

DPD
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Applicant:

CITY OF SEATTLE
Department of Planning and
Development
Seattle Public Utilities

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Construction of Side Sewers
(Drainage and Wastewater
Discharges)

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Stormwater Code, Side Sewer Code

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I. Background

The Director of Seattle Public Utilities, as defined in Chapter 21.16 of the Seattle Municipal Code (SMC), has authority for the establishing, executing and enforcing the requirements for private side sewers. Through a Memorandum of Agreement (MOA) between Seattle Public Utilities (SPU) and the Department of Planning and Development (DPD), DPD is responsible for reviewing permit applications, inspecting construction, and retaining record drawings for private side sewers. Connection of side sewers will be made to a natural drainage outlet OR approved point of discharge as determined by DPD in consultation with SPU and the Seattle Department of Transportation (SDOT) based upon applicable regulations and requirements. SPU owns, operates, and manages the City's public sewer and drainage systems and SDOT manages the public rights-of-way in which the sewer and drainage systems exist. City departments seek to protect the environment, ensure public safety, and safeguard both private and public property from damage as guiding principles.

II. SIDE SEWER DEFINITIONS

Words and phrases used in this DR, unless contrary to or inconsistent with the context, shall be given the same meaning as in the Seattle Municipal Code, Chapter 21.16 and Chapter 22.801, or as defined below. Unless otherwise defined, all technical or material terminology used is to be given meaning as commonly accepted in the sewer and drainage trade.

1. **"Applicant"** means a person who applies for a land use permit, construction permit, or side sewer permit with the Seattle Department of Planning and Development (DPD).
2. **"Approved Material"** means a material approved by DPD and SPU.
3. **"As-built drawings"** means an as-constructed side sewer plan that includes all changes made to a project during construction and submitted to DPD.
4. **"Buildover"** means constructing permanent buildings and/or structures over publicly owned infrastructure or within a public easement or within the Pipe Zone of Influence of public infrastructure.
5. **"Combined Side Sewer "** means a privately owned and maintained pipe system which is designed to carry drainage water and wastewater from a plumbing outlet or other approved facility, to the public sewer system.
6. **"Contractor"** means an applicant, owner, developer, registered side sewer contractor, or permittee, unless specifically noted otherwise.
7. **"Combined Sewer"** as defined by Chapter 21.16 of the Seattle Municipal Code.
8. **"Core Tap"** means a new side sewer connection to a public main.
9. **"Curb"** as defined by latest edition City of Seattle Standard Specifications for Road, Bridge and Municipal Construction and the latest edition Standard Plans for Municipal Construction.

10. **"Curb discharge – Street"** means drainage allowed to pipe discharge from private property through the street curb onto the street pavement in the Public Place.
11. **"Curb discharge – Alley"** means drainage allowed to discharge from private property onto the alley pavement in the Public Place.
12. **"Drainage water"** as defined by Chapter 22.801 of the Seattle Municipal Code.
13. **"Emergency"** means there is a present danger or an imminent threat to human health, or that significant property damage is likely to occur if immediate action is not taken.
14. **"Environmentally Critical Area (ECA)"** as defined by Chapter 25.09 of the Seattle Municipal Code.
15. **"Inactive stub"** means a side sewer that is not in use by the project or another property at the time of permitting (e.g. a capped side sewer).
16. **"P-traps"** means fittings or devices to provide a liquid seal which will prevent the back passage of air, without materially affecting the flow of sewage or waste water through it.
17. **"Pig ports"** means a pressure sealed cleanout used for a force main.
18. **"Pipe Zone of Influence"** means the area adjacent to a pipe or structure up to a projected line drawn at a 45-degree angle from the outside edge of the pipe or structure to the ground surface. E.G. if a pipe invert is 15 feet below the ground surface, the Pipe Zone of Influence extends perpendicularly from the invert of the pipe horizontally to a point across the ground surface 15 feet on either side of the projected vertical centerline of the pipe. If the pipe invert is less than ten feet below the ground surface, then the minimum pipe zone of influence shall be ten feet on either side of the pipe.
19. **"Public Storm Drain"** as defined by Chapter 22.801 of the Seattle Municipal Code.
20. **"Pump system"** means a pumping station designed to lift drainage or wastewater flows. The pump system is controlled by a standard control center and discharges through an outlet connection.
21. **"Pump system -- Duplex"** means a pumping station with two pumps. Both pumps are controlled by a standard control center and discharge through a common outlet.
22. **"Sanitary Sewer"** as defined by Chapter 21.16 of the Seattle Municipal Code.
23. **"Sanitary Side Sewer"** means a privately owned and maintained pipe system which is designed to carry only wastewater from a plumbing outlet or other approved facility, to the public sewer system.
24. **"Side Sewer Permit"** means a permit that allows the construction of conveyance pipes and other associated facilities for collection, conveyance, and discharge of drainage and/or wastewater to an approved outlet.

25. **"Side Sewer Permit for Temporary Discharges"** means a permit that allows temporary discharge of on-site surface and subsurface water to existing public drainage and/or sewer facilities during construction activities.
26. **"Side Sewer Work"** has four separate definitions as follows:
- A **repair** of an existing side sewer means the repair, replacement, or any other work done on an existing side sewer that is still in service to serve existing facilities. This includes measures such as pipe lining and pipe bursting.
 - An **alteration** of an existing side sewer means the installation work done for a new side sewer, because of new building construction associated with existing facilities. The installed side sewer connects to an existing side sewer that is still in service to serve existing facilities.
 - A **new** installation of a side sewer means the installation of a new side sewer because of new building construction (e.g. The lot is currently vacant or the existing structure has been demolished). Connection may be made to the public main or an existing side sewer.
 - A **capping** of an existing side sewer means the abandonment of said side sewer.
27. **"Site"** as defined by Chapter 22.801 of the Seattle Municipal Code.
28. **"Site Inspector"** means the City Site Inspector performing the inspection work required by the side sewer permit, or his or her designee.
29. **"Subsurface Drain"** means a collection system designed to collect drainage water or groundwater from an underground area, such as a drain used under the surface of a playground or golf course or along the exterior or interior footings of a building or structure.
30. **"Thrown Street"** means the transverse slope of the completed street slopes from one edge to the other edge of the pavement. Stormwater runoff flows across the street to the low-side gutter line. The thrown street is a deviation of the standard street cross section which consists of a crowned roadway, sloping down at 2% slope from the crown to the gutter line on each edge of the roadway.

III. CODES AND STANDARDS

All side sewer work shall comply with this DR and the following:

- ♦ City of Seattle Side Sewer Code (Seattle Municipal Code Chapter 21.16).
- ♦ City of Seattle Stormwater Code (Seattle Municipal Code Chapter 22.800–808).
- ♦ City of Seattle Environmentally Critical Areas Ordinance (Seattle Municipal Code Chapter 25.09).
- ♦ Latest edition City of Seattle Standard Specifications for Road, Bridge and Municipal Construction and the latest edition Standard Plans for Municipal Construction **except as otherwise provided in this DR.**

- ✦ Latest edition Seattle-King County Public Health Code Plumbing for plumbing work located within the building or structure.
- ✦ Latest technical manuals such as SPU's and DPD's Director's Rules (DR).
- ✦ Latest edition SDOT Right Of Way Improvements Manual for work proposed in the Public Place.
- ✦ Latest edition SDOT Street and Sidewalk Pavement Opening and Restoration Rule.
- ✦ Latest edition SDOT Street Improvement Permit Procedures for Construction in Public Right-of-way.
- ✦ Latest edition SPU Core Tap Procedures
- ✦ Latest edition SDOT Traffic Control Manual for In-Street Work
- ✦ Latest edition Department of Ecology Criteria for Sewage Works Design ("Orange Book").
- ✦ AASHTO Task Force 22 Report – Cross-Reference for Drainage Pipe Specifications for Waterways, Airports, Railroads, Transit and Highways.
- ✦ AASHTO Highway Drainage Guidelines, 3rd Edition, Volumes I-XIII.
- ✦ ASTM Volume 08.04 Plastic Pipe and Building Products.
- ✦ Other standards may apply to work in the Public Place.

IV. ATTACHMENTS

A. Exhibits

Exhibit 1 – Rigid Pipe Bedding & Backfill Under Pavement Located In A Public Place

Exhibit 2 – Flexible Pipe Bedding & Backfill Under Pavement Located In A Public Place

Exhibit 3 – DIP Pipe Bedding & Backfill Under Pavement Located In A Public Place

Exhibit 4 – Use Of Wye Branches and Cleanouts

Exhibit 5 – Side Sewer Installation Based On Standard Plan No. 283

Exhibit 6 – Side Sewer & Service Drain Connection To A Combined Sewer System

Exhibit 7 – Side Sewer & Service Drain Connection To A Separated System

Exhibit 8 – Footing Drain Connection to Private Catch Basin Prior To Discharge Into Combined Sewer System

Exhibit 9 - Footing Drain Connection to Private Catch Basin Prior To Discharge Into Storm Drain System

Exhibit 10 – SDOT Backfill And Pavement Restoration Limits For Side Sewer Construction In A Public Place

Exhibit 11 – Force Main Connection Including Last 10 LF Gravity Side Sewer

Exhibit 12 – Private Catch Basin (w/ Steel Reinforcing)

Exhibit 13 – Private Inlet (w/o Steel Reinforcing)

Exhibit 14 – Flow Spreader Facility

Exhibit 15 – Riprap Splash Facility

Exhibit 16A – Pipe Anchor Detail A

Exhibit 16B – Pipe Anchor Detail B

Exhibit 17 – Curb Discharge, 4-inch Iron Pipe with Curb Reinforcing

Exhibit 18 – Utility Tunnel for Existing Trees

Exhibit 19 – Retention System

Exhibit 20 – Maintenance Hole Lid using Locking Screws

Exhibit 21 – Side Sewer Pump Installation Example Detail

V. GENERAL REQUIREMENTS

A. Allowable Materials

1. This is a list of approved materials for use in side sewer construction. It does not constitute a City engineering analysis for installation requirements or site specific factors that must be taken into account during design and construction. Materials listed shall conform to the most recent edition of the City of Seattle Standard Specifications for Road, Bridge and Municipal Construction (unless specified otherwise herein for work on private property) and shall include the following:
2. For Both Drainage and Wastewater:
 - a. PVC Pipe – ASTM D 3034 SDR 35 (standard minimum wall thickness), 4-inch through 15-inch (See City of Seattle Standard Specification 9-05.3)
 - b. PVC Pipe Schedule 40 and Schedule 80 – ASTM D 1785 with fittings per ASTM D 2466 and D 2467 (not for use in Public Place)
 - c. ABS Pipe –ASTM D 2661 with fittings per ASTM D 3311 (not for use in Public Place)
 - d. Ductile Iron Pipe – ANSI A21.51 Class 50 or AWWA C151 (minimum). Glands on mechanical joint pipe and fittings shall be ductile (See City of Seattle Standard Specification 9-05.2)
 - e. Vitrified Clay Pipe – ASTM C 700 with joints per ASTM C 425 (See City of Seattle Standard Specification 9-05.4)
 - f. Butt Heat Fusion Polyethylene (PE) Plastic Pipe – PE 3408 Material per ASTM D 3350 and fittings per ASTM 3261, Minimum SDR 21, less than 12-inch diameter (See City of Seattle Standard Specification 9-05.5(5))

3. For Drainage Only:

- a. Perforated PVC Subsurface Drain Pipe – ASTM D 2241 (minimum SDR 21), or ASTM D 3034 (See City of Seattle Standard Specification 9-05.3(1)), or ASTM D1785 Schedule 40 (not for use in Public Place).
- b. Concrete Pipe – Less than 12-inch diameter, ASTM C 14 Class 3; 12-inch or 15-inch in diameter, ASTM C 76 Class IV; 18-inch or larger in diameter, ASTM C 76 Class III (See City of Seattle Standard Specification 9-05.1(1))
- c. Corrugated Polyethylene Drain Pipe (detention pipe located on private property) – Minimum 12-inch diameter, maximum 60-inch diameter, AASHTO M 294, Type S (material not approved for use in Buildover applications) (See City of Seattle Standard Specification 9-05.5(2))
- d. Corrugated Polyethylene Drainage Tubing Drainage Pipe – Maximum 10-inch diameter, AASHTO M 252 (See City of Seattle Standard Specification 9-05.5(1)A)
- e. Steel Pipe for Detention – AASHTO M 36 Type I ***[Material not approved for use in the Public Place nor as a detention facility in landslide-prone areas nor in Buildover applications]*** (See City of Seattle Standard Specification 9-05.7(5))
- f. Aluminum Pipe for Detention – AASHTO M 196 Type I ***[Material not approved for use in the Public Place nor as a detention facility in landslide-prone areas nor in Buildover applications]*** (See City of Seattle Standard Specification 9-05.6(4))

NOTE: Cellular-core (foam core) pipe is not allowed in the construction of side sewers.

B. Pipe Bedding

1. All pipe bedding installed in the Public Place shall be per the City of Seattle Standard Specifications for Road, Bridge and Municipal Construction.
2. All pipe bedding located on private property, including detention pipe, shall comply with the bedding requirements as listed in Table A, Bedding Requirements for Types of Pipe Material. See Exhibits 1 through 3 for examples for bedding and backfill associated with rigid, flexible, and ductile iron pipe materials used for construction within private property.
3. Bedding materials shall be in place and inspected by the Site Inspector for compliance and approved prior to backfilling trench. The project's geotechnical engineer can provide recommendations for the selection of material, with approval from the Site Inspector.

Table A, Bedding Requirements for Types of Pipe Material

TYPE OF PIPE MATERIAL	BEDDING REQUIREMENT
Rigid (Concrete, Vitrified Clay)	Fill and compact to the springline of the pipe with Type 9 aggregate (pea gravel - 3/8" washed gravel). Above the springline of the pipe, native soils used for fill must be compacted per City of Seattle standards. Class C Bedding per City Specifications 7-17.3(1)B2.3
Flexible (Polyvinyl Chloride (PVC), Acrylonitrile butadiene styrene (ABS), Corrugated Metal, Spiral Rib, Polyethylene (PE))	Fill and compact to 6 inches above the top of the pipe with Type 22 aggregate (crushed gravel – 3/4"). See part 2 of this Section. Class B Bedding per City Specifications 7-17.3(1)B3
Force Main Rigid	Fill and compact to 6 inches above the top of the pipe with Type 9 aggregate (pea gravel – 3/8" washed gravel). Class B Bedding per City Specifications 7-17.3(1)B2.2
Force Main Flexible	Fill and compact to 6 inches above the top of the pipe with Type 22 aggregate (crushed gravel – 3/4"). See part 2 of this Section. Class B Bedding per City Specifications 7-17.3(1)B3
Ductile Iron	Native soils used for fill to the springline of the pipe shall be compacted to provide uniform support. Above the springline of the pipe, native soils used for fill must be compacted per City of Seattle standards. Class D Bedding per City Specifications 7-17.3(1)B2.4

C. Minimum Pipe Sizes

1. Side sewers on private property that serve one unit shall be a minimum of 4 inches in diameter.
2. Side sewers shall be a minimum of 6-inches in diameter for the following:
 - a. Side sewers located in the Public Place (Service drains that are permitted to discharge to a curb face may use pipe smaller than 6 inches in the Public Place. See Part VII Section I, Curb Discharge, for further information.)
 - b. Side sewers that serve two units and up to eight dwelling units maximum.
 - c. Side sewers and service drains being merged together prior to the Public Place, downstream of the merged connection.
 - d. Side sewers that serve commercial or industrial sites.

3. Refer to Part V Section K, New Connections to Public Mains, Table B for maximum allowable diameter of side sewer connections to public mains.

D. Fittings

1. All fittings shall be factory-produced and designed for installation on the pipe to be used. All fittings must meet minimum standards per Part V Section A (General Requirements – Allowable Materials).
2. The maximum deflection at any one fitting shall not exceed the manufacturer's recommendation.
3. All changes in grade or line shall be made with 45-degree or 22½-degree bends or wyes for side sewer pipe.
4. Double and triple wyes are not permitted.
5. The maximum deflection of any combination of two adjacent fittings shall not exceed 45 degrees (one-eighth bend) unless the following adjustment is made:
 - a. Adjacent fittings are spanned by a straight pipe of two feet or more in length. Under special circumstances, a straight pipe less than two feet in length may be allowed (with the Site Inspector's approval) due to field construction restrictions (such as close proximity of side sewer to building foundations);
 - b. The two fittings are wyes, and there is a cleanout installed (to grade) on the upstream straight leg of both fittings to allow cleaning between the fittings and downstream of the second fitting. See Part V Section I, Cleanouts.
6. 90-degree bends are not allowed except for the following two scenarios:
 - a. The installation of a 90 degree long-radius is allowed at the most upstream downspout to act as a cleanout. The top of the fitting shall be flush with the finish grade.
 - b. For p-traps that are less than three feet deep. Refer to Part VII Section C, Downspout Standards.
7. Tees are not allowed in side sewer construction, except for test ball access.
8. Grafts are not allowed on side sewers. Such connections shall be accomplished by installing a standard manufactured wye.

