# Chapter 1 REQUIREMENTS AND POLICIES

This chapter outlines the City of Portland's stormwater management requirements and the related regulations and policies. It includes:

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# 1.1 PURPOSE OF THE STORMWATER MANAGEMENT MANUAL

As the City of Portland is developed, impervious surfaces create increased amounts of stormwater runoff during rainfall events, disrupting the natural hydrologic cycle. Without stormwater management, these conditions erode stream channels and prevent groundwater recharge. Parking lots, roadways, rooftops, and other impervious surfaces increase the pollution levels and temperature of stormwater that is transported to streams, rivers, and groundwater resources. Implementing the requirements in this manual will help protect Portland's water resources, which in turn will provide great benefit to human health, fish and wildlife habitat, recreational resources, and drinking water.

Stormwater management is also critical in terms of protecting Portland's sanitary and stormwater infrastructure. Increased runoff contributes to combined sewer overflows (CSOs) and basement sewer backups. Implementing onsite infiltration and flow control measures will conserve the existing and future conveyance capacity of storm sewers and combined sewers.

Strategies for meeting the requirements in this manual depend on a number of site factors, including infiltration capacity, available infrastructure, proposed development plans, and the drainage basin the proposed development is in. The applicant's ability to effectively use the design standards in this manual depends on a demonstrated understanding of the development site's ecology and of the upstream and downstream impacts resulting from stormwater management improvements. The standards addressed in this manual are intended to make site-specific improvements to properties across the City and to comprehensively manage stormwater by watershed.

Stormwater management is critical to maintaining and enhancing the City's livability and improving watershed health. The *Stormwater Management Manual* allows the City of Portland to protect both watershed resources and infrastructure investments with every land improvement. As each development and redevelopment project meets the requirements of this manual, it will contribute to achieving these important citywide goals.

#### **Regulatory Mandates**

In response to the impacts of urbanization on water quality, Congress passed the Clean Water Act of 1972 (amended in 1987), which prohibits the discharge of pollutants into waters of the United States unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The permit requirements, published in 1990, require large (Phase I) cities such as Portland to obtain an NPDES permit for their municipal separate storm sewer system (MS4) discharges. Compliance with the NPDES MS4 permit requires the cities to establish a comprehensive stormwater management program, including establishing controls on post-development stormwater runoff and source controls for industrial facilities that contribute substantial pollutant loading to the MS4 system. Portland established this citywide regulatory program in 1999, which includes water quality and flow control design standards for onsite stormwater management facilities. The program focuses on low-impact development practices, structural source control devices, and maintenance and operational best management practices (BMPs) designed to improve stormwater quality. The source control requirements included in this manual are designed to meet the NPDES Industrial Stormwater Discharge Permit requirements for those facilities required to have permit coverage. Within this regulatory context, developers and municipal agencies are required to implement controls that reduce pollution carried in runoff. This *Stormwater Management Manual* is part of Portland's WB4

In addition, the federal Safe Drinking Water Act (SDWA) of 1974 provides a comprehensive framework to ensure the quality and safety of drinking water supplies. Within the state of Oregon, the Department of Environmental Quality (DEQ) regulates stormwater discharges to underground injection control (UIC) systems under the SDWA. UICs are used to infiltrate stormwater runoff from both public and private properties. DEQ issued a water pollution control facility (WPCF) permit to the City in 2005 for approximately 9,000 public UICs used to discharge stormwater runoff from publicly owned streets. As part of the compliance, the City was required to establish a comprehensive UIC management plan that includes structural, non-structural, and institutional controls to ensure the protection of groundwater as a drinking water resource. This *Stormwater Management Manual* assists with the implementation of Portland's UIC management plan.

The purpose of this manual is to respond to these regulatory mandates by providing stormwater management principles and techniques that help preserve or mimic the natural hydrologic cycle, minimize sewer system problems, and improve water quality. The manual provides developers and design professionals with specific requirements for reducing the impacts of stormwater from new development and redevelopment.

#### Relationship to the Sewer and Drainage Facilities Design Manual

Both the *Stormwater Management Manual* and the *Sewer and Drainage Facilities Design Manual* (Environmental Services, August 2006) are under the authority of the Bureau of Environmental Services (BES) and adopted by City Council as an administrative rule. They are complementary documents that share features related to hydrology and hydraulic design of drainage facilities.

The *Sewer and Drainage Facilities Design Manual* is the primary reference for designing public sewers. It is referenced for the design of pipelines, drainage channels, and other public facilities that convey and dispose of sanitary sewage, stormwater, and combined sewage flows. The *Stormwater Management Manual* should not be used to design any public sewer conveyance facility presented in the *Sewer and Drainage Facilities Design Manual*.

The content of the two manuals may overlap while addressing different aspects of system infrastructure design. Designers must reference both manuals when working in the City of Portland to determine the appropriate standards that apply to a project. Before finalizing any design, it is the responsibility of the project engineer to contact the City to resolve any conflicts between the documents.

# 1.2 APPLICABILITY

All development and redevelopment<sup>1</sup> proposals are subject to the requirements of the *Stormwater Management Manual* during a number of review and permit processes. These processes generally include land use reviews and zoning, site development, and building permits. Each development proposal will have a unique set of reviews and permits, based on what is proposed and the location. **Exhibit 1-1** provides a general overview of the development review process and shows when stormwater management requirements apply.

The thresholds for proposals that are subject to the requirements are:

- Properties that propose new offsite discharges or new connections to the public system are required to comply with stormwater requirements for the impervious area draining to the discharge point.
- Projects that develop or redevelop over 500 square feet of impervious surface.

Proposals meeting these thresholds must comply with stormwater **infiltration and discharge** requirements, as specified in the stormwater hierarchy described in **Section 1.3.1**, the **flow control** requirements specified in **Section 1.3.2** and the **pollution reduction** requirements specified in **Section 1.3.3**. All projects must also comply with **Chapter 3** operations and maintenance requirements and **Chapter 4** source control requirements.

The Bureau of Development Services (BDS) administers the land use review process and permits for <u>private</u> improvements. Public works permits are required for <u>public</u> infrastructure improvements, which are generally located in the public right-of-way and are administered by the City's service bureaus, including Transportation, Environmental Services (BES), and Water.

For more information about the City of Portland's development review and permit processes, refer to: <u>http://www.portlandonline.com/bds/index.cfm?c=35891</u>.

For more information about the City of Portland's public works permit process, refer to <u>http://www.portlandonline.com/index.cfm?c=43826</u>.

<sup>&</sup>lt;sup>1</sup> See the **Definitions** (which follow Chapter 4) for a definition of development, redevelopment, and other terms used in this manual.





#### **Projects on Private and Public Property**

Stormwater management requirements apply projects on both private and public property, including all streets, alleys, driveways, and sidewalks. Stormwater that is generated from private property must be managed on private property, in privately maintained facilities. Stormwater that is generated from public property must be managed on public property, in publicly maintained facilities.

# **Exceptions**

An applicant may propose to construct a "shared facility" that is designed to manage stormwater from private and public property. A shared facility may be in the right-ofway or on private property. This may be considered if one the following criteria is met:

- 1. Public street improvements require the construction of a public stormwater management facility, and there is an opportunity for a private facility to accept public runoff that cannot be managed effectively in the right-of-way.
- 2. The applicant clearly demonstrates that private stormwater management facilities cannot be constructed on private property (for example, when minimum zoning requirements cannot be met), and there is sufficient area in the right-of-way to construct a facility that can manage stormwater from both the street and the private property.

Both BES and City Council must approve an agreement for a shared facility. In addition, the private property owner must share in the ongoing operations and maintenance costs of the facility in proportion to the property's stormwater contribution.

# Sidewalks and Driveways

Applicants are required to size stormwater facilities in the right-of-way to manage stormwater from all the impervious area within the right-of-way, including sidewalks and driveway aprons. Where it is not feasible for sidewalks to drain into a stormwater facility in the right-of-way, applicants are encouraged to use street trees as an impervious area reduction technique (see Section 2.3.3 for specifications).

