

Appendix L
Design and Construction Standards

CHAPTER 6

Water

6.010 General

Any extension of the Tumwater Water System must be approved by the Department of Public Works and, all extensions must conform to the State Department of Health and the Coordinated Water System Plan and the City Water Comprehensive Plan.

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, as required by the City, whether adequate water pressure and volume will be available to meet fire flow requirements. An analysis of the system shall be required to confirm that fire flow requirements will be met.

All new homes and businesses constructed within the corporate City limits shall connect to City water. All new homes and businesses constructed within the City of Tumwater's Urban Growth Area shall connect to City water provided that the structure originates within 200 feet of a public water main; in the case of private residential or commercial development where the developed property abuts a right-of-way in which a public water main is located or where a service connection is otherwise provided, all structures requiring water shall be required to connect to city water regardless of distance from the public water system.

Anyone who wishes to extend or connect to the City's water system shall contact the Development Services Department for appropriate approvals.

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 and Special Power of Attorney for Annexation if required, and all applicable fees must be paid. For exceptions to this policy see Section 3.120 C.2.

Issuance of building permits for new construction shall not occur until final Public Works approval is given. As an exception to this policy, building permits may be issued upon completion and acceptance of the

required fire protection facilities and the requirements as outlined in 3.120 C.2 have been met. **The certificate of occupancy will not be issued until final Public Works approval is given for all improvements.**

6.020 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 3.010 and 3.060. Mains and fittings shall be located on the north or east side six feet off centerline of the roadway, drive aisle, private drive, or easement. On boulevards and arterial roadways, the location of the water main and fittings shall be located as directed by the City, see Chapter 4 street details.

The layout of extensions shall provide for the future continuation and/or "looping," of the existing system. Specific looping requirements shall be determined during plan review by the City. Dead end mains shall only be installed if looping is impractical due to topography, geology, or as determined by the City. At a minimum, two connection points on separate mains to provide dual feeds for the development shall be required. In addition, main extensions shall be as required in Chapter 3.190.

In order to prevent transient water conditions and increased pressure losses, water main velocities shall not exceed 8 feet per second during peak and fire flow conditions.

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

6.024 Water Modeling

Water modeling shall be required to adequately size and loop mains in order to achieve fire flow and peak hour demands. The City will determine whether the modeling will be completed by the City or by the design engineer.

Peak hour demand modeling will only be completed when required by the City.

Fire flow (flow and pressure) will be determined through modeling under conditions specified by the City. A physical fire flow test will not replace the requirement for modeling.

General Notes (Water Main Installation)

1. All workmanship and material shall be in accordance with City of Tumwater standards and the most current copy of the WSDOT/APWA Standard Specifications for Road, Bridge, and Municipal construction. In cases of conflict, the most stringent standard shall apply.
2. The contractor shall be in compliance with all safety standards and requirements as set forth by OSHA, WISHA, and the Washington State Department of Labor and Industries.
3. The contractor shall be responsible for all traffic control in accordance with the WSDOT/APWA Standard Plans for Road, Bridge, and Municipal Construction (all applicable “K” plans) and/or the Manual on Uniform Traffic Control Devices MUTCD). Prior to disruption of any traffic, a traffic control plan shall be prepared and submitted to the City for approval. No work shall commence until all approved traffic is in place.
4. All approvals and permits required by the City of Tumwater shall be obtained by the contractor prior to the start of construction.
5. If construction is to take place in the County right-of-way, the contractor shall notify the County and obtain all the required approvals and permits.
6. A preconstruction meeting shall be held with the City of Tumwater Construction Inspector prior to the start of construction.
7. The contractor shall be fully responsible for the location and protection of all existing utilities. The contractor shall verify all utility locations prior to construction by calling the Underground Locate line at 1-800-424-5555 a minimum of 48 hours prior to any excavation.
8. It shall be the responsibility of the contractor to have a copy of an approved set of plans on the construction site at all times.
9. All surveying and staking shall be performed per the corresponding chapter of the City of Tumwater Development Guidelines and Public Works Standards.
10. Temporary erosion control/water pollution measures shall be required in accordance with Section 1-07.15 of the WSDOT/APWA Standard Specifications for Road, Bridge, and Municipal Construction and the City

- of Tumwater Drainage Design and Erosion control standards. At no time will silts and debris be allowed to drain into an existing or newly installed facility unless special provisions have been designed.
11. Water mains equal to or less than ten inches in diameter shall be AWWA C900 Class 200 or ductile iron standard pressure rating 350. Water mains larger than 10 inches in diameter shall be ductile iron standard pressure class rating 350. See Chapter 6.030B for more detailed pipe specifications.
 12. 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 or Waterous Series 2500.
 13. **Existing valves shall be operated by City employees only.**
 14. Hydrants shall be City approved as specified on the hydrant and shall be bagged until the system is approved. All hydrants shall be equipped with Storz adapters.
 15. The contractor shall install, chlorinate, and flush all water lines. The lines shall be chlorinated and tested in conformance with the above referenced specification (See Note 1 above) and Section 6.200 of the Development Guidelines and Public Works Standards. After flushing the chlorinated water from the disinfected lines, the contractor shall measure the chlorine residual to verify that flushing is complete. This shall be completed prior to requesting the City for microbiological samples.
 16. All pipe and services shall be installed with continuous tracer tape installed 12" to 18" under the ground surface. The marker shall be plastic non-biodegradable, metal core backing marked "water" which can be detected by a standard metal detector. Tape shall be Terra Tape "D" or approved equal. In addition to tracer tape, install direct bury, U.S.E. 14 gauge blue coated copper wire, wrapped around or taped to the pipe, as shown on detail. Low voltage grease-type splice kits shall be used on tracer wire. Continuity testing of the wire will be done by the City.
 17. All service line locations shall be marked on the top or face of the curb with an embossed "W" 3 inches high and ¼ inch into concrete.
 18. The City will be given 72 hours notice prior to scheduling a shutdown. Where connections require "field verification", connection points shall be

exposed by contractor and fittings verified 72 hours prior to distributing shut-down notices.

19. Separation between water and sewer shall be maintained per Department of Ecology (DOE) standards. See Development Guide Section 6.130 for more information.
20. A concrete pad per detail shall be installed around all valve boxes and blow-offs that are not in a pavement area.
21. 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.
22. The minimum burial depth of all water lines shall be 42 inches.
23. 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.
24. At the City's request the contractor shall install a temporary 2-inch brass blow off for flushing and sampling on the existing and/or new water main. 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 and sampling are completed the 2-inch pipe shall be removed. The corporation stop shall be shut off and capped tight with threaded brass cap.
25. When an existing City 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 water services to the new main.
26. Sand shall be placed around and under service lines by hand to a height of 6-inches above and 4-inches below the line (s). Excavation for the meter box shall be an additional one foot around the entire box and backfilled with sand per City detail.
27. Meters 3 inches or larger in size must be ordered by the contractor/developer a minimum of 10 weeks in advance of installation.

28. All valve box, blow-off, and manhole lids shall be clean and clear of asphalt or concrete before scheduling a walk through.
29. The 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. In no case shall the test pressure be less than 225 psi.
30. No lot line water mains are allowed.

6.025 Wellhead Protection Areas

The wellhead protection area designated for each of the City's wells is an irregular boundary determined by topography, water flow patterns (both above and below ground), soil types, flow rates and other criteria. Please contact the Development Services Department or Water Resources in Public Works to determine whether your project is situated within a wellhead protection area. In order to protect the public water supply, all applicable portions of the Aquifer Protection ordinance and the Wellhead Protection ordinance as specified in TMC 16.26 and the following criteria shall apply to any project or portion of a project which is partially or completely located within a wellhead protection area.

- ◆ Existing private wells within the City of Tumwater shall comply with the Department of Ecology standards.
- ◆ The drilling of new exempt wells, or the redevelopment of existing exempt wells, shall be prohibited within the City's critical aquifer recharge areas except where the use of such wells is for the purpose of the City of Tumwater's water supply, or resource protection, environmental monitoring or remediation of contamination.
- ◆ All storm water shall be directed away from the well's 100 foot sanitary setback. Storm water shall not penetrate the same aquifer supplying the well within the well's 1-year time-of-travel zone.
- ◆ A storm and erosion control plan requiring treatment of storm water is required. Depending on the individual characteristics of the project, and the susceptibility of the particular wellhead to contamination, more stringent treatment requirements than those required in the *Drainage Design and Erosion Control Manual for Tumwater* may be imposed by the City.
- ◆ If the project is to be platted, it must be noted within the covenants of the plat and in the General Notes of any engineering plans that the project is located within the one, five, or ten year time-of-travel zone wellhead protection area.
- ◆ All garbage bins and dumpsters, except in single family subdivisions, shall be covered in a manner that prevents rainwater from entering the containers. A sanitary drain shall be provided for compaction-style dumpsters that may generate leachate.

