

# SECTION 10 - UTILITIES AND OTHER RIGHT-OF-WAY USES

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## SECTION 10

### UTILITIES AND OTHER RIGHT-OF-WAY USES

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#### 10 - 01 UTILITY LOCATIONS WITHIN RIGHT-OF-WAY

See Standard Drawings 10-010, 10-020.

##### A. GENERAL

Utility installations shall be located to minimize need for later adjustment, to accommodate future roadway improvements and to provide service access to such installations with minimum interference to roadway traffic.

Longitudinal installations should be located as near as practicable to the right-of-way line and on uniform line and grade.

Utility line crossings of a road should be as near a right angle (normal) to the road centerline as practicable. Where practicable, crossings should avoid deep cuts, footings of bridges and retaining walls, or locations where roadway drainage would be affected.

Where existing facilities are in place, new facilities shall be compatible with the existing installations and shall conform to these Standards, where possible.

Gravity systems, whether sanitary sewer or storm drainage, shall have precedence over other systems in planning and installation except where a non-gravity system has already been installed under a previously approved permit.

Electric utilities, natural gas, power, telephone, cable TV, and fiber optics lines shall preferably be installed underground, either side of the road, with a minimum horizontal separation of five feet , at plan location and depth compatible with other utilities and storm drains.

Notwithstanding other provisions, underground systems shall be located at least 4 feet (4') away from road centerline and where they will not otherwise disturb existing survey monumentation, nor interfere with the location of planned survey monumentation.

Asphalt concrete patches of existing pavement shall be as thick as the existing pavement or 2 inches, whichever is thicker.

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### B. ADJUSTMENT AND RELOCATION OF EXISTING UTILITIES

Existing underground utilities in a public right-of-way shall be removed or relocated when road work funded by the city would disturb the existing underground utility. All such removal or relocation shall be at the sole expense of the owning utility and all work must be accomplished by the same permitting process as for new installations.

Notwithstanding reinforcement or protection otherwise provided, a permittee shall be responsible for the security of each existing pipeline and utility within a road construction zone. Where there are unusual utility hazards or where heavy construction equipment will be used, the permittee shall provide adequate temporary protection. In replacing the roadway, the design should give due consideration to the protection of previously existing utilities in the roadway section without sacrificing the geometrics of roadway design.

### C. UNDERGROUND UTILITIES - COVER AND SEPARATION

The grade of the underground utility shall be constructed in compliance with applicable Federal and State codes.

Sanitary Sewer and Water Lines shall be separated in accordance with Washington State Department of Ecology "Criteria for Sewage Works Design, 1992", Chapter 2.4, Special Details.

Power and service utilities shall maintain a minimum horizontal separation of five feet (5') from storm, water and sewer lines.

### D. UNDERGROUND UTILITIES - CASINGS

Casings shall be installed for roadway crossings when required by appropriate industry codes.

Casings may be required for the following conditions:

1. As an expediency in the insertion, removal, replacement, or maintenance of a carrier line crossing or other locations where it is necessary in order to avoid open trench construction.
2. As protection for carrier lines from external loads or shock either during or after construction of a road.
3. For jacked or bored installations of coated carrier lines unless assurance is provided to the city that there will be no damage to the protective coating.

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Within the road right-of-way, where practicable, casing pipes shall extend beyond the toe of fill slopes, back of roadway ditch, or outside of curb.

Other than for necessary vents and/or drains, casing pipes shall be sealed at both ends.

Casing pipes shall be designed to support the load of the road and superimposed loads thereon and, as a minimum, shall equal the structural requirements for road drainage facilities. Casings shall be composed of materials of sufficient durability to withstand any conditions to which they may normally be exposed.

### E. UNDERGROUND UTILITIES - MATERIALS

Carrier pipes (pipes directly enclosing a transmitted fluid or gas) shall conform to the material and design requirements of the appropriate utility industry and governmental codes and specifications.

Carrier pipes shall be designed to support the load of the road plus superimposed loads thereon when the pipe is operated under all ranges of pressure from maximum internal to zero pressure.

### F. UNDERGROUND UTILITIES - MARKING

Location markers and emergency information shall be used when required by applicable State and Federal Standards.

### G. UNDERGROUND UTILITIES - INDIVIDUAL SERVICE LINES

Individual Water Service Lines shall:

Be placed with minimum 24 inches cover from finished grade.

Side connection shall enter perpendicular to the right-of-way within the frontage of the lot served.

