

Title Public Drainage System Requirements		Number TBDDWW 210	Rev. No. 0
Responsibility Drainage and Wastewater Line of Business / Project Delivery and Engineering Branch		Supersedes NA	Pages TBD
General Manager/CEO Approval		Approval Date	Effective Date July 1, 2021

Table of Contents

[I. Purpose](#) 2

[II. Discretion](#) 2

[III. Approved Point of Discharge](#)..... 3

[IV. Ensure Sufficient Capacity](#) 5

[V. Extensions – Projects Not Conducted in the Public Right-Of-Way](#)..... 10

[VI. Extensions – Projects Conducted in the Public Right-Of-Way](#) 16

[VII. Public Drainage System Requirements](#)..... 18

[VIII. Definitions](#)..... 33

[IX. Authority/References](#)..... 33

I. PURPOSE

A. To support implementation of the Stormwater Code, the Director of Seattle Public Utilities (SPU) promulgates rules that provided specific technical requirements, criteria, guidelines, and additional information. This Director's Rule consists of rules for the purpose of implementing the Stormwater Code, specifically [the following sections of the Seattle Municipal Code Sections:\(SMC\):](#)

- 1) ~~Approved~~ [Minimum Requirements for Discharge Point \(SMC 22.805.020.B\)](#) [\(also known as "Approved Point of Discharge"\)](#)
- 2) [Ensure Sufficient Capacity \(SMC 22.805.020.H\)](#)
- 3) ~~New~~ [Extension of Public Drainage System – Projects Not Conducted in Public Right-of-Way \(SMC 22.805.020.L\)](#)

B. (Typically applies to Single-family Residential and Parcel-based Projects)

- 1) ~~New~~ [Extension of Public Drainage System – Projects Conducted in Public Right-of-Way \(SMC 22.805.020.M\)](#)

C. (Typically applies to Roadway Projects)

- 1) ~~New~~ [Public Drainage System Requirements \(SMC 22.805.020.N\)](#)
- 2) ~~(formerly CAM 1180)~~

[D. For terms used in this Director's Rule, refer to SMC 22.801 \(Stormwater Code - Definitions\), SMC 21.16.030 \(Side Sewer Code - Definitions\), and Section VIII \(Definitions\) of this Director's Rule.](#)

II. DISCRETION

A. In limited or exceptional circumstances, and when it is in the best interests of the utility, SPU's General Manager/~~CEO~~ [Chief Executive Officer](#) (Director) or authorized designee, may modify or waive the drainage requirements or public drainage improvements under this rule.

B. Director in this rule means "[the](#) Director of SPU" per SMC 22.801.050, unless otherwise noted.

III. APPROVED POINT OF DISCHARGE

Stormwater Code Language ~~(existing code language)~~

22.805.020 – Minimum Requirements for All Projects

~~B. Refer to the approved point of discharge for drainage water from each site that shall include, but not be limited to, receiving waters and whether the capacity of the drainage system is adequate for the flow rate and volume. For those projects that require a proposed discharge point shall be identified in the plan required by this subtitle, for review and approval or disapproval by the Director.~~

~~C.B.~~

- A. All projects shall convey stormwater flow to an approved point of discharge and include overflows for all stormwater best management practices (BMPs-).
- B. The approved point of discharge as determined by the Director, in order of priority, includes the following:
- 1) Receiving waters
 - 2) Public storm drain pipes
 - 3) Ditch and culvert system
 - 4) Public combined sewer system
 - 5) Infiltration on site
- C. Stormwater and groundwater (including footing drains) shall not be conveyed to or enter a sanitary sewer (SMC, ~~Section~~ 21.16.220) even if a system was “formerly combined” regardless of project size. Refer to SPU’s Water & Sewer Map for “Mainlines Permitted Use” in determining whether a system is classified as a sanitary sewer: https://gisrevprxy.seattle.gov/wab_ext/DSOResearch_Ext/
- D. Extension of the piped public drainage system may be required even if a ditch and culvert system or a public combined sewer abuts a parcel/project. Refer to Section V (Extensions – Projects Not Conducted in Public Right-of-Way) and Section VI (Extensions – Projects Conducted in Public Right-of-Way for requirements.
- Note: The public combined sewer is not a public drainage system by definition.
- E. Seattle has a complicated system due to historical annexations, major sewer and drainage projects, and other complexities. Therefore, prior to proceeding with project design, confirm your project discharge location with the City of Seattle (City) through the City’s Preliminary Application Report (PAR) process to determine your project requirements. To determine Stormwater Code project requirements for projects that are not required to go through the PAR process, contact the Drainage Review Team at SideSewerInfo@Seattle.gov for projects conducted on private property or SPU_DSO@seattle.gov SPU_PlanReview@Seattle.gov for projects conducted in the right-of-way.
- F. The types of conveyance systems to the approved point of discharge, in order of priority, ~~includes~~include the following:
- 1) Direct pipe connections
 - 2) Ditch and culvert system

- 3) Gutter or street flow line
- 4) Surface dispersal

SMC 22.805.020.H (Ensure Sufficient Capacity) and SPU's Design Standards and Guidelines for requirements.

A. Ensure Sufficient Capacity Requirements

- 1) The minimum requirement to ensure sufficient capacity is in addition to other Stormwater Code minimum requirements.
- 2) The Director may waive the requirements to perform a downstream analysis if the system has been determined by the Director to have sufficient capacity or the project has otherwise provided flow control (e.g., providing Peak Flow Control for projects that discharge to the public combined sewer system).
- 3) For public drainage system or combined sewer improvements ~~(including flow control)~~, the Director shall determine the type of ~~required~~ improvements ~~(i.e., system improvements vs. installation of flow control facilities)~~ in accordance with the City's Standard Plans and Specifications, SPU's Design Standards and Guidelines, and as specified in rules promulgated by the Director.
- 4) For projects that discharge to a ditch and culvert system where there is insufficient capacity to accommodate flow from the site, provide the following:
 - a) For projects not conducted in the public right-of-way (e.g., Parcel-based, Single-family Residential), in any order, provide one of the following to accommodate flows from the site:
 - i) Meet Existing Condition Standard (SMC 22.805.080.B.4) on the project site.
 - ii) Meet Peak Control Standard (SMC 22.805.080.B.5) on the project site and mitigate identified downstream capacity issues (~~Section~~Sections D & E).
 - iii) Mitigate identified downstream capacity (~~Section~~Sections D & E) and erosion (~~Section~~Sections B & C) issues.
 - b) For projects conducted in the public right-of-way (e.g., **Sidewalk, Roadway**), in the following order of priority and based on feasibility, provide one of the following as determined by the Director to accommodate flows from the site:
 - i) Mitigate identified downstream capacity (~~Section~~Sections D & E) and erosion (~~Section~~Sections B & C) issues.
 - ii) Meet/Mitigate identified downstream capacity issues (Sections D & E). and meet the Peak Control Standard (SMC 22.805.080.B.5) on the project site and mitigate identified downstream capacity issues (Section D & E).
 - iii) Meet the Existing Condition Standard (SMC 22.805.080.B.4) on the project site.
- 5) Upon review of the downstream erosion and capacity analyses described below (Section B and Section D), the Director may require a more detailed quantitative downstream analysis. The quantitative analysis shall require ~~either~~one of the following:
 - a) A quantitative analysis using non-surveyed field data and a uniform flow analysis, ~~or~~.
 - b) A quantitative analysis using surveyed field data and a backwater analysis.

The analysis required will depend on the nature and significance of the identified downstream issues ~~identified~~.

- ~~1. For public drainage system improvements, refer to Section F (Public Drainage System Improvement Priority) for priority order of improvements as determined by the Director.~~

B. Erosion Analysis Requirements

- 1) ~~The~~ Conduct a downstream erosion analysis ~~shall be conducted for at least one-quarter mile downstream of each proposed project discharge point~~ to identify existing or potential erosion problems that may occur as ~~the~~ result of the project. Unless requested by the Director, the downstream analysis ~~is will be~~ a qualitative analysis based on available information and site observations conducted by a qualified professional. A downstream erosion analysis is typically ~~only~~ required only for discharges to ditch and culvert systems and direct discharges to receiving water bodies. The downstream erosion analysis shall consist of the following tasks:
 - a) Define and map the study area. The study area shall extend one-quarter mile downstream ~~from~~ of each proposed project discharge point.
 - b) Review published data and reports. At a minimum, the following resources of documented information relevant to the analysis shall be reviewed, at a minimum: basin plans, Federal Emergency Management Agency (FEMA) maps, drainage and design reports from nearby projects, drainage complaints, geographic information system (GIS) mapping data, and sensitive/critical areas reports.
 - c) Perform a field inspection. Inspect the downstream flow path(s) from each proposed discharge point to identify existing and potential erosion issues. The field inspection of the study area for the downstream analysis ~~study area~~ shall investigate any issues ~~reported or observed~~ noted during the resource review, verify the basin delineation and characterization, verify the existing stormwater conveyance information, and identify existing or potential scouring and incision, bank sloughing and erosion, and sedimentation and siltation.
 - d) Document the drainage system(s) and ~~the~~ existing and potential erosion issues (even if they do not meet the following definitions ~~below~~) in the Drainage Report. Potential erosion problems that require mitigation include:
 - i) Severe Ditch Erosion: A condition where the lining ~~for~~ of an existing downstream ditch is insufficient to prevent erosion for the predicted post-development 25-year recurrence interval flow velocity or where any existing ditch erosion and/or incision is documented or observed.
 - ii) Severe Outfall Erosion: A condition where an existing downstream outfall or outfall structure is insufficient to prevent erosion for the predicted post-development 25-year recurrence interval flow velocity or where any outfall erosion or scour is documented or observed.
 - iii) Severe Creek Erosion: A condition where an existing downstream creek or stream has documented or observed erosion and/or incision.