E. Pipe Cover

1. Private Property: A minimum pipe cover of 1'-6" is required on private property for flexible and rigid pipes.
2. Property Line: A minimum pipe cover of 2'-6" is required at the property line.
3. Curb Line: A minimum pipe cover of 5-feet is required at the curb when connecting to a public main. A side sewer may be allowed to have less cover at the curb that is located in the Public Place if the site is permitted to connect to an existing lateral and that existing lateral has less than 5 feet of cover at the curb located in the Public Place.

4. If the above minimum pipe coverage(s) cannot be achieved, the following options are available:

- a. the pipe must be embedded (six-inch minimum surrounding pipe) in controlled density fill (CDF) or concrete. See City of Seattle Standard Specifications Section 9-01.5 and 5-05.3(1) for CDF and concrete mix-design requirements, or
- b. ductile iron pipe must be used, or
- c. schedule 40 or 80 PVC pipe materials must be used.

F. Pipe Slope

1. Pipe shall have a slope of at least two percent (1 vertical:50 horizontal).
 - a. Pipe that cannot meet two percent can be constructed at one percent if the pipe is a minimum of 4-inches in diameter. A Save Harmless and Indemnification Agreement must be executed with King County Records by all property owners connected to the side sewer if it is installed between one and two percent.
2. A side sewer pump shall be required if the side sewer has less than one percent slope.
3. Pipe slopes exceeding 100 percent (1 vertical:1 horizontal) will require the use of restrained joint ductile iron or solvent welded PVC Schedule 40 or 80 piping materials.
4. Pipes shall have a minimum of ten feet of gravity flow in the Public Place prior to connection to the public system or discharge to the curb face (for approved curb discharges).

G. Pipe Clearances

1. For existing and new side sewers, the following minimum clearances are required:
 - a. Six inch vertical separation between the existing side sewer and the new side sewer, except at the point of connection between the two lines, if they are designed to be connected.
 - b. 12-inch horizontal separation between the existing side sewer and the new side sewer, except at the point of connection between the two lines, if they are designed to be connected.
 - c. If the above minimum clearances cannot be accomplished, ductile iron or solvent welded PVC Schedule 40 or 80 pipe shall be used and shall extend at least five feet beyond the abutting utility line.
2. Between the new side sewer and a water main or water service, the following minimum clearances are required based on City of Seattle Standard Plans and Specifications:
 - a. Side sewers installed below a water main or water service shall be at least 6 inches clear in the vertical distance and 12 inches clear in the horizontal

distance from the water main unless ductile iron pipe is used for the side sewer.

- b. Ductile iron pipe shall be used for all side sewers crossing over water mains, for a perpendicular distance of five feet from the center of the water main.
3. On private property, side sewers and water services shall achieve minimum separations and materials per Section 720 of the Uniform Plumbing Code. Side sewer piping made of clay or materials not approved for use in a building shall not be run in the same trench unless there is a minimum of 12-inches of vertical and horizontal separation between the utilities (as measured from the nearest points), and the water service is placed on a solid shelf excavated on one side of the common trench. Water services shall also cross over (not under) side sewers made of clay or other materials not approved for use in a building.
4. In addition to the above, whenever a new side sewer clears an existing or new utility service by six inches or less, polyethylene plastic foam per City of Seattle Standard Specifications Section 9-05.10 shall also be placed between the pipes for cushioning prior to backfilling.

H. Pipe Installation

1. Bell and spigot pipe shall be installed with the bell end up-grade.
2. Rigid pipe shall be installed in a straight line and at uniform grade between fittings.
3. Flexible pipe may be installed in a slight curve alignment per the manufacturer's recommendations and at uniform grade between fittings.
4. Pipe should be installed starting at the downstream connection.
5. All pipe shall be installed in a manner such that the Site Inspector can verify the pipe material (i.e. print-side up).
6. Connections shall be made with rubber gasket, mechanical joint, or compatible solvent, depending on pipe type and fitting design. All connections shall conform to the manufacturer's specifications.
7. Connections to structures, when using rigid pipe, shall utilize flexible connections when the connection is located in an area classified as liquefaction or in a settlement sensitive area classified as "peat."
8. Surface mounting of side sewers using ductile iron pipe with restrained joints, PE pipe, or solvent welded PVC Schedule 40 or 80 pipe and anchoring may be allowed for those situations in which trenching and backfilling are inappropriate such as in steep slope areas. Anchoring systems must be designed and stamped by a licensed professional engineer. See Exhibits 16A and 16B.
9. Any side sewer pipe laid in a steel casing shall be laid in minimum lengths of eight feet. The casing shall be sealed at both ends using standard casing end seals, cement slurry, or approved material. Side sewer pipes that are less than eight feet in length may use casing segments shorter than eight feet. The casing shall extend two feet past the zone of influence of any structure.

I. Cleanouts

1. Cleanouts shall consist of a wye fitting in the side sewer. Cleanouts shall be provided as follows:
 - a. one for each total change of 90 degrees in grade or alignment or one every 100 feet of pipe length;
 - b. one on the upstream reach of the last wye fitting in the side sewer serving a building or structure (see Exhibit 4);
 - c. one adjacent to the building foundation on the upstream reach of the last wye branch in the side sewer (see Exhibit 4).
2. For situations where the site conditions preclude the normal placement of cleanouts, or building conditions preclude placement of a cleanout within close proximity to the building structure, two cleanout assemblies may be constructed in close proximity to each other but in a reverse direction. This will facilitate both upstream and downstream pipe cleaning.
3. If reverse wyes are used (e.g. for a temporary test tee fitting), they must be brought to grade and finished as cleanouts.
4. Downspouts may qualify as cleanouts provided there is three or less bends before connecting to the service drain.
5. All cleanouts located in the Public Place shall be extended to grade and shall be bolted down (drilled and tapped). Cleanouts may be located within the Public Place per Standard Plan No. 278 & 280 subject to approval by SDOT.

J. Maintenance Holes

1. Private Maintenance Hole construction:
 - a. Any gravity side sewer having a minimum pipe diameter of 6-inches, shall, at a minimum, have a maintenance hole located every 400 feet.
 - b. Clearly label maintenance holes located on private property which are part of a private side sewer system as "Private" on the maintenance hole lid.
 - c. Private maintenance holes are not allowed to be constructed in the Public Place.
 - d. On private property, use a 3-bolt locking maintenance hole ring and cover (See Exhibit 19 of this DR) in lieu of the "locking cam" maintenance hole ring and cover shown in Standard Plan 230.
2. Public Maintenance Hole construction:
 - a. Public maintenance hole construction must be approved by SPU prior to side sewer permit issuance and shall be built per City of Seattle Standards. Maintenance hole construction shall be included with the side sewer permit but will require SPU coordination and inspection during the installation of the maintenance hole. The Registered Side Sewer Contractor (RSSC) must notify SPU Core Tap Hotline 48 hours prior to beginning work on excavation and installation of the maintenance hole.

- b. **Note Maintenance Hole Construction Restriction:** Side sewers requiring new connections to public mains shall follow the core tapping schedule outlined in Table B below. If proposed side sewer pipes do not have diameters that allow direct core tapped connections to the existing public pipe system, side sewer pipes must be split into smaller pipe sizes (e.g. two 6-inch pipes) from the building. This may be accomplished using an appropriately designed flow splitter or by having separate connections, such as for different portions of the proposed structure. If the applicant demonstrates to SPU that flows cannot be split amongst several pipes and connected per the core tapping schedule in Table B, connection of the side sewer to the public main shall require a maintenance hole or rolled tee at SPU's discretion.

K. New Connections to Public Mains

1. New side sewer connections to a public main shall be installed at a 90 degree angle to the main sewer (in plan view). Refer to Exhibit 10 for the connection detail for a 30 to 45 degree angle to the main (in section view) for a new core tap, per latest edition of the SPU Core Tap Procedures.
2. At the Public Place/private property interface the side sewer invert shall be at least one-foot higher than the crown elevation of the public main (see Exhibit 10). In instances where achieving the minimum pipe slope requirement reduces the pipe cover below 2 foot 6 inches (minimum standard) at the property line, ductile iron or PVC Schedule 40 or 80 pipe materials shall be used.
3. Side sewers connecting to mains shall be at least one standard pipe diameter size less than the main (e.g. 6-inch side sewer connection to 8-inch or larger storm drain or combined sewer main). New connections must be sized or split as appropriate to allow a core tap of a new connection without requiring a new MH or tee for the proposed connection. See Table B, Core Tap Connection Requirements for Side Sewer Connections to Existing Mains.
4. Before excavating for side sewer work, the Contractor shall review information available from the City to verify elevations and locations of the sewer infrastructure. The contractor shall also check the information made available by the City to ensure that field conditions match the as-built data.
5. Rolled tees (if allowed by SPU) and core taps will be done by SPU staff and must be scheduled and coordinated by the RSSC. If allowed by SPU, maintenance hole construction shall be done by the RSSC and shall require SPU inspection and material approval.
6. SPU is responsible for core taps and rolled tees on public mains and public culverts even if they are not in the Public Place. Additionally, the side sewer work associated with this type of connection must be performed by an RSSC if it is within the Pipe Zone of Influence of the public main, within an existing City easement, or within five feet of the outside edge of the main, whichever distance is greater. The contractor or permittee shall contact SPU prior to preparing for such a proposed connection and to determine if restoration by the permittee is acceptable.

7. Side sewer work associated with public culverts and ditches in the Public Place must be performed by an RSSC, and shall be permitted, constructed, and inspected per these and other relevant rules.

8. The RSSC shall complete trenching and shoring operations per Washington State Department of Labor and Industries (L&I) standards. SPU crews will not enter an excavation that is improperly shored or is considered inadequate to protect the health and safety of SPU workers. If trenching and shoring does not meet L&I requirements, the RSSC's competent person shall remedy deficiencies. SPU shall not be liable for shoring conditions or costs associated with shoring improvements. See Part V Section V, Trench Shoring for additional information. If disputes regarding shoring adequacy cannot be resolved, the issue may be referred to L&I staff for investigation.

Table B, Core Tap Connection Requirements for Side Sewer Connections to Existing Public Mains

MAIN SIZE	SIDE SEWER SIZE CONNECTION TO PUBLIC MAIN (New Maintenance Holes or Tees Require SPU Approval)			
	6-Inch	8-Inch	10-Inch	12-Inch
8-inch	Core Tap Req'd	NA	NA	NA
10-inch	Core Tap Req'd	NA	NA	NA
12-inch	Core Tap Req'd	Core Tap Req'd	NA	NA
14-inch DIP	Core Tap Req'd	Core Tap Req'd	NA	NA
15-inch	Core Tap Req'd	Core Tap Req'd	NA	NA
16-inch DIP	Core Tap Req'd	Core Tap Req'd	NA	NA
18-inch	Core Tap Req'd	Core Tap Req'd	NA	NA
20-inch	Core Tap Req'd	Core Tap Req'd	Core Tap Req'd	NA
21-inch	Core Tap Req'd	Core Tap Req'd	Core Tap Req'd	NA
24-inch & Larger	Core Tap Req'd	Core Tap Req'd	Core Tap Req'd	Core Tap Req'd

NA – Not Allowed

L. Main Extensions

1. When an applicant is required to build an extension to the public sewer system per 21.16.260, an engineering plan showing the public main extension shall be prepared by a licensed professional engineer and permitted by SDOT and SPU before a side sewer permit is issued for the property(s).

2. SPU may consider appeals to the public main extension requirements. An applicant can request review of the extension requirement through a formal appeals process. The evaluation will be based on information and submittals provided by the applicant as well as criteria such as public infrastructure and future development.

M. Use of Existing Sanitary and Combined Side Sewers

1. SPU may approve the use of an existing side sewer for a new or converted building or dwelling unit when the RSSC determines that the existing side sewer stub, tee or wye is in an operative condition per Part V, Section N, Existing Stubs and Tees. In addition, regardless of number of units sharing the side sewer, the following must be completed prior to building permit issuance:

- a. The existing side sewer must be evaluated, and the evaluation must be stamped by a licensed professional engineer. The evaluation shall include pressure test of existing pipe (per Part V, Section Q, Testing) and video inspection (per Part V, Section AA, Video Summary); or
- b. The existing side sewer can be rehabilitated, which can include pipe relining or pipe bursting, per Part V, Section P, Pipe Lining and Pipe Bursting. The rehabilitation of the existing side sewer must be evaluated and stamped by a licensed professional engineer and submitted to the Site Inspector prior to finalization of the side sewer permit. Pipe relining does not require pressure testing of the side sewer, per Section P of this DR, if only one access point is used for the rehabilitation work.

2. If the existing side sewer cannot meet the above criteria, a new side sewer must be constructed and connected to the public sewer system.

3. A project may be allowed to connect to an existing side sewer without meeting the requirements for pressure testing in Section M, paragraph 1a above, if the existing side sewer was permitted by the City and constructed no more than fifty (50) years prior to the date of the development proposal submittal. However, the permit applicant must still provide an engineering evaluation/certification that the pipe is in a condition and has the capacity to serve the existing and proposed connections. The applicant must also indemnify and save the City harmless for the connection.

4. A project may be allowed to connect to an existing side sewer without meeting the requirements for engineering evaluation/certification and pressure testing if the existing side sewer was permitted by the City and constructed after 2003.

5. Detached Accessory Dwelling Units (DADUs) may be allowed to connect to the existing side sewer used by the existing single family residence on the subject without meeting the requirements for engineering evaluation/certification and pressure testing if the permit applicant indemnifies and saves the City harmless for such a connection. Requirements under Part V, Section R, Service to Accessory Buildings and Part VI, Section C, Maximum Number of Units, must still be met for DADU proposals.

6. Projects where the number of buildings or dwelling units does not increase may be allowed to connect to the existing side sewer without meeting the requirements for engineering evaluation/certification and pressure testing if the permit applicant indemnifies and saves the City harmless for such a connection.

N. Existing Stubs and Tees

1. The RSSC is responsible for notifying the Site Inspector **AND** SPU field crews if the RSSC discovers a broken wye or tee or breaks an existing wye or tee. The RSSC shall have a responsible person remain at the site until SPU field crews arrive at the site.
2. The RSSC is responsible for locating any stub, wye, or tee in the Public Place that was installed as part of a City sewer construction project or as part of a previous private development. The permittee shall coordinate with SPU any excavation work for the connection prior to encountering the main. In addition, the RSSC is responsible for determining that a wye or tee is in an operative condition. Verification may include a flow test done in the presence of a Site Inspector. SPU and DPD will not be held financially responsible for work associated with locating or connecting to an existing stub, wye, or tee.
3. As with new connections to existing mains (see preceding Section K), when a project proposes to connect to an existing wye, tee, or stub on a public main that is located on private property (whether in an easement or not), an RSSC is required to perform any side sewer work that is within the Pipe Zone of Influence of the public main or within five feet of the outside edge of the main, whichever distance is greater.
4. If an existing wye, stub, or tee cannot be located in the field based upon dimensions from City records, the RSSC is financially responsible to have a new tee installed by SPU.
5. If a project proposes to connect to an existing, inactive tee or wye on a public main, the RSSC is responsible for verifying that the tee or wye is in good condition and is functional. If a stub or tee or wye is capped at the main or has been covered by a previous pipe relining process within the main, the permittee shall be financially responsible for having the cap or liner removed after consulting with SPU regarding access to the public main and liner protection inside the main.