Stormwater facilities in the right-of-way are **not** sized to treat stormwater from private driveways. Stormwater from private driveways must be managed on private property. Applicants are encouraged to use vegetated filter strips to manage driveway runoff where possible (see Section 2.3.3 for specifications). Under the appropriate site conditions, applicants may also consider pervious pavement for driveways. In any case, it is not expected that a separate stormwater facility will be constructed to serve only a sidewalk or residential driveway under 500 square feet.

# **Stormwater Management Retrofits**

Stormwater retrofits help the City incrementally provide stormwater management for existing development. Appendix A.5 summarizes the regulations within this manual that apply to both voluntary and non-voluntary stormwater retrofits.

# **1.3 STORMWATER MANAGEMENT REQUIREMENTS**

Section 1.3.1 addresses the infiltration and discharge requirements, Section 1.3.2 the flow control requirements and Section 1.3.3 the pollution reduction requirements. Section 1.3.4 outlines the requirements that apply in the Columbia South Shore area and Section 1.3.5 provides a summary of all stormwater management requirements.

#### **Vegetated Facilities Meet Multiple Requirements**

While it is necessary to describe each stormwater requirement separately, the response to meet the requirements need not be separate. Traditional stormwater management tended to respond to each concern independently (e.g., filters reduced pollution, storage tanks provided detention and pipes conveyed and discharged the stormwater). The City's current stormwater management approach relies on the use of vegetated surface infiltration facilities to comprehensively meet multiple requirements. Vegetated facilities allow the applicant to meet pollution reduction, flow control, and infiltration requirements.

# 1.3.1 Infiltration and Discharge

Prior to development, most native soils have a sufficient duff layer and permeability to absorb and infiltrate rainwater. This is because of a combination of factors, including the structure of the soil, the connected pores and channels created by plant roots, and the presence of leaf litter and other organic matter. Because most rain storms are not large enough to exceed the soil permeability and completely saturate the native and undisturbed soil, only a small percentage of water collects on the surface. Under these conditions, water that accumulates at the surface typically collects in rivulets that combine to form creeks, streams, and rivers.

Urbanization results in the loss of native soil conditions as a result of soil compaction and the creation of impervious surfaces, which disrupts the hydrologic cycle. Impacts include increased stormwater flow rates and volumes as well as decreased groundwater recharge and, consequently, low base flows into streams.

Portland's infiltration and discharge requirements are designed to:

- Protect watershed health by requiring onsite infiltration wherever feasible in order to mimic pre-development hydrologic conditions...
- Protect the capacity of downstream infrastructure and minimize combined sewer overflows and basement sewer backups within the combined sewer system.
- Protect groundwater resources by preventing and removing pollutants from stormwater before discharging it into a UIC.

#### Feasibility

Stormwater must be infiltrated onsite to the maximum extent feasible, before discharging any flows offsite. The appropriate use of infiltration depends on a number of factors, including soil type, soil conditions, slopes, and depth to groundwater. The point of discharge is also site specific and dependent on the availability and condition of public and private infrastructure. The feasibility of infiltration and the discharge point have a direct impact on the pollution reduction and flow control requirements for a site. Therefore, it is critical to determine the feasibility of infiltration and the point of discharge before designing a stormwater facility.

While many of the stormwater management facilities presented in **Chapter 2** aim to maximize infiltration, not every site can infiltrate all of the stormwater from large, intense rainfall events. Unless complete infiltration of the 10-year storm (3.4 inches of rainfall over 24 hours) can be accomplished, an offsite discharge point must be identified.

BDS (Bureau of Development Services) approves infiltration on private property.

**BES** (Bureau of Environmental Services) approves infiltration on public property, including the public right-of-way, and approves all offsite discharge for both public and private property.

# **Infiltration Facility Prerequisites**

To use an infiltration facility, the following prerequisites must be met:

- 1. Seasonally high groundwater must be more than 5 feet below the lowest elevation of a UIC 5 feet or less in depth. Seasonally high groundwater must be more than 10 feet below the lowest elevation of a UIC more than 5 feet in depth.
- 2. All setbacks must be met pursuant to **Chapter 2**. Setbacks are measured from the center of the stormwater facility to the adjacent boundary, structure, or facility. All setback requirements are minimums and can be increased, based on the discretion of City of Portland staff.

# **Stormwater Infiltration and Discharge Hierarchy**

# **Onsite Infiltration**

**Catagory 1:** Requires total onsite infiltration with vegetated infiltration facilities. Examples include infiltration swales, planters and basins.

**Catagory 2:** Requires total onsite infiltration with vegetated facilities that overflow to subsurface infiltration facilities. Examples of subsurface infiltration facilities include drywells, soakage trenches and sumps. These facility types are underground injection control structures (UICs) and must be registered with DEQ. Roof runoff is exempt from pollution reduction requirements and may drain directly to a UIC.

# Offsite Discharge

**Catagory 3:** Requires onsite detention with vegetated facilities that overflow to a draingeway, river, or storm-only pipe. Vegetated facilities (lined or unlined) must meet pollution reduction and flow control requirements to the maximum extent feasible prior to offsite discharge.

**Catagory 4:** Requires onsite detention with vegetated facilities that overflow to the combined sewer system. Vegetated facilities (lined or unlined) must meet pollution reduction and flow control requirements to the maximum extent feasible prior to offsite discharge.

#### **Stormwater Hierarchy**

Decisions regarding the degree of onsite infiltration and the discharge point (when complete onsite infiltration is not feasible) are based on the stormwater hierarchy, as shown in **Exhibit 1-2**<sup>2</sup> and **Exhibit 1-3**. The highest technically feasible category must be used (1 = highest, 4 = lowest). Applicants must provide the appropriate technical analysis and evaluation to demonstrate the need to move from Category 1 through each consecutive category. Infiltration testing is required to determine the feasibility of onsite infiltration and the existing infiltration rate.

Roof runoff is exempt from pollution reduction requirements and may drain directly to a UIC. Residential roofs (up to three units) are excluded from UIC authorization. See **Section 1.4** for further clarification of UIC requirements.



Exhibit 1-3: Stormwater Hierarchy Illustration

<sup>2</sup> The stormwater hierarchy is based on the City's WPCF permit with DEQ regarding onsite infiltration and offsite discharge. The hierarchy is how the City satisfies the requirements of Oregon Administrative Rules (OAR) 340-040 for the protection of groundwater.

#### **Stormwater Hierarchy Exemptions**

The following circumstances may qualify a site to move to the next category of the stormwater hierarchy. These circumstances are evaluated on a site-by-site basis. It is the responsibility of the applicant to justify moving from one category to the next, based on technical issues or competing code requirements. All circumstances are subject to BES review and approval and may require an appeal.

- The site is located within a wellhead protection area and must meet the Water Bureau's requirements for protection of groundwater resources (see Section 1.3.4).
- The site has high groundwater, poor infiltration rates (less than 2.0 inch per hour tested rate), or steep slope conditions. The City may require a certified geotechnical engineer or engineering geologist to demonstrate and recommend that this exception applies to a site.
- Contamination is present at the site, as determined by DEQ. Sites that have contaminated soils conditions must be evaluated by DEQ to determine if areas on the property are suitable for infiltration without the risk of mobilizing contaminants in the soil or groundwater. Documentation showing DEQ's contamination assessment and determination must be submitted to BES at the time of permit application.
- There is a conflict with required source controls for high-risk sites (as identified in **Chapter 4**).
- Space constraints may prohibit the construction of onsite infiltration facilities. Code requirements such as minimum density, minimum lot coverage, and required zero lot line setback for urban districts may exempt the use of onsite retention facilities. (**Note:** Maximum density allowed by the zoning code does not exempt the applicant from stormwater requirements. In this case, technical requirements for infrastructure must be met before the development is approved.)

# Infiltration Standards

Where complete onsite infiltration is feasible, the following standards apply:

• Surface Infiltration Facilities (Public or Private). Surface infiltration facilities must demonstrate the ability to infiltrate the 10-year, 24-hour storm. Chapter 2 provides detailed facility sizing and design procedures.