- ◆ In commercial projects, where hazardous products are stored or used, a spill and containment plan shall be implemented. Depending on the nature of a project, more stringent spill and containment requirements than those required in the *Drainage Design and Erosion Control Manual for Tumwater* may be imposed by the City.
- ◆ Integrated pest management shall be utilized in choosing landscaping. This is required to minimize the use of pesticides, fertilizers, etc. Contact Thurston County Environmental Health for the most current Integrated Pest Management standards.
- ◆ Land spreading disposal facilities (as defined by WAC 173-304 and WAC 173-308) are prohibited within the designated one-year time-of-travel zone.
- ◆ Agricultural operations including stockyards and feedlots involving the raising and keeping of farm animals are prohibited in the one-year time-of-travel. TMC 16.26.040. Examples include, but are not limited to, dairies, stables, horse boarding/training, auction facilities, feedlots, and poultry raising.
- ◆ Gas stations, petroleum products refinement, reprocessing, and storage (except underground storage of heating oil or agricultural fueling in quantities less than 1,100 gallons for consumptive use on the parcel where stored), and liquid petroleum products pipelines are prohibited within the designated one-year time-of-travel zone. TMC 16.26.040. Examples of other prohibited uses include, but are not limited to, maintenance/fueling facilities for municipal, county, state, school district, transit, airports, railroads, and buses. Gas stations without an attendant are also prohibited.
- ◆ Automobile wrecking yards are prohibited within the designated one-year time-of-travel zone. TMC16.26.040. Examples of other prohibited uses also include junk, scrap, or salvage yards.
- ◆ Wood waste landfills (as defined by WAC 173-304-100) shall be prohibited within the designated one-year time-of-travel zone. TMC16.26.040.
- ◆ Dry cleaners, excluding drop-off only facilities are prohibited within the designated one-year time-of-travel zone. TMC16.26.040.
- ◆ Landfills (municipal sanitary solid waste and hazardous waste) are prohibited within the designated one-, five-, and ten-year time-of-

travel zones. TMC16.26.040.

◆ Hazardous waste transfer, storage and disposal facilities are prohibited within the designated one-, five-, and ten-year time-of-travel zones. TMC16.26.040.

◆ Wood and wood products preserving are prohibited within the designated one-, five- and ten-year time-of-travel zones. TMC16.26.040.

◆ Chemical manufacturing is prohibited within the designated one-, five and ten-year time-of-travel zones. TMC16.26.040.

◆ For any use, new and expanding, within the designated one-, five- and ten-year time-of- travel zones which uses, stores, handles or disposes of hazardous materials, refer to TMC 16.26 for appropriate specifications.

6.030 Main Line

A. 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 City of Tumwater Fire Marshall; however, the quantity of water required will in no case be less than 1,000 GPM at 20 psi residual pressure for single family and duplex occupancies and a cumulative 1500 gpm at 20 psi residual for all other occupancies except IBC Group U. Check with the City's Building Official for Group U requirements. Fire hydrants shall be located on water mains 8 inches diameter and larger.

The minimum water main size shall meet minimum fire flow requirements and be equal to or larger than eight inches for looped lines and ten inches for dead end lines as long as fire flow requirements can be met. The minimum water main size for commercial and industrial applications shall be 12-inch. Larger size mains are required in specific areas outlined in the 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 requirements or for future service. Oversizing agreements may be negotiated with the City.

Pressure

- A minimum of 40 pounds per square inch (psi) at customer meters shall be provided during normal demand conditions and 30psi during peak hour demand, not including a fire or emergency; add 4 psi to the required minimum pressure at the meter for each additional floor above the main floor.
- A maximum distribution system pressure of 130 psi shall be provided during normal demand conditions, not including pressure surges.
- Customers receiving service pressures over 80 psi shall follow the provisions of the Uniform Plumbing Code for pressure reduction with individual PRV's.

Velocity

- Under normal conditions, the velocity of water in a transmission main should be less than 5 feet per second (fps).
- Under emergency conditions, such as fire, the velocity of water in the water mains shall be less than 8 fps.

- B. All pipe for water mains shall comply with one of the following types:

Ductile Iron Pipe: Ductile iron pipe may be used on mains up to 10-inches diameter. Ductile iron pipe shall be used on mains over 10-inches in diameter. Ductile iron pipe shall conform to AWWA C 151 standard pressure class rating 350 and have a cement mortar lining conforming to AWWA C 104. All pipes shall be joined using non-restrained joints which shall be rubber gaskets, push on type or mechanical joint, conforming to AWWA C 111.

For pipes with less than 42 inches of cover, ductile iron pipe shall be used. The pressure class shall be no less than 350.

PVC Pipe: All PVC pipe shall conform to the latest revision of the following specifications: 4-inch through 10-inch pipe shall meet AWWA C900 Class 200 standards.

Two Inch Pipe: All two inch pipe shall be blue, class 200 polyethylene plastic pipe manufactured from all virgin material, category 5, grade P34, class C high density polyethylene ID ASTM D2239-SDR7 PE 3408; cell classification 335434C to 355434C from Philips Driscopipe, Eagle Pacific (3408), Superlon Plastics, U.S. Poly or approved equal.

- C. All fittings shall be ductile iron compact 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 plastic non-biodegradable, metal core or backing which can be detected by a standard metal detector. Tape shall be Terra Tape "D" or approved equal. In addition to tracer tape, install 14 gauge, direct bury, U.S.E. blue coated copper wire, wrapped around or taped to the top of pipe, brought up and tied off at valve body as shown on detail.
- E. The minimum cover for all water mains from top of pipe to finish grade shall be 42 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 42 inches regardless of projected grades.
- F. When minimum cover of the 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.
- G. When designing a 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. Only ductile iron pipe will be allowed.

6.040 Connecting To Existing Water Main

If a tap or cut-in is being made by anyone other than the City, the City Inspector shall have the contractor sign the Verification of Disinfected Equipment Form.

The existing or new valve against the new connection or the tapping valve shall be pressure tested prior to any new connection.

After the contractor installs the new main, the contractor shall be responsible for disinfecting and flushing it per specifications in Chapter 6.200 of the *City of Tumwater Development Guidelines and Public Works Standards* and AWWA guidelines.

The developer's engineer shall be responsible for determining the scope of work for connection to existing water mains. See detail. Cut-in tees may be allowed only with the approval of the Director of Public Works.

At the City's request the contractor shall install a temporary 2-inch brass blow off for flushing and sampling on the existing and/or new water main. 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 and sampling are completed the 2-inch pipe shall be removed. The corporation stop shall be shut off and capped with threaded brass cap.

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.

No tap shall be made to an existing main on a Monday without Public Works approval.

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

6.050 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. Either the contractor will notify customers involved or affected by the water service interruption or the City will charge the contractor for the cost of said notification. The contractor shall make every effort to schedule water main construction with a minimum interruption of water service. In certain situations, the City may dictate scheduling of water main shutdowns so as not to impose unnecessary shutdowns during specific periods to existing customers.

6.060 Hydrants

- A. Existing hydrants within the construction project shall be upgraded to current standards or replaced as determined by the City.
- B. The lead from the service main to the fire hydrant shall be per detail.
- C. Fire Hydrants shall have two 2-1/2 inch outlets and one 4-1/2 inch pumper port outlet with a 5 inch Storz adapter. All outport threads shall be National Standard thread. The hydrant shall have a positive and automatic barrel drain. Hydrant shall be of the "safety" or break-away style.
- D. Hydrant leads shall not exceed 60 feet. If a hydrant is required 60 feet or more from the main, the main shall be extended, a tee shall be installed and the hydrant lead shall commence from the second tee. The lead from the service main to the fire hydrant up to 19 feet shall be megalugged. For installations exceeding 19 feet, either megalugs or field lock shall be required. Hydrant extensions shall use restrained joints from the main to the hydrant.

Approved hydrants are as shown on hydrant detail. All hydrants shall be bagged by the contractor until system is approved.

- E. The Department of Public Works and the City of Tumwater Fire Marshall work together to insure that adequate hydrant spacing and installation are achieved.