O. Pumps

1. If a pump is required to connect the side sewer force line to a side sewer or public main, the permittee shall attach a copy of the pump manufacturer's specifications to the side sewer permit application. The pump specifications shall include gallons per minute (gpm) and the total system head (static head and dynamic head).
2. Pumps shall be specifically designed for the applicable use (e.g., drainage discharges or wastewater discharges) using the pump manufacturer's recommended operating guidelines.
3. No more than one property shall be connected to any pump system, including the force-line
4. Separate pump systems (wet wells, pumps, etc) are required for drainage and wastewater applications, if pumping is required or proposed.
5. *A duplex pump system is required for multi-unit buildings and commercial buildings unless otherwise approved by DPD.*

6. Projects which propose pump systems and are located within a designated geologic hazard area may be subject to additional side sewer and geotechnical requirements per DPD.
7. The discharge pipe (force-line) shall have a non-corrosive check-valve, a "quick-release" connector/fitting, and a non-corrosive gate-valve to facilitate pump removal. The pipe shall have a minimum inside diameter of two-inches for injector pumps, one-and-one quarter-inches for grinder pumps, or three-inches for duplex pump systems, or per manufacturer recommendations. The discharge force line shall be PVC Schedule 40 or Schedule 80 or ductile iron or as approved by the Site Inspector.
8. A force-line pipe may not connect directly to a public main. Prior to connecting to the public main or encroaching on the Public Place, the force-line shall discharge into a standard, gravity-flow section of side sewer pipe that is at least 10 feet in length (see Exhibit 11).
9. Force-line sections of pipe are required to have "pig ports" for the following two conditions:
 - a. A maximum of 100 foot intervals; and
 - b. Wherever fitting bends total 135°.
10. The force-line pipe located outside the building shall be pressure tested per requirements of Part V Section Q, Testing. DPD also requires that the pump be operational prior to finalizing the side sewer permit.
11. The pump shall be installed in a chamber that is readily serviceable. The tank shall be made of non-porous, non-corrosive, structurally sound material such as plastic, fiberglass, stainless steel, or concrete. If a concrete tank is used, a fiberglass reinforced plastic or polyurethane hybrid polymer resin or equivalent shall be installed in the concrete chamber. The liner may be cast integral with the precasting of the maintenance hole or field assembled and sealed in the precast concrete sections.
12. Pump systems shall be designed and installed to provide easy access from the ground surface to all mechanical and electrical devices.
13. An audible alarm system is recommended for pump systems.
14. An electrical permit is required for an electrical hookup of a pump if a new circuit is required for the pump.
15. Pumps located within a building are subject to Seattle-King County Department of Public Health inspection.

P. Pipe Lining and Pipe Bursting

1. Pipe lining and pipe bursting are allowable methods for the repair of side sewers using materials compatible with the diameter and pipe type of the existing side sewer. Excavation and associated work for pipe lining and pipe bursting in the Public Place must be performed by an RSSC.
2. For pipe lining, the contractor shall demonstrate to the Site Inspector via live video inspection that the pipe liner does not protrude into the public main after completion of reline work. If the pipe liner does protrude into the main or if the Site

Inspector is unable to verify that the liner does not impact the public main, the RSSC must contact SPU Utility Systems Management (USM) unit to determine required remedies. A video recording of the public main may be required by SPU if pipe reline or bursting work has the potential to impact the public main or is in the Pipe Zone of Influence of SPU facilities. The Site Inspector will not finalize any side sewer permit involving reline work near the main without verification that the liner does not impact the main or without SPU approval.

3. Video inspection shall include all portions of the repair work from the point of the insertion to the point of terminus. This may include inspection from the soil pipe connection up to the public main, as applicable.

4. The RSSC or subcontractor performing the proposed reline work shall have a current license agreement with the product manufacturer/assembler and shall have such license available to the Site Inspector. Additionally, the individuals performing the reline work shall be certified by the product manufacturer/assembler.

5. Pipe lining and pipe bursting repair work must conform to current ASTM Standards for pipe lining and pipe bursting, including ASTM F1216. Pipe lining installation shall be in accordance with the requirements of the product manufacturer/assembler and as directed by their technical representatives. Prior to pipe reline work, the existing side sewer must be cleaned, root cut, jetted, rodded, and otherwise cleaned to a condition that allows for reline work to be effective per the manufacturer's recommendations. The contractor shall provide information to DPD as requested during issuance of permit or site inspection.

6. Due to pipe-bursting strain and/or temperature affects on the pipe during installation, the pipe will be required to rest for at least 24 hours (or as long as recommended by the manufacturer, whichever is longer) prior to the final pipe cutting and the connection being made to the existing pipe to allow it to achieve equilibrium.

7. Repair of any portion of an existing side sewer pipe utilizing pipe lining or pipe bursting requires a side sewer permit and DPD inspection.

8. A pressure test shall be required for pipe lining and pipe bursting work that has two access points.

9. If site conditions change, and if pipe bursting or relining is proposed after a permit has been issued, the applicant must update the side sewer permit to reflect the revised work.

Q. Testing

1. Side sewer repairs and new connections of a total length of 10 feet or more, alterations, and all new side sewers shall be tested for water tightness. Testing shall be done in the presence of the Site Inspector.

2. When discharging to a public main, pressure testing of the drainage piping shall be conducted between the lowest open point of the service drain and piping in the Public Place is required. Testing shall be conducted in the presence of the Site Inspector.

3. Per City of Seattle Standard Specifications 7-17.3(4) B, Exfiltration Test, when using water for testing, leakage shall be no more than 0.28 gallons per hour per inch inside diameter per 100 linear feet of pipe, with a hydrostatic head of 6 feet above the crown at the upper end of the test section, or above the natural groundwater table at the time of test, whichever is higher.
4. Testing may also be done by air pressure according to the City of Seattle Standard Specifications 7-17.3(4) D, Air Pressure Test, with low-pressure air by the pressure drop method.
5. If a pipe section fails to pass the water or air pressure test, it shall be repaired or replaced and retested as outlined above. If not repairable, the damaged pipe section shall be replaced with a new one and the joints retested as specified above.
6. If the existing downstream side sewer pipe fails to pass water flows adequately indicating there is downstream blockage, impairment, and/or restriction, the Site Inspector will note the downstream flow problem in their inspection report. It is the applicant's responsibility to ensure that the side sewer is fully functional.
7. Pressure testing is not required for the following:
 - a. Catch basin outlet lines discharging to natural water courses on private property,
 - b. Service drains using weep hole outlets,
 - c. Drain lines upstream of their connection to the lowest open point of the service drain located on private property,
 - d. Tightline connections between footing drain systems and the service drain.

R. Service to Accessory Buildings

1. Wastewater piping from an accessory structure to a main structure shall adhere to the Seattle-King County Department of Health requirements. Permitting and inspection of the pipe between the accessory building to the main structure shall be performed by the Seattle-King County Plumbing Inspector. Piping extending from the main structure to the public main shall comply with the Side Sewer Code and this DR.
2. If a side sewer connects plumbing in an accessory structure to the existing side sewer, permitting, construction, and inspection will adhere to the Side Sewer Code and this DR. Inspection from the plumbing of the accessory building to the side sewer will be done by the Site Inspector.

S. Special Requirements

1. No new building or structure or addition may be constructed over an existing side sewer. If this conflict arises, one of the following must be completed:
 - a. the existing side sewer must be relocated outside the new building footprint and side sewer materials and construction shall conform to this DR, or
 - b. the side sewer must be upgraded and inspected under a plumbing permit issued by Seattle-King County Public Health. Materials and construction

shall conform to the Uniform Plumbing Code as adopted by the City and King County.

2. Building over (Buildover) agreements (construction over public facilities) must be approved by and secured from SPU prior to building permit issuance. Applicant shall be responsible to check legal documents, project survey data, and available maps and records for existing City utility infrastructure and/or easements in order to identify the existence of public structures that are located on private property.
3. Any Public survey monuments located within the block of the project area shall be surveyed by SPU surveyors before and after completion of the work if the construction activity threatens or may cause disturbance to the monuments. The owner and/or contractor shall coordinate the survey with the SPU Survey Section. Further, the owner and/or contractor shall be responsible for the expense of both surveys, including the resetting of the monument by SPU, if shifting has taken place.
4. The contractor shall connect all outlets from plumbing fixtures and/or drainage facilities unless specifically noted otherwise on the application, plat, and/or permit, and approved by the City.
5. Where existing public sewer and drainage utilities are combined in the Public Place:
 - a. For new construction, the new side sewer and service drain on private property shall be separated to the street property line and one connection to the public main or an existing side sewer shall be made. See Exhibit 6.
 - b. For additions, separation of the service drain to the property line is not required.
6. Where the existing public sewer and drainage utilities are separated in the Public Place:
 - a. For new construction, separation of the service drain to the property line is required, and connection to occur depending on the availability of public mains located in the Public Place. See Exhibit 7.
 - b. For additions, separation of the service drain to the property line is not required.
7. Under a side sewer repair permit, the connection of the existing side sewer and service drain can remain in the same configuration.
8. Backwater valves located outside a building shall be placed in a chamber so that each valve is readily accessible for maintenance. A cleanout shall be installed upstream of the backwater valve, after the last change in direction, for maintenance access.

T. Emergency Repairs

1. Contractors may commence emergency repairs without a side sewer permit if the emergency occurs after City business hours. Owners or contractors are required to apply for a side sewer permit on the next City business day after repairs have started. Contractors who have made financial arrangements with DPD may obtain side sewer

repair permits on-line at the DPD Side Sewer Web site. Any emergency work in the Public Place must be performed by an RSSC and must comply with the requirements set forth in SDOT's Traffic Control Manual.

2. Emergency repairs may include trenching, repairing pipe, installation of new pipe, and bedding only. Trench backfilling may not begin until DPD has inspected and approved the pipe and installation.

U. Capping

1. At the end of a pipe designated to be permanently capped, the pipe end shall be completely filled with concrete for a minimum length of 12 inches. On private property, a solvent welded cap may be used on pipes that have solvent welded fittings.

2. A side sewer permit for capping shall be required for projects having a demolition permit only. A side sewer permit for capping will not be required for projects having a demolition permit and a construction permit since the temporary capping is considered incidental to construction.

V. Trench Shoring

1. Trenching and shoring considerations shall be the responsibility of the contractor's competent person who has the training, the experience, the knowledge, the ability to detect deficiencies and hazards, the authority to take prompt corrective measures to eliminate existing and predictable hazards, and the authority to stop work when required.

2. If the Site Inspector believes that working conditions are hazardous or that the competent person is unavailable during inspection, the inspector may defer the matter to Washington Department of Labor and Industries (L&I) for further investigation. Trenching and shoring shall comply with L&I requirements. See Part V, Section K, New Connections to Public Mains for further requirements.

W. Side Sewer Construction in an Environmental Critical Area (ECA)

1. Repairs of existing side sewers located in a designated ECA can receive a side sewer permit per SMC 25.09.040 A, Permits and Approvals Required.

2. Construction of new side sewers in a designated ECA or buffer area, as associated with any required building permits, shall be in compliance with all ECA Code (SMC 25.09) requirements as determined through review by DPD.

X. Existing Trees and Pipe Trenching

1. Contact SDOT Urban Forestry (684 -TREE (8733)) 48-hours prior to any work within the dripline of trees in the Public Place. All side sewer construction shall avoid trenching within the dripline of existing trees in the Public Place. See City of Seattle Standard Plan 133 and Section 1-07.16(2) of the City's Standard Specifications for work requirements near trees in the Public Place.

2. Side sewer work on private property shall not be in the dripline of trees that are identified or intended to remain on the project site or on adjacent property. Exhibit 19

provides an alternate method for tunneling near tree roots on private property. However, if there is no alternative, certain conditions shall apply including:

- a. Trenches shall be constructed no closer than half the distance from the tree trunk to the dripline.
 - b. Roots shall be cut with sharp instruments to reduce the potential damage to the tree.
 - c. The trench shall be backfilled within the shortest amount of time possible, and the soil shall not be compacted, unless directed by the Site Inspector.
3. Side sewer work that impacts trees in designated ECA areas shall still be subject to the terms and conditions of the City's ECA Code, SMC 25.09.

Y. Plan Required at Issuance of Side Sewer Permits

1. The applicant for a side sewer permit for a project that includes a new side sewer serving a new building or addition to a building exceeding 750 square feet (i.e. project requires drainage review) shall submit to DPD a copy of the approved building permit plan set with a cover sheet containing the DPD reviewer's stamps, signatures, and side sewer plans. Said plans will become reference documents for the side sewer permit.
2. The applicant for a side sewer permit that includes a new side sewer serving an existing structure shall submit a drawing of the intended side sewer work, and said drawing will become reference documents for the side sewer permit.
3. The applicant for a side sewer permit that includes only a repair to the existing side sewer is not required to submit a drawing of the intended side sewer repair work.

Z. As-Built Drawing

1. Before a permit will be finalized, an as-built drawing shall be prepared and submitted by the contractor or property owner that includes all changes made to side sewers and submitted to DPD for review and approval. See DPD Client Assistance Memo 504, Side Sewer As-built Plan Requirements for more information.
2. At the time of the side sewer inspection, the Site Inspector will verify that the as-built side sewer information prepared by the permit holder is accurate and complete. The permittee shall be responsible to provide a clean, accurate, legible, and precise as-built document to the Site Inspector.
3. Time spent by the Site Inspector to review, verify, and/or correct the side sewer as-built plan shall be charged to the side sewer permit per SMC 21.24, Permit Fees and Connection Charges.
4. The permittee is responsible for demonstrating that the as-built improvements are located according to the property lines and/or Public Place. A survey prepared by a licensed surveyor may be required by the City if it is deemed unclear from the location of the existing improvements and the constructed side sewer improvements as they relate to private property and/or Public Place.

AA. Video Summary

Video or TV inspection work is required for various side sewer work discussed in this DR. To assist contractors and other users of this document, this section provides a summary of areas in the DR that require video inspection. Details for each inspection and procedure must still be followed, and the contractor is responsible for identifying the requirements in the City's respective Codes and the related Rules for their work. TV inspections and recordings must generally meet the requirements listed in Section 17-17.3(4)I of the City of Seattle Specifications regarding parameters such as quality of work and lighting.

1. Special Requirements section; provide a video inspection of existing, inactive stub to DPD Site Inspector prior to finalizing the permit.
2. Emergency Repairs section; provide video inspection of inside of the side sewer pipe to DPD if backfill occurs prior to inspection and testing.
3. Existing Stubs and Tees section; as above, provide video inspection of existing, inactive stub to DPD Site Inspector prior to finalizing the permit.
4. Pipe Lining and Pipe Bursting section; provide real-time video inspection of side sewer reline work to the Site Inspector to demonstrate that the work has not impacted the public main. A video tape of the public main may be required by SPU if pipe reline or bursting work has the potential to impact the public main or is in the Pipe Zone of Influence of SPU facilities.
5. Use of Existing Side Sewer section; video inspection is required of the existing side sewer for evaluation by a licensed professional engineer.

VI. WASTEWATER DETAILS

A. Applicability

The provisions of Part VI of this DR apply to side sewers and the details associated with wastewater discharges.

B. Side Sewer Details

1. Septic tanks and similar installations shall not be connected to the public sewer system.

C. Maximum Number of Units

1. Per the side sewer code, only one building is allowed to connect to a single side sewer connecting to the public main in the abutting Public Place. Notwithstanding the requirements in the side sewer code, there may be situations where this is not practicable (e.g. where multiple buildings, as part of a common plan of development, do not all abut the Public Place). If more than one building is allowed by the City to connect to one side sewer, there are a maximum number of units that will be allowed on a single side sewer, as outlined below.

- a. No more than eight (8) single family or multi-family dwelling units shall use a single private side sewer pipe of 6 inches in diameter, regardless of pipe slope or engineering calculations.

- b. More than eight (8) single family or multi-family dwelling units shall use a single private side sewer pipe of 8 inches or larger in diameter.
2. In cases where the existing sewer main will not allow a core tap of a side sewer due to the size of the public main, flows shall be separated inside the building to allow for multiple core taps of smaller diameter side sewers.

VII. DRAINAGE DETAILS

A. Applicability

The provisions of Part VII of this DR apply to service drains and the details associated with drainage discharges.

B. Service Drain Permit Requirements

1. It is the responsibility of the permittee or property owner to obtain all required permits. There are severe penalties for commencing work without applicable permits.
2. Modification of existing water quality or flow control facilities, including adding additional catch basins and piping, will require a side sewer permit.
3. Side sewer permit is not required if the service drain is connecting to an existing on site infiltration system that has not been recorded by the City as a permitted facility.
4. A Side Sewer Permit for Temporary Discharges on construction sites may be required during drainage review depending on project size and/or groundwater conditions. See associated DPD Director's Rules and CAMs for more information.