- Public Infiltration Sump Systems. The peak flow rate from a 10-year storm must be calculated using the Rational Method (Q=C\*I\*A), with a safety factor of 2 applied. The intensity must correspond to the calculated time of concentration (5-minute minimum). (See the *Bureau of Environmental Services Sewer and Drainage Facilities Design Manual* for rainfall intensity charts; for 5-minute time of concentration, intensity = 2.86 in/hr.)
- **Private Drywells and Soakage Trenches**. Drywell sizing charts or soakage trench sizing guidelines found in **Section 2.3.3** must be used. Drywells must be able to pass the testing procedure outlined in **Section 2.3.3** when post-construction testing is required by BDS.

# Discharge Standards<sup>3</sup>

# **Offsite Discharge to Surface Flow**

Where stormwater is discharged to an offsite surface flow conveyance facility, such as a ditch, drainageway, stream, or river, the following standard applies:

• Beginning at the point of discharge from the site, the surface conveyance facility must have the capacity to convey flows from the 25-year storm from all contributing upstream drainage areas. The 25-year storm flow rate must be calculated using the Rational Method (Q=C\*I\*A), with intensity corresponding to the calculated time of concentration (5-minute minimum), or other approved hydrologic modeling method for conveyance.

# **Offsite Discharge to Piped Flow**

Where stormwater is discharged to an offsite piped conveyance facility, such as a storm sewer or combined sewer, the following standards apply:

• For new development or redevelopment with an increase in net impervious area: Beginning at the point of discharge from the site, the piped conveyance facility must have the capacity to convey flows from the 10-year storm from all contributing upstream drainage areas without surcharge. The piped conveyance facility may surcharge during the 25-year storm, but the hydraulic grade line must remain below ground surface level. Combined sewers, or sewers in the Cascade Station/Portland International Center and Columbia South Shore Plan Districts (see Exhibit 1-8), must have the capacity to convey flows from the 25-year storm without surcharge. The 10-year storm flow rates must be calculated using the Rational Method (Q=C\*I\*A), with intensity corresponding to

<sup>&</sup>lt;sup>3</sup> The discharge and conveyance information contained in this section is provided for general reference. Please refer to the *Sewer and Drainage Facilities Design Manual* (Environmental Services, August 2006) for the complete list of approved hydrologic modeling methods, rainfall intensity charts and allowable surcharge criteria.

the calculated time of concentration (5-minute minimum), or other approved hydrologic modeling method for conveyance.

• For redevelopment with no net increase in impervious area: Existing downstream pipe conveyance facilities may be allowed to surcharge under certain circumstances.

#### **Discharge to Existing Stormwater Management Facilities**

A development may discharge to an existing **publicly** operated stormwater facility if **all** of the following criteria are met:

- The applicant illustrates that private onsite infiltration facilities have been thoroughly considered and applied where feasible.
- The existing stormwater management facility was adequately designed to include the proposed development area. For infiltration facilities, the discharging property must have been included in the assumed drainage basin when the existing facility was sized.
- The conveyance system and facility to which the development will discharge will have capacity for existing and proposed flows, as approved by BES.
- Stormwater runoff from development on private property must not discharge into any public infiltration sump systems.
- Drainage from City rights-of-way with more than 1,000 vehicle trips per day (TPD) cannot be discharged to public UICs that receive drainage primarily from public rights-of-way with less than 1,000 TPD.

In addition to publicly owned and operated stormwater management facilities, many private facilities exist. A development may discharge to an existing **private** stormwater management facility if **all** of the following criteria are met:

- The stormwater management facility was adequately designed to include the proposed development area.
- The conveyance system and facility to which the development will discharge will have adequate capacity.
- The development's owner enters into a written legal agreement with the owner of the private stormwater management facility. BES and BDS must review and approve this agreement, and the owners must record it as an easement on both properties.

• There is no history of maintenance violations at the facility to which the development will discharge, as determined by BES and BDS. BES may choose to conduct a site investigation to determine if the existing facility is being maintained adequately.

#### Escape Route

All projects must demonstrate that in the event the stormwater facility fails or rainfall exceeds the facility design capacity, that flows will be routed to maintain public safety and avoid property damage. Depending on site conditions, this may include an overflow structure or storage in parking lot, street, or landscaping areas. Applicants must describe where the flow will be routed on a basin site plan to illustrate where flood conditions or ponding is expected to occur.

# 1.3.2 Flow Control

As discussed in the previous section, urbanization decreases the infiltration capacity and permeability of native soils and increases the amount of impervious area. Combined, these circumstances create increased stormwater flow rates and volumes.

The basic concept for flow control (detention and retention) is that water from developed areas is managed with a variety of techniques and released to downstream conveyance systems at a slower rate and lower volume. Managing flows in this way attempts to mimic the natural rainfall runoff response of the site prior to development, protecting downstream properties, infrastructure, and natural resources from the increases in stormwater runoff peak flow rates and volumes that result from development.

- **Detention facilities** store stormwater and release the water slowly, typically over a number of hours.
- **Retention facilities** also store stormwater. Rather than storing and releasing the entire runoff volume, however, the facility permanently retains a portion of the water onsite. The water infiltrates and recharges the groundwater aquifer and, in the case of surface retention facilities, evaporates or is absorbed and used by vegetation. In this way, retention facilities reduce the total volume of water released downstream.

In the past, flow control efforts often relied solely on detention facilities such as ponds, tanks, or vaults that control peak flow rates. These facilities, however, allow the duration of high flows in creek systems to increase, causing the potential for increased erosion downstream. For example, after development with detention, the magnitude of the 2-year peak flow rate may not increase, but the amount of time (duration) that the

flow rate occurs will increase, and the frequency with which the 2-year peak flow rate occurs will also increase.

In contrast, systems such as pervious pavement, ecoroofs, planters, swales, and other surface vegetated facilities are particularly effective in lowering the overall runoff volume and reducing the amount of time (duration) and frequency of the peak flow rate. Therefore, stream systems that require erosion protection, including salmonid habitat streams, warrant the use of retention systems. In addition, by infiltrating and evaporating stormwater, vegetated retention systems recharge groundwater that serves as the base flow for streams during the dry season. Where retention systems cannot be used, detention systems that control the duration of the geomorphically significant flow (i.e., flow capable of moving sediment) must be used. Such detention systems lower release rates and must be designed to protect the stream channel.

Time of concentration (the time it takes rainfall to accumulate and run off a site) is another important factor in determining downstream hydrologic impacts created by development. Flow rates from individual sites may be controlled, but when they are combined quickly in fast-flowing conveyance pipes, the downstream effect will still be increased instream flow rates and volumes. Breaking flow patterns up into surface retention systems helps increase a site's time of concentration and lessens downstream impacts.

The City's flow control requirements aim to ensure that post-development peak flows leaving the site:

- Do not exceed the capacity of the receiving conveyance facility or water body.
- Do not increase the potential for stream bank and stream channel erosion.
- Do not add significant volume to an existing closed depression, such as Holgate Lake or other similar geologic features found throughout the City.
- Do not create or increase any upstream or downstream flooding problems.
- Do not create or increase the occurrence of combined sewer overflows or basement sewer backups.

# **Flow Control Requirements**

To meet flow control requirements, planters, swales, and other vegetated surface facilities are required to the maximum extent feasible. Impervious area reduction techniques, such as pervious pavement and ecoroofs, may also be necessary in order to meet flow control requirements.

Flow control standards vary, depending on the point of discharge. The base standard must be sufficient to maintain peak flow rates at their pre-development levels for the 2-year, 5-year, and 10-year, 24-hour runoff events. Note that for redevelopment projects, pre-development condition is defined as undeveloped land (see **Definitions**).

Applicants proposing to discharge stormwater offsite must evaluate the capacity of the offsite receiving system (storm sewer, combined sewer, ditch, drainageway, etc.) with regard to the discharge requirements presented in **Section 1.3.1**. BES staff may determine that additional onsite flow control is required if the offsite receiving system does not have sufficient capacity to accept the proposed flows.