C. Erosion Mitigation Requirements

- 1) Mitigate identified erosion problems. If no existing or potential erosion problems are identified based on the above criteria, no mitigation is required. For existing and potential erosion problems that ~~do meet~~ are identified, the ~~criteria,~~ following mitigation shall be provided ~~as follows:~~

- a) Severe Ditch Erosion: Line a ditch segment ~~for~~to accommodate the post-development 25-year recurrence interval velocity. Mitigation design shall not decrease existing conveyance capacity.
- b) Severe Outfall Erosion: Provide energy dissipation outfall protection or an energy dissipation structure ~~for~~to accommodate the post-development 25-year recurrence interval velocity or ~~provide~~ an energy dissipater must be provided. Mitigation design shall not decrease existing conveyance capacity.
- c) Severe Creek Erosion: Provide creek bank protection and/or restoration measures ~~for~~to accommodate the post-development 25-year recurrence interval velocity. Mitigation design shall not decrease existing conveyance capacity.

D. Capacity Analysis Requirements

- 1) ~~The~~Conduct a downstream capacity analysis ~~shall be conducted~~ for ~~at least~~ one quarter mile downstream ~~from~~of each proposed project discharge point. Unless requested by the Director, the downstream analysis ~~is~~will be a qualitative analysis based on available information and site observations conducted by a qualified professional. The downstream capacity analysis shall consist of the following tasks:
 - a) Define and map the study area. The study area shall extend one-quarter mile downstream ~~of~~ each ~~flow path from the~~ proposed project ~~site~~discharge point.
 - b) Review published data and reports. At a minimum, the following resources of documented information relevant to the analysis shall be reviewed, at a minimum: basin plans, FEMA maps, drainage and design reports from nearby projects, drainage complaints, GIS mapping data, and sensitive/critical areas reports.
 - c) Inspect the downstream flow path to identify existing and potential flooding issues. The field inspection of the ~~study are for the~~ downstream analysis ~~study area~~ shall investigate any issues ~~reported or observed~~noted as part of the resource review, verify the basin delineation and characterization, verify the existing stormwater conveyance information, and identify existing or potential overtopping and flooding.
 - d) Document the drainage system(s) and ~~it~~the existing and potential flooding issues (even if they do not meet the following definitions ~~below~~) in the Drainage Report. Existing and potential issues meeting the following definitions require mitigation:
 - i) Conveyance Nuisance Flooding: Observed or documented flooding of private property, roadway shoulder or lane, flow across driveways or flooding of outbuildings or the predicted 10-year recurrent overflow of a constructed conveyance system.
 - ii) Severe Building Flooding: Observed or documented building flooding or the predicted 25-year recurrence interval flood elevation will impact a finished floor of a habitable building or the electric/heating system of a habitable building. The recurrence interval shall be reduced to 5-year for any building deemed essential.
 - iii) Severe Roadway Flooding: Observed or documented roadway flooding that covers more than a roadway shoulder plus half the width of a travel lane or the predicted 10-year (arterial) or 25-year (residential) recurrent flood elevation will cover more than a roadway shoulder plus half the width of a travel lane.

E. Capacity Mitigation Requirements

- 1) Mitigate identified capacity issues. Measures must be ~~taken not implemented~~ to ~~prevent an~~ increase ~~in~~ flows downstream of the mitigation, or the Ensure Sufficient Capacity analysis will need to continue for an additional ~~one~~-quarter mile. Mitigation can be provided by ~~either one of the following~~:
 - a) Improving capacity in the downstream drainage system to ensure sufficient capacity ~~for to accommodate~~ the post-development 10-year (for conveyance nuisance flooding) and/or 25-year (for severe building or roadway flooding) recurrence interval flow rate, OR
 - b) Constructing flood control measures ~~for to accommodate~~ the post-development 10-year (for conveyance nuisance flooding) ~~or~~ 25-year recurrence (for severe building or roadway flooding) interval flow rate.

B. ~~Public Drainage System Improvement Priority~~

- ~~1. For projects that are not required to meet flow control or water quality treatment per Chapter 22.805 (Minimum Requirements for All Projects), in the following priority (Table 1), provide one of the following system improvements as determined by the Director:~~

Table 1: Conveyance System Priority Order	
1	Improve existing drainage system [per Standard Plans]
2	Install Vegetated Conveyance Swale per Standard Plan 294
3	Install Vegetated Conveyance Swale with underdrain.
4	Establish curb and gutter system in project area
5	Install Vegetated Conveyance Swale with underdrain and liner
6	Install Piped Storm Drain

- ~~2. For projects that are required to meet flow control or water quality treatment per Chapter 22.805 (Minimum Requirements for All Projects), in the following priority (Table 2), provide one of the following system improvements as determined by the Director:~~

Table 2: Conveyance System Priority Order	
1	Install Infiltrating Bioretention per Standard Plan 292
2	Install Infiltrating Bioretention with underdrain per Standard Plan 293a
3	Install Non-infiltrating Bioretention & underdrain per Standard Plan 293b
4	Install detention or Water Quality BMPs

V. EXTENSIONS – PROJECTS NOT CONDUCTED IN THE PUBLIC RIGHT-OF-WAY

This section describes ~~and contains the~~ minimum requirements for extension of the Public Drainage System related to projects not conducted in the public right-of-way. These requirements typically apply to Single-family Residential (SMC 22.801.200) and Parcel-based Projects (SMC 22.801.170).

For projects conducted in the public right-of-way, refer to ~~Chapter~~Section VI of this rule.

Stormwater Code Language ~~[new code language]~~

L. Extension of the Public Drainage System: For projects not constructed in the public right-of-way, extension of the piped public drainage system across the full extent of the parcel boundary in the abutting public place shall be required for any of the following:

1. All projects where ~~the Director has determined an extension is required considering, but not limited to, the~~ minutes of the project:

a. Public safety concerns are:

b. Endangers public review.

c. Adversely affects the safety and operation of public right-of-way, utilities, or other property owned or maintained by the City;

d. Adversely affects the functions and values of an environmentally critical area or buffer;

e. Adversely affects an area with known erosion or flooding problems;

f. Adversely affects any properties, or right-of-way.

2. All projects with 5,000 square feet or more of new plus replaced hard surface, unless:

a. The piped public drainage system is already accessible within an abutting public place across the full extent of the project's parcel boundary; to each existing, proposed, or adjusted parcel; or

b. The project is otherwise not required to extend by rules promulgated by the Director.

PROJECT REQUIREMENTS

A. General Requirements

2) Extension of the **pip**ed public drainage system (also known as a Pipe Storm Drain (PSD)) is required unless otherwise noted.

3) Note: The public combined sewer is not a public drainage system by definition.

3)4) In combined sewer service areas where a public drainage system is determined to not be accessible to be extended, be inaccessible for extension, the extension of a public combined sewer may be allowed in lieu of a public drainage system extension instead (refer to SMC 21.16.040).