C. Downspout Standards

1. Downspouts can connect directly to a service drain that discharges into a combined sewer main via a combined side sewer provided that either the downstream service drain connects to a common p-trap or a private catch basin (with downturned elbow) or p-traps are installed on all downspouts. Cleanouts are recommended for all p-traps for maintenance access. Cleanouts are required on the upstream and downstream sides of p-traps if the invert of the p-trap is more than 3 feet deep. The flow control device located within a stormwater detention system is not considered as an effective gas trap since the overflow device opens within the structure to the open air. Detention systems that connect to combined sewer systems shall have sealed MH covers and/or a downstream p-trap to prevent sewer gases from escaping from the structure.
2. Downspouts, storm drainage facilities, or service drains for new construction are to connect to the side sewer at the property line, right-of-way line or at the junction where the separate drainage and sanitary side sewers transition into a combined side sewer which conveys the combined flow to the existing combined sewer main.
3. Drainage discharge from downspouts may be spilled onto a paved parking area only if the parking area drainage is collected by a private catch basin or if it sheet flows to a channelized alley which has an inlet structure at the downstream end of the alley, prior to intersecting the street or sidewalk.

4. Downspouts may be connected to private catch basins only if the total area drained by the catch basin and roof drains does not exceed the catch basin capacities described in Table C, Private Catch Basin Service Areas.

5. In no case shall downspouts be connected directly to a groundwater collection system or the tightline connection from a groundwater collection system.

D. Private Catch Basins Standards

Private catch basins shall generally meet the standards under Sections 7-05 and 7-08 of the City's Standards Specifications. Private catch basins may not encroach into the Public Place and, except as noted, shall meet or exceed the following minimum standards:

1. The trap for each catch basin collecting drainage from paved parking areas shall be constructed with a 90 degree elbow or tee (plugged at the top end) the same diameter as the outlet pipe. The trap shall extend into the catch basin a minimum of six-inches below the outlet invert. See the City's Standard Plan Number 267a.

2. Catch basins may be constructed "on line" or "off line" to the service drain alignment.

3. Catch basins may be used for change in pipe alignment up to 90 degrees.

4. Drain lines from catch basins and drain inlets that are located under cover, such as in a garage or carport, shall connect to the wastewater lateral and not to the service drain.

5. The maximum area served by a catch basin shall be determined according to Table C. Also see Exhibits 12 and 13 for examples.

Table C, Private Catch Basin Service Areas

Type of Area Served	Maximum Area Served (Minimum Outlet Dia.)	Type of Structure	Minimum Sump Volume (cf)	Sump Depth (ft)
Non-traffic	500 square feet (4-inch)	Area Drain	N/A	N/A
Non-traffic	2,000 square feet (4-inch)	Inlet	N/A	N/A
Traffic	7,500 square feet (4-inch)	Catch Basin Std Plan #241	9	3
Traffic	15,000 square feet (6-inch)	Catch Basin Std Plan #241	9	3
Traffic	30,000 square feet (8-inch)	Catch Basin Std Plan #240	32	2.67
Footing drain to service drain	N/A	Catch Basin	2	2

N/A – Not applicable

6. Washington State Department of Transportation (WSDOT)/American Public Works Association (APWA) Type I and Type II catch basins, or equivalent, may be substituted for City designated Type 241a and Type 240 catch basins for private on-site drainage construction. See Exhibit 12.

7. Hard-surfaced and graded areas shall be constructed so that drainage will be collected on-site and does not cause damage to public or private property. Drainage collected from these areas should be discharged to a storm or combined sewer main, weep hole at the curb, drainage ditch, or other approved outlet. Drainage shall not discharge to a sanitary sewer, unless it is specifically allowed by SPU per SMC 22.802.

E. Subsurface Drain Systems

1. Water collected by subsurface drains shall pass through a catch basin before discharge to a public system or watercourse (see Table C and Exhibit 12). A separate permit from King County may be required for connection of subsurface drains to a public sewer system.

2. Subsurface drains shall be connected downstream of the flow control structure and shall not discharge directly into flow control system.

3. Subsurface drains shall not discharge onto any public sidewalk or Public Place.

4. The catch basin(s) used for the subsurface drain system may be placed within the building provided that the solid cover is water tight and is inspected by the Seattle-King County plumbing inspector.

5. Subsurface drains may be discharged to an on-site infiltration pit (dry well) if site conditions allow infiltration.

6. Tightlines from subsurface drains to a catch basin will be inspected by DPD Site Inspectors as part of the side sewer permit.

F. Service Drain Details

1. Service drains shall not connect to a sanitary sewer main even if the main converts to a combined sewer main downstream.

2. Service drains may be allowed to discharge on site at the discretion of DPD. Erosion control protection, such as rip rap, dispersal device, or other approved method, shall be provided for these service drains.

3. Discharge of service drains to ECAs and their associated buffers must meet the conditions and requirements of the ECA Code and will be at the discretion of DPD review staff.

4. Service drains shall be connected directly to the storm main or combined sewer main or other public drainage system unless otherwise approved by DPD, SPU, and/or SDOT (e.g. curb discharge, infiltration) per the conditions and requirements of this DR, the City's Stormwater Code, its accompanying DRs, and any other applicable City rules and regulations.

5. If a public culvert is too shallow to allow a 45-degree core tap, the service drain may use a junction box per standard plan number 277 when a service drain is proposed to connect to a culvert (previously a ditch) located in the Public Place. The junction box

shall have a solid top and shall not be used as an inlet structure for capturing surface runoff. Old sandboxes and inlets are not acceptable connection points for service drain connections. An existing junction box may be used if it meets the criteria stated herein and space is available on the junction box for the connection. The junction box and/or the connection shall be inspected by SPU prior to cover, and the RSSC must notify SPU at least 48 hours prior to beginning work on excavation and connection to a public culvert.

G. Work within Public Place

1. Backfill and restoration of the Public Place shall be in accordance with City of Seattle Standard Plans and Specifications, Seattle Right Of Way Improvements Manual, and SDOT Street, and Sidewalk Pavement Opening and Restoration Rules. Contact SDOT prior to any construction or restoration in the Public Place to obtain all applicable permits and approvals.

H. Drainage Requirements Associated with the Public Place

1. Surface drainage collected from the Public Place will not be routed through private property unless that property is the natural drainage course or a public main on private property (existing or to be constructed) is available.

I. Curb Discharge into the Public Place

1. Curb discharge will be authorized at the discretion of DPD (in consultation with SPU and SDOT as needed) based on site conditions, requirements of the Side Sewer Code, this DR, and available drainage/public infrastructure.

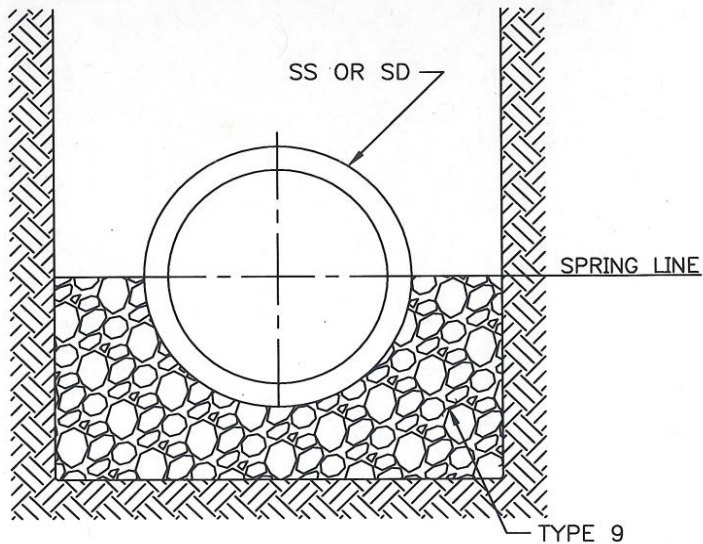
2. Curb discharge of drainage from developments may be allowed based on the following conditions:

- a. The project has less than 5,000 square feet of new plus replaced impervious surface;
- b. either the available public drainage infrastructure does not abut the site in the Public Place, **or**, is on the far side of the street centerline.
- c. drainage from that discharge point remains in the gutter line all the way to the nearest inlet structure;
- d. the discharge does not originate from a footing or other subsurface drain system;
- e. the discharge enters a public inlet before the next downstream intersection, regardless of the level of existing street improvements;
- f. the inlet is not located more than 350 feet downstream of the curb discharge point;
- g. the inlet discharges to a storm drainage system;
- h. the existing (or rebuilt) street curb is high enough to preclude flowing water from leaving the gutter line;
- i. discharges do not encroach on the travel lane;

- j. discharge is not on the high side of a street when the street cross section is a "thrown street" and;
 - k. discharge to the curb face is through a minimum of ten feet of gravity-flow and not directly from a pressurized system (see Part V Section F, Pipe Slope and Section O, Pumps).
3. When the existing curb height is less than five (5) inches in height, approval for curb discharge from SDOT is required prior to permit issuance.
4. Curb discharge through an existing curb which is brick, granite, or other special and/or decorative material must be approved by SDOT's Street Use Division prior to permit issuance.
5. Curb discharge may be allowed for temporary discharge of collected construction drainage, with DPD and SDOT approval as appropriate, provided it is part of the project's approved TESC plan. Changes in the field shall be coordinated with the DPD Site Inspector and the SDOT Street Use Inspector.
6. DPD and SPU may allow discharge to occur in an alley provided the following conditions exist:
- a. the alley is channeled to direct drainage to the center gutter line;
 - b. drainage from the discharge point flows to the alley gutter line;
 - c. the alley has concrete or asphalt paving;
 - d. a City inlet is located at the terminus of the alley to allow alley drainage to discharge to the street or into a drainage system without surface flow crossing the sidewalk; and
 - e. discharge to the alley is through a minimum of ten feet of gravity-flow and not directly from a pressurized system (see Part V Section F, Pipe Slope and Section O, Pumps).

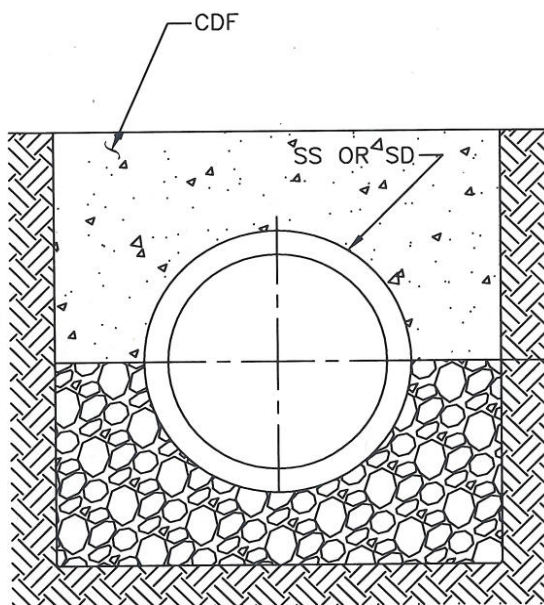
The use of "bubblers", "energy dissipater boxes", and riprap are allowed as part of the alley discharge drainage system provided these facilities are located on private property.

7. Curb or Alley Discharge Restriction: Curb or alley discharge will not be allowed for the following conditions;
- a. the project is located within a combined sewer area;
 - b. available public drainage infrastructure abuts the property **and**, is on the near side of the street centerline;
 - c. the project has greater than 5,000 sf of new plus replaced impervious surface



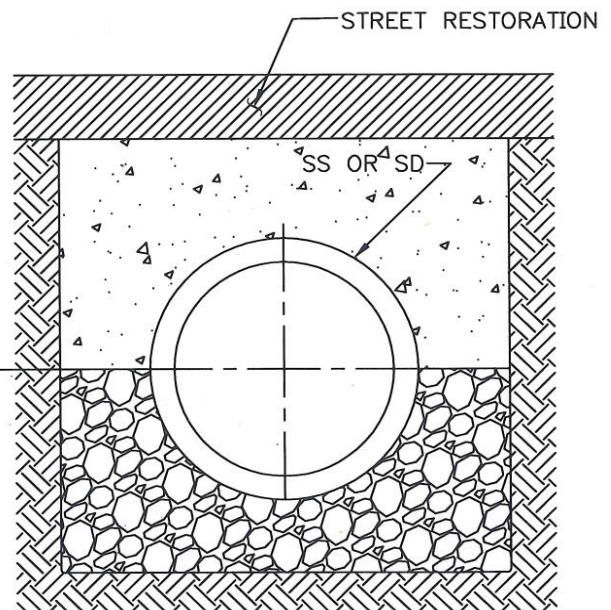
STEP 1

CONTRACTOR TO COMPLETE BEDDING
TO SPRING LINE AND COORDINATE
WITH DPD INSPECTION.



STEP 2

CONTRACTOR TO COORDINATE WITH SDOT
FOR CDF BACKFILL WITHIN TRAVELLED
ROADWAY.



STEP 3

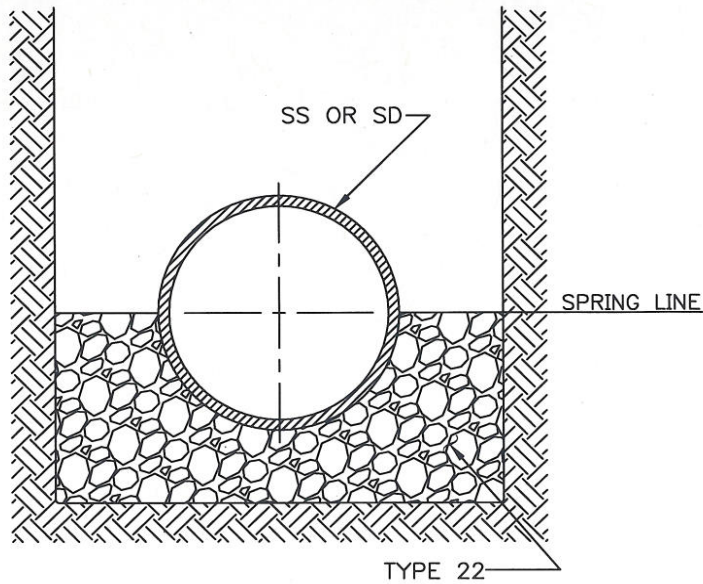
SDOT TO COMPLETE STREET
RESTORATION.

SCALE: NTS

1. CL "B" BEDDING
2. CONCRETE PIPE: ASTM C14 CL3 <12"
ASTM C76 CL IV 12" TO 15"
ASTM C76 CL III WALL B 18" OR >

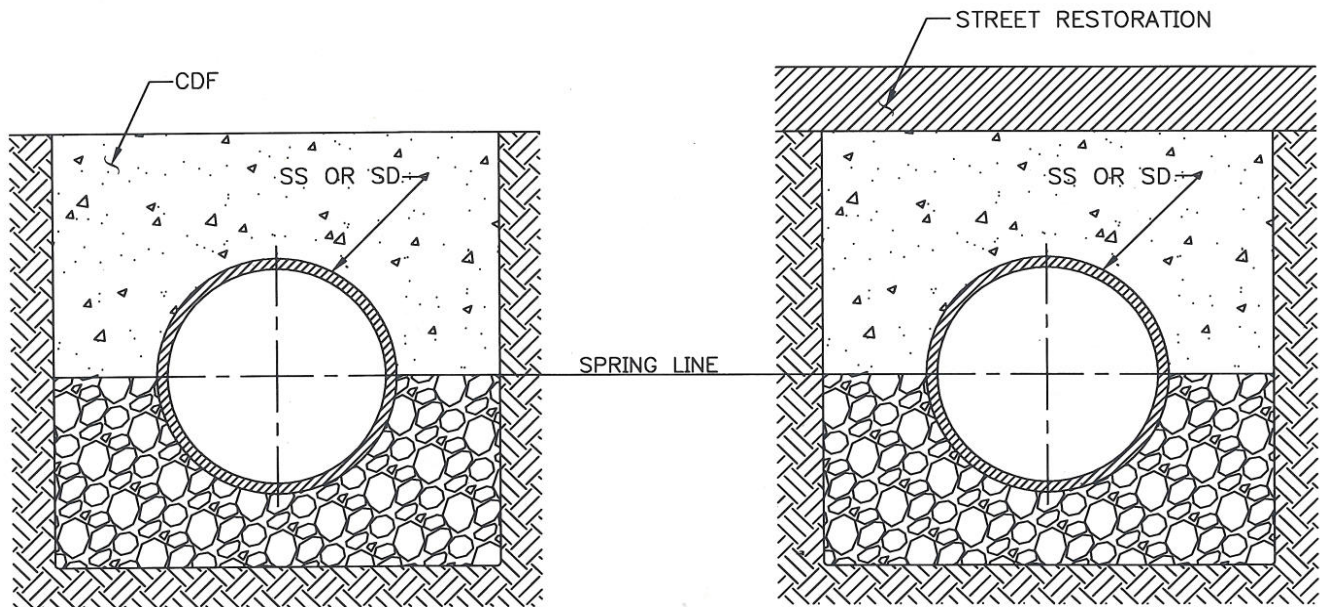


City of Seattle



STEP 1

CONTRACTOR TO COMPLETE BEDDING TO SPRING LINE AND COORDINATE WITH DPD FOR INSPECTION.