# Flow Control Requirements When Discharging to a Stream

Most tributary streams in Portland show evidence of excessive stream bank and channel erosion. Any development that discharges stormwater offsite that eventually flows to a tributary stream must be designed to a more restrictive requirement to reduce the potential for further aggravation of instream erosion problems. This applies to all tributaries and storm sewers that drain to streams or overland storm drainage systems within the Portland area except the Columbia Slough, which is regulated by Multnomah County Drainage District.

Flow control in these areas should aim to avoid discharging flows that will cause channel erosion. Channel-eroding flow varies from stream to stream. Unless more specific data are available, the City assumes that channel-eroding flow is one-half of the 2-year, 24-hour pre-developed (Lewis & Clark era) peak flow, and the requirements of this manual are based on that assumption. Specifically, the more restrictive flow control requirement is to limit the 2-year, 24-hour post-development peak flow rate to the pre-development erosion-initiating rate (one-half of the 2-year, 24-hour flow rate). The facilities must also control the post-development flows from the 5-, 10-, and 25-year, 24-hour peak flows to the pre-development 5-, 10-, and 25-year, 24-hour levels.

# Flow Control Requirements in Combined Sewer Areas

Substantial stormwater volumes in the combined sewer system result in overflows to surface water and basement flooding in many areas served by combined sewers. Stormwater that enters the combined sewer system during low-flow periods is treated at the City's wastewater treatment plants, using costly energy and other resources. For these reasons, it is important to limit the quantity of stormwater entering the combined sewer system. Development projects in combined sewer areas are required to **infiltrate stormwater onsite to the maximum extent feasible**. (See **References and Resources** for a link to a map of the combined sewer basins.)

For developments that are served by combined sewers but are unable to achieve total onsite infiltration, the following requirements apply:

1. BES will review development and redevelopment plans to ensure that discharge to a combined sewer system will not increase the risk of an overflow event or localized basement flooding. Additional requirements may apply depending on the scope and location of the project.  Development projects that are allowed to discharge to a combined sewer system do not need to provide detention for the 2-year and 5-year storm events. Detention facilities must be designed to control post-development flows from the 25-year peak flow to the pre-developed 10-year peak flow rate.

Exhibit 1-4 summarizes the City's flow control requirements.

#### **Flow Control Exemptions**

New development and redevelopment projects may be exempt from flow control requirements if they discharge stormwater runoff directly into the Willamette River, Columbia River, or Columbia Slough through a private storm sewer, separated public storm sewer, or Multnomah Country Drainage District system with available capacity. See **References and Resources** for a link to a map that delineates areas where flow control may not be required. This map is not definitive and BES must confirm all sites exempt from flow control requirements.

- This exemption is for flow control only; the pollution reduction requirements presented in **Section 1.3.3** still apply.
- Development must still properly dispose of stormwater using approved methods in accordance with **Section 1.3.1**.

When flow control is not required, facilities may be downsized to meet pollution reduction requirements only. (This exemption does not apply to facilities sized with the Simplified Approach.) When facilities are downsized to meet pollution reduction requirements only, flows above the pollution reduction design flow must be routed around the facility with an approved diversion structure, unless otherwise approved by BES.

#### Temporary Structures

Temporary structures (see **Definitions**) are exempt from **flow control** requirements, subject to BES review. Exemptions will not be allowed in circumstances where permits or other municipal regulations may be violated if the requirement(s) are lifted.

Onsite infiltration is required to the maximum extent feasible. Where complete onsite infiltration is not feasible, vegetated onsite retention facilities are required to the maximum extent feasible.

After the stormwater infiltration and discharge requirements from **Section 1.3.1** have been applied and the point of stormwater discharge is determined, the flow control requirements below apply.

Piping systems that provide conveyance from a site to an approved discharge point must have adequate capacity, per the *Sewer and Drainage Facilities Design Manual*; if not, additional onsite flow control may be required.

1. Discharge Point	2. Retention Requirement	3. Detention Requirement
Direct discharge to Willamette River, Columbia River, or Columbia Slough, or discharge to a storm-only piping system or Multnomah Country Drainage District system (with capacity) that directly discharges to one of the above water bodies.	Use onsite retention (flow volume control) facilities and infiltrate onsite to the maximum extent feasible.	None.
Discharge to any other overland storm drainage system, including streams, drainageways, and ditches, or to any storm pipe system that eventually discharges to an overland drainage system.	Use onsite retention (flow volume control) facilities and infiltrate onsite to the maximum extent feasible.	<ul> <li>Limit post-development peak runoff rates as follows:</li> <li>2-year post-development peak rate to one-half of the2-year pre- development peak rate</li> <li>5-year post to 5-year pre</li> <li>10-year post to 10-year pre</li> <li>25-year post to 25-year pre</li> </ul>
Discharge to a combined sewer.	Use onsite retention (flow volume control) facilities and infiltrate onsite to the maximum extent feasible.	Limit 25-year post- development peak runoff rate to 10-year pre-development peak rate.
Base requirement for all other discharge points.	Use onsite retention (flow volume control) facilities and infiltrate onsite to the maximum extent feasible.	Maintain peak flow rates at their pre-development levels for the 2-year, 5-year, and 10- year, 24-hour runoff events.

# **1.3.3 Pollution Reduction**

Urbanization has serious impacts on the quality of surface water and groundwater. As land is developed, impervious areas interfere with the natural biological processes of soil that remove impurities from the water, and also increase stormwater runoff. The increased flows pick up pollutants from impervious areas and transport them downstream to receiving waters and the City sewer system.

Pollutants of concern include:

- Suspended solids (sediment)
- Heavy metals (dissolved and particulate, such as lead, copper, zinc, and cadmium)
- Nutrients (such as nitrogen and phosphorus)
- Bacteria and viruses
- Organics (such as oil, grease, hydrocarbons, pesticides, and fertilizers)
- Floatable trash and debris

#### **Vegetated Facilities and Pollution Reduction**

Vegetated facilities included in **Chapter 2** under the Simplified Approach or Presumptive Approach are assumed to meet Portland's pollution reduction requirements. Vegetated facilities filter stormwater, removing pollutants as the water flows through the vegetation and soil.

Vegetation may be one of the most cost effective and ecologically efficient means available to improve water quality. Vegetation shades water courses, which lowers water temperature; captures and absorbs water in leaves and roots, which reduces peak flows; and stabilizes soil by providing cover for disturbed soils. Vegetation also provides wildlife habitat and scenic and aesthetic benefits.

As stormwater enters a vegetated facility, the vegetation slows the water down, allowing sediments to be trapped on the surface of the facility. Typically, the surface area of the facility is designed to allow stormwater to pond and evaporate while sediments settle into a layer of mulch and then soil. The mulch prevents soil erosion and retains moisture for plant roots. It also provides a medium for biological growth and the decomposition or decay of organic matter. The soil stores water and nutrients to support plant life. Bacteria, nematodes, and other soil organisms degrade organic pollutants such as petroleum-based compounds. They also help mix organic material, increase aeration, and improve water infiltration and water-holding capacity. Bacteria and other beneficial soil microbes process the majority of pollutants.

Vegetated facilities are required to the maximum extent feasible. If a project proposes to use facilities other than those presented in **Chapter 2** for pollution reduction, the

applicant must demonstrate through the Performance Approach that the proposal meets or exceeds the pollution reduction requirements.

# **Pollution Reduction Requirements**

The City of Portland has the following citywide pollution reduction requirements for all projects that develop or redevelop over 500 square feet of impervious area and all existing development that proposes to create new offsite stormwater discharges:

- 70 percent removal of total suspended solids (TSS) is required from 90 percent of the average annual runoff. (See **Appendix E** for more detailed information about the formulation of Portland's pollution reduction standards.)
- In watersheds that have established total maximum daily loads (TMDLs) or that are on DEQ's 303(d) list of impaired waters (Exhibit 1-5), stormwater management facilities must be capable of reducing the pollutant(s) of concern, as approved by BES.

# Total Suspended Solids Requirements

Total suspended solids are particles that are too small or light to settle out from stormwater under high flow conditions. In many ways, TSS is a surrogate measure for water quality; therefore, the percentage of TSS removal from stormwater is an accepted standard to measure pollution reduction.