- ~~1. Extension of the piped public drainage system may be required even if a public combined sewer abuts a parcel.~~
- ~~4)5) _____~~ A private easement across an adjacent parcel shall not preclude the requirement of extension of the public drainage system, system modification, and/or side sewer installation perpendicular to an abutting public drainage system if otherwise required by this rule.
- ~~5)6) _____~~ Any division, redivision, or lot boundary adjustment of land that has the effect of avoiding public drainage system installation or other appurtenance requirements shall not change the installation requirements under this rule that would apply before the division, redivision, or lot boundary adjustment.
- ~~2. Projects on lots created, adjusted, or amended through any division, redivision, or lot boundary adjustment of land that front an existing or created street right-of-way shall extend the public drainage system. If one is not already accessible within an abutting public place.~~
- ~~3. When authorized by the Director or more parcels of a project are landlocked, a side sewer between the public drainage system and the structure served by the system may occupy a portion of one or more parcels of the project that are not served by that side sewer when:~~
- ~~a) The parcel served is landlocked; Refer to 21.16.250 (Easements and~~
- ~~6)7) _____~~ ~~The parcel served has been granted Agreements) for easement rights for the side sewer by the parcel crossed by the side sewer; and requirements.~~
- ~~(1) Additional utilities may be allowed within the utility easement when required clearances and setbacks with other utilities are met.~~
- ~~(2) Except for the portion necessary to connect a side sewer to a public main, side sewers shall be on a private parcel and not in the public right-of-way unless approved by the Director and the agency having jurisdiction over the public right-of-way.~~
- ~~4. Side sewers shall follow the shortest path from the public drainage system to the parcel or unit being served.~~
- ~~7)8) _____~~ The cost of an extension is borne by the applicant. Some cost may be recovered by a Latecomer Agreement.
- ~~8)9) _____~~ In some circumstances, including but not limited to state highways, divided roadways, the presence of railroad or streetcar tracks, or other obstructions in the right-of-way, installing a public drainage system to serve the near side of the road shall be required.
- ~~5. The Director may require an extension to be installed with a pipe larger than the standard size in this rule.~~
- ~~a) When a larger diameter pipe is required for the project, the cost of the larger pipe shall be borne by the applicant.~~
- ~~9)10) _____~~ In special circumstances, the system may be best served by the installation of a pipe that is larger ~~pipe~~ than required by this rule (i.e., 25-year storm event) or other system improvements. In such cases, SPU shall pay the difference in cost of materials east between for the required and the desired size.
- ~~10)11) _____~~ If one or more parcel is parcels are landlocked, the Director may require that the applicant provide an easement to the benefit of the Utility and install a public drainage system on a private parcel.

~~6. An Utility-owned public drainage system may be required on a private parcel if the parent lot of a subdivision is more than 300 feet deep as measured from the parcel line at the public right-of-way to the point farthest away from it. Natural barriers, such as ravines or open bodies of water, may be excluded from the total parcel depth, as determined by the Director.~~

~~11)12) Refer to SMC 22.805.020.N and Section 5VII of this rule for design requirements for the public drainage system.~~

~~12)13) Refer to Director's Rule ENG-430-4 (Utility System Improvement Dispute Process) for dispute procedures for system improvements.~~

F. Requirements for All Projects:

1) Projects are required to extend the piped public drainage system if the Director determines that a project meets the criteria in SMC 22.805.020.L.1.

G. Requirements for "Small Projects"

1) Unless SMC 22.805.020.L.1 applies, projects with less than 5,000 square feet of new plus replaced hard surface are not required to extend the piped public drainage system, if the project does not meet 22.805.020.L.1, and any of the following apply applies:

- a) The approved point of discharge is directly to into a receiving water;
- b) Curb or alley discharge is allowed and used per Directors' Rule SDCI 6-2021 / SPU DWW-300, Section E (DRAINAGE DETAILS - VII.I (Curb or Alley Discharge into the Public Place); or.
- c) Onsite infiltration is allowed and used per Directors' Rule SDCI 10-2021 / SPU DWW-200, Volume .3, Section F per below (DRAINAGE DETAILS - Onsite Infiltration 4.3.2.1 (Requirements for Projects with No Off-site Point of Discharge).

H. Requirements for "Large Projects"

H.A. Requiroments for "Large Projects"

1) Unless SMC 22.805.020.L.1 applies, projects with 5,000 square feet or more new plus replaced hard surface are not required to extend the piped public drainage system, if the project does not meet 22.805.020.L.1, and any of the following apply applies:

- a) The piped public drainage system is not accessible to be extended as determined by the Director.
- b) The approved point of discharge is directly to a receiving water.

a) — When one parcel:

c) Shares a continuous The project has less than 5,000 square feet of new hard surface and a public combined sewer or a ditch or culvert system is accessible within the abutting public place to each existing, proposed, or adjusted parcel.

d) The project is greater than 600 LF from a piped public drainage system and a public combined sewer or a ditch or culvert system is accessible within the abutting public place to each existing, proposed, or adjusted parcel.

(1) — One parcel has a parcel boundary along two intersecting streets; and

(2) ~~One boundary that~~ contains a piped public drainage system
~~[along the full extent of the boundary]; and~~

~~e)e) and~~ a single service is required.

f) ~~The project is a unit lot subdivision and the following conditions apply:~~

i) ~~The unit lot subdivision shares a boundary with more than one street; and~~

ii) ~~One boundary contains a piped public drainage system.~~

~~e)g)~~ The Director makes the determination to waive or modify the requirements to extend the piped public drainage system. ~~The waiver or modification shall provide the minimum relief necessary from the requirement to extend the public drainage system.~~ In making the determination the Director may consider, but is not limited to, the following conditions:

i) The location of an environmentally critical area or buffer or disruption of existing drainage patterns makes extending, improving, or maintaining the public drainage system impractical;~~;~~

ii) An existing bridge, viaduct, or other structure such as a substantial retaining wall makes extending the public drainage system impractical;~~;~~

iii) Extension of the public drainage system cannot be built and operated under gravity flow conditions while meeting applicable engineering standards

DRAINAGE DETAILS

This section, ~~Drainage Details~~, applies to ~~Small Projects~~.

B. ~~Curb or Alley Discharge into the Public Place~~

1. ~~Curb or alley discharge is authorized at the discretion of the Director based on site conditions, requirements of the Stormwater Code, the Side Sewer Code, the Requirements for Design and Construction of Side Sewer (Drainage and Wastewater Discharges), this rule, and available public infrastructure.~~

2. ~~Curb or alley discharge of drainage may be allowed based on the following conditions:~~

a) ~~The project has less than 5,000 square feet of new plus replaced hard surface;~~

b) ~~No more than 5,000 square feet of hard surface is discharged from the site;~~

c) ~~The available public drainage infrastructure does not abut the site in the Public Place; ((or, is on the far side of the street centerline,))~~

d) ~~Drainage from that discharge point remains in the gutter line all the way to the nearest inlet structure that discharges to a dedicated public storm drainage system;~~

e) ~~The discharge does not originate from a footing or other subsurface drain system;~~

f) ~~The inlet is not located more than ((350)) 600 feet downstream of the discharge point;~~

NOTE: Text in Section E (Curb or Alley Discharge into the Public Place) is from Requirements for Design & Construction of Side Sewers (Drainage & Wastewater Discharges) with edits noted via underline and ((strikethrough)).

- g) ~~The inlet discharges to a storm drainage system that does not discharge to a combined system;~~
 - h) ~~The available curb or alley abuts the site in the Public Place.~~
3. ~~Curb discharge may be allowed based on the following conditions:~~
- a) ~~The discharge enters a public inlet before the next downstream intersection, regardless of the level of existing street improvements;~~
 - b) ~~The existing (or rebuilt) street curb is high enough to preclude flowing water from leaving the gutter line;~~
 - c) ~~Discharge is not on the high side of a street when the street cross section is a "thrown street" and;~~
 - d) ~~Discharge to the curb face is through a minimum of ten feet of gravity flow and not directly from a pressurized system.~~
 - e) ~~Discharges do not encroach on the travel lane;~~
 - f) ~~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.~~
 - g) ~~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.~~
 - h) ~~Curb discharge may be allowed for temporary discharge of collected construction drainage, with SDCI 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 SDCI Site Inspector and the SDOT Street Use Inspector.~~
4. ~~Alley discharge may be allowed based on the following conditions:~~
- 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;~~
 - 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);~~
 - f) ~~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 the site.~~

5. ~~Curb or alley discharge is not allowed~~ for any of the following conditions:

- a) ~~The project is located within a combined sewer area;~~
- b) ~~The available public drainage infrastructure abuts the parcel in the public place¹; ((and, is on the near side of the street centerline))~~
- e) ~~The project has greater than 5,000 sf of new plus replaced hard surface or the total hard surface area on the parcel, including existing hard surfaces, is greater than 5,000 sf.~~

C. ~~Onsite Infiltration~~

1. ~~Onsite infiltration may be allowed if the following conditions apply:~~

- a) ~~The project has less than 5,000 square feet of new plus replaced hard surface;~~
- b) ~~Onsite infiltration is allowed per Directors' Rule DPD 21-2015/SPU DWW-200, Volume 3, Section 4.3.2.1 (Requirements for Projects with No Off-site Point of Discharge).~~

¹ SDCI may evaluate far side connection to a ditch/culvert on a case-by-case basis. In certain conditions, such as a pump requirement or insufficient information on the ditch/culvert system, infiltration (pursuant to Section F) may be evaluated ahead of the direct connection.