Number 12 Copper Trace Wire is required for Polyethylene Pipe. Wire shall be connected to existing tracer wire along water main. See Standard Drawings 10-140 and 10-150 for details.

Individual Sanitary Sewer Side Service Lines shall:

Have a minimum diameter of 6 inches for the portion within public right-of-way.

Be connected to the sewer main with a “sweeping tee” joint for new construction. See Standard Drawing 10-085 for connection to new sewer mains.

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Septic Tank Effluent Lines shall:

Have a minimum inside diameter of 2 inches.

Be encased in cast or ductile iron pipe of larger diameter or encased as approved by the city engineer, for that portion of pipe within the right-of-way.

Be placed with a minimum of 4 feet of cover from the lowest roadside feature (i.e., bottom of ditch), within 10 degrees of deflection from a perpendicular line to road centerline and extend to outside the right-of-way line. Private easements shall be submitted and recorded with the county auditor for parallel installation to the right-of-way line.

Be jacked or bored under the roadway to the standards of this Section 10-02, unless otherwise approved by the city engineer.

Have record drawings of the installation submitted to the city Engineering Department and recorded with the county auditor.

Stay clear at least 5 feet horizontal and one foot vertical from underground utilities and appurtenances.

Line shall be air pressure tested to 200% of its operation pressure for 15 minutes. No pressure drop is acceptable during the test time.

Vents shall be required for casings, tunnels and galleries enclosing carriers of fuel where required by federal safety standards. Vent standpipes should be located and constructed so as neither to interfere with maintenance of the road nor to be concealed by vegetation. Preferably standpipes should stand by a fence or on the right-of-way line.

Drains shall be required for casings, tunnels or galleries enclosing carriers of liquid, liquified gas, or heavy gases. Drains for carriers of hazardous materials shall be directed to natural or artificial holding areas to prevent the potential for surface or ground water contamination. Drains for which only water or other non-hazardous liquids may discharge, may be directed into the roadway ditch or natural water course at locations approved by the city engineer, subject to federal, state and local regulations. The drain outfall shall not be used as a wasteway for routine purging of the carrier unless specifically authorized by the city engineer.

Manholes should be designed and located in a manner that will cause the least interference to other utilities or future road expansion. Installations in the pavement or shoulders should be avoided.

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### H. ABOVE GROUND UTILITIES

WSDOT Control Zone distances shall be used as a guide for evaluation and replacement of above ground utility facilities that are located within the city right-of-way. Such distances are shown on Standard Drawings 10-010 and 10-020 for roads with a posted speed of 35 mph or less.

For posted speeds greater than 35 mph, control zone distances are contained within Appendix 1, entitled "Control Zone Guidelines - Utilities" of the WSDOT Utility Manual.

Power poles and other above ground utility objects should be placed outside of control zone areas unless justified to the city engineer's satisfaction by suitable engineering studies considering traffic safety, or where shielded by a barrier, placed in an area normally inaccessible to vehicles or utilize a breakaway design to the greatest extent possible. Installation of power poles and other above ground utility objects will not be permitted in sidewalks or walkways.

Locations of poles shall be compatible with driveways, intersections, and other roadway features (i.e., they shall not interfere with sight distance, roadway signing, traffic signals, culverts, etc.). Where possible, utilities shall share facilities so that a minimum number of poles are needed.

Costs of relocating poles or obstacles to achieve these standards are the responsibility of the developer whose project necessitates compliance with these standards.

These standards are not intended to prevent the developer from making financial arrangements with an appropriate utility or other owner of the obstacle to accomplish removal of the pole or obstacle.

### I. POWER AND COMMUNICATION LINES

Single-pole construction and joint use of the pole is desirable and should be used whenever feasible.

The minimum vertical clearance for overhead power and communication lines above the road and the minimum lateral and vertical clearance from bridges shall be in compliance with the National Electrical Safety Code and Washington State Department of Labor and Industries Electrical Construction Code.

Where irregularly shaped portions of the right-of-way extend beyond the normal right-of-way limits, a uniform alignment of facilities shall be allowed within the right-of-way.

**10 - 02            UNDERGROUND UTILITY INSTALLATION**

See Standard Drawings 10-030, 10-040

**A.        GENERAL**

The WSDOT/APWA Specifications, particularly Sections 5-04, 7-17.3(3), 9-01 through 9-03, will apply unless otherwise stated below.

Applicable federal and state regulations regarding trench safety requirements shall be met.