Unless otherwise required by the City of Tumwater, the following guidelines shall apply for hydrant number and location:

1. On arterials or boulevards, hydrants may be required on both sides of the roadway as determined by the Director of Public Works.
2. At least one hydrant shall be installed at all intersections.
3. Hydrant spacing of 330 feet shall be required in all areas except single family and duplex residential areas.
4. Hydrant spacing of 660 feet shall be required for single family and duplex residential areas.
5. A hydrant shall be located at the end of all mains eight inches or larger if the end of the line is more than 200 feet from the previous hydrant.
6. Hydrants located in cul-de-sac or dead end areas which, either by design, topographic or manmade feature, prohibit straight line distance measurement, shall be located to serve no more than 120,000 square feet or have a maximum travel distance of 330 feet. Where a cul-de-sac or dead end exceeds 330 feet, a hydrant shall be required.
7. When any portion of a proposed commercial building is in excess of 400 feet from a fire hydrant on public street, on-site hydrants may be required by the City of Tumwater Fire Marshall. Such hydrants shall be located per City of Tumwater Fire Marshall and easements for such hydrants shall be granted to the City.
8. An additional fire hydrant may be required at a commercial, institutional, industrial, or converted business if an existing structure is enlarged, altered, repaired, or moved when the floor area exceeds 500 square feet and/or when structural additions, alterations and/or repairs to any portion of an

existing structure within any 12 month period exceeds 25 percent of the value of the structure over 500 square feet.

9. Buildings or structures having a water flow requirement of 1,500 gpm or more shall be supplied by looped 12 inch or larger water mains around the building with hydrants spaced per the Fire Code. Internal looping will be confirmed using water modeling.

10. Hydrants shall be a minimum 40 feet from any building.

11. A two-way, blue reflective hydrant marker per the striping detail shall be required perpendicular to each hydrant. Hydrant markers shall be placed four inches from the centerline on the same side of the road as the hydrant.

A scaled down plan view of the proposed water system shall be included on the plans. The scale shall be appropriate to show the entire proposed system. This plan view shall show the location of all the proposed hydrants plus the location of the appropriate existing hydrants adjoining the project. If the project only includes the addition of one or two new hydrants, the locations of at least 3 existing hydrants in the project vicinity need to be shown on the plan view.

- F. Fire hydrants shall be set as shown on the hydrant detail.
- G. For requirements regarding use, size and location of a fire department connection (FDC) and/or post indicator valve contact the City of Tumwater Fire Marshall. Location of FDC shall be shown on water plans.
- H. Where needed, the Department of Public Works or City of Tumwater Fire Marshall may require hydrants to be protected by two or more bollards. See detail and Fire Code.
- I. Fire hydrants meeting required fire flow must be installed, tested, and accepted prior to the issuance of a building permit.
- J. All fire hydrants in the City of Tumwater shall be powder coated according to the following procedures:

1. Sandblast hydrant.
2. Preheat hydrant @ 400 degrees for 1 hour.
3. Apply one coat of epoxy base primer, 2.5 to 3.5 mils.
4. Flash 1st coat 15 to 20 minutes @ 400 degrees.
5. Add 2nd coat of powder, 1.5 to 2.5 mils.
6. Bake in oven @ 400 degrees for 40 minutes.
7. Remove and cool.

Powder to be used: Cardinal T009-YL14, D.O.T. Yellow, T.G.I.C. Polyester 90% Gloss.

6.062 Hydrant Meters

Hydrant meters may be obtained by completing the required paperwork with Public Works at the Maintenance Service Center (7200 New Market Street SW). A deposit is required. Once the deposit is made, the meter may be picked up by the applicant. A daily fee and charges for the amount of water used is billed on a monthly basis. Also, any damages incurred and final billings are assessed upon returning the meter to the Maintenance Service Center. Those fees are subtracted from the deposit paid and a refund check is mailed to the applicant.

The contractor shall ensure that measures to prevent backflow, cross connections and contamination of the City system comply with AWWA standards. When using the hydrant meter to fill a vehicle, the vehicle must be equipped with an approved antisiphon air gap. The air gap shall be at least twice the diameter of the inlet pipe. See Detail.

6.065 Fire Sprinkler Underground Line

This chapter refers to building fire sprinkler lines, not irrigation or landscape sprinkler lines.

City of Tumwater Fire Marshall will witness the test of the sprinkler underground line and obtain the certificate for underground piping. The sprinkler underground line shall be tested per N.F.P.A. pamphlet #24 standards. The sprinkler underground line shall not be tested until Public Works has tested and approved the distribution main up to the City valve. A microbiological sample shall be obtained from the fire sprinkler main between the City's main line valve and the backflow prevention assembly (BPA). The City's main line valve shall not be opened before a satisfactory test result has been returned. See drawing

6-25 for a map clarifying the location of the City valve and the sprinkler underground line.

If a BPA is not located in a public right-of-way, easements shall be required. The sprinkler underground line shall be that portion of the line located behind the City valve.

In no instance shall domestic or irrigation service connections be made to the sprinkler underground line.

See Chapter 6.110, Backflow Prevention, for additional information.

6.070 Valves

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

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 1,000 feet. There shall be three valves on each tee and four valves on each cross (excluding hydrant tees.) Valves installed with tees and crosses shall be flanged together. All valves shall open counter-clockwise. Additional valves and valve spacing may be required by the City during plan review.

- A. Gate Valves, 2 inch to twelve inch: The design, materials and workmanship of all gate valves shall be Ductile Iron Body resilient wedge valves conforming 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, Kennedy, Clow R/W, Waterous Series 2500, or American AVK.
- B. Butterfly Valves: Butterfly valves shall be used on all lines 14 inches and larger except when a tapping valve is required. Butterfly valves shall conform to AWWA C504, Class 150B, with cast iron short body, O-ring stem seals, geared operator designed for underground installation, and a 2-inch square operating nut. Butterfly valves shall be Mueller, Linseal III, Kennedy, M&H, Pratt Ground hog, or Allis Chalmers.
- C. Valve Box: All valves shall have a standard East Jordan Iron Works or an 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. 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 detail.

- D. Valve Marker Post: Valve marker posts shall be 4-inch by 4-inch reinforced concrete or schedule 40 steel posts 5-feet long stamped with "W" and distance to valve in blue. Post shall be painted with one base coat and two coats white oil base enamel. The need for valve marker posts will be determined during plan review. See detail.

6.075 Bend Markers

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

6.080 Casing

The casing shall be as follows: one quarter inch steel casing pipe or ductile iron class 52. In special cases C-900 class 200 PVC pipe may be allowed. Casing spacers are required. A minimum of three spacers are required per 20-feet of pipe. Spacers shall be as manufactured by Uni-Flange®, Calpico Inc. or approved equal. No more than one inch of clearance is allowed per set of spacers or insulators.

All pipe within casings shall be ductile iron class 52.

The joints of the transmission pipe within the casing pipe shall be restrained with a Restrained Casing Spacer made by Uni-Flange®, or if using Calpico Inc. insulators, the pipe joints shall be restrained with a restraint system approved by the City of Tumwater. 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.

6.090 Air and Vacuum Release Valve

Air and vacuum release valves (ARV) shall be installed on the same side of the street (water north & east) as the main, behind the sidewalk on the property corner (residential applications). For mains up to 12 inches diameter ARV's shall be as shown on detail. The engineer shall size the ARV for mains 14 inches diameter and larger.

ARV's must be installed so as not to create a cross connection situation. Measures to prevent backflow, cross connections, and contamination of the City system shall comply with AWWA standards.

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 are to be graded to prevent the need for an air release valve.

6.100 Blowoff Assembly

The blowoff assembly shall be as shown on the details at the end of this Chapter. The pressure rating for blowoff assemblies shall be 200 psi. If located in cul-de-sacs, the blowoff assembly shall be placed near the center of the cul-de-sac. See Section 6.060 for hydrant requirements at the end of 8-inch and larger mains.

6.110 Backflow Prevention

A. General

The installation of required backflow assemblies is necessary to protect the public water system from possible contamination. All water system connections to serve newly constructed and existing buildings or properties with domestic potable water, sprinkler systems, or irrigation systems shall comply with the minimum backflow prevention requirements as established by the Department of Health (DOH), and the American Water Works Association (AWWA) Standards.

Real or potential cross connections with the City of Tumwater water system shall be prohibited under all circumstances.

Please refer to Chapter 6.065 for additional information regarding sprinkler underground lines.

Please refer to Chapter 6.062 for requirements when filling vehicles with a hydrant meter.

B. Definitions Related to Cross Connection Control

Backflow

The undesirable reversal of flow of water or other substances through a cross connection into the public water system or consumer's potable water system.

Backflow Assembly Tester (BAT)

A person holding a valid BAT certificate issued in accordance with chapter 246-292 WAC.

Cross Connection

Any actual or potential physical connection between a public water system or the consumer's water system and any source of nonpotable liquid, solid or gas that could contaminate the potable supply by backflow.

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 shut-off valves attached to each end of the assembly and fitted with properly located test cocks. This assembly will only be used to protect against a non-health hazard.

Double Check Detector Assembly (DCDA)

The term "double check detector 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 is designed for use on fire protection services rated as a low-health hazard, (no chemical addition).

High health hazard

A cross connection which could impair the quality of potable water and create an actual public health hazard through chemical or radiological poisoning, the spread of disease, or physical hazard.

In-Premises or Fixture Isolation

A method of protection for the health of consumers served by the consumer's potable water system. The installation of an approved air

gap or backflow prevention assembly within the property lines of the consumer's premises at, or near, the point of hazard.