VI. EXTENSIONS – PROJECTS CONDUCTED IN THE PUBLIC RIGHT-OF-WAY

This section describes ~~and contains the~~ minimum requirements for extension of the Public Drainage System related to projects conducted in the public right-of-way. These requirements typically apply to **Sidewalk Projects** (SMC 22.801.200) and **Roadway Projects** (SMC 22.801.190) that are ~~only~~ conducted only within the public right-of-way.

For projects not conducted in the public right-of-way, typically Single-family residential or Parcel-based projects, refer to Section V of this rule.

<p>Stormwater Code Language [new code language]</p> <p><u>M. Extension of the Public Drainage System</u>: For projects constructed in the public right-of-way, extension of the piped public drainage system across the full extent of the site shall be required for any of the following:</p> <ol style="list-style-type: none">1. All projects where the Director has determined an extension is required considering, but not limited to, the following attributes of the project:<ol style="list-style-type: none">a. Poses a hazard to public health, safety or welfare;b. Endangers any property;c. Adversely impacts the safety and <u>impacts the safety and</u> operation of City right-of-way, utilities, or other infrastructure <u>infrastructure</u> by the City;d. Adversely impacts the safety and <u>impacts the safety and</u> operation of an environmentally critical area or buffer;e. Adversely affects an area with known erosion or flooding problems; orf. Adversely impacts <u>impacts</u> receiving waters, any properties, or right-of-way.2. The project's total new plus proposed <u>total new plus proposed</u> drainage <u>drainage</u> is 50 percent or more of the existing hard surface of the project <u>of the project</u> project limits are defined by the length of the project and the width <u>width</u> of the right-of-way. If a project encompasses more than one intersection, the project limits are further defined by one intersection to the other and blocks may vary in length as <u>as</u>, unless:<ol style="list-style-type: none">a. The piped public drainage system is already accessible within the site across the full extent of the site; <u>across the full extent of the site</u>; orb. The project is otherwise not required to extend by rules promulgated by the Director.
--

A. General Requirements

- 1) Extension of the **piped** public drainage system (also known as a Pipe Storm Drain (PSD)) is required unless otherwise noted.
- 2) Note: The public combined sewer is not a public drainage system by definition.
- 2)3) In combined sewer service areas where a public drainage system is determined ~~to not be accessible to be extended~~, be inaccessible for extension, the extension of a public combined sewer may be allowed ~~in lieu of a public drainage system extension~~ instead (refer to SMC 21.16.040).

~~2. Extension of the piped public drainage system may be required even if a public combined sewer abuts a parcel.~~

~~3)4) _____ The cost of an extension is borne by the applicant. Some cost may be recovered by a Latecomer Agreement.~~

~~4)5) _____ In some circumstances, including but not limited to state highways, divided roadways, the presence of railroad or streetcar tracks, or other obstructions in the right-of-way, installing a public drainage system to serve the near side of the road shall be required.~~

~~3. The Director may require an extension to be installed with a pipe larger than the standard size in this rule.~~

~~4. When a larger diameter pipe is required for the project, the cost of the larger pipe shall be borne by the applicant.~~

~~5)6) _____ In special circumstances, the system may be best served by the installation of a pipe that is larger ~~pipe~~ than required by this rule (i.e., 25-year storm event) or other system improvements. In such cases, SPU shall pay the difference in cost of materials ~~cost between for~~ the required and the desired size.~~

~~6)7) _____ Refer to SMC 22.805.020.N and Section 5VII of this rule for design requirements for the public drainage system.~~

~~5. Refer to ENG-430.1 (Utility System Improvement Dispute Process) for dispute procedures for system improvements.~~

B. Requirements for All Projects:

1) All projects conducted in the public right-of-way (e.g., sidewalk projects, roadway projects) are required to extend the piped public drainage system if the Director determines that a project meets the criteria in SMC 22.805.020.M.1.

C. Extension Not Required

1) Projects are not required to extend the piped public drainage system, #under the following conditions:

a) The piped public drainage system is not accessible to be extended as determined by the Director; ~~;~~

b) The Director makes the determination to waive or modify the requirements to extend the piped public drainage system. The waiver or modification shall provide the minimum relief necessary from the requirement to extend the public drainage system. In making the determination the Director may consider, but is not limited to, the following conditions:

i) The location of an environmentally critical area or buffer or a disruption of the existing drainage patterns makes extending, improving, or maintaining the public drainage system impractical; ~~;~~

ii) An existing bridge, viaduct, or other structure such as a substantial retaining wall makes extending the public drainage system impractical; ~~;~~

iii) Extension of the public drainage system cannot be built and operated under gravity flow conditions while meeting applicable engineering standards.

VII. PUBLIC DRAINAGE SYSTEM REQUIREMENTS

Stormwater Code Language ~~[new code language]~~

Refer to proposed Stormwater Code during public review. Final code language to be added to final rule

Public Drainage System Requirements

This rule explains standard criteria for civil engineers to ~~design~~ use in designing the following:

- ~~Pipe~~ Piped Storm Drain (PSD)
- Detention pipes
- ~~Shallow street~~ Culverts
- Catch basin (CB) and inlet facilities
- Other public drainage systems

NOTE: Text in ~~Chapter IV~~ (PUBLIC DRAINAGE SYSTEM REQUIREMENTS) is from ~~Client Assistance Memo (CAM) 1180~~ with edits noted via ~~track changes~~ track changes.
Note: To facilitate review, numbering from CAM 1180 is used, but will be updated in final rule.

~~As~~ Because specific site conditions greatly affect the feasibility of many design elements outlined in ~~these rules~~, ~~Seattle Public Utilities (this rule, SPU)~~, at its discretion, may approve design variations other than ~~those~~ specified by these requirements. SPU and the Seattle Department of Transportation (SDOT) must approve all drainage improvements in the right-of-way.

A. ~~1.~~ Point of Discharge

- 1) Per SMC 22.805.020_B (Minimum Requirements for Discharge Point), selection of the point of discharge ~~effor~~ any project shall consider whether the capacity of the drainage system is adequate for the flow rate and volume from the project site. If a project proposes to redirect flow from one public drainage system to another, the project shall analyze potential ~~capacity- or creek characteristic-related~~ impacts ~~to~~ on the ~~receiving public drainage~~ downstream system or receiving water.

~~Consult with SPU early to determine if the project is required to extend a public drainage system and to identify the approved point of discharge.~~

B. ~~2.~~ Grade Roadways and Alleys to Collect Drainage

1) ~~2.1~~ Curb Returns

- a) Grade curb returns at a minimum ~~0.5%~~ slope of 0.5% in the flow line so that ~~any~~ no low point is ~~not~~ located in ~~any~~ a crosswalk or in front of a curb ~~ramp~~ ramp per Standard Plan 260a.
 - .
 - i) Avoid locating open grates ~~outside of~~ inside curb ramp wings ~~as well as the curb ramp landing~~. This allows maintenance of the structure without closing the curb ramp. Open grates within the curb ramp landing are not allowed.
 - ii) Additionally, grade curb returns at a minimum ~~0.5%~~ slope of 0.5% in the flow line so that any drainage collection structure is not:
 - iii) From a curb ramp landing to any grate with a minimum clear distance of 1-foot. When unavoidable, a variance that is Americans with Disabilities Act (ADA) compliant will be considered.
 - iv) In a vehicle parking zone. This is to avoid the need for temporary on street parking restrictions when maintenance is required.