When trenching through existing pavement, the open cut shall be a straight cut made by saw cutting a continuous line and be a minimum of 1 foot outside the trench limits unless against an existing curb lip or as approved by the city engineer. Trench sides shall be kept as nearly vertical as possible. Shoring shall comply with the Washington State Department of Labor and Industries Safety Code.

The pipe or carrier shall be installed and the trench backfilled in a manner assuring no deformation of the pipe likely to cause leakage or degradation to the structural integrity of the roadway structure. Compaction and restoration shall be accomplished as detailed below and immediately after the trench is backfilled, so as to cause the least disruption to traffic.

Temporary restoration of road surface for overnight use shall be accomplished by using cold mix, ATB, or steel plates. ATB used for temporary restoration may be dumped directly into the trench, bladed out, and rolled. After rolling, the trench must be filled flush with asphalt to provide a smooth riding surface. Asphalt materials used for temporary patching must be removed prior to placement of hot mix patch.

Gravel shoulders disturbed by excavation shall be replaced full depth with approved backfill and topped with 2 inches of crushed surfacing top course in accordance with WSDOT/APWA Specifications Section 9-03.9(3).

Final patches shall conform to Standard Drawing 10-030 and be completed within 48 hours. This time frame may be adjusted at the city engineer's discretion if delays are due to inclement paving weather, or other adverse conditions that may exist. However, delaying of final patch or overlay work is allowable only subject to the city engineer's approval.

If required by the city engineer or the Department of Planning and Community Development, and prior to starting construction, the contractor/utility shall submit a proposed haul route for review to the city engineer. Based on review of the proposed haul route, a hauling route agreement may be required.

For Utility Trench Restoration and Backfill standards, see Standard Drawing 10-030.

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Plowing of communication and electrical lines on or adjacent to existing roads by means of a vibratory plow may be allowed by the city engineer provided the structural integrity of the roadway is not impaired and the installed lines are a minimum of 12 inches below the lowest ground surface.

Window Cuts shall be restored to Standard Drawing 10-030.

Water settling of backfill in trenches under existing roadways is not permitted.

### B. EXISTING ROADWAYS

#### Utility Trenches Parallel To Road Alignment

1. All trench backfill under the roadway shall be mechanically compacted to 95% of maximum density (modified proctor) except for trenches over 8 feet in depth.

Throughout the length of any pipe run, manhole to manhole, in which any part of the trench is over 8 feet deep, backfill at depths over 8 feet shall be compacted mechanically to at least 90% of maximum density. All densities shall be determined by testing specified in WSDOT/APWA Specifications Section 2-03.3(14)D.

2. In any trench in which the density in the top 8 feet falls below 95 percent, and further compaction cannot be achieved with the existing material, at least the top 4 feet shall be replaced with bank run gravel as specified in the WSDOT/APWA Specifications Section 9-03.19 or other suitable import material. This imported backfill material shall then be mechanically compacted to 95 percent of maximum density.
3. Backfill compaction shall occur in sufficiently thin lifts to achieve the density requirements as specified above. Such compaction shall be performed to within 6 inches of existing road grade. After placing a tack coat on the existing asphalt edges, the final patch shall be constructed with ACP to match existing thickness or 2 inches, whichever is greater.
4. Any exceptions to the overlay requirement will be on a case-by-case basis, subject to approval by the city engineer, considering the existing conditions of the roadway. Portland Cement Concrete pavement shall be restored consistent with WSDOT/APWA Specifications Section 5-05.

## UTILITIES AND OTHER RIGHT-OF-WAY USES

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### Utility Trenches Transverse To Road Alignment

1. Utility trenching through existing pavement across the road alignment will be discouraged. It will not be permitted unless it can be shown that alternatives such as boring or jacking are not feasible, or unless the utility can be installed just prior to reconstruction or overlay of the road.
2. The entire trench shall be backfilled with bank run gravel or crushed surfacing top course meeting the requirements of WSDOT/APWA Specifications Sections 9-03.19 and 9-03.9(3) of the respectively and shall be mechanically compacted to 95% of maximum density (modified proctor) in accordance with WSDOT/APWA Specifications Section 2-03.3(14)D. CDF may be required by the city engineer in accordance with Section 10-06 of this Section.
3. Six months or after all settlement has occurred, a full width overlay consisting of 2 inches ACP will be required where the same utility has installed or previously installed multiple (2 or more) utility crossings, 200 feet or less apart. In these cases, the overlay shall extend 10 feet longitudinally beyond each patch end. A pre-level may be required prior to the overlay. See Section 10-05.