STEP 2

CONTRACTOR TO COORDINATE WITH SDOT FOR CDF BACKFILL WITHIN TRAVELLED ROADWAY.

STEP 3

SDOT TO COMPLETE STREET RESTORATION.

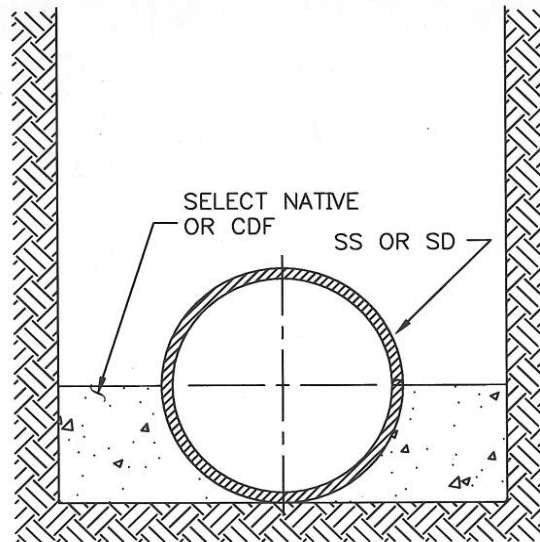
SCALE: NTS



City of Seattle

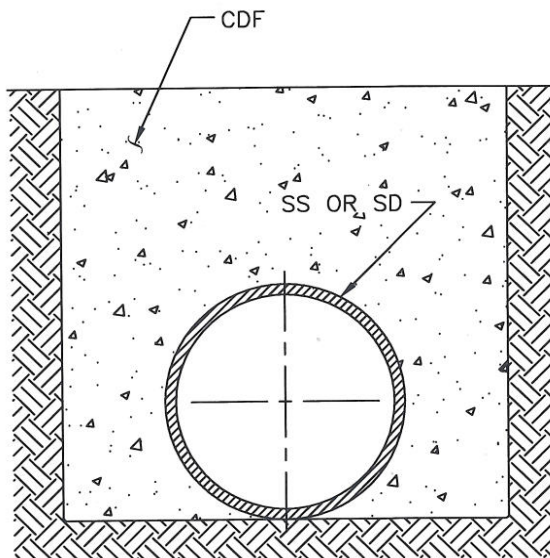
PAGE 29

**FLEXIBLE PIPE BEDDING &
BACKFILL UNDER PAVEMENT
LOCATED IN A PUBLIC PLACE**



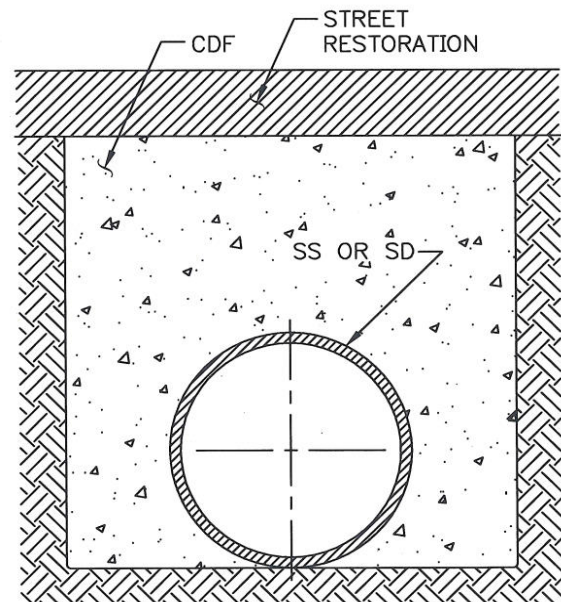
STEP 1

CONTRACTOR TO COMPLETE
BEDDING TO SPRING LINE
AND COORDINATE WITH DPD
FOR INSPECTION.



STEP 2

CONTRACTOR TO COORDINATE
WITH SDOT FOR CDF BACKFILL
WITHIN TRAVELLED ROADWAY.



STEP 3

SDOT TO COMPLETE STREET
RESTORATION.

SCALE: NTS

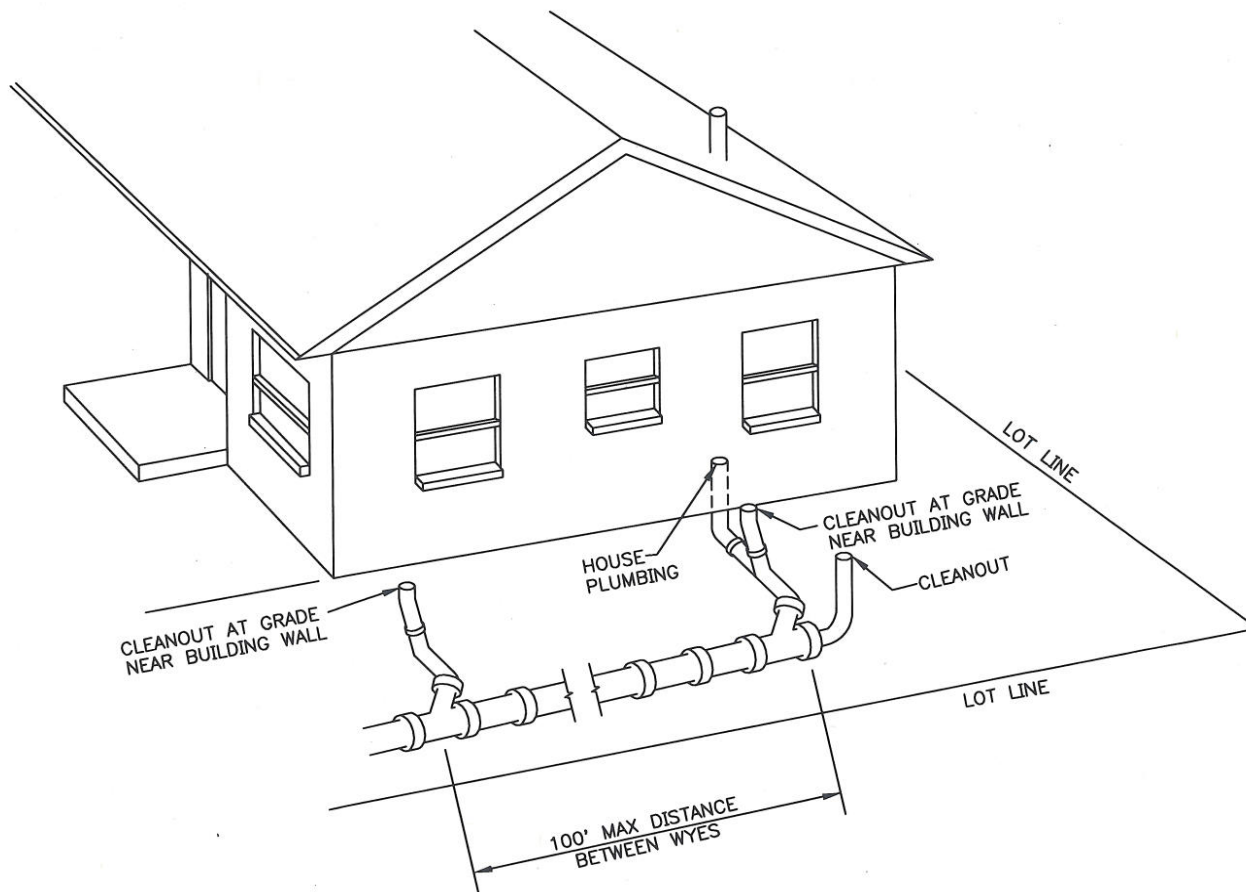
1. CLASS "D" BEDDING
2. DIP CLASS 50 MIN.



City of Seattle

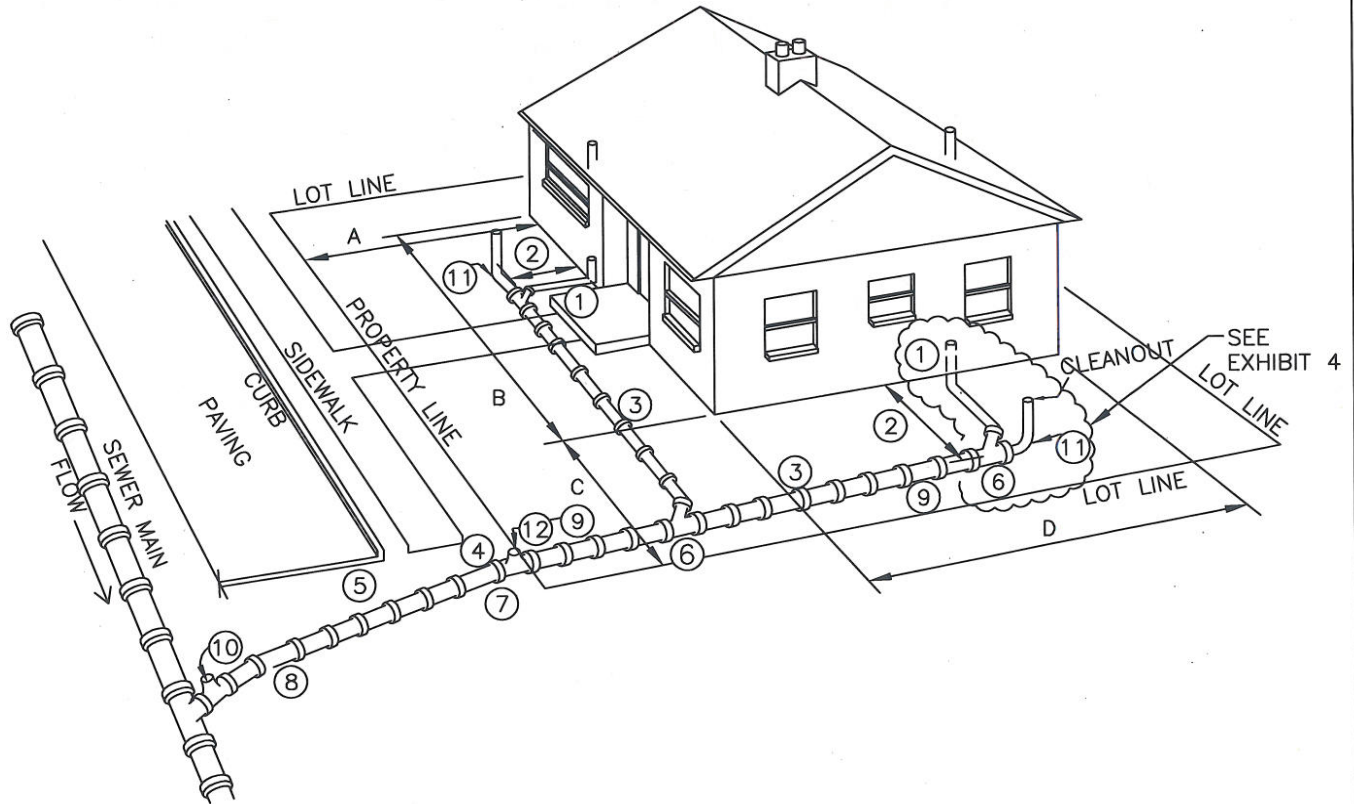
PAGE 30

**DIP PIPE BEDDING & BACKFILL
UNDER PAVEMENT LOCATED
IN A PUBLIC PLACE**



CLEANOUT ON INTERIOR SOIL
PIPE MAY REPLACE CLEANOUT
OUTSIDE BUILDING WALL

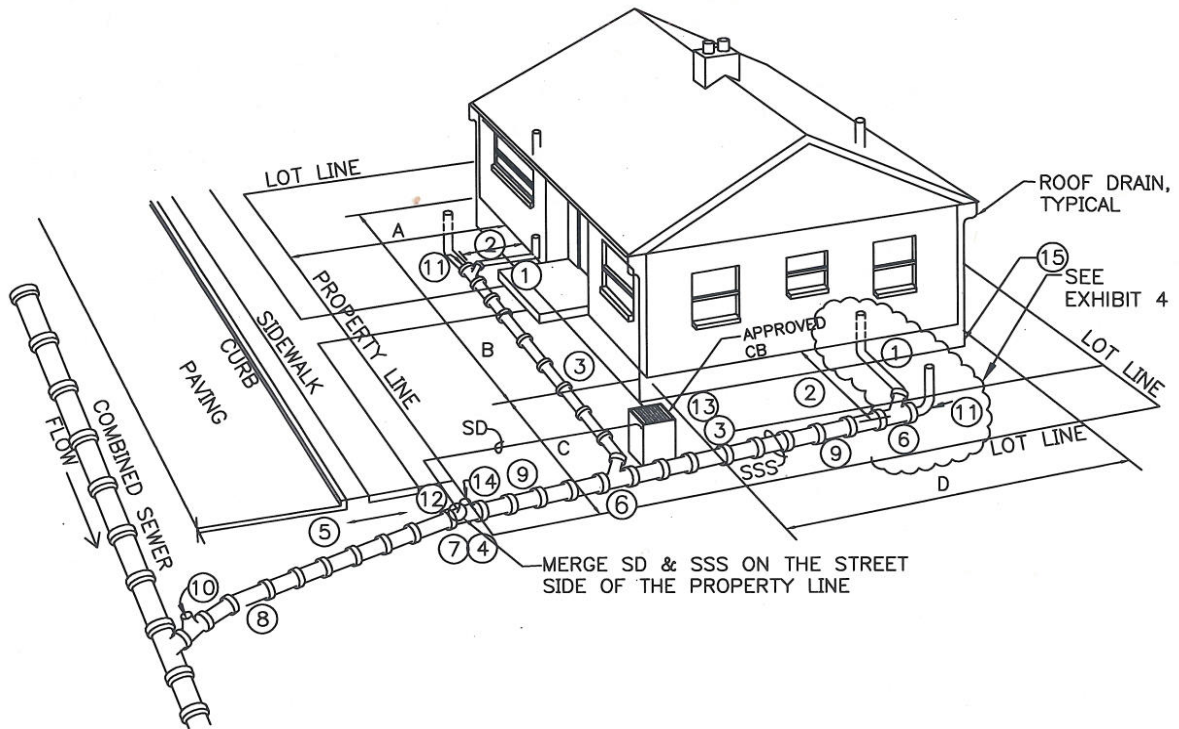




NOTES:

1. ALL HOUSE PLUMBING OUTLETS MUST BE CONNECTED TO THE SEWER. DOWNSPOUTS AND DRAINAGE WATER SHALL BE CONNECTED TO A SEPARATE STORM DRAINAGE SYSTEM, IF AVAILABLE.
2. 2'-6" MIN DISTANCE FROM HOUSE, EXCEPT FOR SOIL PIPE CONNECTION.
3. 1'-6" MIN COVER OF PIPE.
4. 2'-6" MIN COVER AT PROPERTY LINE.
5. 5'-0" MIN COVER AT CURB LINE.
6. LAY PIPE IN STRAIGHT LINE BETWEEN BENDS. MAKE ALL CHANGES IN GRADE OR LINE WITH BENDS OR WYES.
7. STANDARD 4" TO 6" INCREASER.
8. 6" SEWER PIPE: MIN SIZE IN STREET, AND ELSEWHERE AS DIRECTED. 2 % MIN GRADE, 100% MAX.
9. 4" SEWER PIPE: MIN SIZE ON PROPERTY. 2% MIN GRADE, 100% (45') MAX.
10. TEST "T" WITH PLUG.
11. CLEANOUT AT UPSTREAM END OF SIDE SEWER.
12. TEST "T" WITH PLUG AT PROPERTY LINE AS REQUIRED.
13. ALL CONSTRUCTION REQUIRES A PERMIT AND PAYMENT OF FEE. COMPLETE LEGAL DESCRIPTIONS OF PROPERTY AND DIMENSIONS A, B, C AND D THAT SHOW THE SIZE AND LOCATION OF THE HOUSE ARE REQUIRED FOR ISSUANCE OF THE PERMIT.
14. CONSTRUCTION IN STREET MUST BE DONE BY A REGISTERED SIDE SEWER CONTRACTOR.
15. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH CURRENT SIDE SEWER ORDINANCES.
16. ORDINANCE 97016 APPLIES TO INSTALLATION OF SIDE SEWER.