- b) Avoid creating closed-contour low points and minimize new low points that trap stormwater.
- 2) ~~2.2~~ Right-of-Way Behind the Curb
- a) Grade right-of-way behind the curb to the street. The standard cross section is shown on Standard Plan 400.
 - b) When SPU agrees that the standard cross section is ~~not feasible~~infeasible, especially at curb bulbs and bus bulbs, typical drainage design considerations or exceptions include the following:
 - i) Direct drainage away from building entrances.
 - ii) Direct any overflow towards the street.
 - iii) Evaluate alternative curb heights down to ~~4-inch~~a minimum of 4 inches.
 - iv) Evaluate alternative slopes on the sidewalk down to ~~0.5%~~a minimum of 0.5%.
 - v) Use the existing curb line along the walksidewalk as a depression line to drain off water to the street.
 - vi) Grade so that overflow from rain gardens in the planting strip ~~rain garden overflow to overtop~~overtops the curb towards the street.
 - vii) Direct drainage to landscaping or infiltration facilities.
 - viii) Install curb cut outlets from bioretention features per Standard Plans 295c and 295d.
- 3) ~~2.3~~ New Curb Bulbs
- a) To the extent practical, grade new curb bulbs to allow drainage to flow to a standard location for a drainage collection structure.
 - b) When locating low points, consider access issues related to maintenance of drainage collection ~~structure maintenance access issues~~structures, such as worker exposure to traffic, and ~~parked~~ vehicles parked over the structure.
- 4) ~~2.4~~ Concentrated Flow
- a) Collect flow concentrated along a gutter or flow line in a drainage structure. Do not leave allow the flow to fan out after the flow is it has concentrated.
- 5) ~~2.5~~ Inlet and catch basin~~CB~~ Staking Points
- a) Set elevations for inlets and CB grates at the curb face. Include the drainage transition zone as shown in Standard Plan 260a.
- 6) ~~2.6~~ Alleys
- a) Grade alley cross sections per Standard Plan 403, and grade longitudinal sections to drain to the perpendicular street. Public storm drain extensions to mid-alley low points will not be permitted, ~~except when~~, unless SPU agrees that there is no feasible alternative.
- 7) ~~2.7~~ Raised Crosswalks
- a) After SDOT determines that a raised crosswalk is desired for transportation purposes, SPU will review the drainage function and mitigation measures. Detailed grading analysis is required. Grade to limit ponding when drainage pickups are plugged. The overflow path must not be over the sidewalk or onto private property. Refer to Section ~~3.7C.6~~ Gutter flow calculations.

C. ~~3-~~ Locating ~~Catch Basins~~ CBs and Inlets

- 1) ~~3.1~~ Collection points
 - a) Collect drainage in the following locations:
 - i) At all closed contour low points and minor low points along the roadway
 - ii) Upstream of all intersections
 - iii) Upstream of all crosswalks and curb ramps
 - iv) Before transitions on super-elevated roads
 - v) At the downstream end of developed alleys upstream of the sidewalk
 - b) Design variations, accepted at the discretion of SPU, include:
 - i) No required drainage pickup ~~required~~ if the drainage area is 3,000 square feet or less leading to an intersection, crosswalk, or end of an alley.
 - ii) Additional drainage pickups to limit clogging ~~from due to~~ tree leaves or other debris.
 - iii) Additional drainage pickups at abrupt grade changes.
 - c) Additional drainage pickups (CBs) are required at closed contour low points.
- 2) ~~3.2~~ Maximum curb length of a residential street contributing to a catch basin CB
 - a) Water from less than 1,000 total lineal feet of curb on a residential street may discharge into one catch basin CB. This includes the length of curb for inlets ~~which that~~ discharge into a catch basin CB as well as the catch basin CB itself.
 - b) ~~While it is desired to grade~~ Although grading streets to minimize closed contour low points along the roadway is preferred, some flat residential streets may require additional drainage pickups.

~~3.3 Open grates [Note: this section moved to 2.1 Curb Returns]~~

- 3) ~~3.4~~ Pedestrian and bicycle routes
 - a) Locate and relocate solid cover CBs to avoid ~~the~~ pedestrian and bicycle access routes. When possible, stay close to the curb to limit the need for lane closures during maintenance and avoid the vehicle wheel path to limit noise and cover wear.
- 4) ~~3.5~~ Standard locations for drainage grates and exceptions
 - a) For standard locations see of drainage grates, refer to Standard Plan 260a and ~~b260b~~ 260b. Exceptions to the requirement of locating structures 1½ 5 feet from the point of curvature (PC) or point of tangency (PT) include the following:
 - i) A wider crosswalk or curb ramp location that would direct pedestrians to cross a grate.
 - ii) Locating the drainage grate ~~further~~ further up gradient to avoid creating a low point ~~further~~ further up gradient.
 - iii) Moving the drainage grate up-gradient to avoid utility conflicts ~~can be avoided by moving the structure up-gradient.~~
 - iv) Locating the drainage grate ~~further~~ further up gradient due to site conditions requiring an abrupt grade change ~~which that~~ flattens ~~up gradient~~ up gradient of the intersection, especially at curb bulbs.

5) ~~3.6~~ Trees

- a) ~~Maintaining~~Maintenance of drainage structures can be ~~a hazard~~hazardous to tree health. To the extent feasible, locate structures outside the full-growth drip line of street trees. The minimum distance from the edge of the trunk to the edge of the structure is 5 -feet per Standard Plan 030.

6) ~~3.7~~ Gutter flow and allowable spread width calculations

- a) To support safety and mobility of vehicles, pedestrians, and bicycles, the spread width of water on roadway edges shall be established as part of the design. Calculations of gutter flow ~~calculations~~and spread width, including sag analysisinlet analyses, are required for projects that build new arterial streets and significant revisions or significantly change the areas contributing flow to existing collection inlets and for projects that build new sidewalk along roadways that previously had no curb and gutter conveyance systems.

b) Allowable spread width of gutter flow:

- i) On arterial streets to avoid vehicle hydroplaning and protecting the function of the entire street for all users including pedestrians and bicyclists, the allowable spread width on a continuous grade is 5.5 feet for the pavement adjacent to the street edge or curb, for the 10-year rainfall intensity, 5-minute duration design storm. Scenarios where a lesser design spread width is proposed requires further assessment as follows:

Allowable flow spread

- ◆ If An assessment of the lane adjacent to the shoulder or curb is used for parking only, allow gutter spread width should be made at locations where a lesser design spread width up is proposed, including:
 - ◆ Near bus stops
 - ◆ Where there is no planting strip to provide separation of pedestrians from the roadway
 - ◆ Upstream of closed contours where allowing bypass flow to enter the full lane width sag location will increase the risk of actual flooding
- ◆ If the lane adjacent to the shoulder or curb is used for bike travel only, allow gutter spread width up to [TBD].
 - ◆ If the lane adjacent to the shoulder or curb is intended to be used for vehiclebike travel, allow gutter
 - ◆ This allowable spread with up to one-half is required regardless of the use of the pavement adjacent to the street edge or curb (eg parking lane, bike lane, vehicle travel lane, etc).
- ii) In the case of a closed contour, a roadway sag inlet analysis is required.
 - ◆ Roadway sag inlet analysis shall be according to WSDOT's Hydraulic Manual.
 - ◆ Roadway sag inlet analysis shall use the 50-year rainfall intensity, 5-minute duration design storm.
 - ◆ If the closed contour is located in an intersection, the Engineer should consider safety at the intersection, the effects of icing and hydroplaning of vehicles at this location, and how quickly ponding from the rainfall event will flow off the roadway.

iii) The Engineer shall analyze the spread width of flow at existing and new inlet locations on a continuous run of curb until the curb ends or the curb enters an inlet or other collection structure.

◆ If the curb ends or no collection structure is located upstream of an intersection, the Engineer should evaluate:

◆ Impacts to private property

◆ Anticipated ponding in the ROW

◆ Impacts to traffic, pedestrian, and bicycle safety in an intersection

◆ If the next downstream collection point has capacity for flows.

iv) Where use of the allowable spread width is infeasible, the Engineer should evaluate the following drainage elements:

c) Longitudinal pavement slope (refer to Streets Illustrated for allowable range of slopes)

d) Cross or transverse pavement slope (refer to Streets Illustrated for allowable range of slopes)

e) The depth of flow at the edge of the travel lane width. Flow (maximum of 0.12 feet)

◆ On vehicle traffic lanes greater spread to one-half of the lane width is not widths may be allowed near a bus stop or where there is no planting strip.

where traffic volumes and speeds are low. An assessment of the relative risks and cost of various design spread widths may be helpful. SPU has an interest in minimizing new CB infrastructure when street function is not compromised. Exceptions to the allowable flow-spread width must be approved by SPU and the City Traffic Engineer.

D. ~~4.~~ Type of ~~Catch Basin~~ CB or Inlet to Use Where

1) ~~4.1~~ Preference for CBs preferred

a) CBs provide more reliable drainage pickup and are preferred over inlets.

~~Exceptions~~ Examples of when ~~inlet~~ installation of an inlet is allowed instead of a CB include:

i) The existing condition is an inlet and CB system. See Refer to Detail 1-on the drawings at the end of Section VII.

ii) Utility interferences prevent ~~installing~~ the installation of a CB along the curb line.

See Refer to Detail 2- on the drawings at the end of Section VII.

2) ~~4.2~~ Replacing existing inlets, CBs and connection pipe

a) Inlets along new curbs must conform ~~to~~ with Standard Plan 250 or be replaced. Whenever an inlet is replaced, the connection pipe to the CB must be replaced with new pipe. If SPU determines that the existing CB or CB connection pipe is ~~determined to be~~ defective by SPU, it must also be replaced.