Low health hazard

A cross connection that could cause an impairment of the quality of potable water to a degree that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic qualities of such potable waters for domestic use.

Premises Isolation

A method of protecting a public water system by installation of approved air gaps or approved backflow prevention assemblies at or near the service connection or an alternative location acceptable to the purveyor; to isolate the consumer's entire water system from the public water system.

Reduced Pressure Backflow Assembly (RPBA)

The term "reduced pressure backflow 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 shut off valves at each end of the assembly. This assembly is designed to protect against a high health hazard.

Reduced Pressure Detector Assembly (RPDA)

The term "reduced pressure detector assembly" will mean a specially designed assembly composed of a line-size approved reduced pressure principle backflow prevention assembly with a specific bypass water meter and a meter size approved reduced pressure principle backflow prevention assembly. This assembly is designed for use on all fire protection services rated as a high health hazard (with chemical addition).

Unapproved Auxiliary Water Supply

A water supply (other than the purveyor's water supply) on or available to the consumer's premises that is either not approved for human consumption by the health agency having jurisdiction, or is not otherwise acceptable to the purveyor.

Uniform Plumbing Code

The code adopted under RCW 19.27.031(4) and amended under chapter 51-46 WAC. This code establishes statewide minimum

plumbing standards applicable within the property lines of the consumer's premises.

C. Design and Installation Requirements

1. Any backflow prevention assembly must be installed in full compliance with all relevant aspects of the uniform plumbing code (UPC).
2. When a backflow prevention assembly is required, plans shall be submitted to the City of Tumwater for review and approval prior to installation. In the City of Tumwater, premise isolation is required in all development except residential. Residential development will be considered on a case-by-case basis according to the assessed degree of hazard that exists.
3. Premise isolation 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 Control Specialist or the Public Works Director. Premise isolation assemblies are not permitted inside of buildings.
4. Backflow prevention assemblies and air release valves shall never be submerged in water or installed in any area subject to flooding. If installed in an underground vault, adequate drainage shall be provided.
5. Assemblies must be protected from freezing and other severe weather conditions.
6. If assemblies are to be vertically oriented, the type and model specified shall be approved by DOH for vertical installation in that orientation.
7. All assemblies require a minimum clearance for routine maintenance and testing. Assemblies 2 inches and smaller shall have at least 6 inches clearance on all sides of the assembly. All assemblies larger than 2 inches shall have a minimum clearance of

12 inches on the back side, 24 inches on the test cock side, and 12 inches below the assembly. All RPBA's shall have at least 12 inches of clearance below the drain opening.

8. Support and stability of all assemblies shall be given prime consideration. All assemblies shall be suitably braced to prevent movement.
9. 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.
10. The piping on the inlet side of the assembly shall be rigid brass or copper. Galvanized piping shall not be allowed.
11. When trap primers are required in buildings, a proper air gap (a minimum of two times the supply pipe diameter) is required between the potable water supply and the sewer connection.
12. Backflow assemblies for fire protection shall have approved integrated shut-off valves as part of the assembly and shall be separate from any post indicator valve installed on the sprinkler underground line.
13. When a RPBA is located inside a building or structure, it shall be installed in a location where the occasional spitting from the relief valve and the constant possible discharge in the event of a fouled check valve will not be objectionable. An approved air gap funnel assembly, provided by the manufacturer or fabricated for the specific installation, may be installed to handle the occasional spitting of the relief valve due to pressure fluctuations. A line from the funnel assembly may be run to an adequately sized floor drain of equal or greater size. Check with the manufacturer for the relief valve discharge rates to determine size of the drain.
14. Drains shall be sized to carry the full rated flow of the assembly and shall be double screened and double banded on both ends.

15. Any backflow assembly installed more than 4 feet above floor or ground level shall have a platform under it. The platform shall comply with all applicable safety standards and codes.
16. Assemblies may not be installed above electrical panels or motors.
17. The access to a device located inside a building or structure shall have minimum accessible entrance of three feet wide by five feet high. There shall be no obstacles or structures interfering with these dimensions that could prevent access to the assembly.
18. When installation is complete, the City of Tumwater Public Works Cross Connection Control Specialist shall be notified, and a Washington state certified Backflow Tester (BAT) shall inspect and test the assembly to insure proper installation and operation. Certificate of Occupancy, and water service, shall not be issued until the Public Works Department is provided with a successfully completed test report.
19. The City of Tumwater Public Works Cross Connection Control Specialist reserves the right to reject the test reports that are not complete and accurate. Submittal of inaccurate test results shall result in denial of report forms and a requirement to retest the backflow assembly.
20. No field modifications shall be made to an approved backflow assembly that will change its configuration or function.
21. An approved certificate for verification of accuracy from an approved calibration laboratory or agency shall be provided to the City of Tumwater Public Works Department on an annual basis for approved backflow testing equipment used in the protection of the City of Tumwater 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 Tumwater Public Works Department along with a completed assembly test report.

22. 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 Tumwater Public Works Cross Connection Control Specialist.

When installation is complete, a Washington State Certified Backflow Assembly Tester (BAT) shall inspect and test the assembly to insure proper installation and operation. Certificate of Occupancy and water service shall not be issued until the testing certificate is received, reviewed, and approved by the City of Tumwater.

D. Applicability

Backflow prevention assemblies shall be installed at the expense of the property owner. A backflow prevention assembly shall be installed at any premise or fixture where installation is deemed necessary to accomplish the purpose of these regulations, either at the service connection or within the premises, as determined by the City's Cross Connection Control Specialist or the Director of Public Works. Situations where a backflow assembly will be required include, but are not limited to:

1. If the nature and extent of any activity on a premises, the materials used in connection with any activity on a premises, or the materials stored on the premises, could in any way contaminate or pollute the potable water supply.
2. When existing internal cross connections are not correctable, or intricate plumbing arrangements make it impractical to ascertain whether or not a cross connection exists.
3. If entry is restricted such that inspections for cross connections cannot be made with sufficient frequency or with sufficient notice.
4. If materials of toxic, objectionable, or hazardous nature, either liquids, solids, or gases are being used such that, if back siphonage or back pressure should occur, a health hazard could result.
5. On any mobile apparatus that connects to or takes water from the City's water system.

6. Any use of radiant heat will require the installation of a reduced pressure backflow assembly (RPBA) at the meter.
7. When an in-ground irrigation system is connected to the public water system.
8. Whenever any unapproved alternative water source is present on the premise.
9. A reduced pressure backflow assembly (RPBA) 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 RPBA device shall be installed at the meter.
10. On any premises where a bypass arrangement is installed around the backflow assembly, a second backflow assembly of equal protection shall be installed on the bypass piping.
11. Any customer with a recognized real or potential cross connection shall be required to install an appropriate backflow prevention assembly, commensurate with the degree of hazard and the backflow conditions. Failure on the part of any customer to properly protect the public water system from contamination is sufficient cause for the immediate discontinuance of public water service to the premise. At its discretion the city may elect to install the appropriate backflow prevention assembly at the owner's expense.

E. Follow-up Testing

All backflow assemblies shall be tested on an annual basis, to insure proper operation. Annual testing is required at the user's expense. The results of the annual testing shall be submitted to the City of Tumwater Public Works Department.

A list of certified backflow assembly testers (BAT'S) who have registered with the City and are in good standing, is available upon request. The tester shall hold a current Washington State Department of Health Backflow Assembly Tester (BAT) Certification and possess documentation insuring their test gauge is properly calibrated.

Any BAT who knowingly submits false documents or a false test report shall be removed from the City's list of BAT's in good standing. If the City determines the false report was malicious and/or could have resulted in illness or death, a report will be made to the Washington Department of Health and proceedings to suspend or revoke the BAT's certificate shall be initiated.

All assemblies found not functioning properly shall be promptly repaired or replaced by the water user. If any such assembly is not promptly repaired or replaced, the City may deny or discontinue water to the premise until the correction is made. All testing and repairs are the financial responsibility of the water user.

Existing backflow assemblies that are no longer on the DOH approved list of 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 an approved assembly commensurate with the degree of hazard.

The City of Tumwater has the authority to perform regular inspections on all backflow assemblies used to protect the City's water system and shall be provided reasonable access to the premises for inspection purposes. If reasonable access cannot be provided, a reduced pressure backflow assembly must be installed at the service connection to that premises.

F. Backflow Assembly Test (BAT) Form Requirements

The following information is required on all test report forms submitted to the City. Items 1 through 12 are standard information required on all forms.

1. BAT Certification Number.
2. Name: Name of business or property owner.
3. Address: Your building or residence street address.
4. 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.
5. What the Cross-Connection Hazard is: Backflow devices isolate such things as irrigation systems, carbonation machines, boilers, etc.