NTS



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9. 4" SEWER PIPE: MIN SIZE ON PROPERTY. 2% MIN GRADE, 100% (45°) MAX.
10. TEST "T" WITH PLUG.
11. CLEANOUT.
12. CONNECTION TO SIDE SEWER REQUIRES SIDE SEWER TO BE 6".
13. TYPE 50 CATCH BASIN OR P-TRAP AT EACH DOWNSPOUT.
14. TEST "T" WITH PLUG AT UPSTREAM SIDE OF SIDE SEWER AS REQUIRED.
15. P-TRAP AT ALL DOWNSPOUTS IF CB IS NOT USED.
16. ALL CONSTRUCTION REQUIRES A PERMIT AND PAYMENT OF FEE. COMPLETE LEGAL DESCRIPTIONS OF PROPERTY AND DIMENSIONS A, B, C AND D THAT SHOW THE SIZE AND LOCATION OF THE HOUSE ARE REQUIRED FOR ISSUANCE OF THE PERMIT.
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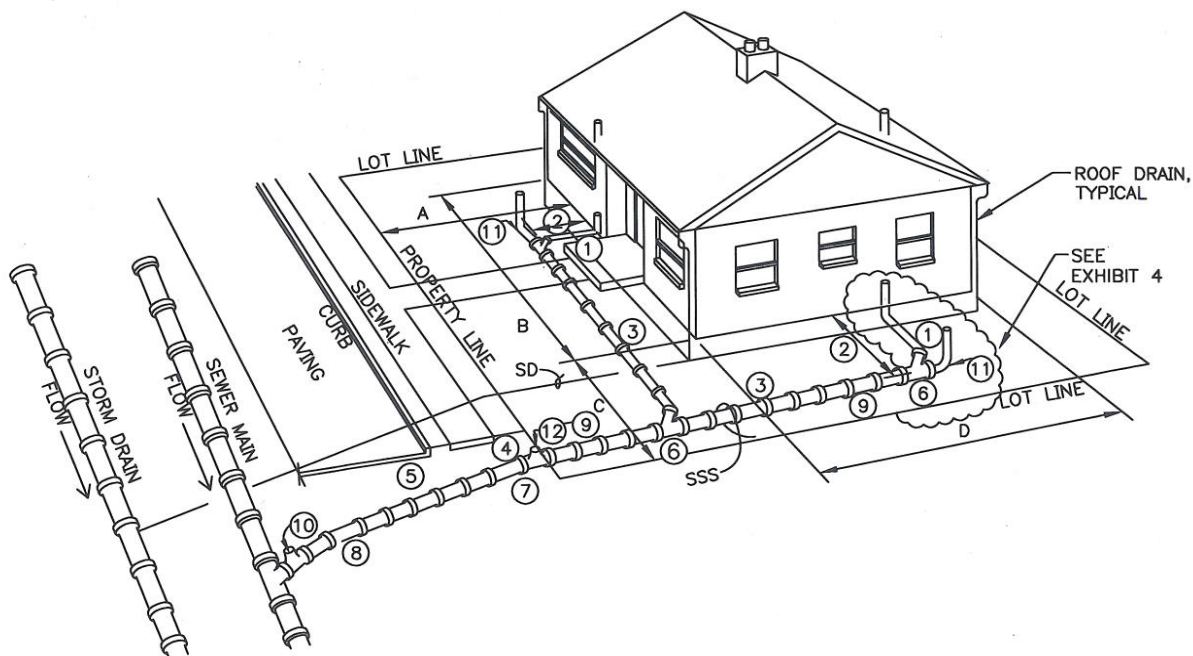
NTS



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PAGE 33

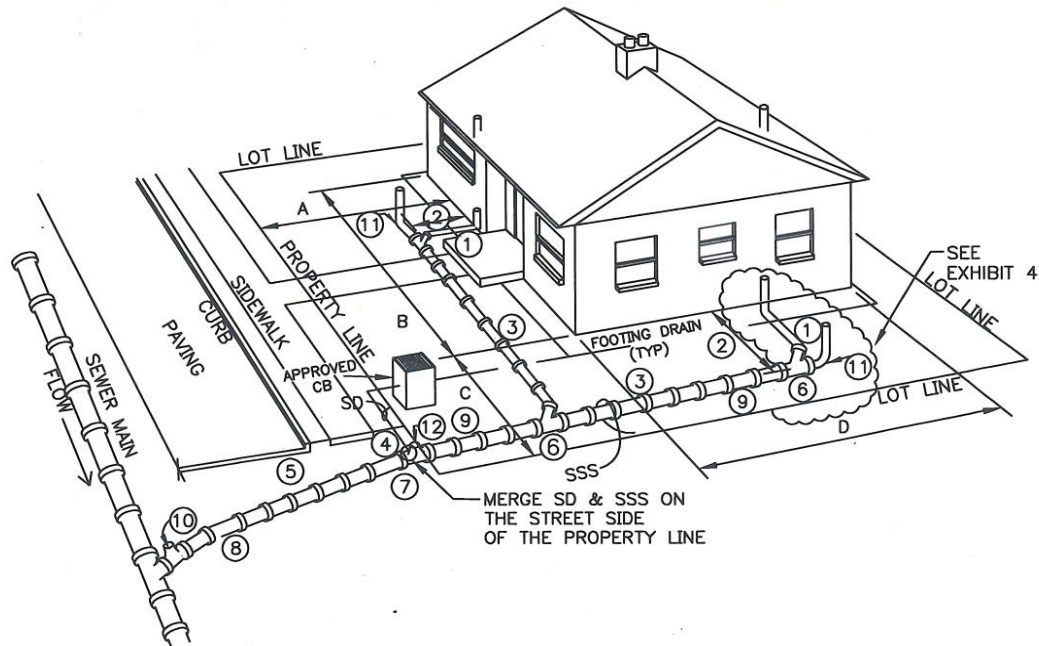
**SIDE SEWER & SERVICE DRAIN
CONNECTION TO A
COMBINED SEWER SYSTEM**



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NTS

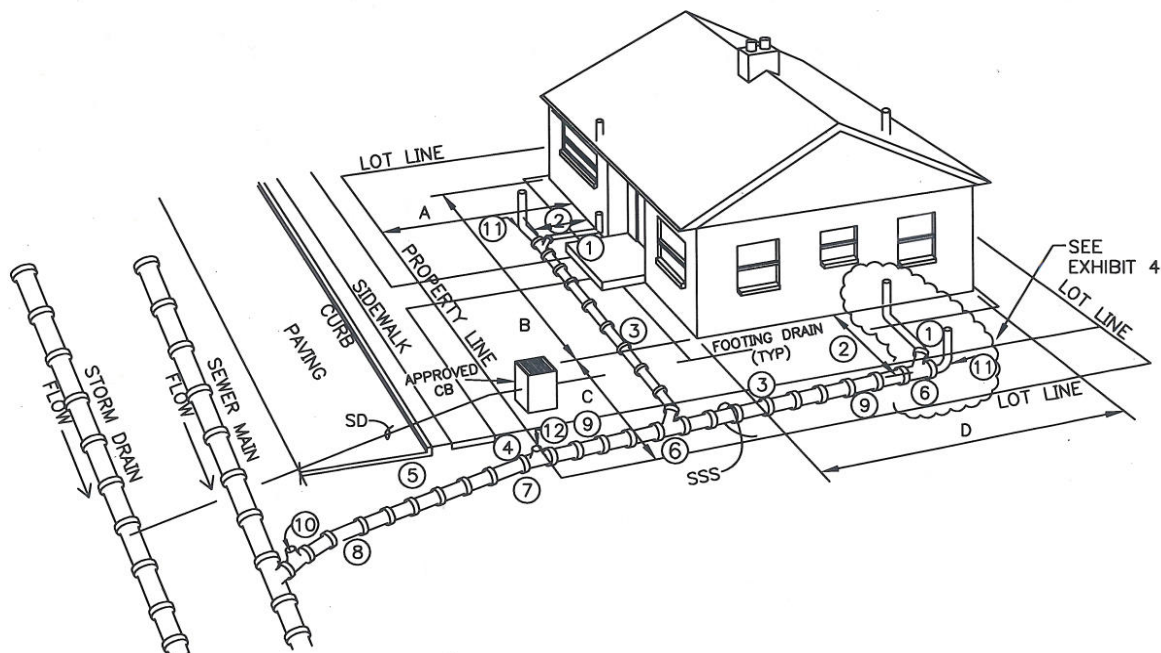


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NTS





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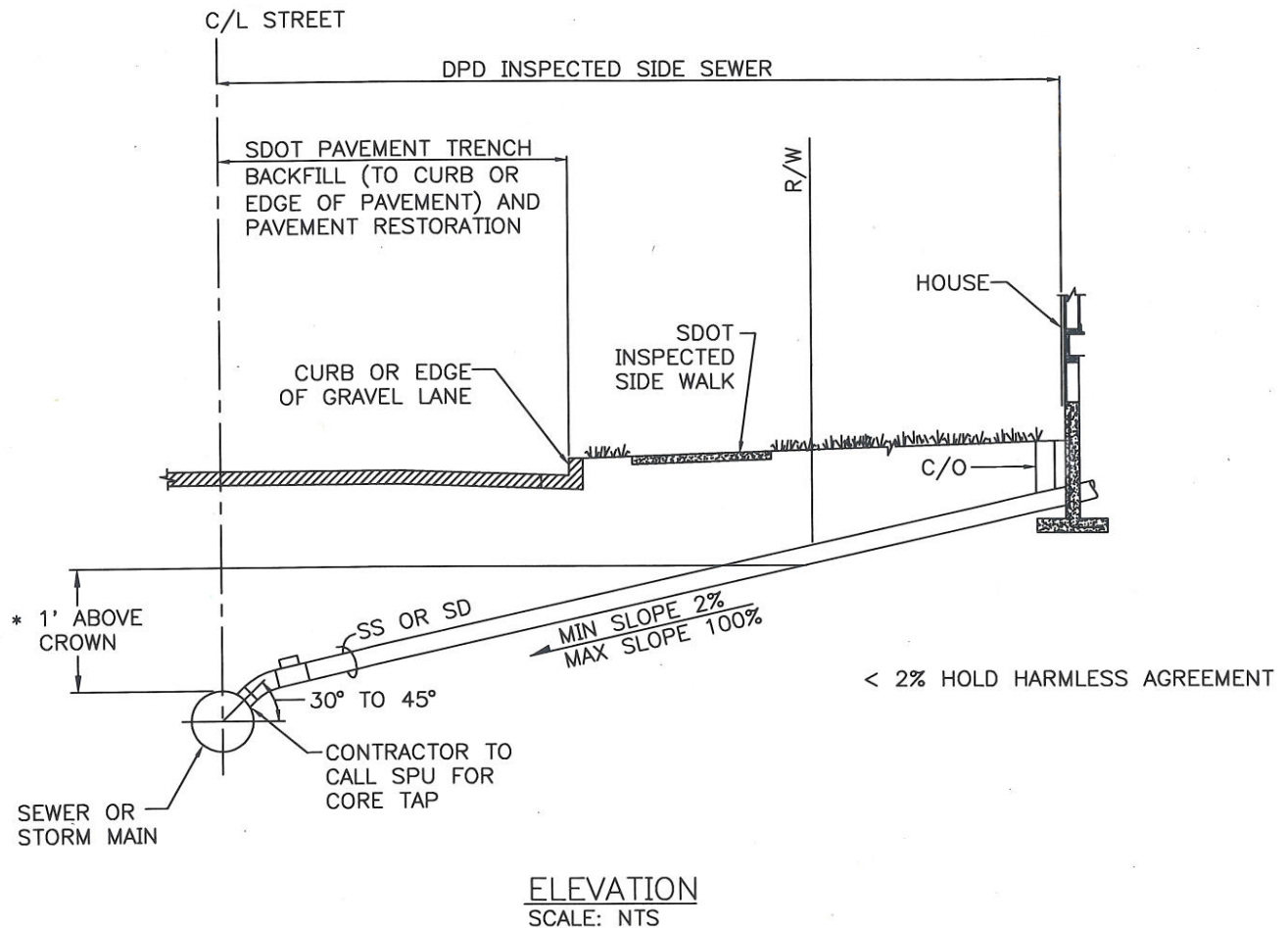
NTS



City of Seattle

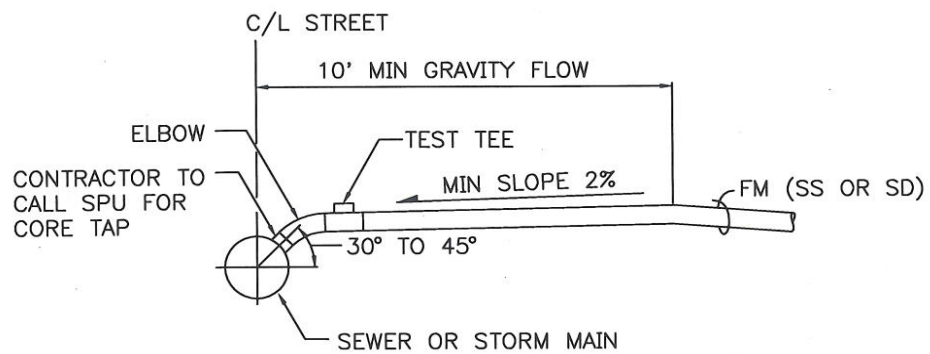
PAGE 36

**FOOTING DRAIN CONNECTION TO AN
APPROVED PRIVATE INLET BASIN PRIOR TO
DISCHARGE INTO STORM DRAIN SYSTEM**



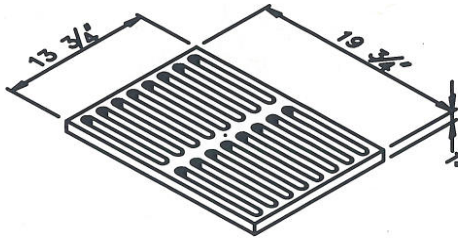
NOTE:
USE OF EXISTING WYES MAY BE APPROVED
DEPENDING ON WYE CONDITION (MATCH NOMINAL
SIZE ONLY).

* 1' ABOVE CROWN IF FEASIBLE.
BACKFLOW VALVE REQUIRED IF
UNABLE TO PROVIDE ELEVATION
DIFFERENCE.



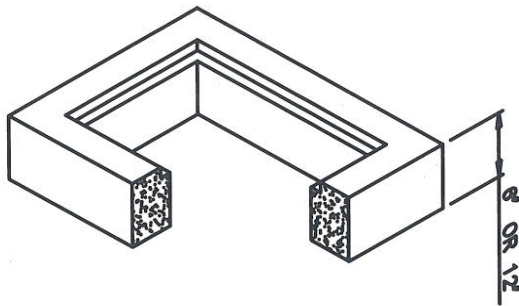
ELEVATION
SCALE: NTS





TOP UNIT

AVAILABLE WITH FRAME CAST INTO 6" TO 12" RISER TO ACCEPT GRATE OR WITH GRATE SET DIRECTLY INTO EXTENSION.

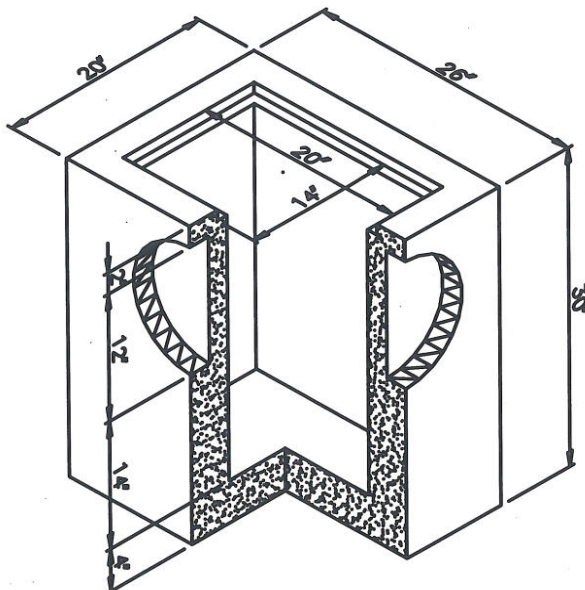


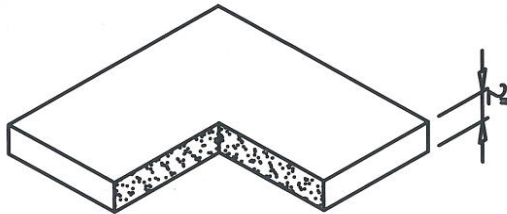
BASE SECTION

KNOCKOUTS ARE PROVIDED FOR 8" PIPE ON FOUR SIDES.

BASE IS DESIGNED FOR USING THE GRATE WITH OR WITHOUT THE FRAME.

ALL CONCRETE IS 4,000 PSI MIN.