3) ~~4.3~~ Standard CB installation

a) Standard CB installation within the street shall be ~~per~~ in accordance with Standard Plan. 240D, which has a vaned grate and through curb opening.

b) Typical design variations and exceptions include the following:

- i) Type 242B installation:
 - ◆ To accommodate locating other shallow utilities behind the curb.
 - ◆ To avoid a top slab within the pavement.
 - ii) Type 240A installation when inlets provide the open grated surface and the CB has a solid lid.
 - iii) Type 240C, or [type 242A, installations](#) that do not have a through curb opening, when the structure is not at a curb or the curb height is less than 4 -inches.
- 4) ~~4.4~~ Standard Inlet Installation
- a) Install standard inlets within the street per Standard Plan 250B, which has a vaned grate and through curb opening. Use type 250A when the structure is not at a curb or [the](#) curb height is less than 4 -inches.
- 5) ~~4.5~~ At curb bulbs
- a) For curb bulbs, [see refer to Detail 4- on the drawing at the end of Section VII.](#) Locate a Standard Plan 240 CB no ~~further~~[farther](#) up-gradient than 1-~~1/2~~[.5](#) feet from the PC or PT of the curb bulb.
 - b) Use a Standard Plan 250 inlet when the existing condition is an inlet and CB system and:
 - i) The location is not a closed contour low point or a minor low point.
 - ii) The inlet connection pipe can be placed at a minimum slope of 5% with an invert at the CB 2-inches minimum above the outlet pipe invert.
 - iii) Either an existing CB in good condition or a new type 240A CB is located in the roadway.
- 6) ~~4.6~~ Closed Contour Low Points
- a) At closed contour low points, two independently connected CBs are required in order to minimize [the following](#):
 - i) Street flooding caused by plugging of the ~~catch basin~~[CB](#) or inlet
 - ii) Drainage runoff overtopping the curb
 - iii) Private property damage
 - b) At most locations, the second CB is located on the opposite side of the street. [See-Refer to Detail 3- on the drawings at the end of Section VII.](#)
- 7) ~~4.7~~ Alleys
- a) In alleys, use a Standard Plan 241 catch basin.
- 8) ~~4.8~~ Elevated Structures
- a) For all elevated structures, consult with SPU ~~early~~ about [the](#) requirements [early in the design process](#). If drains are required on a bridge, install per Standard Plan 290 with a grate per Standard Plan 265. New bridge downspouts shall have a minimum pipe diameter of 6 -inches and a minimum bend radius of 4 -feet.

9) ~~4.9~~ Non-Standard Installations Within Shallow Ditch and Culvert System

- a) For non-standard installations within the shallow ditch and culvert system, consult with SPU ~~early~~ about ~~the~~ requirements: ~~early in the design process~~. Design variations, allowed at the discretion of SPU, include ~~the following~~:
- i) Replacing all existing sand boxes within the project area with either a CB or a junction box, depending on the function.
 - ii) Grading and defining depression lines to reduce the number of structures needed.
 - iii) CB to CB connections along the culvert. This avoids offset CBs that require a junction box because a tee connection to the existing shallow culvert is ~~not feasible~~: ~~infeasible~~
 - iv) Eliminating the trap when connecting CB to CB.
 - v) Installing a Standard Plan 241 CB with a vane grate within the roadway.
 - vi) Reducing or eliminating riser sections, if the street surface is flat enough to allow adjustment of the casting with a reduced riser.
 - vii) Inverted frames to reduce the height of the casting.
 - viii) Situation specific designs of shallow structures.

10) ~~4.10~~ Other Non-Standard Installations

- a) Other non-standard installations and modified structures may be approved if SPU agrees that grading to eliminate the need is ~~not feasible~~: ~~infeasible~~. Structures will be individually reviewed, using the following criteria:
- i) The non-standard structure ~~is~~ ~~has the following attributes~~:
 - ◆ ~~Is~~ accessible and maintainable.
 - ◆ Does not ~~increase the~~ ~~result in an increased~~ risk of flooding, ~~and~~
 - ◆ ~~Is~~ ADA compliant.
 - ii) Within the roadway, consider in the following order:
 - ◆ Use of one or two smaller standard structures to increase storage volume (~~ex. e.g.~~ Standard Plan 241 with vanned grate).
 - ◆ A modified shallower CB that has a standard grate, the maximum sump possible and a trap. ~~(detail required)~~
 - iii) Behind the curb installations will be evaluated in the following order:
 - ◆ Depression line to an inlet connected to existing CB.
 - ◆ Depression line to CB and connection to main.
 - ◆ Trench grates will ~~only~~ be approved ~~only~~ if there is no infrastructure available for CB connection.

E. ~~5~~ Inlet and CB Connection Pipes

1) ~~5.1~~ Sizing

- a) ~~Standard size for~~ inlet connection and CB connection ~~pipe~~ ~~pipes~~ standard size is 8-inch diameter. Design variations, allowed at the discretion of SPU, include ~~the following~~:

- i) When the CB is being connected to a 10-inch-diameter or smaller combined sewer, use a 6-inch-diameter pipe.
 - ii) Allowing a variance to reconnect to an existing 6-inch-diameter connection pipe in good condition, rather than replacing the pipe all the way to the mainline. Use a 6-inch-diameter pipe and a flexible gasketed coupling with stainless steel shielding. Connecting new 8-inch-diameter pipe to an existing 6-inch-diameter pipe is not allowed.
 - iii) Installing a 6-inch-diameter pipe when collecting sidewalk drainage only.
- 2) ~~5.2~~ Inlet Connections
 - a) Inlet connections must be straight and conform with the following specifications:
 - i) Placed at a minimum slope of 5%
 - ii) ~~Have~~ A maximum length of 50 feet
 - iii) ~~Have~~ An invert at the CB that is at least 2 inches above the invert for the outlet pipe invert
 - b) Inlets must connect to a CB. Direct connection to a mainline must be made from a structure with a sump and outlet trap.
- 3) ~~5.3~~ Outlet Location and Orientation
 - a) ~~See~~ Refer to Standard Plans 240, 242, 250 and 261 for allowable location and orientation of outlets from structures. Pipe must be oriented to allow tool access utilizing the length of the casting opening, and traps ~~shall~~ must be below the casting, so they can be reached.
- 4) ~~5.4~~ CB Connections
 - a) CB connections must be placed at a minimum slope of 2% and a maximum slope of 100% slope. Horizontal and vertical bends are expected, but shall not exceed 22½ degrees in a single fitting. A straight pipe section of at least 1-foot minimum is required between fittings.
- 5) ~~5.5~~ Connection pipe material
 - a) ~~Pipe material is~~ Connections shall be ductile iron (DIP). ~~See~~ Refer to standard construction notes "Drainage CB and Inlet Notes" (docx) and Standard Specifications for Municipal Construction . Design variations, allowed at the discretion of SPU, include the following:
 - i) Use of a non-metallic pipe when site conditions include corrosive soils or other corrosion source.
 - ii) Evaluating matching the existing pipe material when coupling to an existing pipe to remain.
- 6) ~~5.6~~ Connecting to the mainline pipe
 - a) Connections to a new mainline pipe must be by manufactured tee unless one of the following attributes applies to the new mainline is:
 - i) Diameter of a least 24-inch or greater, or inches
 - ii) Reinforced concrete pipe (RCP).
 - b) For information on allowable connections and procedures for connections to existing mainline pipe, ~~see Core Tap Procedures~~ refer to Core Tap Procedures for Storm and Sewer Mains. Connections to maintenance holes are non-standard and will be evaluated by SPU on a case-by-case basis.

- 7) ~~5.7~~ Shallow street culvert connections
 - a) When it is ~~not feasible~~infeasible to install a tee on the existing culvert above the springline, connect to shallow street culverts with a junction box.
- 8) ~~5.8~~ Ditch connections
 - a) Connections to a ditch must be tapered to match the ditch grading and may require armoring to prevent erosion.
- 9) ~~5.9~~ Plan submittal requirements
 - a) Provide station and offset to staking point at face of curb for CBs and inlets per Standard Plan 260a.
 - b) Profiles are not required for inlet or CB connection pipe/pipes, except to show known conflicts or non-standard laying conditions, or connections to mainlines. The standards allow for some field adjustment.
 - c) Call out to provide polyethylene foam protection when clearances are less than 6 -inches.
 - ~~d) Call out measured lengths per Standard Plan 010.~~
 - d) Call out measured lengths per Standard Plan 010.

