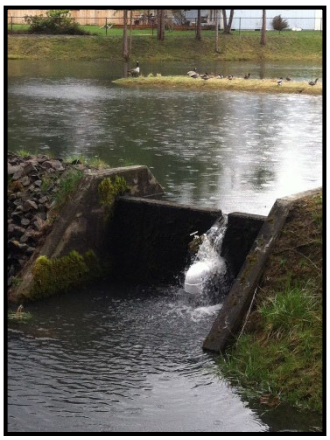
City of Lacey
2022 Stormwater Design Manual



City of Lacey
2022 Stormwater Design Manual

Effective June 30, 2022

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Effective June 30, 2022

Primary References

Washington State Department of Ecology,
2019 Stormwater Management Manual for Western Washington
Pierce County, *Stormwater Management and Site Development Manual*, 2021
Low Impact Development Technical Guidance Manual for Puget Sound, 2012

Chapter 1 – Overview and Definitions

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Chapter 1 – Overview and Definitions

1.1 Background and Authority

This City of Lacey 2022 Stormwater Design Manual (SDM or "this manual") is a revised and updated replacement for the 2016 SDM. This 2022 SDM is based on the Washington State Department of Ecology *2019 Stormwater Management Manual for Western Washington* (2019 Ecology Manual). In creating this 2022 SDM, the City of Lacey Department of Public Works has retained the chapter format of the 2016 SDM, which is a reorganized version of the Ecology Manual. The reader is referred to the 2019 Ecology Manual for further background information and supporting details available on Ecology's website at: <https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Stormwater-permittee-guidance-resources/Stormwater-manuals>.

The City is required to regulate stormwater discharges to its municipal separate storm sewer system (MS4) and to waters of the state, in compliance with the Western Washington Phase II National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Permit. Under the NPDES Municipal Stormwater Permit, the City must establish and apply the minimum requirements specified in the permit and provide design guidance for stormwater quality and quantity control for new development and redevelopment projects in the City. Through this manual, the City is complying with the Clean Water Act and the NPDES Municipal Stormwater Permit. Where requirements in this manual are also covered in any other law, ordinance, resolution, rule, or regulation of any kind the more restrictive law shall govern.

The SDM applies to virtually all land-disturbing activity, construction, new development, or redevelopment projects in the City. This manual has been adopted by local ordinance (Chapter 14.27 Lacey Municipal Code [LMC]) and has force of law. Failure to comply may trigger administrative or enforcement action, and result in project delays, fines, or penalties. For the purposes of interpreting and using this manual, the words "shall," "will," and "must" are always mandatory; the word "should" is situation-specific and not necessarily mandatory but strongly encouraged; and "may" is situation-specific and permissive. The City of Lacey Stormwater Design Manual Administrator (SDM Administrator) is authorized to determine if situation-specific requirements are applicable to any particular project.

The SDM Administrator is also authorized to request information or to impose requirements beyond those specified in this manual, which may occur for various reasons including but not limited to:

- To protect public safety, health, and welfare
- To prevent flooding, erosion, endangerment to property, habitat destruction, or water quality degradation
- To implement regulatory mandates such as a total maximum daily load (TMDL)

- To protect uninterruptible services
- To implement increases in requirements imposed by state or federal agencies or other pertinent factors
- To clarify, correct, augment, or update information in this manual

1.2 Objective

The objective of this manual is to provide guidance and requirements to control the quantity and quality of stormwater produced by new development and redevelopment, such that they comply with water quality standards and contribute to the protection of beneficial uses of the receiving waters. Water quality standards include:

- Chapter 173-200 of the Washington Administrative Code (WAC), Water Quality Standards for Groundwaters of the State of Washington
- Chapter 173-201A WAC, Water Quality Standards for Surface Waters of the State of Washington
- Chapter 173-204 WAC, Sediment Management Standards

This manual establishes the minimum "core requirements" for stormwater control and site development requirements for all new development and redevelopment in the City and applies to all sites as detailed in Chapter 2 – Applicability and Core Requirements, and Chapter 3 – Stormwater Submittals. The core requirements outlined in Chapter 2 are based on the "Minimum Requirements" outlined in the 2019 Ecology Manual, but have been adapted for use in the City. Stormwater management requirements are satisfied by the application of best management practices (BMPs) identified in this manual, when they are selected and designed according to the procedures and criteria specified in this manual.

The requirements of this manual are applicable to all types of public and private land development projects in the City—including residential, commercial, industrial, and road projects. Stormwater management for road projects shall meet all the core requirements stated in this manual, although federally-funded road projects may be required (per Washington State Department of Transportation [WSDOT] Local Agency Guidelines) to design to WSDOT Highway Runoff Manual (HRM) standards, at a minimum. In this case, the more stringent stormwater requirements of this manual or the WSDOT HRM shall apply.

