pipe and/or the sewer or water service per City of Yelm standards.

6.00.150 Hydrostatic Tests

The reclaimed water main and appurtenances and service connections to the meter setter shall be tested in sections of convenient lengths under a hydrostatic pressure equal to 150 psi in excess of that under which it will operate for 15 minutes. In no case shall the test pressure be less than 225 psi. 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.

The contractor shall provide all necessary equipment and shall perform all work connected with the tests. The test pump shall be clean and disinfected. 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 the air in the line has been released before requesting the City to witness the test. 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 the air in the line has been released before requesting the City to witness the test.

6.00.170 Reclaimed Water Irrigation

All reclaimed water irrigation systems located within the public right-of-way shall be designed by a landscape architect registered in the State of Washington or City-approved design firm. Parts lists shall be submitted with each project.

The General Notes on the following pages are required on all plans for City operated or maintained reclaimed water irrigation systems or on any owner association operated or maintained reclaimed water irrigation systems located within the public right-of-way.

At sewer lift stations, reclaimed water irrigation systems shall be installed with an approved backflow prevention assembly in accordance with Chapter 4.00.110 of this manual. See reclaimed water detail. A separate reclaimed water irrigation meter shall be provided for reclaimed water irrigation systems. Medians shall require a separate meter. The reclaimed water irrigation system shall be installed after the area has been properly prepared. The pipe trenches shall be no wider than is necessary to lay the pipe or install equipment.

The median system shall be a completely separate system with its own separate appurtenances.

Reclaimed water irrigation sprinklers shall be situated to not wet any public street or sidewalk. Spray heads shall not be used in planters less than 3 feet wide. Drip reclaimed water irrigation methods shall be employed in areas less than 3 feet wide to prevent overspray. Turf heads shall be placed at finished grade as measured from the top of the sprinkler. Shrub heads shall be 12 inch pop up type placed at finished grade unless otherwise specified. Drip reclaimed water irrigation emitters shall be installed in accordance with the manufacturer's recommendations.

Installation and maintenance of reclaimed water irrigation systems in roadway planter strips shall be as shown in the table below. The system owner shall be responsible for the on-going utility expenses incurred.

	Single Family Residential Zones	Multi-Family & All Other Zones
Arterial Boulevard	Developer installs, Homeowners Association maintains or a Community Facilities District may be established	Developer installs. Owner or Owners Association maintains or a Community Facilities District may be established
Arterials	Developer installs, Homeowners Assn. maintains. If the association doesn't maintain, a Community Facilities District may be established at the City's discretion	Developer installs. Owner or Owners Association maintains (the City will maintain where existing covenants don't address this issue)
Collectors	Developer installs, Homeowners Assn. maintains Developer installs, Owners Association maintains	Developer installs, Homeowners Assn. maintains Developer installs, Owners Association maintains
Residential	Developer installs & Homeowners Assn. maintains. If Owner installs, owner maintains	Developer installs & Homeowners Assn. maintains Owner installs, owner maintains

GENERAL NOTES (RECLAIMED WATER IRRIGATION SYSTEMS)

1. It shall be the responsibility of the contractor to have a copy of an approved set of the landscaping plans signed by the Director of Public Works on the construction site at all times.
2. Electrical permits and inspections are required for all reclaimed water irrigation services within the City of Yelm. The contractor is responsible for obtaining permits prior to any type of actual construction. Prior to installation of any materials, the irrigation contractor shall submit for approval by the City, five copies of material catalog cuts, specifications, shop drawings and/or wiring diagrams. Any materials purchased or labor performed prior to such approval shall be at the contractor's own risk.
3. A clearly marked service disconnect shall be provided for every automatic reclaimed water irrigation installation unless otherwise stated on a City approved set of plans. The location and installation of the disconnect shall conform to the National Electrical Code (NEC) and City of Yelm standards. The service disconnect shall be City approved.
4. All low voltage wire shall be a minimum size of #14 UF from each control valve to the terminal interface.
5. All low voltage splices shall be Spears DS 400 or a City approved equal. All splices shall be done in valve control boxes. Direct burial splicing will not be allowed.
6. All materials specifications from Section G Material Specifications of this paragraph shall be shown on the plans.
7. A separate reclaimed water irrigation meter shall be provided for reclaimed water irrigation systems. Medians shall require a separate meter. The reclaimed water irrigation system shall be installed after the area has been properly prepared. See Chapter 4B.125 for soil preparation requirements. Pipe trenches shall be no wider than is necessary to lay the pipe or install equipment. The top 6 inches of topsoil shall be kept separate from the subsoil and shall be replaced as the top layer when backfill is made.
8. The median system shall be a completely separate system with its own separate appurtenances for City owned medians.
9. All reclaimed water irrigation lines to be installed under existing pavement or areas to be paved shall be installed within a casing. The casing shall be a minimum 4 inch diameter or twice the diameter of the encased pipe. The casing shall be AWWA C900 DR 14 PVC pipe. The reclaimed water irrigation casing shall extend a minimum of 1