- Projects may use vegetated facilities from the Simplified Approach or Presumptive Approach (as specified in **Chapter 2**) to meet the 70 percent removal of TSS from 90 percent of the average annual runoff, without submitting additional data on TSS removal.
- If a project uses non-vegetated facilities for pollution reduction, the applicant must demonstrate through the Performance Approach (as specified in **Chapter 2**) that the development proposal meets the specific TSS removal requirements.

# Total Maximum Daily Load (TMDL) and 303(d) List Requirements

- Development projects in watersheds with established TMDLs or on DEQ's 303(d) list may use vegetated facilities from the Simplified Approach or Presumptive Approach (as specified in Chapter 2) without submitting additional data on pollutant removal.
- If a project in a watershed with established TMDLs or on the 303(d) list uses non-vegetated facilities for pollution reduction, the applicant must demonstrate through the Performance Approach (as specified in **Chapter 2**) that the

development proposal is consistent with specific TMDL or 303(d) requirements. The base requirement is to select and use a stormwater management facility that is capable of reducing the pollutants of concern, as approved by BES.

TMDL Parameters									
Columbia	Wil	lamette	Columbia	Johnson	Fann	o and	Tryon		Westside
River	Rive	er	Slough	Creek	Ash	Creek	Creek		Streams
Total	Bact	eria	Bacteria	Bacteria	Bacte	eria	Bacteria		Bacteria
dissolved	Dio	kin	Phosphorus	DDT	Phos	phorus	Temperatu	ıre	
gas	Tem	perature	Lead	Dieldrin	TSS				
Dioxin			PCB	Temperature	Temp	perature			
			DDT/DDE						
			Dieldrin						
			Dioxin						
			Temperature						
303(d)-Liste	ed Par	ameters							
Columbia Willamette Rive		te River	Columbia Slough Johnson		Creek Fanno and		nno and		
River					-			As	sh Creek
Bacteria		Mercury		Manganese		PCB		Di	eldrin
Dissolved		Manganes	e	Iron		PAH			
oxygen		Iron							
pН		DDT/DDI	Ξ						
DDT/DDE		PCB							
PCB		Aldrin							
Arsenic		PAH							
PAH								1	
Temperature	5								

Exhibit 1-5: TMDL and 303(d)-Listed Parameters by Watershed as of August 1, 2008

#### **Pollution Reduction Exemptions**

#### Rooftops

Projects that infiltrate stormwater runoff from rooftops using UICs (i.e. private soakage trenches or drywells) are not required to provide pollution reduction prior to infiltration. This exemption does not apply to projects that discharge stormwater offsite. All UICs must be registered with DEQ except for residential roofs (up to three units) and footing drains which are excluded from UIC regulations. Refer to **Section 1.4** for specific pollution reduction requirements for UICs.

#### Temporary Structures

Temporary structures (see **Definitions**) are exempt from **pollution reduction** requirements, subject to BES review. Exemptions will not be allowed in circumstances where permits or other municipal regulations may be violated if the requirement(s) are lifted.

#### **Pollution Reduction Standards**

In Portland, flow rate-based pollution reduction facilities are designed to treat runoff generated by a rainfall intensity of 0.19 inches per hour (depending on time of concentration; see Exhibit 1-6).

**Exhibit 1-6**: Rainfall Intensity Needed to Treat 90 Percent of the Average Annual Runoff in Portland for Flow Rate-Based Facilities

Site's Time of Concentration (Minutes)	Rainfall Intensity (inches per hour)
5	0.19
10	0.16
20	0.13

The above rainfall intensities must be used in the Rational Method (Q=CIA) equation to calculate pollution reduction runoff rates for rate-based pollution reduction facilities.

Facilities sized by routing a hydrograph through the facility (rate-based facilities with a storage volume component) may use a continuous simulation program (with a minimum of 20 years of Portland rainfall data) or a single-storm hydrograph-based analysis method, such as the Santa Barbara Urban Hydrograph (with 0.83 inch of rainfall over 24 hours and NRCS Type 1A rainfall distribution), to demonstrate treatment of 90 percent of the average annual runoff volume. (See **Appendix E** for more detailed information about the formulation of Portland's pollution reductions standards.)

Volume-based facilities are designed to treat runoff generated by 0.83 inch of rainfall over 24 hours (with NRCS Type 1A rainfall distribution) with a Vb/Vr (volume of basin/volume of runoff) ratio of 2, and will treat roughly 90 percent of the average annual runoff.

#### **Manufactured Treatment Technologies**

There will be sites where BES staff members and permit applicants agree that it is not technically feasible for vegetated facilities, including swales and planters, to meet all stormwater management requirements for the proposed impervious area. Manufactured treatment devices may be considered for sites in separated storm sewer areas when slope and infiltration limitations prevent the use of any reasonably located vegetated facilities (lined or unlined) or for sites unable to size the water quality storm (.83" in 24 hours). In those instances, specific approved manufactured treatment technologies may be proposed for pollution reduction.

If BES staff members agree that a manufactured treatment technology is appropriate, the applicant may select a treatment device from the approved vendor list under the Presumptive Approach in **Chapter 2**. Other facility types that are not on the list may be

used in some specific applications that include additional treatment in a "treatment train," but must be submitted to BES as a Performance Approach.

As of this writing, the proprietary technologies that have been demonstrated to meet Portland's pollution reduction requirements are limited, particularly those approved as "stand-alone pollution prevention facilities." The approved vendor list is posted on the BES website at: <u>http://www.portlandonline.com/shared/cfm/image.cfm?id=205377</u>

# Additional Pollution Reduction Requirements for Vehicle and Equipment Traffic Areas

Vehicle and equipment traffic areas with the following characteristics must also incorporate a coalescing plate oil/water separator into the stormwater management design:

- Commercial or industrial parking lots that store wrecked or impounded vehicles.
- Areas with a high likelihood of total oil and grease loadings e.g., vehicle repair, vehicle sales, and vehicle fueling services.

#### **Requirements:**

- The coalescing plate oil/water separator must be installed upstream of the stormwater management facilities, and the sizing must meet Section 4.3.2 requirements. Examples of oil/water separators are located in Appendix G.5 (Typical Detail SW-501).
- 2. An operations and maintenance (O&M) Plan, per **Chapter 3 and Appendix D.5** requirements, must be submitted for the oil/water separator.
- 3. Vehicle and equipment traffic areas that trigger these requirements must be paved with an impervious material; pervious/porous pavements are not allowed. Gasoline can react with asphalt pavement and compromise its integrity. Areas that have a high risk of gasoline spills or exposures must therefore be paved with concrete.
- 4. If discharging to a public or private UIC, the federal Safe Drinking Water Act requires a state-issued UIC authorization by rule or a water pollution control facility (WPCF) permit for facilities that have subsurface discharges of stormwater or wastewater. These permits must be obtained from DEQ before any subsurface injection system is constructed. DEQ may classify the vehicle and equipment traffic areas described in this section as high risk and may not allow the use of UICs for stormwater disposal. Discharge of any stormwater mixed with runoff from motor vehicle waste from repair or maintenance activities or fluids from industrial or commercial areas where hazardous substances, toxic materials or petroleum

products are stored, used or handled is prohibited. Contact DEQ and review **Section 1.4** for information about infiltration prohibitions in certain areas of the City and additional UIC requirements. Private discharges to a City UIC are prohibited.

5. Alternatives to these requirements can be requested by filling out the Source Control Special Circumstances form located in **Appendix D8**.

#### **Pollution Reduction in Combined Sewer Areas**

Pollution reduction is required in combined sewer areas for both public rights-of-way and private property, unless <u>all</u> of the following conditions are met:

- 1. The project has used vegetated stormwater management facility types to the maximum extent feasible, as approved by BES.
- 2. BES has assessed the impacted downstream area and confirmed that flow from the combined system will at no juncture be diverted to a surface water body, except as intended by the municipal system's design.
- 3. Future adopted plans for the combined sewer overflow (CSO) program do not include a separation of that conveyance system.
- 4. No activities are planned for the site that will require stormwater pollution prevention measures, as described in **Chapter 4** of this manual.
- 5. There is no significant risk of pollutant loading of a degree or nature that cannot be treated by the proposed stormwater facilities.
- 6. An offsite management fee is paid to BES. (See **Appendix D.7** for the appeal process to request an offsite management fee.)