### C. UNTRENCHED CONSTRUCTION (JACKING, AUGERING OR TUNNELING)

Tunneling may be ordered by the city engineer under pavements, buildings, etc. The developer/contractor shall install the pipe by jacking, auguring or tunneling, or installing the pipe in a casing pipe by a combination of these methods.

When use of a casing pipe is required, the developer/contractor shall be responsible to select the gauge and size required, unless otherwise indicated on the drawings, and consistent with his jacking or auguring operation, and shall be set to line and grade. During jacking or auguring operations, particular care shall be exercised to prevent caving ahead of the pipe which will cause voids outside the pipe. When the carrier pipe is installed within a casing pipe, the carrier pipe shall be skidded into position in an acceptable manner and to the line and grade as designated. The annular space between the casing and the pipe shall be filled with controlled density fill or as otherwise approved by the city engineer.

Prior to jacking or auguring activities, shop drawings describing these activities, including dimensioning of pit length and size of underground borings and complete description of shoring, shall be submitted to the city engineer for approval.

Water boring shall not be permitted.

## UTILITIES AND OTHER RIGHT-OF-WAY USES

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### D. NEW PLAT ROADS

When working in areas where new plat roads are proposed, backfill compaction shall be achieved throughout the entire depth of trench by mechanical compaction as described in previous subsections.

### E. TESTING

Consistent with the above and prior to placing any surface materials on the roadway, it shall be the responsibility of the developer to provide density test and soil reports certified by an independent testing agency, satisfactory to the city engineer.

A minimum of one (1) test shall be taken within every 100 feet of trench length and at depths of 50% of trench depth and at the surface, or as specified by the city engineer. Compaction of laterals or service line trenches shall be tested where required by the city engineer.

## 10 - 03 AESTHETIC/SCENIC CONSIDERATIONS

Utility installations shall be designed and constructed to minimize the adverse effect on existing roadside manmade or natural amenities. Special efforts shall be taken to minimize any potential negative impact on areas of scenic beauty (i.e., scenic strips, viewpoints, rest areas, recreation areas, public parks or historic sites, etc.).

Overhead utility installations shall be permitted in areas of scenic beauty when other utility locations are not available, are not technically feasible, are unreasonably costly, or are less desirable from the standpoint of visual quality.

If the utility company intends to use chemical sprays to control or kill weeds and brush in scenic areas, prior approval must be granted by the city engineer at least annually. The city engineer may limit or restrict the types, amounts, and timing of applications if a significant negative impact on the aesthetics of the area is anticipated, provided such limitations or restrictions are not in conflict with state law.

Refuse and debris resulting from the installation or maintenance of the utility facilities shall be promptly removed at the end of every working day.

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### 10 - 04 INSTALLATIONS ON ROADWAY BRIDGES AND STRUCTURES

Attachment of utility lines to a roadway structure (including bridges) may be allowed where such attachment conforms to sound engineering considerations for preserving the roadway structure and its safe operation, maintenance and appearance. The attachment shall be in accordance with the following:

Attachment of a utility shall not be considered unless the structure in question is of a design that is adequate to support the additional load and can accommodate the utility facility without compromise of highway features, including reasonable ease of maintenance.

Manholes and other utility access panels shall be avoided within the roadway portion of the structure.

Attachment on a structure of a pipeline carrying a hazardous substance shall be avoided where practicable.

The utility attachment shall not reduce the clearance of a structure where such clearance is critical. Attachment to the outside of a structure shall be avoided where there are reasonable alternatives.

Utility mountings shall be of a type which shall not create noise resulting from vibration.

Any hole created in a structure abutment shall be sleeved, shall be of a minimum size necessary to accommodate the utility line, and shall be sealed to prevent any leakage of water or backfill material.

The utility line back of the abutment shall curve or angle out to align outside the roadbed area in as short a distance as is operationally practicable.

### 10 - 05 MISCELLANEOUS PROVISIONS

#### A. PRESERVATION, RESTORATION, AND CLEANUP

The size of disturbed area necessary to install a utility shall be kept to a minimum.

Restoration methods shall be in accordance with these standards and/or special provisions of the franchise, permit, or agreement.