foot beyond the structure under which casing is being jacked or bored.

10. Upon final acceptance of the work, the contractor shall submit two as-built drawings per Chapter 3.065.
11. Privately owned sprinkler heads built along slopes in excess of 2 percent shall contain check valves.

6.00.170 Reclaimed Water Irrigation (Cont.)

A. Layout of Reclaimed water irrigation System

The contractor shall stake all reclaimed water irrigation heads and mark all proposed trenches within the reclaimed water irrigation system per the approved plans prior to installing the system. Alterations in layout may be expected, i.e., to conform to ground conditions and to obtain full and adequate coverage to the landscaping. However, no alterations shall be made without prior authorization by the City.

B. Excavation

Trenches shall be no wider at any point than is necessary to lay pipe or install equipment. Trench bottoms shall be of relatively smooth sand 4 inches below and 6 inches above the pipe.

Detectable marking tape shall be placed in the trench 6 inches directly above, parallel to, and along the entire length of all nonmetallic water line and nonmetallic conduit. The width and depth of the tape shall be as recommended by the manufacturer or the City.

C. Piping

The reclaimed water irrigation main line is the line containing the supply usually situated between the reclaimed water irrigation meter and the reclaimed water irrigation control valves. The reclaimed water irrigation lateral lines are the lines between the reclaimed water irrigation control valves and the connections to the reclaimed water irrigation heads. Swing joints, thick walled poly pipe, flexible risers, rigid pipe risers, and associated fittings are not considered part of the lateral line but incidental components of the reclaimed water irrigation heads.

All reclaimed water lines shall be purple PVC and be a minimum of 18 inches below finished grade as measured from the top of the pipe. Where possible, mains and laterals or section piping shall be placed in the same trench.

All reclaimed water irrigation lines to be installed under existing pavement or areas to be paved, shall be installed within a minimum 4 inch diameter or twice the diameter of the encased pipe. The casing shall be AWWA C900 DR 14 PVC pipe. The reclaimed water irrigation casing shall extend a minimum of 1 foot beyond the structure under which casing is being jacked or bored.

D. Valve boxes

Valve boxes shall be installed flush to grade outside of play and high vehicular and pedestrian traffic areas.

Valve boxes shall have filter fabric underlayment installed at the bottom to prevent rodent intrusion and sediment build up.

Valve boxes shall be supported with bricks or concrete blocks as approved by the City to prevent settlement.

Reclaimed water valve boxes shall be purple in color and have purple lids with permanent lettering stating: "RECLAIMED WATER DO NOT DRINK".

E. Pipe Connections

During construction, pipe ends shall be plugged or capped to prevent entry of dirt, rocks, or other debris.

PVC pipe, couplings and fittings shall be handled and installed with care and in accordance with the manufacturer's recommendation. For gasketed connections, the outside of the PVC pipe shall be chamfered to a minimum of 1/16 inch at approximately 22 degrees. For all other connections, pipe and fittings shall be joined by solvent welding. Solvents used must penetrate the surface of both pipe and fittings which will result in complete fusion at the joint. The solvent and cement shall be of a type recommended by the pipe manufacturer.

Threaded PVC joints shall be assembled using Teflon tape as recommended by the pipe manufacturer.

On plastic to metal connections, work the metal connection first. Use a non-hardening compound on threaded connections. Connections between metal and plastic are to be threaded utilizing female threaded PVC adapters with a threaded schedule 80 PVC nipple only.