# 1.3.4 Columbia South Shore

# **Columbia South Shore Well Field Wellhead Protection Area**

The Water Bureau's *Columbia South Shore Well Field Wellhead Protection Area Reference Manual* (June 25, 2003) regulates the storage, handling, use, and transportation of hazardous materials in the Columbia South Shore Well Field Wellhead Protection Area (see Exhibit 1-7). Requirements apply to indoor and outdoor storage areas; loading and unloading areas; fuel dispensing facilities; storage, maintenance, and repair of vehicles and equipment; and transportation routes on private property and in public rights-ofway. To protect groundwater from spills of hazardous materials, the requirements focus on spill control measures and prevention of infiltration into the ground. In portions of the wellhead protection area, drainage facilities in the public right-of-way must be lined with a polyethylene geomembrane liner and have appropriate spill control measures. Material and installation requirements for the polyethylene geomembrane liners are stated in Sections 00350 and 02320 of the 2007 *City of Portland Standard Construction Specifications*. Planting trees or deep rooted shrubs over the top of required polyethylene geomembrane liners is prohibited in the wellhead protection area to protect the liners from root damage. Water Bureau review is required to determine which requirements apply. In some instances, infiltration may be allowed.





#### Columbia South Shore and Cascade Station/Portland International Center Plan Districts

The Columbia South Shore Plan District (Zoning Code Chapter 33.515.255) and Cascade Station/Portland International Center Plan District (Zoning Code Chapter 33.508.270) (see **Exhibit 1-8**) prohibit all new sumps, septic tanks, and other onsite disposal systems for sanitary disposal or disposal of industrial process water. All onsite stormwater and wastewater treatment and disposal systems must be discharged into a system approved by BES and BDS.



Exhibit 1-8: Cascade Station/Portland International Center and Columbia South Shore Plan Districts

# **1.3.5 Summary of Stormwater Management Requirements**

Properties that propose new offsite discharges or new connections to the public system must comply with stormwater **infiltration and discharge** requirements for the impervious area draining to the discharge point, as specified in the stormwater hierarchy described in **Section 1.3.1**. Exhibit 1-9 summarizes these requirements.

Infiltration and Discharge	Stormwater Hierarchy
Applies citywide. See Section 1.3.1.	• <b>Category 1</b> : Vegetated infiltration facility with no overflow.
The Bureau of Development Services (BDS) approves infiltration on <b>private</b> property; the Bureau of Environmental Services (BES) approves infiltration on <b>public</b> property, including the public right of way and	• <b>Category 2:</b> Vegetated facility with overflow to sump, drywell, or soakage trench.
approves offsite discharge locations.	• <b>Category 3:</b> Vegetated detention facility with overflow to drainageway, stream, river, or storm-only pipe
(less than 2.0 in/hr tested infiltration rate),	inver, of storm-only pipe.
unstable soils, contamination or high risk of contamination, and wellhead protection areas are exempt from the total infiltration requirement. Flow control and pollution reduction requirements still apply.	• <b>Category 4:</b> Vegetated detention facility with overflow to a combined sewer.

Exhibit 1-9: Summary of Infiltration and Discharge Requirements

Projects that develop or redevelop over 500 square feet of impervious surface are required to comply with the **flow control** and **pollution reduction** requirements described in **Section 1.3.2** and **Section 1.3.3**, respectively. Properties with existing development that propose new offsite discharges or new connections to the public system must also meet the pollution reduction and flow control requirements. **Exhibit 1-10** summarizes these requirements.

All projects must comply with Chapter 3 operations and maintenance requirements and Chapter 4 source control requirements.

Flow Control (Detention and Retention)				
Applies citywide to all projects that develop or redevelop over 500 square feet of impervious area. Flow control facilities are approved by BDS and BES. Detention exemptions: Sites that drain directly to the Columbia or Willamette Rivers or Columbia Slough (see site evaluation maps listed in <b>References and Resources</b> ) and via storm-only systems with adequate capacity. Retention exemptions: Sites with unstable soils, contamination, or high risk of contamination.	<ul> <li>Must use vegetated retention facilities to infiltrate onsite to the maximum extent feasible.</li> <li>For discharge to a surface water body or storm-only system that discharges to surface water (other than those exempt), must detain: <ul> <li>2-year post-development peak runoff rate to one-half of the 2-year pre-development peak rate</li> <li>5-year post-development peak runoff rate to 5-year pre-development peak rate</li> <li>10-year post-development peak runoff rate to 10-year pre-development peak rate</li> <li>25-year post-development peak runoff rate to 25-year pre-development peak rate</li> </ul> </li> <li>For discharge to a combined sewer, must detain the 25-year post-development peak rate</li> <li>For discharge to a combined sewer, must detain the 25-year pre-development peak rate</li> </ul> <li>For all other discharge points the base requirement is maintain peak flow rates at their pre-development levels for the 2-year, 5-year, and 10-year, 24-hour runoff events.</li>			
Pollution Reduction	on (Water Quality)			
<ul> <li>Applies citywide to all projects that develop or redevelop over 500 square feet of impervious area.</li> <li>Pollution reduction facilities are approved by BDS and BES.</li> <li><i>Exemptions: Runoff from residential roofs (three units or less) that goes to infiltration facilities.</i></li> </ul>	<ul> <li>Must achieve 70 percent TSS removal from 90 percent of the average annual runoff.</li> <li>In watersheds with a TMDL or on DEQ's 303(d) list of impaired waters, must use a pollution reduction facility that will reduce pollutants of concern.</li> <li>Must use vegetated facilities to the maximum automt facility.</li> </ul>			

# 1.4 UNDERGROUND INJECTION CONTROL (UIC) STRUCTURE REQUIREMENTS

This section provides general UIC information only. Complete UIC regulations and requirements are available on the DEQ website: <u>http://www.deq.state.or.us/wq/uic/uic.htm</u>

DEQ defines a UIC as any system, structure, or activity that is intended to discharge fluids below the ground surface. UICs can pollute soil and groundwater if not properly designed, sited, and operated. Stormwater systems such as, but not limited to, sumps, drywells, and soakage trenches are examples of UICs subject to DEQ regulation.

DEQ can also classify other systems as UICs, depending on the design. Additional information about UIC determination is available on the DEQ website noted above. Examples of systems that DEQ can classify as UICs are provided below, along with criteria to help determine when the system is or is not a UIC.

UICs are regulated under the federal Safe Drinking Water Act (administered by DEQ) and the State Plumbing Code. Applicants must obtain authorization from the DEQ Water Quality Division, UIC Program before constructing, operating, modifying, or decommissioning any UIC.

#### **Surface Infiltration Facilities**

DEQ generally does not classify surface infiltration facilities such as pervious pavements, swales, planters, and basins as UICs.

# Perforated Pipe Systems

An assemblage of perforated pipes, drain tiles, or other similar mechanisms, including French drains, designed and intended to collect and convey infiltrated stormwater to another disposal or discharge point is not classified as a UIC. However, the final discharge point receiving stormwater from the collection or conveyance system may be classified as a UIC. If the final discharge point is below the ground surface, the system is generally classified as a UIC.

#### **Pervious Pavements**

When pervious pavement is designed with perforated pipe(s) to convey the stormwater to another point of discharge, DEQ does not classify the system itself as a UIC; however, the point of discharge may be classified as a UIC. When pervious pavement is designed with a trench that is deeper than it is wide or with perforated pipe(s) under the pervious pavement, DEQ may classify the pervious pavement as a UIC. Utility trenches such as water, sewer, and gas lines are exempt from this classification. If it is difficult to determine whether the proposed stormwater system design is or is not a UIC, it is best to consult with DEQ prior to submitting a City permit application.