F. ~~6-~~ Mainlines- 2 Pipe Storm Drains (PSD)

- 1) ~~6.1~~ Standard location
 - a) Locate storm drains in the standard location, 7 -feet south or west of the right-of-way centerline, as shown in Standard Plan 030. ~~Alternate~~Alternative alignments require approval by SPU and SDOT.
- 2) ~~6.2~~ Sizing
 - a) Storm drains must be designed for full gravity peak flow with a 4% annual probability (25-year recurrence) for existing and anticipated loads. The hydraulic grade line (HGL) for that peak flow must stay a minimum of 4-feet below the rim of all drainage structures and a minimum of 3-feet below the lowest elevation served by gravity flow on adjacent private properties.
 - b) For more information on requirements for hydrologic analysis, including tidal and lake backwater constraints, ~~see~~refer to Appendix F ~~of~~to the Stormwater Manual Hydrologic Analysis and Design ~~(pdf)~~.
 - c) PSDs must be a minimum of 12-~~inch~~ inches in diameter.
- 3) ~~6.3~~ Pipe slope
 - a) Pipe slope shall generally follow the surface topography at a standard depth of cover of 6-feet. Desired minimum pipe slope is 1%. Typical exceptions include the following:
 - i) Downstream system is deeper_r or shallower than 6 feet.
 - ii) Surface topography is flat_u and pipe slope is 0.5%.
 - iii) Connection cannot be made unless pipe slope is less than 0.5%
- 4) ~~6.4~~ Minimum velocity
 - a) Required minimum velocity ~~required~~ is 3 -feet per second (fps). If velocity exceeds 20 fps, energy dissipation in the downstream maintenance hole (MH) is required to minimize hydraulic jumps.

- 5) ~~6.5~~ Pipe material
 - a) Pipe material will be as approved by SPU, most typically ~~DIP. See~~ ductile iron pipe. Refer to standard construction notes "SPU Mainline and Detention Pipe Notes" (docx) and Standard Specifications for Municipal Construction.
- 6) ~~6.6~~ Plan submittal requirements
 - a) On pipeline profiles, calculate and show the invert elevations at MHs by projecting the pipe slopes to the center of the structure.
 - b) Call out measured lengths per Standard Plan 010.
 - ~~b)a) Show the Call out measured lengths per Standard Plan 010.~~
 - c) HGL ~~shown~~ on the profile, if the pipe is surcharged.
 - d) Provide notes documenting ~~major~~ hydrologic and hydraulic design assumptions.
 - e) Provide a drainage report documenting all calculations.

G. ~~7.~~ Maintenance Holes

- 1) ~~7.1~~ Where maintenance holes are required
 - a) Maintenance holes (MH) are required ~~to be located at~~ in the following locations:
 - i) Every 375-feet
 - ii) At intersecting streets for future extensions
 - iii) At pipe ends
 - iv) At pipe junctions
 - v) At grade breaks
 - vi) ~~Changes in~~ Where horizontal alignment changes
 - b) Design variations, allowed at the discretion of SPU, include the following:
 - i) Setting a MH on the smaller pipe within 30 feet of the connection when the connection is to a very large diameter PSD.
 - ii) Not requiring a MH if any of the following apply:
 - ◆ At an end of pipe that is less than 100 feet in length, especially if a future extension is anticipated.
 - ◆ For a single vertical or single horizontal bend no greater than $22\frac{1}{2}^{\circ}$ degrees between MHs.
 - ◆ If the MH spacing requirement results in difficult access to the MH.
- 2) ~~7.2~~ Match pipe crowns
 - a) Crowns of pipe ~~Pipe crowns~~ must match at MHs. For details on MHs, see ~~therefer to~~ Standard Plans 204 through 212. For standard installations, use Type A, unless the pipeline is too shallow.
- 3) ~~7.3~~ Drop connections
 - a) Drop connections may be approved when SPU agrees that the slope or depth makes matching the pipe crowns ~~not feasible~~ infeasible. For inside drop connections, ~~see~~ refer to Standard Plan 233b.

4) ~~7.4~~ Sizing

- a) For information on MH sizing, see [maintenance hole selection \(pdf\)](#).

H. ~~8~~-Detention Pipe and Flow Control Structures

1) ~~8.1~~ Detention pipe standards

- a) Detention ~~must be in a detention pipe conforming~~ [facilities shall conform](#) to Standard Plan 270 [Flow Control Structure with Detention Pipe](#).

2) ~~8.2~~ Locating detention and flow control structures

- a) Locate detention [facilities](#) to minimize traffic impacts during maintenance, including:
- i) Locate off arterials, when feasible.
 - ii) Locate MHs to allow a single lane closure ~~when inspecting during inspection~~ or ~~maintaining maintenance of~~ the structure.
- b) Connect the flow control structure to a MH on the mainline. When possible, use and rechannel an existing MH.

3) ~~8.3~~ Detention pipe material

- a) Detention pipe material will be as approved by SPU, typically DIP or RCP. Polypropylene or steel reinforced polyethylene will be allowed if pavement restoration can ~~wait be delayed for~~ 30 days after installation ~~to allow~~ for flexible pipe testing. ~~See~~ [Refer to](#) standard construction notes "SPU Mainline and Detention Pipe Notes" (docx) and Standard Specifications for Municipal Construction.

4) ~~8.4~~ Plan submittal requirements

- a) Detention pipe profile-
- b) ~~A~~ Detail of the flow control structure-
- c) Notes with the detail documenting the major hydrologic and hydraulic design assumptions-
- d) ~~A~~ Drainage report documenting all detention calculations-

I. ~~9~~-Culverts and Ditches

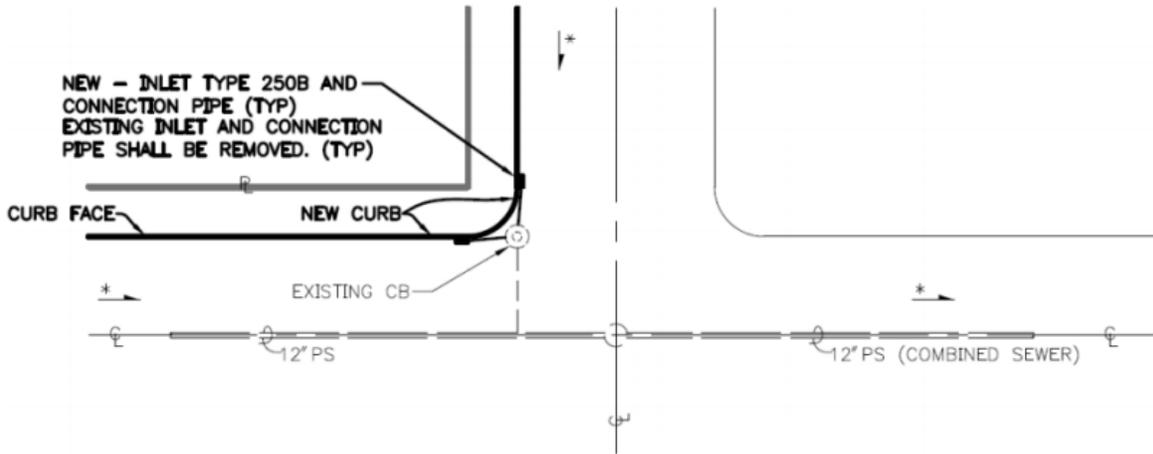
- 1) Within the informal ditch and culvert system, the City ~~of Seattle~~ does not generally ~~permit~~ [allow](#) the filling of a ditch in the street right-of-way. ~~See~~ [Refer to](#) Policy DWW-205 Ditch Replacement.

- 2) Any existing culvert pipe with less than 42 feet of cover under [the hard surface of](#) a project's proposed roadway hard surface or concrete sidewalk (Standard Plan ~~270420~~) must be replaced, unless the existing culvert pipe ~~is~~ [has the following attributes](#):

~~Meets current size design standards for culvert pipe, and~~

- a) ~~Consists of~~ Ductile Iron Pipe (DIP), ~~and~~
 - b) Has sufficient capacity. See SMC 22.805.020.H (Ensure Sufficient Capacity) and ~~associated rules~~ [Section IV of this rule](#) for sufficient capacity determination.
- 3) Culverts on fish-bearing creeks or streams, even with intermittent flows, are not addressed in this rule.
- 4) ~~9.1~~ Sizing culverts

- a) When replacing an existing roadside ditch with a culvert, size ~~the~~ new roadside ~~culverts~~culvert to maintain the capacity of the existing ditch. Culverts must ~~behave~~ a minimum ~~of 12-inch~~ diameter of 12 inches, or if connecting to an existing culvert ~~which is~~ larger than 12-~~inch~~ inches in diameter ~~then the diameter of the new culvert must~~ match that of the existing larger culvert size.
 - b) When replacing an existing culvert, the new culvert must at a minimum match the existing culvert size.
- 5) 9.2-Culvert pipe material
- a) For culverts, use ductile iron pipe with Class D bedding. ~~Alternate~~Alternative materials may be approved by SPU when pipe cover is greater than 2 feet.