Unsatisfactory restoration work shall be corrected by the utility within 10 business days of the date of written notification. At the direction of the city engineer and without further notification, unsatisfactory restoration work will be corrected by Public Works Department. The utility company shall be billed for all cost incurred by the city for the execution of the restoration construction.

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### B. TRAFFIC CONTROL AND PUBLIC SAFETY

Traffic controls, including detours for all utility work, shall conform with the currently applicable Manual on Uniform Traffic Control Devices for Streets and Highways. A traffic control plan, approved by the city engineer, shall be required for “Right-of-Way Construction Permits” affecting vehicular traffic.

All construction and maintenance operations shall be planned to keep interference with traffic to a minimum. On heavily traveled roads, construction operations interfering with traffic should not be scheduled during periods of peak traffic flow. Work shall be planned so that closure of intersecting streets, road approaches, or other access points is held to a minimum.

Adequate provision shall be made to safeguard any open excavation, and shall include barricades, lights, flaggers, or other protective devices as may be necessary or as requested by the city engineer.

The storage of materials on through roadways pavement and shoulders shall not be permitted. Parking of vehicles on through roadways shall be kept to a minimum.

### C. EMERGENCY REPAIRS

All utility facilities shall be kept in a good state of repair. Emergency repairs shall be undertaken in a timely manner.

If emergency repairs disturb the right-of-way, such repairs may be immediately undertaken and the right-of-way restored. Approval as to the manner of final restoration of the right-of-way shall be secured from the city engineer in a timely fashion.

## 10 - 06 CONTROL DENSITY FILL (CDF)

Control Density Fill may be required by the city engineer in lieu of native backfill material in situations where trench settlement cannot be tolerated such as installation of transverse trenches on arterial roads.

### A. MATERIAL

CDF shall conform to the following specifications:

1. Portland Cement: Type I-II ASSHTO M85.
2. Mineral Filler Admixtures: pozzolans or fly ash (ASTM C-618, Class F).
3. Aggregate: Everett Washed Coarse Sand No. 2.

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CDF shall be used in the following proportions for 1 cubic yard. Batch weight may vary depending on specific weights of aggregates.

Portland Cement	50 lbs/yd <sup>3</sup>
Fly Ash	250 lbs/yd <sup>3</sup>
Everett No. 2 Washed Coarse Sand (SSD)	3,200 lbs/yd <sup>3</sup>
Water	50 gals/yd <sup>3</sup> max.

Add sufficient water to provide a 6 inch to 8 inch slump delivered in place at the job site.

### **10 - 07      PRE-LEVEL**

Should the permanent patches required in Section 10-03 not be of satisfactory surface texture and grade, an asphalt pre-level shall immediately be done to ensure a smooth driving surface during the period before the final asphalt overlay.

### **10 - 08      STRIPING REPLACEMENT**

All traffic striping and walkway delineation shall be replaced as necessary per these Standards. Temporary striping shall be used when approved by the city engineer.

### **10 - 09      FINAL UTILITY ADJUSTMENT TO FINISH GRADE**

All utility covers which are located on proposed asphalt roadways shall be set to final elevation prior to placing base material and pavement or as directed by the city engineer.

### **10 - 10      FINAL CLEANUP AND RESTORATION**

In addition to restoration of the roadway, as described above, the responsible utility company or other permit holder shall care for adjacent areas in compliance with Sections 1-04.11 "Final Cleanup" and 8-01 "Erosion Control" in the WSDOT/APWA Specifications. In particular:

Streets and roadways shall be cleaned and swept both during and after each working day.

Disturbed soils shall be final graded, seeded, and mulched after installation of the utility. In limited areas, seeding and mulching by hand, or sod placement using approved methods, may be acceptable.

Ditches lined with erodible soil and subject to rapid flows shall require seeding, jute matting, netting, placement of sod, or rock lining to control erosion.

Any silting of downstream drainage facilities, whether ditches or pipe and catch basins, which results from the utility installation shall be cleaned out and the work restored to a stable condition as part of the site cleanup each day.

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### 10 - 11 RIGHT-OF-WAY USE RESTORATION REQUIREMENTS

Standard Drawing 10-040 contains standard right-of-way use restoration requirements applicable to all construction in the public rights-of-way.

### 10 - 12 SANITARY SEWER DESIGN REQUIREMENTS

The design of sanitary sewers shall be in conformance with the applicable sections of the State of Washington, Department of Ecology manual - "Criteria for Sewage Works Design," and the City's Standards as modified herein.