#### UIC Registration, Rule Authorization, and Permitting

Owners or operators of new and existing public or private UICs, with the exception of single-family residential roof and footing drains, are required to register and provide site inventory data to DEQ.

Rule authorization allows the owner to operate a UIC without a water pollution control facility (WPCF) permit from DEQ. For rule authorization approval, UICs must meet the requirements of OAR Chapter 340, Division 44. These requirements are summarized below under *Criteria for UIC Rule Authorization*.

In some instances, DEQ may issue a permit for UICs instead of rule authorization; this is determined on a site-specific basis.

This section of the manual focuses on <u>proposed</u> public or private UICs for new construction and redevelopment, including UIC closures. Therefore, registration and rule authorization for proposed public and private UICs only (not existing UICs) will be discussed further.

The difference between a public and private UICs is:

<u>Public UIC</u>: A public UIC collects stormwater from publicly owned facilities, parking lots, and public rights-of-way and is managed by the City of Portland.

<u>Private UIC</u>: A private UIC collects stormwater from private property, including roofs, parking lots, and other impervious surfaces, and discharges it to an onsite UIC. The onsite UIC is managed by the private property owner.

Development that proposes the use of either public or private UICs must follow the infiltration and discharge requirements in **Section 1.3.1** and meet all other requirements within this manual for managing stormwater.

DEQ has set minimum criteria for rule authorization, listed below and also found on the DEQ website at <u>http://www.deq.state.or.us/wq/uic/authorization.htm</u>.

- Only stormwater will be entering a UIC.
- Site development, design, construction, and management practices have minimized stormwater runoff entering the UIC.
- No other stormwater disposal destination is appropriate. Note: Discharge to the combined sewer system is not considered an appropriate discharge point if onsite infiltration is approved.
- UICs must not be located within 500 feet of water supply wells (domestic, irrigation, or industrial).
- UICs must not be located within 500 feet or a two-year time of travel of public drinking water supply wells (whichever is more protective).
- No soil or groundwater contamination is present.
- The UIC is not deeper than 100 feet and does not discharge within required separation distances of the highest seasonal groundwater level:
  - ✓ For UICS  $\leq$  5 feet deep, the separation distance is a minimum of 5 feet.
  - ✓ For UICs > 5 feet deep, the separation distance is 10 feet.
- A confinement barrier or filtration medium is present, or best management practices (BMPs) are used to prevent or treat stormwater contamination prior to entering a UIC.
- Design and operation of the UIC prevents accidental or illicit spills and allows for temporary blocking.

Compliance with these criteria must be demonstrated during the registration process to obtain rule authorization. If the criteria cannot be met, the applicant will have to apply for a permit or use another method of stormwater disposal. The provision of all required information in the application form will ensure a more timely review and approval process.

# **UIC Rule Authorization Process**

DEQ has issued a WPCF permit to the City to construct and operate public UICs as specified within the permit. The permit requires the City to develop and implement a comprehensive management plan that details how the City will construct, operate, and evaluate UICs to ensure compliance with permit requirements. Because of the City's permit, the rule authorization process for proposed public UICs is different than for private UICs. The public and private rule authorization processes are outlined below.

#### **Constructing New UICs**

# <u>Public UICs</u>

The City of Portland manages the registration and rule authorization submittal process for public UICs proposed for construction, redevelopment, or decommissioning. To ensure a timely rule authorization process, it is critical for applicants to notify the City immediately once they have determined that UICs may be used for stormwater discharge from the public right-of-way. The City will complete the rule authorization process in accordance with the requirements of the City's WPCF permit. Notice to proceed will be given when the City determines that the proposed UIC meets permit requirements.

# Private UICs

For private development or redevelopment using UICs for stormwater discharge, applicants must apply directly to DEQ for rule authorization before constructing the UIC. To ensure a timely review by DEQ, all required information should be provided in the application. For general requirements, see *Criteria for UIC Rule Authorization*, above. A City building permit does not authorize the construction of a UIC on private property; only DEQ can authorize a UIC.

DEQ recommends that registration and rule authorization applications for UICs serving private property should be submitted to DEQ according to the following timelines:

Summer: At least 90 days prior to construction Winter: At least 60 days prior to construction

These timelines could be exceeded if all the required information is not provided by the applicant at the time of submittal. The applicant should allow for an appropriate amount of time to obtain all required information prior to submittal. For time-sensitive

projects, DEQ recommends that applicants contact DEQ directly for an estimated application turn-around time.

DEQ requires a copy of the rule authorization approval letter to be kept onsite for local, state, and federal inspections.

# **Depth to Groundwater Investigation Requirements**

Part of the rule authorization and permitting process requires both public and private UICs to have a minimum separation distance between the bottom of the UIC and the seasonal high groundwater level (see **Exhibit 1-11**). Several areas within the City have known shallow groundwater. Within areas of known or suspected shallow groundwater, additional information about depth to groundwater (DTW) must be collected to ensure the bottom of the proposed UIC meets separation distance requirements.

Depth of UIC	Minimum Separation Distance between the Bottom of UIC and Seasonal High Groundwater		
≤ 5 feet deep	5 feet		
> 5 feet deep	10 feet		

Exhibit 1-11: Depth f	o Groundwater	Requirements
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To determine if a DTW investigation is required for a proposed public or private UIC, refer to **Appendix F.1** *Depth to Groundwater Investigation*, and the *Estimated Depth to Seasonal High Groundwater* map located in **References and Resources** section. The City derived this map based on the *Estimation of Depth to Ground Water and Configuration of the Water Table in the Portland, Oregon Area,* prepared by the United States Geological Survey (USGS).

For public or private UICs proposed within the **50-foot** groundwater contour of the above-referenced map, the applicant must provide the site-specific DTW investigation. One of the following methods must be used to obtain the DTW measurement:

- Install a temporary piezometer.
- Use existing onsite or nearby high-quality shallow groundwater level data.

For DTW investigation installation, DTW measurement, and reporting requirements and criteria for using existing data, see **Appendix F.1** under *Depth to Groundwater Investigation*.

#### **UIC Decommissioning Process**

The decommissioning, or closure, of a UIC system requires submittal of a completed pre-closure notification application to DEQ prior to closure. The pre-closure application requires information about the UIC, development of a sampling plan, and collection and laboratory analyses of any sediment and standing water from within the UIC in accordance with the sampling plan to ensure that site remediation or cleanup is not necessary prior to closure. Include sufficient time in construction schedule to accommodate the time necessary to collect, analyze, and summarize any sediment and water samples collected for decommissioning. DEQ recommends that applications be submitted 60 days prior to closure.

If flow is redirected from a private UIC to a City stormwater or drainage system, all new discharge connections must meet the requirements of this manual.

#### Public UICs

The City of Portland manages the pre-closure application submittal process for public UICs proposed to be decommissioned. The City will complete the decommissioning process in accordance with the City's UIC Management Plan, Appendix D: Decommissioning Procedure for UIC Systems.

#### Private UICs

Pre-closure applications for private UICs must be submitted directly to DEQ. A City building permit does not authorize the decommissioning of a UIC on private property. Only DEQ can authorize the decommissioning of a UIC.

For questions regarding rule authorization, permitting, and decommissioning of UICs, call (503) 229-5886.

For copies of UIC registration applications, call 503-229-5189.

Rule authorization, permit, and pre-closure applications, along with general information, can be found on the DEQ website at: <u>http://www.deq.state.or.us/wq/uic/uic.htm</u>.

Rule authorization and pre-closure applications for private UICs should be sent, along with the associated application fee, to:

Oregon Department of Environmental Quality Business Office 811 SW 6<sup>th</sup> Avenue Portland, OR 97204

For technical questions, call the DEQ UIC Program at 503-229-5945.

#### **Registration and Rule Authorization Resources**

Resources are available to help the applicant provide the required criteria for rule authorization. Below is a partial list of resources. Resources are also provided on the DEQ UIC registration forms.