6. Size/Type: Size and type of backflow preventer, such as ½ inch DCVA.
 - Manufacturer.
 - Name, Serial Number: Be accurate. Include alpha prefixes, such as A120220.
 - Model Number/Model: Use complete model number, such as 007LTK.
7. 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.
8. 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.
9. Test Results: To include the following:
 - Values required for each check valve tested.
 - Repair information and details.
 - Final test results.
10. Test Equipment Information: Record the gauge, make, model, serial number, and verification of accuracy date.
11. Certified Tester Information.
 - Important Note: The report form must include the signature of the person performing the test, a certification number, and the date of the test.
 - All test reports must include legibly printed tester's name, telephone number, certification number, test completion date, gauge serial number, and gauge accuracy.
12. Person Repairing Assembly: Printed or typed name of person repairing assembly.

6.120 Service Connection

- A. All service connections relating to new development shall be installed by the developer at the time of mainline construction. Services shall not be connected to a hydrant lead or the sprinkler underground line. After final Public Works approval has been given, 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 system is inspected and approved. The use of construction bibs or “cheaters” is prohibited.

- 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 service line, the meter, box, and setter.

Service taps larger than 2 inches, connecting to an existing main, shall be made by the contractor per Section 6.040. Service taps that require crossing an arterial street in excess of two lane widths shall be made by the contractor. These types of services shall be denoted on the plans.

- C. Service lines shall be as specified herein. No glued joints will be accepted. Service lines shall be installed perpendicular to and $22\frac{1}{2}^{\circ}$ above horizontal of the main. Tracer tape and wire wrapped around the pipe shall be installed on all service lines.

One to two inch diameter service lines shall be blue in color pressure class 200, polyethylene plastic tubing manufactured from all virgin material category 5, grade P34, class C high density weight polyethylene OD ASTM D2737-SDR7 PE3408 or ASTM D2239-SDR7 PE3408; cell classification 335434C to 355434C, from Philips Driscopipe, Eagle Pacific (3408), Superlon Plastics, 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.

- D. With the exception of public and private school sites, new installation of master meters will not be allowed.
- E. After January 1, 2007, when connection to the public water system is desired by a customer connected to a well exempt from the

provisions of RCW 90.44.050, the “exempt” well must be properly decommissioned per DOE standards prior to making the connection. When connection to the public water system is desired by a customer connected to an existing well permitted under the provisions of RCW 90.44.050, or with such a “permitted” well on site, a physical disconnect between the well and the public water system must be made and maintained. This is necessary to assure that an unapproved auxiliary water supply (the customer’s well) will not contaminate the City’s water supply. Provided it is in compliance with DOE setback standards, the customer’s “permitted” well may be kept serviceable for irrigation purposes only. In addition, if a well is to be used for irrigation, an RPBA shall be required and installed as premise isolation at the public water supply service connection. If an existing well is not to be used for irrigation purposes, it must be decommissioned per DOE standards. No water meter will be installed until the RPBA is installed and a cross connection inspection has been completed to the satisfaction of the City.

- F. Lots or pads created by plats, replats, short plats, or binding site plans shall have a water service installed as required below.

In single family subdivisions, (including mobile home and manufactured home subdivisions) a service shall be provided to each lot or pad, including open tracts and landscaping in the right-of-way. If a domestic and an irrigation meter are desired at a particular lot or tract, additional services shall be installed.

Duplexes shall have a separate service installed for each living unit regardless of how many duplexes are on a single lot. Example: One duplex on one lot shall have two services; two duplexes on one lot shall have four services and so on. A subdivision of duplexes shall have at least one service installed at all open tracts.

Multi-family and commercial complexes shall have at least one meter installed per separate building and a separate irrigation meter(s) if an irrigation system is installed. Additional meters to a multi-family or commercial building may be installed if desired. At least one service shall be installed at all open tracts. Master meters shall meet the criteria as outlined in 6.120D above.

G. Sample stations may be required per the City detail. The requirement for the location and type of sample station will be determined by the City during the plan review. Sample stations shall be located behind the walk on a property line, 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.

H. Service configuration shall be as shown on details at the end of this Chapter. Meters 3 inches and larger shall not be placed in a traffic bearing location. For services larger than 3 inches, the engineer shall submit a detail for approval that addresses the following:

- meter type (turbine, compound, etc.) and size,
- a valve shall be located on both sides of the meter,
- a lockable bypass is required,
- check valves shall be required on the bypass and the meter,
- supports (jack stands) are required under the meter and bypass,
- the vault specified shall provide an 18” clear space from the vault wall to the closest edge of the meter, valves, or pipe,
- the vault shall have a double lid with a reader lid insert,
- the distance from the top of the meter to the bottom of the lid shall be 24 inches minimum and 30 inches maximum,
- a ladder shall be provided in the vault,
- drainage must be provided for the meter pit,
- the inside depth of the vault shall not exceed four feet from the top finish grade to the inside floor elevation.

6.121 Water Meter Purchasing

In an effort to eliminate unaccounted water, the use of construction bibs or other devices used to obtain water without a water meter shall not be permitted. Water meters shall be purchased and installed prior to building permit issuance.

The following requirements shall apply to projects located within the Tumwater water service area.

Residential and Commercial Projects within the City limits:

1. The installation of a water meter prior to issuing the residential building permit is required. The applicant will pay for the water meter (s) (not the related water and sewer general facility charges, LOTT

Capitol Development charge and the stormwater charge) prior to the building permit issuance.

2. The Building Official will ensure a meter is in place at the time of the first inspection. Public Works Inspectors, Meter Readers and the Operations staff will report any construction bibs or connections other than City of Tumwater meters as they transit construction projects. Utility Billing staff will monitor AMR (automated meters) to detect abuse/damage through the use of error reports.

3. Prior to scheduling the final building inspection, the sewer, water, and storm connection fees will be paid by the builder/applicant. Final inspection will not be scheduled until all required fees have been paid.

Residential and Commercial Projects within the Urban Growth Area:

1. The builder/applicant will be required to purchase a meter and pay **all** connection fees prior to the issuance of a building permit.

Irrigation Meters:

1. The developer is required to purchase and install irrigation meters prior to the final plat document being recorded or Final Public Works construction approval being provided.

2. Operations staff will be responsible to verify that irrigation meters are installed at the time of the walk through inspection.

General Water Meter Requirements:

1. For all projects that receive City of Tumwater water, builders/developers will be billed for the cost of replacement or repair of all damaged meters.

2. When devices other than City of Tumwater water meters are found in violation of City policy, violators shall be charged with a misdemeanor.

3. Any project that has received a building permit prior to the 2010 Development Guidelines approval are vested and allowed to utilize construction water (for 90 days) as previously permitted; however all are encouraged to purchase their meters at the earliest date possible.

6.125 Marking Service Lines

The location of all service lines shall be marked on the face or top of the cement concrete curb with a "W" 3 inches in height and 1/4 inch into the concrete.

6.130 Water Main/Sanitary Sewer and Reclaimed Water Crossings

The Contractor shall maintain a minimum of 18 inches of vertical separation between sanitary sewers and reclaimed water, and water mains. To accommodate crossings, the minimum cover for water main of 42 inches may be reduced to 24 inches upon approval by the City to provide for as much vertical separation as possible. When a reduced depth is allowed, ductile iron pipe and/or casings may be required. See 6.080 for casing specifications.

Pressure sewers and reclaimed water shall only be installed under water 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 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 may be necessary to encase the water pipe and/or sewer/reclaimed water service in pipe per DOE standards. No concrete shall be installed unless specifically directed by the City.

6.140 Water Main/Sanitary Sewer and Reclaimed Water in Parallel

Refer to the City of Tumwater details for water main/sanitary sewer and reclaimed water in parallel.

6.150 Staking

All surveying and staking shall be performed by an engineering or surveying firm capable of performing such work. The surveyor directing such work shall be licensed as a Professional Land Surveyor by the State of Washington.

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

The minimum staking of waterlines shall be as directed by the City Inspector or as follows:

- A. Stake centerline alignment every 50 feet (25 feet through curve sections) with cuts and/or fills to invert of pipe maintaining 42 inches of cover over pipe.
- B. Stake alignment of all fire hydrants, tees, water meters, setters and other fixtures and mark cut or fill to hydrant flange finished grade.

6.160 Trench Excavation

- A. 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.
- B. Trenches shall be excavated to the line and depth designated by the City to provide a minimum of 42 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 from water until joining is complete. Surface water shall be diverted so as not to enter the trench. The owner shall maintain sufficient pumping equipment on the job to insure that these provisions are carried out.
- C. The contractor shall perform all excavation. Whatever obstructions are encountered shall be removed or cut out to the width of the trench or roadway section to a depth six 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.
- D. Trenching and shoring operations shall be in conformance with Washington Industrial Safety and Health Administration (WISHA), Washington Department of Labor and Industries (L&I) and Office of Safety and Health Administration (OSHA) Safety Standard.