The intent and purpose of this manual is to:

- Establish criteria for submittal, review, and analysis of all development and other site-altering work
- Manage stormwater to minimize contact with contaminants

- Mitigate the impacts of increased runoff due to urbanization
- Manage runoff from developed property and property being developed
- Protect the health, safety, and welfare of the public

This manual is not intended to preclude alternative engineering solutions to design situations. It is expected that the professional engineer will bring to each project the best of their skills and abilities to see that the project is thoroughly analyzed and designed correctly, accurately, and in compliance with generally accepted engineering practices. Alternatives to the standard plans, specifications, and design details found in this manual may be accepted if they meet or exceed the performance of this manual's standards as determined by the City. Engineers are encouraged to be innovative; however, the burden of proof is on the engineer to document that their innovations meet or exceed the performance of the standards outlined in this manual.

This manual is based on the premise that development and redevelopment shall not negatively impact adjacent and/or downstream property owners nor degrade groundwater or the natural drainage system, including but not limited to streams, ravines, wetlands, potholes, and rivers. Further, development activities shall not impact adjacent and/or downstream property owners in a detrimental manner compared to the predeveloped condition. It is not the intent of this manual to make the City a guarantor or protector of public or private property with regard to land development activities.

1.3 Organization of this Manual

1.3.1 Overview of Manual Content

To accomplish the objective described in Section 1.2, this manual includes the following:

- **Core requirements** that cover a range of issues, such as submittal requirements, pollution prevention during the construction phase of a project, control of potential pollutant sources, treatment of runoff, control of stormwater flow volumes, protection of wetlands, and long-term operation and maintenance. The core requirements applicable to a project vary depending on the type and size of the proposed project.

- **Best management practices (BMPs)** that can be used to meet the core requirements. BMPs are schedules of activities, prohibitions of practices, maintenance procedures, managerial practices, or structural features that prevent or reduce pollutants or other adverse impacts to waters of Washington. BMPs are divided into three groups: implementation of LID site design principles (Chapter 4, Section 4.3), short-term control of stormwater from construction sites (Chapter 5), and long-term management of stormwater at developed sites. Long-term BMPs are further subdivided into those covering flow control to manage the volume and timing of stormwater flows (Chapter 7), runoff treatment to remove

sediment and other pollutants (Chapter 8), and source control to prevent pollution from potential sources (Chapter 9).

- **Requirements for preparing stormwater submittals**. Chapter 3 of this manual covers City stormwater-related submittals that may be required depending on the nature of the project or site characteristics.

1.3.2 Organization of this Manual

This manual is organized into ten chapters, briefly described below. See the subsections of each individual chapter for additional details on the contents of each chapter.

- **Chapter 2** presents the stormwater management core requirements (equivalent to the Ecology Manual's minimum requirements) for new development and redevelopment, information on any additional requirements, the project types and thresholds that trigger the various requirements, and information relating to exceptions and variances from these requirements.

- **Chapter 3** outlines the submittal requirements related to stormwater drainage reviews, including information on site assessment requirements, and submittal documentation requirement for various types of project submittals.

- **Chapter 4** describes the process for selecting BMPs for runoff treatment and flow control, in accordance with the core requirements, and includes LID site design BMPs for preserving native vegetation, restoring site vegetation, reducing effective impervious area, and improving site design.

- **Chapter 5** details the erosion and sediment control requirements and BMPs to be implemented during the construction phase of development projects.

- **Chapter 6** presents the hydraulic and hydrologic analytical methods to be used in developing the drainage design.

- **Chapter 7** addresses selection and design of BMPs intended to meet flow control requirements.

- **Chapter 8** addresses selection and design of BMPs intended to meet runoff treatment requirements.

- **Chapter 9** is devoted to source control of pollution and pollution prevention.

- **Chapter 10** describes the stormwater BMP maintenance process and standards.

- **Appendices** to the chapters contain definitions, forms, checklists, maps, additional technical guidance, and other information relevant to the chapters and to the application of the core requirements.

- **Glossary** – Chapter 1 concludes with a glossary of terms.

1.4 Site Planning and Layout

The design professional is required to address the issue of stormwater management, both quantity and quality, in the early phases of the site planning process. Consideration of the natural characteristics of a site during the initial stages of project planning will help facilitate the site layout and drainage design. Existing topography, soils, vegetation, and drainage patterns can have a significant effect on the site drainage, and must be considered in designing the site and stormwater systems. Smart site planning and stormwater design includes adapting to a site's inherent characteristics rather than ignoring or working against them.