- Well logs and drinking water well locations: Oregon Water Resources Department, <u>http://www.wrd.state.or.us</u>
- Site cleanup and releases: DEQ Profiler: <u>http://deq12.deq.state.or.us./fp20</u>
- Depth to groundwater: US Geological Survey, (503) 251-3200

# 1.5 NON-CONFORMING PARKING LOT AND LANDSCAPE REQUIREMENTS

In addition to the requirements of this manual, development and redevelopment projects must also meet the following requirements of City Code (Title 33: Planning and Zoning).

Chapters 33.266 (Parking and Loading) and 33.248 (Landscaping and Screening) identify parking requirements and development standards.

Chapter 33.258 (Nonconforming Situations) requires nonconforming parking and maneuvering areas to be brought toward compliance with current landscaping requirements under certain conditions (Section 33.258.070). Many of these parking lots lack stormwater facilities and must also upgrade their stormwater facilities if it is feasible to use the new landscaped areas for stormwater treatment and discharge. Feasibility is determined by a number of factors, including but not limited to the following:

**Grade:** Existing grades must allow for stormwater to sheet flow directly to the new facilities. This requirement does not apply when it is impractical for runoff to flow into landscaped areas.

**Soil conditions:** Soil conditions must be evaluated to determine if infiltration is feasible at the proposed location. Sites that have contaminated soils conditions must be evaluated by DEQ to determine if areas on the property are suitable for infiltration without the risk of mobilizing contaminants in the soil or groundwater.

**Surrounding development:** Because infiltration facilities must be setback 5 feet from any property line, sites where perimeter landscaping abuts the property line will be evaluated for stormwater infiltration. Review will consider, among other things, the location of existing development on abutting or downhill parcels.

If a stormwater facility is determined feasible, the appropriate sizing requirements, as specified in **Chapter 2** of this manual, must be used to calculate the size of the facility.

# 1.6 LEED CREDITS

In 2001, the City adopted a Green Building Policy that requires new construction and major renovations of all City facilities to meet the "Certified" level of LEED (Leadership in Energy and Environmental Design). The policy was updated in 2005 to require that new City facilities earn at least LEED Gold and go 30 percent beyond the City of Portland's *Stormwater Management Manual* baseline code requirements. In addition, the policy requires 70 percent ecoroof coverage on all new or replacement roofs.

In 2005, the Portland Development Commission (PDC) adopted a similar policy that requires LEED Silver certification for all publicly financed private-sector projects (that have PDC financing equal to or greater than 10 percent of total project costs and over \$300,000) larger than 10,000 square feet. To help offset the cost of LEED certification, the Oregon Department of Energy expanded the state Business Energy Tax Credit (BETC) to include buildings rated LEED Silver and higher, which has become a powerful incentive for developers and building owners to design and build to the LEED standard. These policies, in addition to a number of other green building initiatives throughout the City, are helping move environmental building practices and LEED certification forward in Portland.

The stormwater management requirements included in this manual support the achievement of LEED v2.2 for New Construction Sustainable Sites Credits 6.1 and 6.2.<sup>4</sup> The requirements can also assist with integrated credit strategies relating to water-efficient landscaping, water use reduction (using stormwater for non-potable uses such as landscape irrigation, toilet and urinal flushing, and custodial uses), and heat island effects from roofs.

# Sustainable Sites Credit 6.1 Stormwater Management: Rate and Quantity

With Portland's requirement to maximize onsite infiltration, the rate and quantity of stormwater that leaves a site depends on the amount of stormwater that can be infiltrated. Vegetated facilities that achieve total onsite infiltration designed with Portland's **Simplified Approach** or **Presumptive Approach** (presented in **Chapter 2**) meet the LEED stormwater management standard for rate and quantity and therefore qualify for Sustainable Sites Credit 6.1 (see **Exhibit 1-12**).

<sup>&</sup>lt;sup>4</sup> The LEED Rating System is an evolving menu of products and standards. Similarly, the requirements in Portland's Stormwater Management Manual are subject to change. It is the responsibility of the LEED team member assigned to the stormwater management credits to verify that the project will fulfill the credit requirements. The City of Portland assumes no responsibility for verifying or interpreting credit achievement.

Exhibit 1-12: LEED Sustainable Sites Credit 6.1 Stormwater Management: Rate and Quantity

#### **Option 1 - Existing imperviousness is less than or equal to 50 percent**

Implement a stormwater management plan that prevents the post-development peak discharge rate and quantity from exceeding the pre-development 1- and 2-year, 24-hour design storms.

OR

Implement a stormwater management plan that protects receiving stream channels from excessive erosion by implementing a stream protection strategy and quantity control strategies.

<u>**Option 2 - Existing imperviousness is greater than 50 percent</u></u> Implement a stormwater management plan that results in a 25 percent decrease in the volume from the 2-year, 24-hour design storm.</u>** 

In Portland, if a site is unable to achieve total infiltration, the flow control standards that apply depend on the point of discharge. In any case, Portland's flow control standards are different from those specified in Credit 6.1. It is therefore necessary for the applicant to conduct additional analysis beyond the Simplified and Presumptive sizing methodology to demonstrate that the LEED Credit 6.1 requirements are met.

If some other calculation method is used under the **Performance Approach** (presented in **Chapter 2**), the applicant is responsible for demonstrating that the LEED stormwater management standard for rate and quantity is met.

# Sustainable Sites Credit 6.2 Stormwater Management: Treatment

The City of Portland's pollution prevention (or treatment) standard is a performance standard that requires 70 percent average annual TSS removal from 90 percent of the average annual rainfall. (See **Appendix E** for more detailed information.) Vegetated facilities designed using Portland's **Simplified Approach** or **Presumptive Approach** are presumed to generally exceed the LEED stormwater management standard for treatment (80 percent average annual TSS removal from 90 percent of the average annual rainfall) and therefore qualify for Sustainable Sites Credit 6.2 (see **Exhibit 1-13**). If the facilities are designed using some other calculation method under the **Performance Approach**, the applicant must demonstrate that the LEED stormwater management standard for water quality treatment is met.

Implement a stormwater management plan that reduces impervious cover, promotes infiltration, and captures and treats the stormwater from 90 percent of the average annual rainfall, using acceptable BMPs. BMPs used to treat runoff must be capable of removing 80% of the average annual post development TSS load based on existing monitoring reports.

For more information about LEED requirements, see the U.S. Green Building Council's website at <u>http://www.usgbc.org/</u>.

# 1.7 SPECIAL CIRCUMSTANCES AND APPEALS

#### **Special Circumstances**

Special circumstances on a proposed site may make it impractical to implement onsite <u>pollution reduction</u> or <u>flow control</u> to the standards specified in this chapter. In that case, applicants may fulfill all or a portion of their stormwater management obligations by compensating the City for the future development of offsite facilities.

Onsite stormwater management must be achieved to the maximum extent feasible, as approved by the City, in all cases before any offsite facilities or fees will be allowed. **Appendix D.7** provides additional information and contains a **Special Circumstances Form** that must be submitted.

Special circumstances may make it impractical to meet the <u>source control</u> requirements of Chapter 4. In that case, applicants may propose alternatives or exceptions. Appendix D.9 provides additional information and contains a Source Control Special Circumstances Form that must be submitted.

#### Impervious Area Reduction Techniques

Applicants should thoroughly consider impervious area reduction techniques before designing a stormwater management plan (see Section 2.3.1). If site conditions are appropriate, the use of these techniques can reduce the required size of a stormwater management facility. This can be especially important if a site is unable to fully meet the stormwater management requirements. Depending on the scope and impact of a project, BES may require consideration of an onsite ecoroof or pervious pavement before any special circumstance is allowed.

#### Appeals

The City has an appeals process that allows applicants to appeal staff interpretation of the City Code and of adopted policies and procedures that guide the review of development proposals. Applicants may appeal any issue related to interpretation of the stormwater management policy (e.g., staff assessment of a site's stormwater management level or a permit denial).

**Appendix D7** describes the appeals process for the requirements of Chapters 1 through 3 (except Section 1.3.3). **Appendix D.9** describes a separate appeals process for Section 1.3.3 and for the source control requirements in Chapter 4.

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