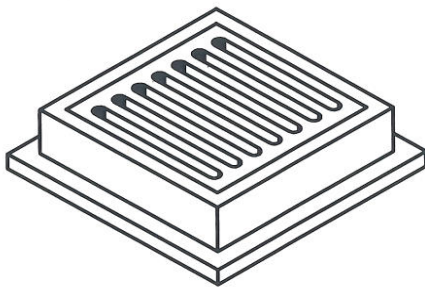


TOP UNIT

A SOLID CONCRETE COVER FOR USE AS A DISTRIBUTE BOX.

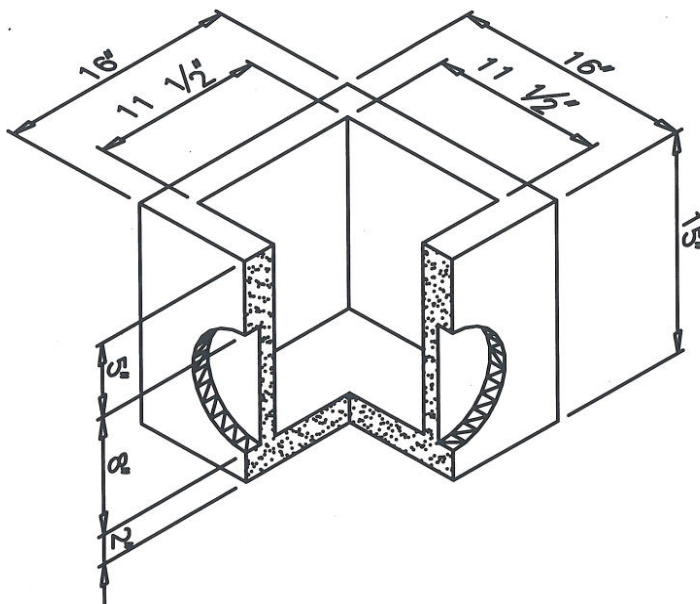
MATERIAL FRAME AND GRATE ARE DESIGNED FOR USE IN A SMALL CATCH BASIN WHEREVER A LIGHT GRATE IS NEEDED.

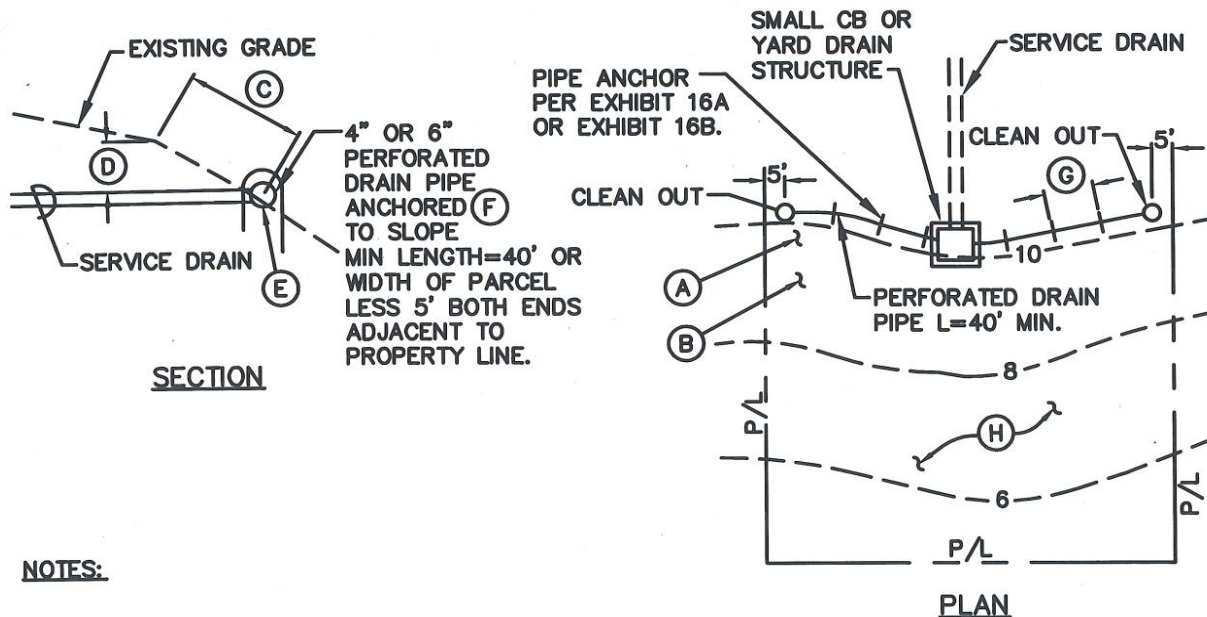
NON TRAFFIC RATED.



BASE SECTION

FOUR KNOCKOUT HOLES ARE PROVIDED ON EACH SIDE TO ACCOMMODATE 4" DIAMETER PIPE.



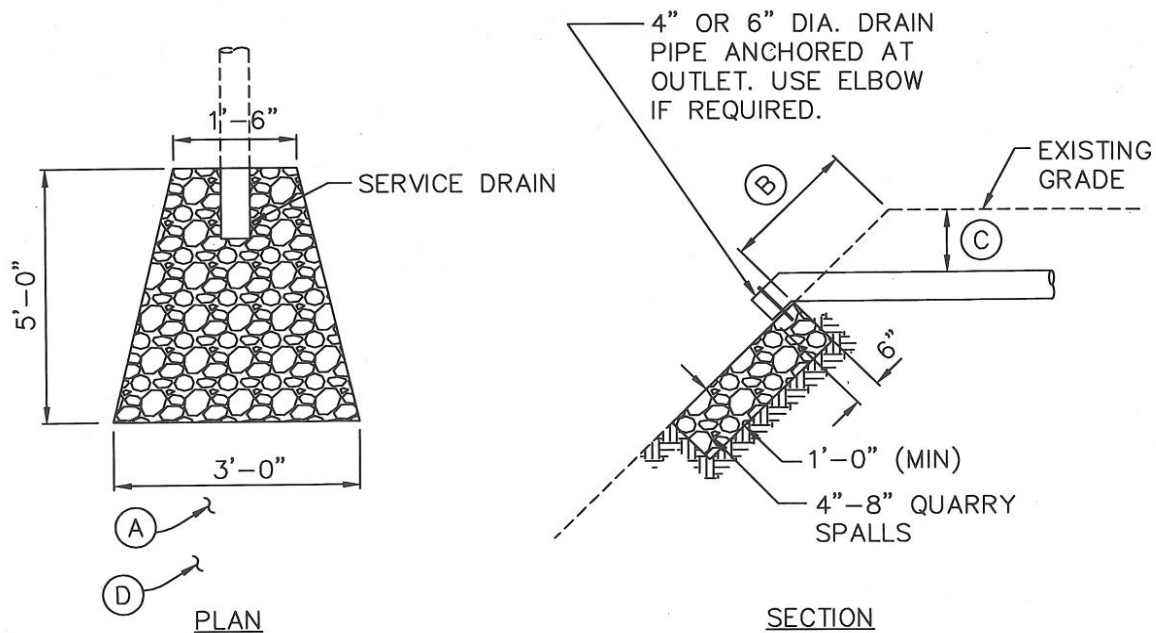


NOTES:

- (A) INSTALL FILTER ROLL OR WADDLE FOR DRAINAGE CONTROL.
- (B) PROTECT OR INSTALL NATIVE VEGETATION CONDUCIVE TO STEEP SLOPES. WIDTH=10' MIN. ALONG ENTIRE LENGTH OF PIPE OR AS REQUIRED BY APPROVED BUILDING PERMIT PLANS.
- (C) SECURE PERFORATED DRAIN PIPE AS CLOSE TO TOP OF SLOPE AS POSSIBLE.
- (D) 18" MIN. UNLESS DIP OR PVC SCHEDULE 40 USED.
- (E) PLACE LINE OF LOWEST PERFORATIONS 2" ABOVE GROUND.
- (F) PLACE ALONG CONTOUR AT 0.5% SLOPE DOWN FROM CB/YARD DRAIN.
- (G) PLACE ANCHORS @ 5' O.C. OR AT EACH BEND, WHICHEVER IS LESS.
- (H) MAINTAIN EXISTING LANDSCAPE.

THIS DRAINAGE OUTLET DEVICE SHALL NOT BE USED IN KNOWN LANDSLIDE (ECA8) OR POTENTIALLY SLIDE (ECA 2) AREAS UNLESS ON SITE DETENTION HAS BEEN INSTALLED INCLUDING DETENTION FOR A SITE HAVING LESS THAN 2,000 SF OF IMPERVIOUS AREA THAT WANTS TO DISCHARGE DRAINAGE ONTO THE EXISTING SLOPE.



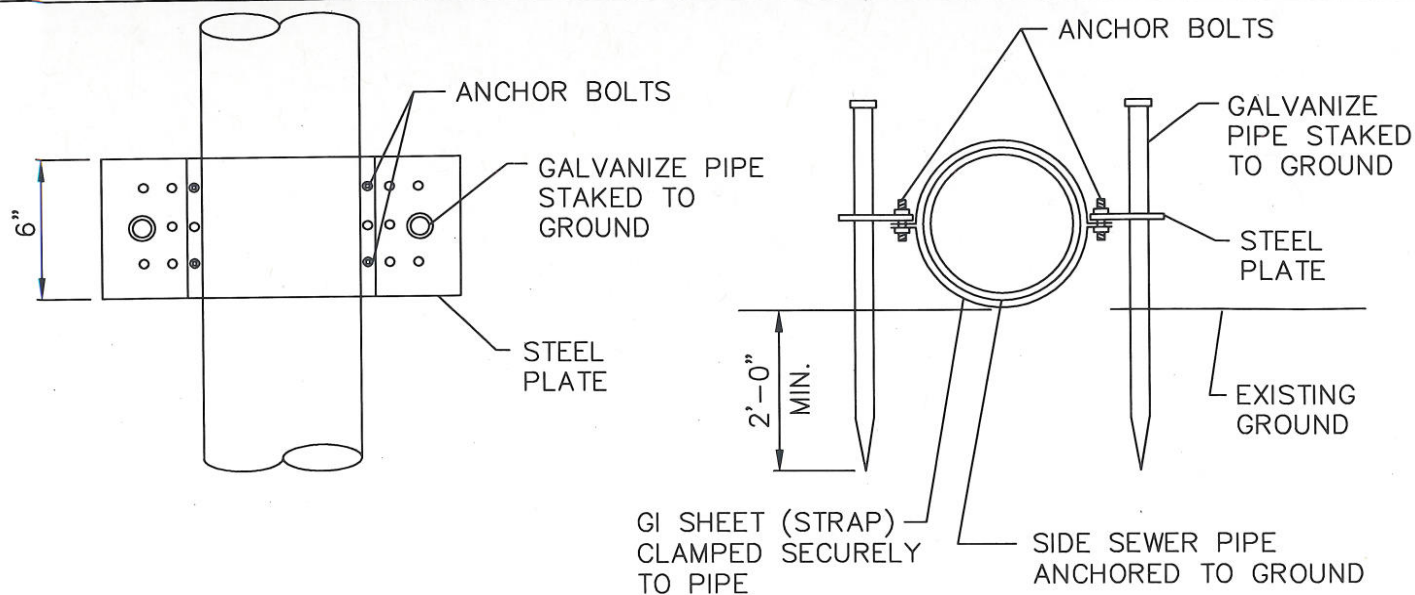


NOTES:

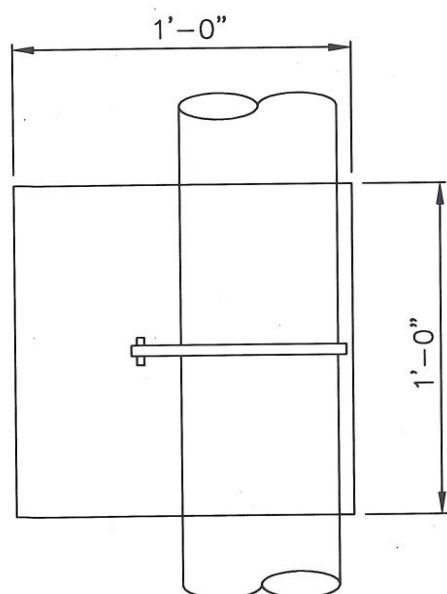
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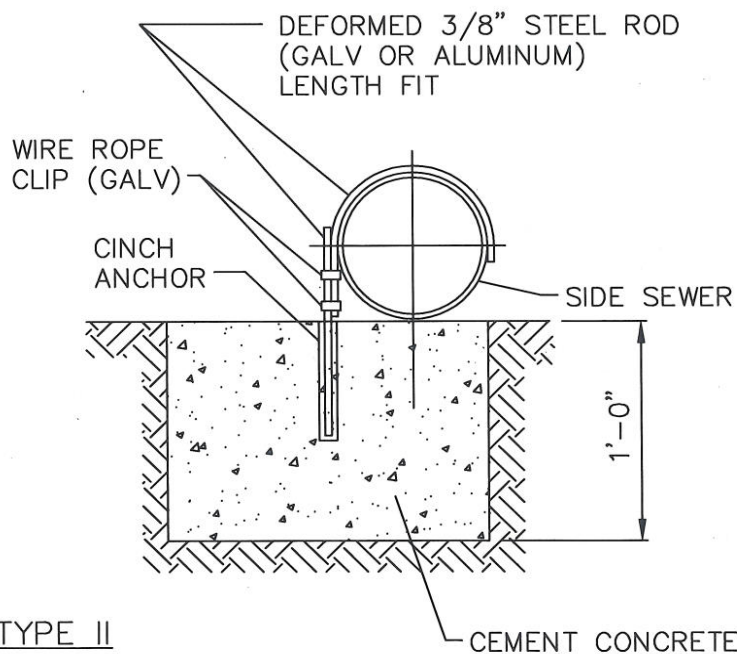




TYPE I



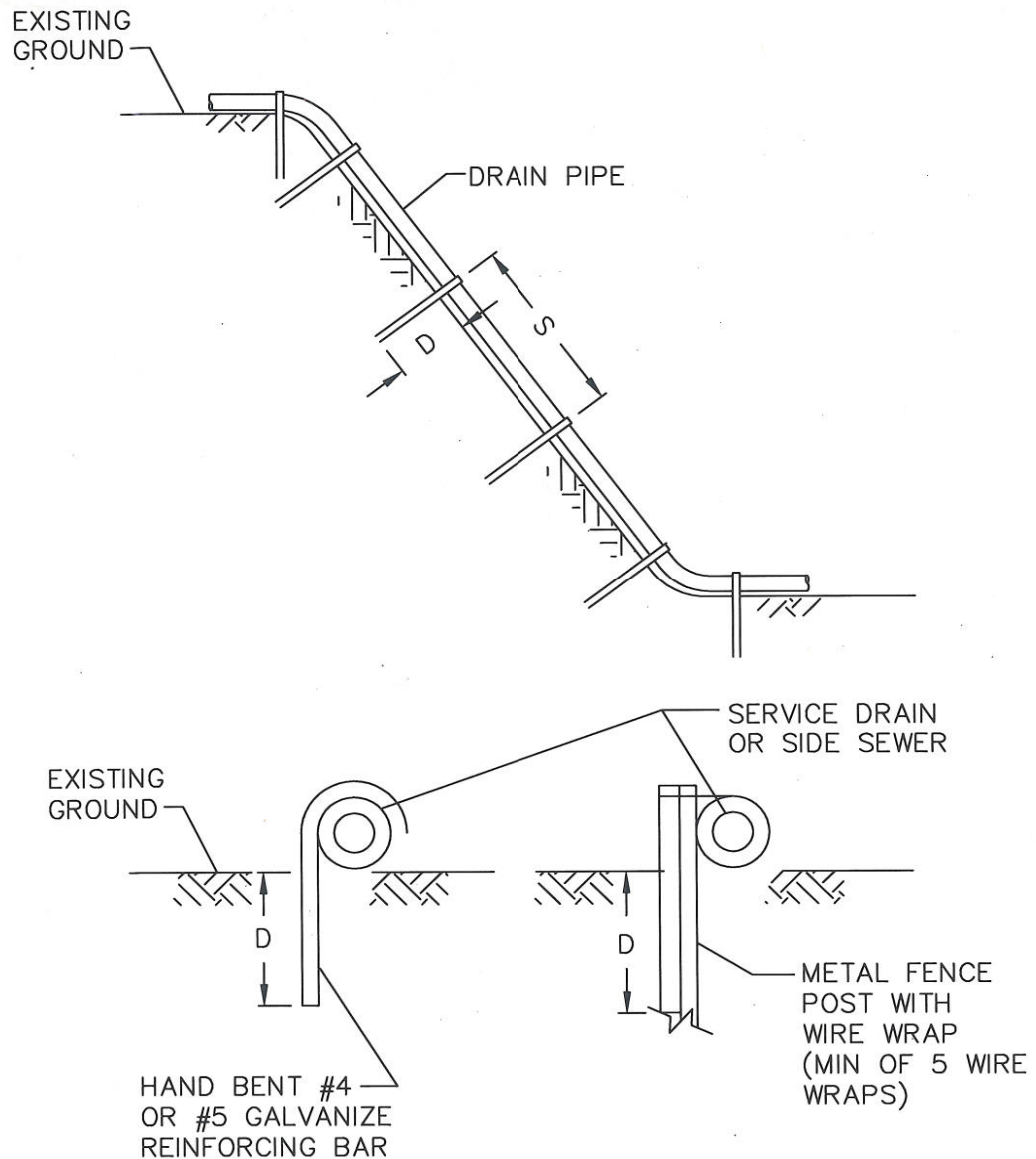
TYPE II



NOTE:

TYPE I AND TYPE II ANCHORS SHALL BE USED WHERE THERE IS COMPETENT SOILS FOR ANCHORAGE.