6.165 Thrust Blocking

Location of thrust blocking shall be shown on plans. Thrust block shall comply with the City thrust blocking details. The addition of restrained

joint fittings may not eliminate the need for thrust blocking.

6.170 Bedding and Backfilling

Bedding material per the City bedding detail shall be placed and compacted around and 4 inches under the water mains by hand tools and to a height of six inches above the top of the water main. The remaining fill shall be compacted to 95 percent of the maximum density. Where governmental agencies other than the City have jurisdiction over roadways, the fill and compaction shall be done to the satisfaction of the agency having jurisdiction. If suitable material, as determined by the City, is not available from trenching operations, the City may order the placing of imported fill conforming to WSDOT/APWA Standard Specification 9-03.12(3) around the water main and gravel base conforming to Section 9-03.10 of the WSDOT/APWA Standard Specifications for Road, Bridge, and Municipal Construction for backfilling the trench. Bedding and backfilling shall be required per the detail.

6.175 Street Patching and Restoration

See Section 4B.170, 4B.173, and 4B.175 and trench restoration detail for requirements regarding street patching and trench restoration.

6.190 Hydrostatic Tests

After the water main and appurtenances and service connections to the meter setter have been installed, filled, and sterilized, the system shall be tested in sections not to exceed 1,500 feet in length. The test shall be conducted 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 for 15 minutes. Any leaks or imperfections developing under said pressure shall be remedied by the contractor. All valves within the system shall be tested. 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 and shall only be used on potable water supplies. 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.

6.200 Sterilization and Flushing

- A. Prior to the acceptance of the work, sterilization of water mains shall be accomplished by the contractor in accordance with the AWWA standard C651-05 for disinfecting water mains. Testing and sampling shall take place after all underground utilities are installed and compaction of the trench to sub-grade or finish grade is complete.
1. The city inspector will open the water valves to fill the new main at the request of the contractor. A minimum chlorine concentration of 50 mg/L shall be established throughout the line. After the main is filled, the valves shall be closed by the city inspector and the line left undisturbed for 24 hours. A minimum free chlorine residual of 10 mg/L shall remain following this period.
 2. After the main has been filled, hydrostatic pressure testing shall be conducted by the contractor in the presence of the city inspector.
 3. After the 24-hour contact time has passed, the contractor shall thoroughly flush the disinfected water main to the sewer or an approved receptacle under the supervision of the city inspector. Flushing will not be complete until chlorine levels in the new main are representative of residuals within the city main system. It will be the contractor's responsibility to measure chlorine residuals during flushing using a method that is accepted by the Washington State Department of Health for drinking water samples. At no time shall chlorinated water from a new main be flushed directly or indirectly into a body of fresh water. This is to included lakes, rivers, streams, drainage ways, and any and all other waters where fish or other natural aquatic life can be expected.
 4. After the main has been thoroughly flushed, water samples shall be taken. Only the city inspector will close the water valves to ensure that the new section is isolated. The city inspector will request microbiological samples to be collected by city staff. For approval by

the local health agency, samples will be collected by the city no sooner than 24 hours after flushing is completed. The valves are to remain closed until microbiological samples for all the connection are satisfactory.

B. Subsequent action will be taken based on initial results of microbiological tests.

1. If coliform bacteria are absent in all new main samples, the city will open valves to the new and the existing system. At that time, the testing process for the new section of main shall be considered complete.
2. If coliform bacteria are present in one new main sample, but there is absence of fecal coliforms or *E. coli.*, the contractor shall take action as directed by the city inspector, including re-flushing the water main. The city shall then re-sample the new main to ensure that the entire section was adequately sterilized as determined by the results of microbiological sample(s) collected following the process in A.3 above.
3. If coliform bacteria are present in more than 1 sample collected from the new section, or from a second sample collected under step B.2., or if fecal coliforms or *E. coli* were detected in any of the new main samples, the city shall ensure that a microbiological sample is collected from the existing water system “upstream” of the project. If the “upstream” sample(s) indicates that coliforms are present in the city water system, go to “C” below. If the “upstream” sample indicates an absence of coliforms in the city water system, the contractor shall re-disinfect the new mains with sodium hypochlorite solution using the continuous feed method as described in the AWWA Standard C651-05 for Disinfecting Water Mains, and then proceed with steps A.1., A.2 and A.3 above. To demonstrate that the new water main was adequately sterilized two sets of microbiological samples, collected at least 24 hours apart with no flushing in between, must indicate an absence of coliform bacteria in the new main.

- C. If an “upstream” sample indicates the presence of coliform bacteria in the city water system, the city shall follow State Department of Health regulations and guidance for addressing the presence of coliforms in the distribution system. The city will calculate system compliance for coliform bacteria and take appropriate action per the City of Tumwater Coliform Monitoring Plan under the supervision of the City of Tumwater Water Resources Division. Follow-up actions may include, but are not limited to: identifying and correcting the likely source(s) of contamination, flushing, testing, and/or public notification. Disinfection and testing of the new main(s) shall not resume until the city water supplying the project test free of coliforms. At that time, the contractor shall take action as directed by the city inspector, including re-flushing the water main prior to the city requesting another set of microbiological samples.

If the initial treatment results in an unsatisfactory bacteriological test, the original chlorination procedure shall be repeated by the contractor until satisfactory results are obtained.

6.210 Irrigation

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

Prior to submitting the design, the contractor/engineer/landscape architect shall hire an independent Certified Landscape Irrigation Auditor, as certified by The Irrigation Association, to review and approve the proposed design.

After the irrigation system is installed, the contractor shall provide an irrigation audit to be performed on the new system by an independent Certified Landscape Irrigation Auditor (CLIA), as certified by the Irrigation Association, prior to final field observation by the Engineer. The CLIA shall test for proper coverage as determined by the Landscape Irrigation Auditor Handbook, most recent edition. The CLIA shall provide written certification that the irrigation system installed provides proper coverage as provided in the handbook.

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

Irrigation systems shall be installed with an approved backflow prevention assembly in accordance with Chapter 6.110 of this manual.

A separate irrigation meter shall be provided for irrigation systems. Medians shall require a separate meter. The irrigation system shall be installed after the area has been properly prepared. See Chapter 4B.125 for soil preparation requirements. 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.

Irrigation sprinklers shall be situated so as to not wet any public street or sidewalk. Spray heads shall not be used in planters less than 3 feet wide. Drip 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 irrigation emitters shall be installed in accordance with the manufacturer's recommendations.

Installation and maintenance of irrigation systems in roadway planter strips installed by private development shall be as shown in the table below. The system maintainer shall be responsible for the on-going water and power expenses incurred.

	Single Family Residential Zones	Multi-Family & All Other Zones
Arterial Boulevard	Developer installs, Homeowners Association maintains	Developer installs, Owner or Owners Association maintains
Arterial	Developer installs, Homeowners Association maintains	Developer installs, Owner or Owners Association maintains
Collector	Developer installs, Homeowners Association maintains	Developer installs, Owners Association maintains
Residential	Developer installs, Homeowner Association maintains	Owner installs, Owner maintains

GENERAL NOTES (IRRIGATION SYSTEMS)

1. All workmanship, material and testing shall be in accordance with the City of Tumwater Development Guidelines, the National Electrical Code and the most current copy of the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction* unless otherwise specified below. In cases of conflict, the most stringent standard shall apply.
2. The contractor shall be in compliance with all safety standards and requirements as set forth by OSHA, WISHA and the Washington State Department of Labor and Industries.
3. The contractor shall be responsible for all traffic control in accordance with the *WSDOT/APWA Standard Plans for Road, Bridge and Municipal Construction* (all applicable “K” plans) and/or the *Manual on Uniform Traffic Control Devices* (MUTCD). Prior to disruption of any traffic, a traffic control plan shall be prepared and submitted to the City for approval. No work shall commence until all approved traffic control is in place.
4. All approvals and permits required by the City of Tumwater shall be obtained by the contractor prior to the start of construction.
5. If construction is to take place in the County right-of-way, the contractor shall notify the County and obtain all the required approvals and permits.
6. If deemed necessary, a pre-construction meeting shall be held with the City of Tumwater Construction Inspector prior to the start of construction.
7. The contractor shall be fully responsible for the location and protection of all existing utilities. The contractor shall verify all utility locations prior to construction by calling the Underground Locate line at 1-800-424-5555 a minimum of 48 hours prior to any excavation.
8. It shall be the responsibility of the contractor to have a copy of an approved set of the landscaping plans on the construction site at all times.
9. Temporary erosion control/water pollution measures shall be required in accordance with section 1-07.15 of the *WSDOT/APWA Standard Specifications for Road, Bridge and Municipal Construction* and the *Drainage Design and Erosion Control Manual for Tumwater*. At no time will silts and debris be allowed to drain into an existing or newly installed facility unless special provisions have been designed.