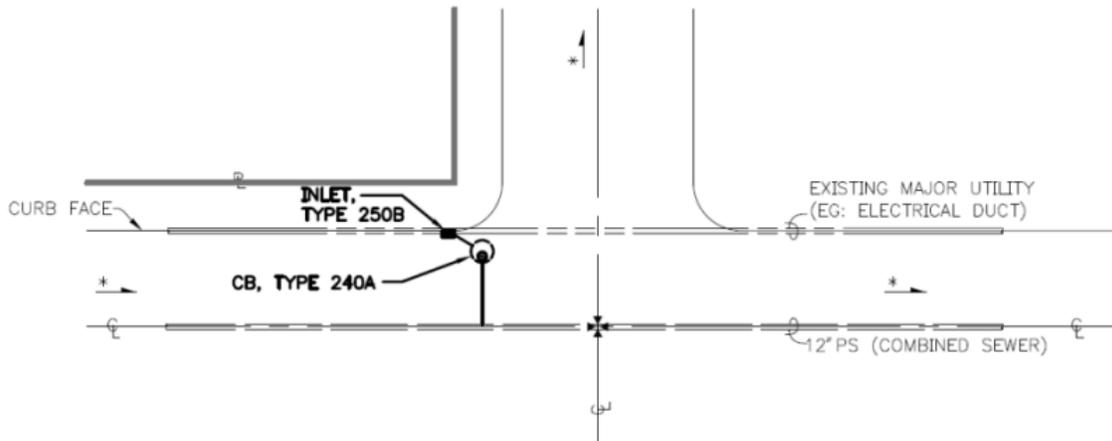


DETAIL 1
INLET PLACEMENT ALONG NEW CURB

NTS

NOTES: EXISTING CATCH BASIN IS NOT REQUIRED TO BE REPLACED IF IN GOOD WORKING CONDITION.

* SLOPE (TYP)



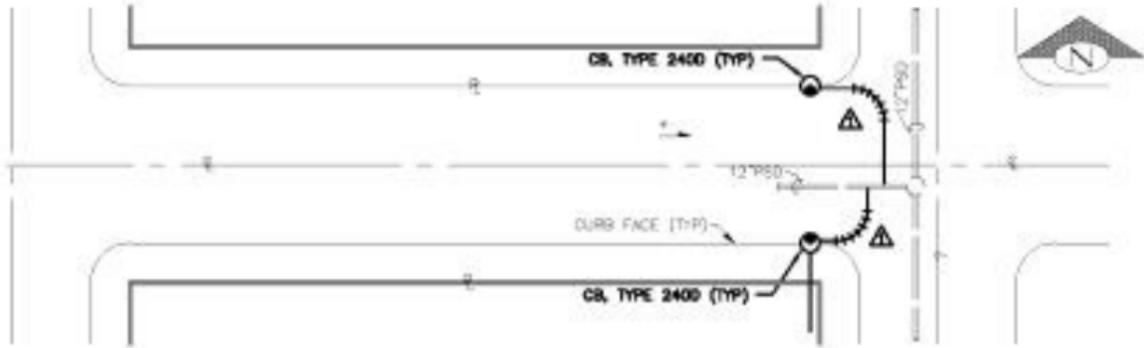
DETAIL 2
INLET PLACEMENT AT UTILITY CONFLICTS

NTS

NOTES: TO BE USED ONLY WHEN MAJOR EXISTING UTILITIES CONFLICT STANDARD CB PLACEMENT.

NOT APPROPRIATE AT CLOSED CONTOUR LOW POINTS WHERE PLUGGING OF THE INLET COULD RESULT IN DAMAGE.

* SLOPE (TYP)



DETAIL
CATCH BASIN LAYOUTS
 NIS

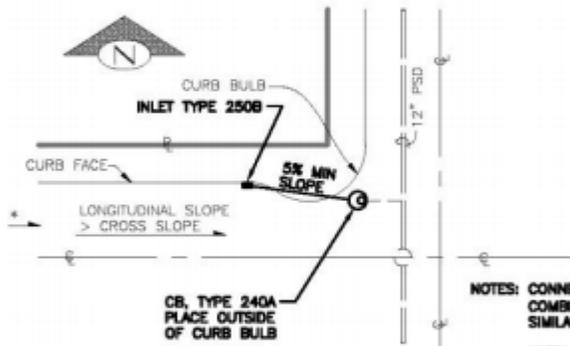
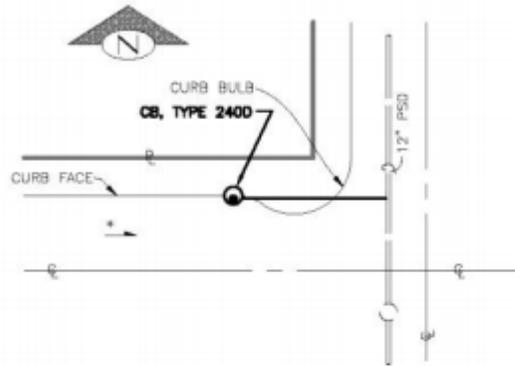
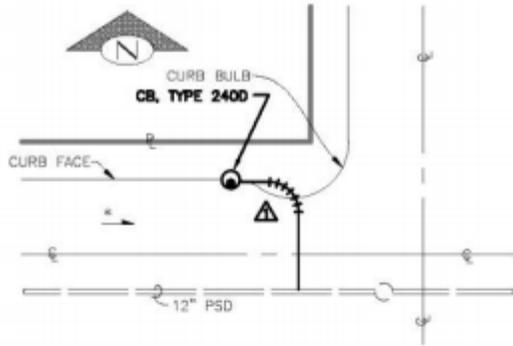


NOTES: MEETS 2 CATCH BASINS AT CLOSED CONTOUR LOW POINT REQUIREMENT ON CROWNED STREETS.

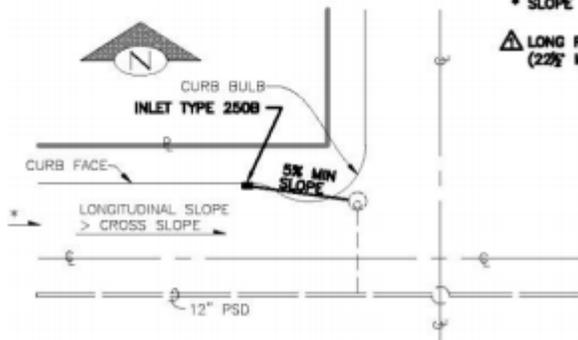
CONNECTION TO A PUBLIC COMBINED SEWER (P.C.S.) SIMILAR TO ABOVE.

+ SLOPE (TYP)

△ LONG RADIUS SWEEP. (225' MAX BEND ONLY)



- NOTES: CONNECTION TO A PUBLIC COMBINED SEWER (PS) SIMILAR TO ABOVE.
- MATCH EXISTING PIPE SIZE.
- EXISTING CB IS NOT REQUIRED TO BE REPLACED IF IN GOOD CONDITION AND LOCATED IN THE ROADWAY.
- * SLOPE (TYP)
 - △ LONG RADIUS SWEEP. (22 1/2° MAX BEND ONLY)



DETAIL
INLET/CATCH BASIN LAYOUT AT CURB BULBS

4
-

NTS

VIII. DEFINITIONS

Landlocked. A parcel that does not abut any street right-of-way and is separated from the nearest street right-of-way by at least 10 feet of the parcel, which cannot serve as access to the parcel from the street right-of-way.

Latecomer Agreement. A contract between SPU and an applicant, pursuant to Revised Code of Washington (RCW), [Chapter 35.91](#), and ~~Seattle Municipal Code (SMC) 21.80~~, which allows an applicant to recover a portion of the costs of installing new utility system improvements from other benefiting parcels at the time they connect to the new system improvements.

Parcel. A tract or plot of land, including unit lot subdivisions under SMC Title 23, Land Use Code. For the purposes of this rule, individual lots are considered separate parcels.

Refer to SMC 22.801 for Stormwater Code Definitions ~~or~~and SMC 21.16.030 for Side Sewer Code Definitions

IX. AUTHORITY/REFERENCES

- [SMC 3.32.020, SPU Administration – Adoption of Rules](#)
- [SMC 22.800, 22.808, Stormwater Code](#)
- [SMC 21.16, Side Sewer Code](#)
- [SPU Director’s Rule DWW-200, Stormwater Manual](#)
- [SPU Director’s Rule, DR-2011-004 Requirements for Design and Construction of Side Sewers](#)
- [City Standard Plans and Specifications](#)
- [City Streets Illustrated](#)
- [SPU Design Standards and Guidelines](#)
- [SPU Policy DWW-205, Ditch Replacement](#)
- ~~RCW ###.###, Title of statute~~
- ~~SMC ###.###, Title of code~~
- ~~Ordinance ###, Title of ordinance~~
- ~~SPU policy no. ###-##, Title of policy~~