Water Quality requirements shall be in accordance with the water quality requirements in Section 9 herein.

The following additional design requirements shall also apply:

1. All public sanitary sewer lines shall be a minimum of eight inches minimum diameter or as required by the city engineer.
2. Connection to city sewer main with a side sewer is mandatory within the existing service area. It is also mandatory outside of the existing service area for all properties that contain or may in the future contain structures constructed for human occupancy and are within 100 feet of city sewer system, or if over 100 feet, may create a health hazard. Side sewers shall be installed from the city sewer main to five feet beyond the property line at all building sites, and shall be a minimum of six inches in diameter, and conform to ASTM-3034/SDR-35. Building sewer line connections to side sewers shall be a minimum of 4 inches in diameter, and conform to ASTM-3034/SDR-35 per Standard Drawing 10-085. For commercial/industrial uses, minimum 6 inches. A 0.02 foot per foot minimum slope shall be provided for all piping, unless waived by the city engineer.
3. One separate and independent side sewer from the public main to all building sites shall be provided for each commercial or multi unit building. A maximum of two residential units may be connected to one side sewer.
4. Manholes shall be installed at a maximum spacing of 300 feet.
5. All public sanitary sewer lines shall end with a manhole; cleanouts will not be allowed.
6. The minimum design velocity shall be two feet per second flowing full.

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7. Sewer lines shall have a 0.1 foot drop through manholes from inlet invert to outlet invert.
8. Connection of side sewer to existing main line shall be with a tee. New construction shall use a sweeping tee connection into the new sewer main.
9. The minimum slope for a side sewer shall be 2%.

### **10 - 13 SANITARY SEWER PLAN REQUIREMENTS**

The following requirements shall be shown on the plans:

1. Plan and profile in accordance with Section 3 herein.
2. Sanitary sewer pipe including locations, length, material, slope, depth and size.
3. Manholes including location, type, rim, and invert elevations. All new manholes shall be numbered consecutively and all existing manholes shall be referenced to the City's current numbering system.
4. Detail any outside drop manhole connections per Standard Drawing 10-070 or 10-080. Inside drops will not be allowed.
5. Identify as many possible utility conflicts as practical.
6. Provide stationing and reference points.
7. All public sewer main lines shall be located within roadway rights-of-way or recorded easements.
8. Location and stationing from downstream manholes shown.
9. Perpendicular connections of side sewers to the main lines.
10. Reference and layout for saw cutting and patching existing streets.
11. An all-weather maintenance access, including typical cross-section of said access roads.

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### 10 - 14 SANITARY SEWER PLAN NOTES

- A. The applicable “General Plan Notes” in Section 3 shall be shown on the plans.
- B. The following applicable notes shall also be shown on the plans:
1. Sewer lines shall be laid to the grades and elevations shown on the drawings and shall not be changed without the city engineer’s approval.
  2. Location of side sewers shall only be changed as required during construction upon approval from the city engineer.
  3. Contractor shall obtain all necessary side sewer connection permit for the Building Department prior to construction.
  4. Unless otherwise approved, all connections to existing sewer main with new tees shall be done by the Public Works Department. The contractor shall be responsible for pipe installation, trench excavation, backfill and pavement restoration.
  5. All manholes in public right-of-way or easements shall be adjusted to final grade before final paving is complete.
  6. Utility covers shall conform to Standard Drawings 9-130, 9-140, 9-150, 9-160, 9-190.

### 10 - 15 WATER LINE DESIGN REQUIREMENTS

- A. The following water line design requirements shall apply:
1. All water mains in a city right-of-way shall be eight inches minimum diameter, Class 52 ductile iron or shall be to the minimum size as indicated in the City's Comprehensive Plan, whichever is larger.
  2. Water lines shall be extended full width of property to be served. Looped connections may be required to maintain continuity in the system.
  3. Water valves shall be installed along the water line at a maximum spacing of 400 feet and at the intersection of lateral lines.
  4. Water valves shall be located in clusters when possible and shall be located so that each leg of the main line system can be isolated separately.