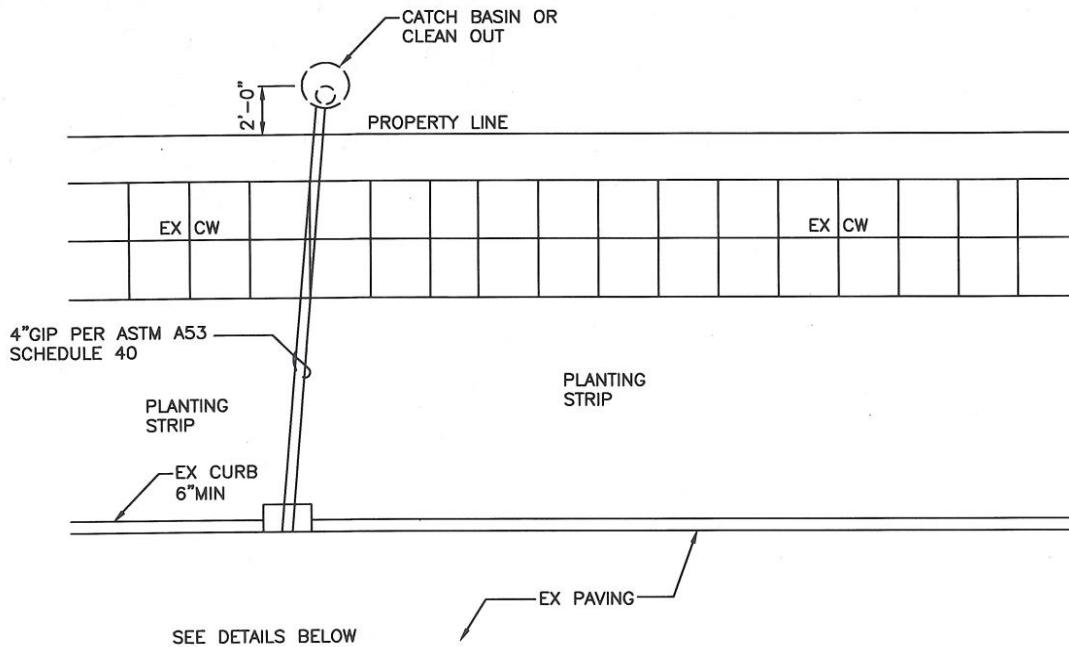


TYPE III

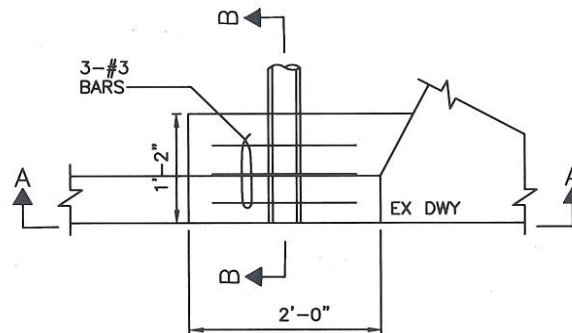
NOTES:

- MINIMUM RECOMMENDED CENTER-TO-CENTER STAKE SPACING, $S=10$ FEET.
- MINIMUM RECOMMENDED DEPTH OF STAKE OR FENCE POST PENETRATION INTO SLOPE, $D=6$ FEET.
- WHEN INSTALLING TIGHTLINE PIPE MAKE SURE PIPE IS PULLED "TAUT" ON THE SLOPE FACE BEFORE INSTALLING STAKES AND PINNING PIPE TO SLOPE FACE.

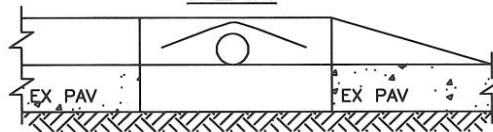




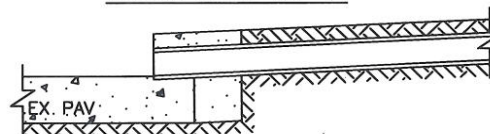
PLAN



PLAN

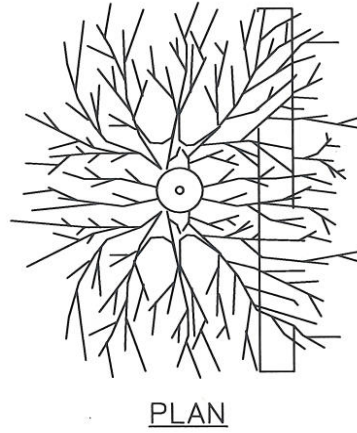
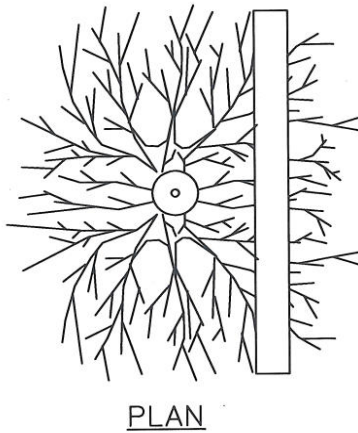
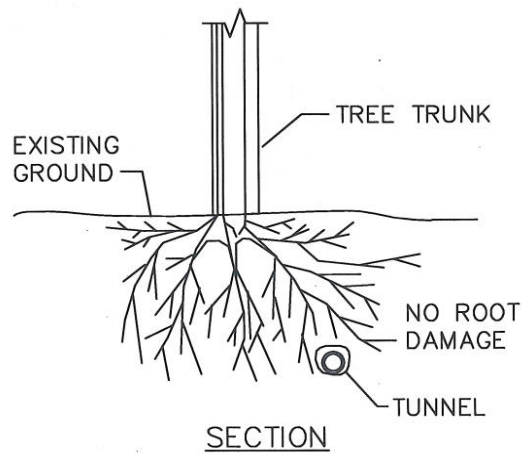
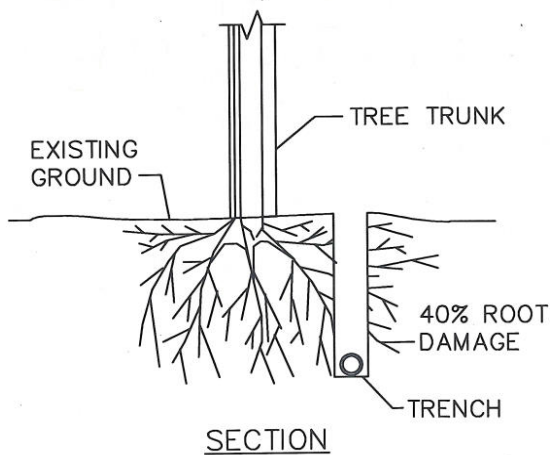


SECTION A-A



SECTION B-B



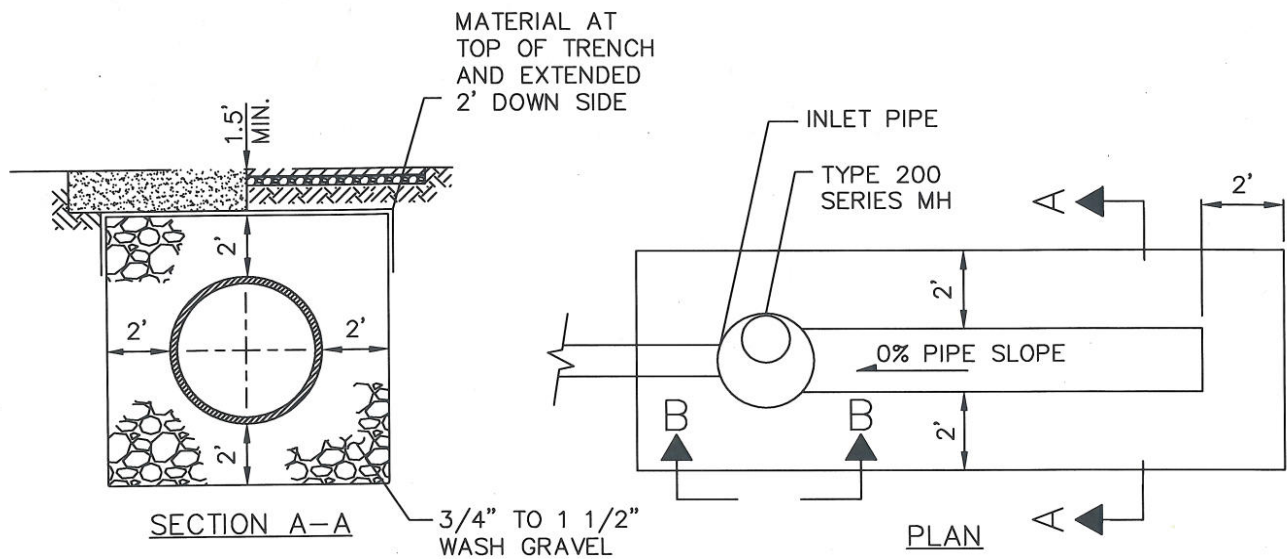


IF A TREE'S DIAMETER IS:	THE DISTANCE OF TUNNELING FROM ANY SIDE OF THE TREE SHOULD BE AT LEAST:
6 TO 9 INCHES	5 FEET
10 TO 14 INCHES	10 FEET
15 TO 19 INCHES	12 FEET
OVER 19 INCHES	15 FEET

NOTE:

FOR TREES UNDER 6 INCHES IN DIAMETER, TUNNELING SHOULD BEGIN AT LEAST 5 FEET FROM THE TREE, OR NO CLOSER THAN THE ROOT BALL IF NEWLY PLANTED. ANOTHER OPTION FOR SMALL TREES IS TO USE A TREE SPADE TO TEMPORARILY MOVE TREES OUT OF THE WAY OF UNDERGROUND WORK.

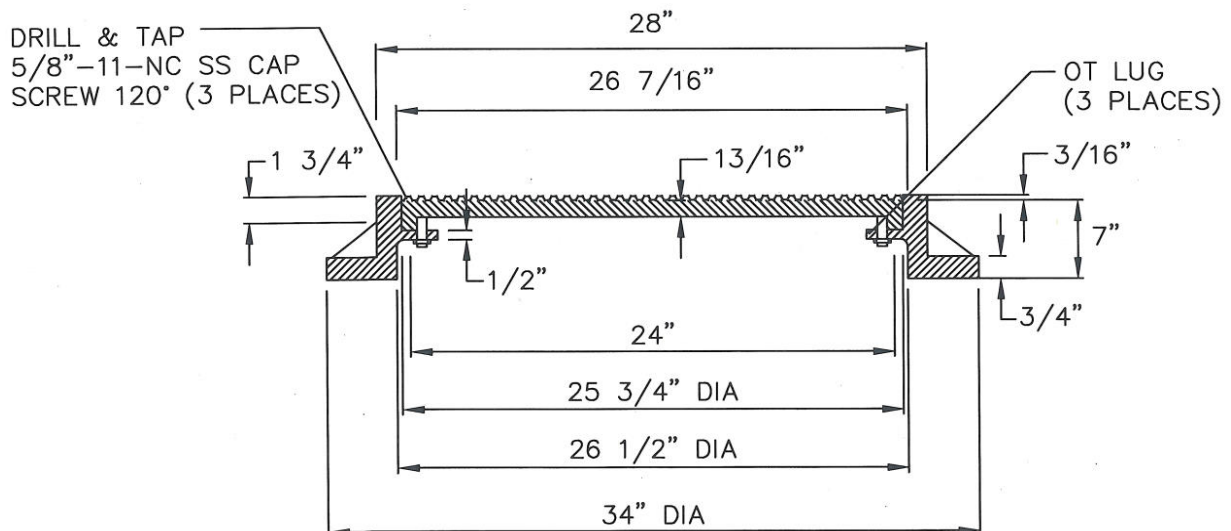
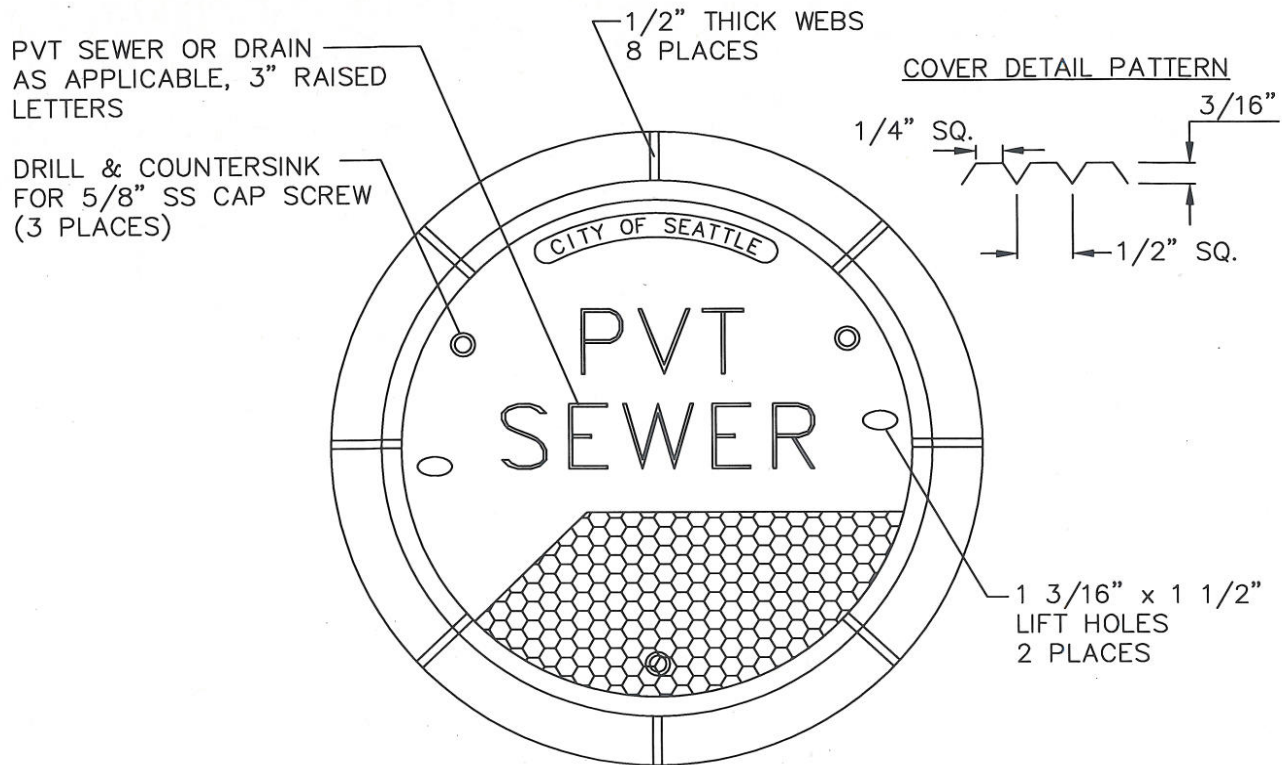




NOTES:

1. ADDITIONAL MH ACCESS TO DETENTION PIPE REQUIRED IF LENGTH IS OVER 100 LINEAL FEET.





MATERIALS

FRAME: CAST IRON ASTM A48 CL. 30

COVER: DUCTILE IRON ASTM A536 CL 80-55-06

APPROX WT: RING-230 LBS, COVER-140 LBS

RATING: H-20

USE OLYMPIC FOUNDRY INC. RING AND COVER OR EQUIVALENT



City of Seattle

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OLYMPIC FOUNDRY INC.
24"x7" SEATTLE 3-BOLT LOCKING
MAINTENANCE HOLE RING AND COVER