10. Electrical permits and inspections are required for all irrigation services within the City of Tumwater. 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.

11. A clearly marked service disconnect shall be provided for every automatic 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 Tumwater standards. The service disconnect shall be City approved.

12. All low voltage wire shall be a minimum size of #14 UF from each control valve to the terminal interface.

13. All low voltage splices shall be of a type equal to a Spears DS 400 or a City approved equal. All splices shall be done in valve control boxes. Direct burial splicing will not be allowed

14. The automatic controller components shall be as specified in Section 6.210F of the Development Guidelines.

15. The City will be given 72 hours notice prior to scheduling a shutdown. Where connections require "field verification", connection points will be exposed by the contractor and the fittings verified 48 hours prior to distributing shut-down notices.

16. A materials specifications list similar to Section 6.210G shall be shown on the plans.

17. A separate irrigation meter shall be provided for irrigation systems. Medians shall require a separate meter. The irrigation system shall be installed after the area has been properly prepared. See Chapter 4B.125 for soil preparation requirements. The 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.

18. The median system shall be a completely separate system with its own separate appurtenances on City owned medians.

19. All 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 steel casing (minimum schedule 40) or C900 Class 200 PVC pipe. The irrigation casing shall extend a minimum of 1 foot beyond the structure under which casing is being jacked or bored.
20. Upon final acceptance of the work, the contractor shall submit as-builts per Chapter 3.105.
21. Privately owned sprinkler heads built along slopes in excess of 2 percent shall contain check valves.

A. Layout of Irrigation System

The contractor shall stake all irrigation heads and mark all proposed trenches within the 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

All soil shall be prepared as specified in 4B.125 prior to trenching. 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 irrigation main line is the line containing the supply usually situated between the irrigation meter and the irrigation control valves. The irrigation lateral lines are the lines between the irrigation control valves and the connections to the 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 irrigation heads.

All water lines shall 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 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 steel casing (minimum schedule 40) or C900 Class 200 PVC pipe. The 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.

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 irrigation pipe. Plastic tape or nylon ty-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 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 irrigation casing. See 6.210 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. Material Specifications

As a means of keeping the City's parts inventory to a minimum and maintenance personnel familiarized and knowledgeable about product operation, the following is a list of approved products to be used on all jobs in which the City will be responsible for maintenance and operations. Requests for approved equals need to be submitted to the City of Tumwater Development Services Department, Engineering Division with approval from Public Works.

<p>Pop Up Spray Heads</p>	<p>Rainbird 1800 PRS SAM</p> <ul style="list-style-type: none"> • minimum of 4" pop up • installed on Toro Funny Pipe
<p>Gear Driven Rotary Heads</p>	<p>Hunter I-20 and I-40 Series</p> <ul style="list-style-type: none"> • installed on prefabricated O-Ring PVC Swing Joints • check valves on all head
<p>Remote Control Valve and Master Valve</p>	<p>Weathermatic 21000DW Series installed with isolation ball valve and double union. A master valve shall be installed directly after the DCVA</p>
<p>Quick Coupling Valves</p>	<p>West Ag 4V100-R-Y or Rainbird 44RC</p> <ul style="list-style-type: none"> • Installed at point of connection and at the furthest valve at the far end of the main line • Installed on prefabricated O-Ring PVC Swing Joints
<p>Double Check Backflow Preventer</p>	<p>Febco 850U or approved DOH equal with schedule 80 PVC unions</p>

<p>Flow Sensing Device</p>	<p>Data Industrial IR series</p> <ul style="list-style-type: none"> • Installed with master control valve • Wiring between flow sensor and irrigation controller shall be twisted pair direct burial 2-conductor shielded 18 AWG or larger stranded copper wire with appropriate ratings for distance of run. Wire shall be a single run with no splices. • Master control valve shall be the same valve as the remote control valve
<p>Automatic Controller (for City owned and Maintained systems)</p>	<p>Toro Sentinel with stainless steel cabinet ad full surge protection</p> <ul style="list-style-type: none"> • Shall be grounded conforming to NEC specifications
<p>Valve Boxes</p>	<ul style="list-style-type: none"> • Carson 910-12B for Quick Coupler • Carson 1419B for remote control valve • Other boxes shall be sized accordingly
<p>Shut-Off Valves</p>	<p>Wilkins 215 ball valve or approved equal</p>

H. Flushing

All main supply lines shall receive two fully open flushing's 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.

I. 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.

J. Backfill

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. Backfill from the bottom of the trench to approximately 6-inches above the pipe shall

be by continuous compacting in a manner that will not damage pipe or wiring and shall proceed evenly on both sides of the pipe. The remainder of the backfill shall be thoroughly compacted, except that heavy equipment shall not be used within 18-inches of any pipe. The top 6-inches of the backfill shall be of topsoil material.

K. 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.

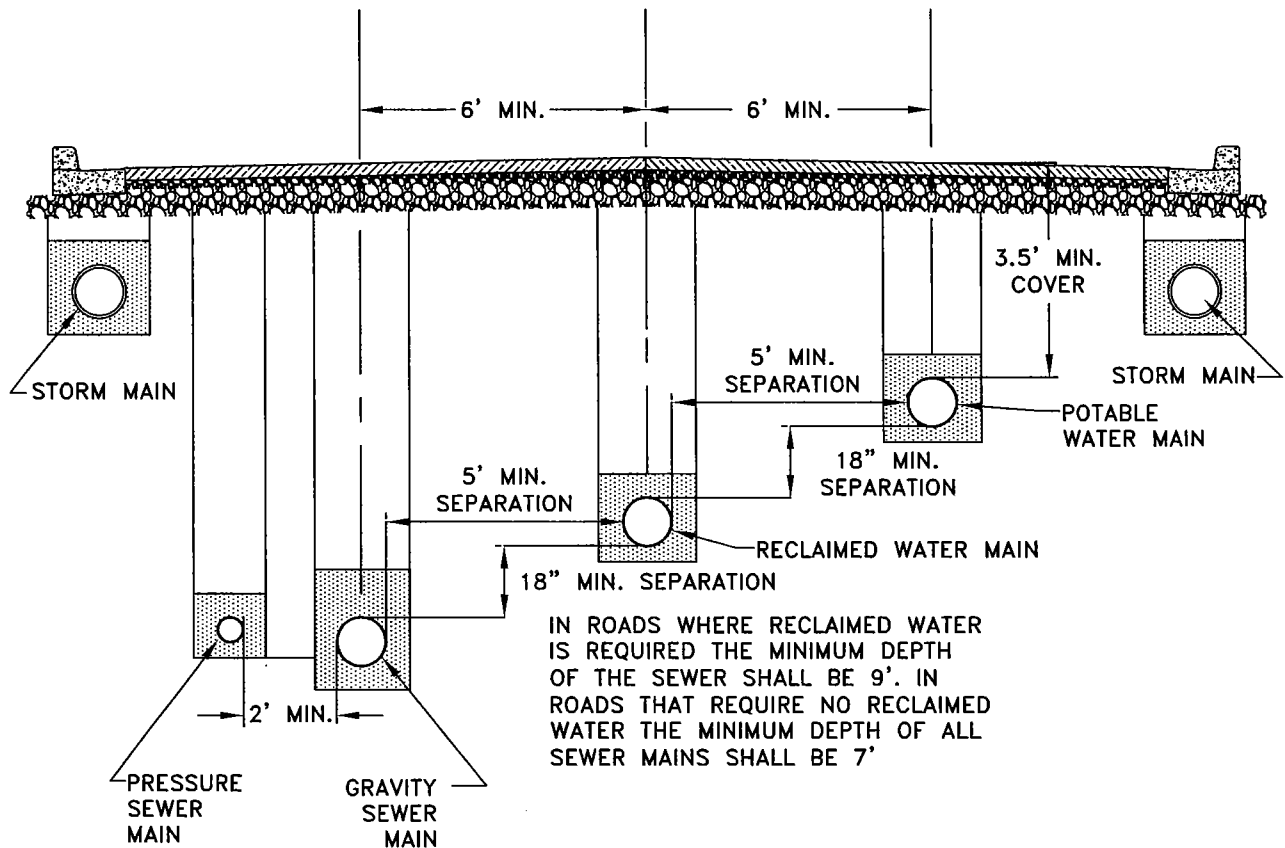
L. System Operation

The 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.

M. As-Built Plans

Upon final acceptance of the work, the contractor shall submit two as-builts per Chapter 3.105.