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5. Dedicated public utility easements shall be a minimum of 15 feet each side of fire hydrant.
6. Dedicated public utility easements shall be a minimum of 10 feet each side of any water main line.
7. Fire hydrant feed lines shall be installed at right angles to the supply main in conformance with the Fire Hydrant Assembly, Standard Drawing 10-110.
8. Hydrants shall stand plumb, set to finish grade with the lowest outlet being a minimum of 18 inches from finish grade, and a clear area around the hydrant of no less than 36 inches.
9. Pumper port shall face street or fire access, and be readily accessible to any fire vehicle for fire fighting and pumping operations.
10. Service line from the water main to the hydrant shall be 6 inches minimum diameter not to exceed 50 feet in length from the valve, as show in Standard Drawing 10-110.
11. Fire hydrants shall be installed on 8-inch minimum diameter water mains.
12. Fire hydrants shall be installed at street corners wherever possible or at minimum spacing of 600 feet along streets in single-family zones, and 300 feet in all other zones. On-site hydrants shall be a maximum of 150 feet from the farthest point of the building(s), as directed by the Fire Department.
13. Minimum distance between sewer and water lines shall be 10 feet horizontally and 18 inches vertically.
14. The domestic water service shall not be connected directly to fire sprinkler line. A separate connection shall be made to the main water line.
15. The fire sprinkler system shall be in accordance with Kitsap County Fire Department regulations. A separate detailed plan of the fire sprinkler system from the main line must be submitted and approved by the Bainbridge Island Fire Marshal, prior to installation.
16. All public water mains shall have a minimum cover of 36 inches.
17. Installation of corporate stops, water services, lines and meters shall be per Standard Drawings 10-140 and 10-150. All connections to city water system shall include a water meter. The city will install the meters. The city may, at the city's option, install services from main line to the meter when the existing water line is in an existing city street.
18. Blow-offs, per Standard Drawing 10-180, are required on dead-end water lines except where fire hydrants are installed at the dead-end.
19. Air and vacuum relief valves, per Standard Drawing 10-110, are required at high points in water main lines.

**10 - 16 WATER LINE PLAN REQUIREMENTS**

The following requirements shall be shown on the plans:

Plan and profile in accordance with Section 3 herein.

Water pipe including location, length, material, slope, depth and size.

Detail all new connections to the existing water system.

Identify as many possible utility conflicts as practicable.

Stationing and reference points.

Valves, meters, and fittings, including size and location.

Blow-offs at low points or dead-ends (2" minimum).

Air and vacuum relief valve at high points.

Pressure reducing valves.

Concrete blocking.

An all-weather maintenance access, including typical cross-section of said access road.

Service sizes and locations.

Meter sizes and locations.

Sewer deduct meter locations and sizes.

Proper reference and layout for saw cutting and patching existing streets.

Fire sprinkler system locations from public water line to building showing gate valve at main line connection. A separate detailed plan of fire sprinkler system, including "Double Detector Check Valve Assembly in accordance with Standard Drawing 10-160, and approved by, the fire marshal prior to installation.

City's water line construction notes and drawing references on plans.

Check/backflow prevention devices on private property service line. Annual maintenance check/certification required for backflow prevention devices and PRV if applicable.

## UTILITIES AND OTHER RIGHT-OF-WAY USES

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### 10 - 17 WATER LINE PLAN NOTES

The applicable "General Plan Notes" in Section 3 shall be shown on the plans. The following applicable notes shall also be shown on the plans:

Water lines shall be laid to the grades and elevations shown on the drawings and shall not be charged without city approval.

Location of water services shall only be changed as required during construction upon authorization of the city. Contractor shall notify the city engineer when exact locations are determined.

Contractor shall obtain all necessary water service connection permits from the city prior to construction.

All valve boxes in public right-of-way or easements shall be adjusted to final grade before final paving is complete in accordance with Standard Drawing 10-210.

Backflow devices required with fire protection and irrigation systems, are to be installed per *City of Bainbridge Island; Handbook of the Cross-Connection Control Program*, available at the Public Works Engineering Department.

### 10 - 18 CONSTRUCTION STANDARDS

#### A. FIRE HYDRANTS

Fire hydrant assemblies shall comply with Standard Drawing 10-110. Fire hydrants shall be the "Traffic Model" with approved breakaway features. All hydrants shall be brass to brass subseat, minimum valve opening of 5-1/4 inch O-ring stem seal, six-inch mechanical or flange shoe connection, 1-1/4 inch pentagonal operating nut, with two 2-1/2 inch NST hose nozzle connections and 4-1/2 inch pumper connection with NST threads. All hydrants shall be Clow-Medalian, M&H 929 or Mueller.

#### B. PIPE

All water main piping shall be ductile iron pipe, cement line standard thickness Class 52 unless otherwise specified, and shall conform to the standard of USA Standard A-21.51 (AWWA C151).