F. Electrical Wire Installation

The electrical controller shall be located in an open space or in a utility easement whenever possible.

All control wires shall be labeled at the controller, splice boxes and at the valves in the field.

Wiring between the automatic controller and the automatic valves shall be direct burial, #14 and may share a common neutral. A minimum of two spare # 14 UF yellow wires shall be installed from the controller to the furthest valve in each direction, looping through each control valve box. There shall be a 2 foot loop left in each control valve box. Separate control conductors shall be run from the automatic controller to each valve. When more than one automatic controller is required, a separate common neutral shall be provided

for each controller and the automatic valve which it controls. Wire shall be installed adjacent to or beneath the reclaimed water irrigation pipe. Plastic tape or nylon type wraps shall be used to bundle wires together at 10 foot intervals, and the wire shall be "snaked" from side to side in the trench. When necessary to run wire separate from the reclaimed water irrigation pipe, the wire shall be bundled and placed under detectable marking tape. When lateral pipe lines have less than 18 inches of cover, direct burial wire shall be installed below the pipe at a minimum depth of 18 inches from finished grade.

Wiring placed under pavement and walls or through walls, shall be placed in reclaimed water irrigation casing. See 8.210 Section C.

Splices will be permitted only at junction boxes, valve boxes, or at control equipment. A minimum of 2 feet of excess conductor wire shall be left at all splices and terminal and control valves to facilitate inspection and future splicing.

G. Flushing

All main supply lines shall receive two fully open flushings to remove debris that may have entered the line during construction. The first flushing shall be completed prior to installing valves or testing.

All lateral lines shall receive one full-open flushing prior to placement of sprinkler heads, emitters, and drain valves. Note, drain valves on main lines are not recommended. Quick couplers shall be installed on the downstream side at the cross connection device and at each terminus of the main line from the cross connection device. The flushing shall be of sufficient duration to remove any dirt and debris that have entered the lateral lines during construction.

H. Testing

All gauges used for testing water pressure shall be certified correct by an independent testing laboratory immediately prior to use on the project. Gauges shall be retested when ordered by the inspector.

Automatic controllers shall be tested by actual operation for a period of two weeks under normal operating conditions. Should adjustments be required, the Contractor shall do so according to the manufacturer's recommendation or under the City's direction until the operation is satisfactory to the City.

All main lines shall be purged of air and tested with a minimum static water pressure of 150 psi for 60 minutes without introduction of additional service or pumping pressure. Testing shall be done with one pressure gauge installed on the line in a location determined by the

City inspector. Lines which show loss of pressure exceeding 5 psi after 60 minutes will be rejected.

All lateral lines shall be purged of air and tested in place at operating line pressure with a pressure gauge and with all fittings capped or plugged. The operating line pressure shall be maintained for 30 minutes with valves closed and without introduction of additional pressure. Lines which show leaks or loss of pressure exceeding 5 psi at the end of specified test period will be rejected.

The contractor shall correct rejected installations and retest for leaks as specified herein.

I. Testing

Backfill shall not be started until all piping has been inspected, tested and approved by the City inspector, after which, backfilling shall be completed as soon as possible. All backfill material placed within 6 inches of the pipe shall be free of rocks, roots, or other objectionable material which might cut or otherwise damage the pipe.

J. Adjusting System

Before final inspection, the contractor shall adjust and balance all sprinklers to provide adequate and uniform coverage. Spray patterns shall be balanced by adjusting individual sprinkler heads with the adjustment screws or replacing nozzles to produce a uniform pattern.

K. System Operation

The reclaimed water irrigation system shall be completely installed, tested and operable prior to planting unless otherwise specified in the plans or as approved by the City. The contractor shall be responsible for all maintenance, repair, and testing, inspecting and automatic operation of the system until all work is considered complete as determined by the final inspection.

L. As-Built Plans

Upon final acceptance of the work, the contractor shall submit Record / As-built drawings.

LIST OF DRAWINGS – RECLAIMED WATER

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1" Reclaimed Water Meter Service	6 - 1
1-1/2" Reclaimed Water Meter Service W/bypass.	6 - 2
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