ALL PIPES SHOWN IN THIS DETAIL
ARE 12" IN DIAMETER EXCEPT FOR
THE PRESSURE SEWER WHICH IS 6"



GENERAL NOTES:

1. THE POTABLE WATER MAIN SHALL BE INSTALLED ON THE NORTH AND EAST SIDE OF THE ROADWAY (6' OFF CENTERLINE).
2. THE SEWER MAIN SHALL BE INSTALLED ON THE SOUTH AND WEST SIDES OF THE ROADWAY (6' OFF CENTERLINE). WHEN THE INSTALLATION REQUIRES BOTH GRAVITY AND PRESSURE SEWER MAINS THE PRESSURE MAIN SHALL BE INSTALLED FURTHER SOUTH OR WEST OF THE GRAVITY SEWER MAIN.
3. THE RECLAIMED WATER MAIN SHALL BE INSTALLED IN THE CENTER OR TO THE SOUTH OR WEST THE CENTER LINE OF THE ROADWAY OR AS DIRECTED BY THE CITY.
4. ALL OF THE ABOVE PIPING SHALL BE INSTALLED IN ORDER OF DESCENDING QUALITY WITH A MINIMUM OF 18" SEPARATION FROM THE BOTTOM OF THE HIGHER PIPE TO THE CROWN OF THE LOWER PIPE. NO DEVIATIONS FROM THIS REQUIREMENT SHALL BE ALLOWED.
5. THE HORIZONTAL SEPARATION WHEN ATTAINABLE SHALL BE 10' FROM THE SPRING LINE OF ONE PIPE TO THE SPRING LINE OF THE NEXT PIPE. WHEN THE 10' SEPARATION IS NOT ATTAINABLE, APPROVAL FROM THE CITY IS REQUIRED TO REDUCE THE SEPARATION REQUIREMENTS TO 5' HORIZONTAL AND 18" VERTICAL.

6. THE DESIGN REQUIREMENT ON THIS SHEET SHALL APPLY TO ALL SITUATIONS WITHIN THE RIGHT-OF-WAY OR EASEMENTS, EXISTING OR PROPOSED.

**CITY OF TUMWATER, WASHINGTON
DEPT. OF PUBLIC WORKS
WATER, RECLAIMED WATER,
GRAVITY & PRESSURE SEWER
PIPE ZONES IN ORDER OF
DESCENDING QUALITY**

APPROVED

DWG. NO.

CITY ENGINEER

7-22

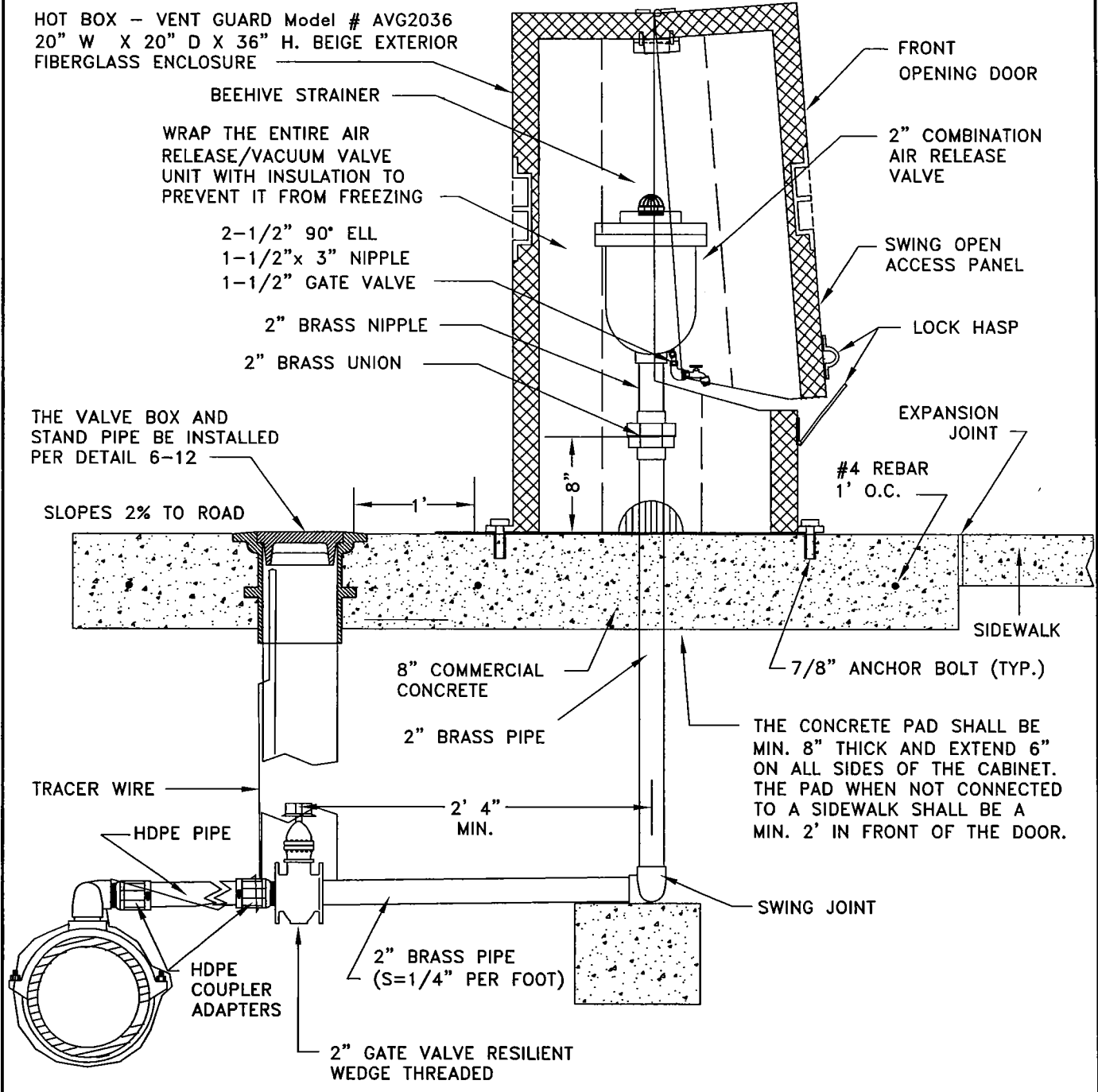
DES
PW

DWN
PW

CKD
JCE

DATE
AUG. 09

HOT BOX - VENT GUARD Model # AVG2036
 20" W X 20" D X 36" H. BEIGE EXTERIOR
 FIBERGLASS ENCLOSURE



BEEHIVE STRAINER

WRAP THE ENTIRE AIR
 RELEASE/VACUUM VALVE
 UNIT WITH INSULATION TO
 PREVENT IT FROM FREEZING

2-1/2" 90° ELL
 1-1/2"x 3" NIPPLE
 1-1/2" GATE VALVE

2" BRASS NIPPLE

2" BRASS UNION

FRONT
 OPENING DOOR

2" COMBINATION
 AIR RELEASE
 VALVE

SWING OPEN
 ACCESS PANEL

LOCK HASP

THE VALVE BOX AND
 STAND PIPE BE INSTALLED
 PER DETAIL 6-12

SLOPES 2% TO ROAD

EXPANSION
 JOINT

#4 REBAR
 1' O.C.

8" COMMERCIAL
 CONCRETE

2" BRASS PIPE

THE CONCRETE PAD SHALL BE
 MIN. 8" THICK AND EXTEND 6"
 ON ALL SIDES OF THE CABINET.
 THE PAD WHEN NOT CONNECTED
 TO A SIDEWALK SHALL BE A
 MIN. 2' IN FRONT OF THE DOOR.

TRACER WIRE

HDPE PIPE

2' 4"
 MIN.

SWING JOINT

HDPE COUPLER
 ADAPTERS

2" BRASS PIPE
 (S=1/4" PER FOOT)

2" GATE VALVE RESILIENT
 WEDGE THREADED

GENERAL NOTES:

1. VALVE ASSEMBLY SHALL BE SET AT THE HIGH POINT OF THE LINE.
2. ALL AIR/VACUUM RELEASE VALVES SHALL BE INSTALLED BEHIND THE SIDEWALK AT THE NEAREST PROPERTY CORNER AND NOT IN FRONT OF A RESIDENCE.
3. AIR RELEASE VALVES SHALL BE 2" APCO 145C, VAL MATIC 202C OR CRISPIN UL-20, ARI D-040 W/THERMO PROTECTION ENCASMENT.
4. ALL FITTINGS AND PIPING SHALL BE BRASS.
5. CABINET SHALL OPEN TOWARDS SIDEWALK.
6. WRAP THE AIR/VACUUM RELEASE VALVE AND PIPING W/INSULATION TO PREVENT IT FROM FREEZING.

CITY OF TUMWATER, WASHINGTON DEPT. OF PUBLIC WORKS			
2" AIR AND VACUUM RELEASE VALVE			
APPROVED		DWG. NO.	
CITY ENGINEER		6-9	
DES. PW	DWN. PW	CKD. JCE	DATE AUG. 09