## UTILITIES AND OTHER RIGHT-OF-WAY USES

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### C. FITTINGS

1. Rubber gasket joints shall be push-on-joint (Tyton) or mechanical joint (M.J.) in accordance with USA Standard A-21.11 (AWWA C-111), unless otherwise specified. Flanged joints shall conform to USA Standard B16.1.
2. Bolts on mechanical joints and fittings shall be tightened uniformly with a torque wrench which measures the torque applied. The torque for mechanical joints shall be as follows:

<u>Bolt Size - inches</u>	<u>Range of Torque ft - lb.</u>
5/8	40 - 60
3/4	60 - 90
1	70 - 100
1 1/4	90 - 120

3. Nuts spaced 180 degrees apart shall be tightened alternately in order to produce equal pressure on all parts of the gland.
4. Set screws on retained glands shall be torqued to manufacturer's specifications.
5. Bolts for fittings and joints shall be cast or ductile iron, zinc or chromium plated or stainless steel.
6. Cast or ductile iron fittings shall be short body for pressure rating of 150 psi, unless otherwise noted. Metal thickness and manufacturing process shall conform to applicable portions USA Standards A21.20, A21.11, B16.2 and B16.4. All fittings shall be cement lined per USA Standard A21.4 (AWWA C-104).

### D. VALVES

Unless otherwise specified, all valves shall be gate valves conforming to the latest revisions to AWWA standard specifications for gate valves for Ordinary Water Works Service No. C-500. They shall be resilient seat valves conforming to AWWA C-509. Gate valves used in conjunction with restrained joint pipe shall have ductile iron bodies; elsewhere valve bodies may be either ductile iron or cast iron. All valves shall open counter-clockwise, and, unless otherwise specified, shall be a non-rising stem type equipped with standard square stem nuts. Stem nuts shall be identical with the city's existing equipment, and all valves shall be furnished with a box, cover, and marker post.

## UTILITIES AND OTHER RIGHT-OF-WAY USES

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### E. VALVE BOXES

Valve boxes and covers shall be cast iron of a type approved by the city engineer prior to their installation. The lengths shall be suitable for the particular depth of water line.

### F. AUXILIARY VALVES

Auxiliary gate valves shall be flanged or as required by the type of pipe being used, and be as specified in subsection on valves in this section.

### G. LOCATING WIRE

Locating wire shall be used along all water main runs and to each fire hydrant, blow-off and meter setter. Wire shall be 12 gauge or larger solid copper with neoprene coating.

### H. COVER OVER PIPELINES

In no case shall less than 36 inches of cover be maintained over the pipe. Local variations in ground surface shall not control, but the average depth shall be the determining factor. The maximum depth shall not be greater than 60 inches to the top of the pipe.

### I. HYDROSTATIC TEST

All water mains and appurtenances shall be hydrostatically tested as specified in WSDOT/APWA Standard Specifications Section 7-11.3(11). See Appendix 'B' for a copy of this test procedure.

The contractor shall provide all necessary equipment and shall perform all work connected with the tests. The contractor shall perform the test to assure that the equipment to be used for the test is adequate and in good operation condition and all air has been released prior to requesting the city inspector to witness the test.

### J. STERILIZATION

Before placing the lines in service, the developer shall sterilize them and have a satisfactory report and approval of sterilization from the local or state health department on samples collected from representative points in the new system. Sterilized sample bottles and/or instructions shall be obtained by the developer from the laboratory where the samples will be tested. The city shall collect all samples for the bacteriological tests.

## UTILITIES AND OTHER RIGHT-OF-WAY USES

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### K. CHLORINE DOSAGE

References in WSDOT/APWA Standard Specifications, Section 7-11.3(12), to an initial chlorine content of the water of not less than 50mg/l is hereby changed to 25mg/l.

Pipe Size (inches)	Volume of Water per 100 ft length (gallons)	Household Bleach 5-1/4% (gallons)	Commercial Bleach 12-1/2% (gallons)
4	65.3	.03	.13
6	146.5	.07	.03
8	261.0	.13	.053
10	408.0	.2	.08
12	588.7	.3	.12
14	799.6	.4	.16
16	1044.4	.5	.21
20	1631.9	.8	.33
24	2349.9	1.1	.47
30	3671.7	1.8	.75
36	5287.3	2.5	1.1
42	7196.6	3.5	1.44
48	9399.6	4.6	1.6