The approach to considering and minimizing stormwater impacts at the site layout stage is commonly referred to as low-impact development (LID). As described in Section 1.5.2, LID emphasizes protection and use of on-site natural features integrated with small-scale hydrologic controls to manage stormwater and simulate predevelopment watershed hydrologic functions. This is achieved by recognizing and focusing on the relationship among the overland and subsurface flow, infiltration, storage, and evapotranspiration characteristics of the site. LID strategies focus on evaporating, transpiring, and infiltrating stormwater on site through native or amended soils, vegetation, and bioengineering applications to reduce and treat overland flow.

Two primary site design strategies shall be considered in developing the site layout and stormwater drainage systems:

1. **Manage stormwater on site.** As stated in Chapter 2 under Core Requirement #5, one of this manual's main stormwater requirements is to employ on-site stormwater management BMPs to infiltrate, disperse, and retain stormwater runoff on site to the maximum extent feasible. This applies during construction (with temporary BMPs) and after development (with permanent BMPs). On an undeveloped (natural) site, stormwater is "managed" near where it falls, mainly by soaking into the ground and by plant interception. Through LID and on-site stormwater management, this approach can be applied on the developed site as well. Preserve large trees and native soils on site to the maximum extent possible. Determine if infiltration is feasible anywhere on the site, and if so, design the site layout to utilize well-drained soils. Keep stormwater dispersed and spread out as much as possible, and use small-scale LID drainage systems, rather than concentrating flows in larger common facilities.

2. **Minimize stormwater runoff by minimizing vegetation loss and reducing effective impervious areas.** This can be accomplished by using smart site design and use of a site's natural features. Site planning and layout strategies include: minimizing the use of impervious areas as much as possible (e.g., roofs; and non-permeable roadways, sidewalks, and parking), clustering buildings and preserving larger areas of open space; minimizing directly connected impervious areas (try to separate impervious surfaces and prevent runoff from concentrating by

disconnecting them and draining impervious surfaces overland to pervious areas); incorporating low maintenance landscaping that does not need frequent applications of fertilizers, herbicides, and pesticides; and minimizing the impact area and soil compaction during construction.

Additional details on LID approaches and requirements in the City are outlined in Chapters 2, 4, and 7.

1.5 Development of BMPs for Stormwater Management

1.5.1 Best Management Practices (BMPs)

BMPs are activities, restrictions, or constructed stormwater facilities that, when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to waters of Washington. The types of BMPs include source control, runoff treatment, flow control, and LID (also referred to as on-site stormwater management BMPs). BMPs that involve construction of engineered structures are often referred to as facilities in this manual. For instance, the BMPs referenced in the runoff treatment menus in Chapter 8 are called runoff treatment BMPs.

The primary purpose of using BMPs is to protect beneficial uses of water resources through the reduction of pollutant loads and concentrations, through reduction of discharges (volumetric flow rates) causing stream channel erosion, and through reductions in deviations from natural hydrology. If it is found that, after the implementation of BMPs prescribed in this manual, beneficial uses are still threatened or impaired, additional controls may be required.

1.5.2 Low Impact Development BMPs (Chapters 4 and 7)

LID is a stormwater and land use management strategy that strives to mimic pre-disturbance hydrologic processes of infiltration, filtration, storage, evaporation, and transpiration by emphasizing conservation, use of on-site natural features, site planning, and distributed stormwater management practices that are integrated into a project design. Certain on-site stormwater management BMPs and LID techniques are required as part of Core Requirement #5 (see Chapter 2), with additional techniques available to supplement or replace traditional stormwater approaches. Chapter 4 presents LID site design BMPs and Chapter 7 presents design guidelines for several of the most common on-site stormwater management (i.e., LID) BMPs. Given the evolving nature of LID approaches, the design standards for these BMPs may change before the next update to this manual. Users should check with the City and/or refer to the City's website for any updates to the design criteria.

1.5.3 Construction Stormwater BMPs (Chapter 5)

Construction stormwater BMPs can provide source control, runoff treatment, or flow control during site construction. Examples include stabilized construction entrances, silt

fences, check dams, and sediment traps. Chapter 5 contains construction stormwater BMPs.

1.5.4 Flow Control BMPs (Chapter 7)

Flow control BMPs typically control the volume, rate, frequency, and duration of stormwater surface runoff. The need to provide flow control BMPs depends on where the development site runoff is discharged to – e.g., a stream system, wetland, or closed depression—either directly or indirectly.

Construction of an infiltration facility is the preferred option for on-site flow control, but is feasible only where more permeable soils are available. Construction of a detention pond with controlled release is a common means of meeting flow control requirements when infiltration is not adequate.

Previous versions of the City and Ecology stormwater design guidelines and requirements (2005 and earlier) focused primarily on controlling the peak flow release rates for recurrence intervals of concern—the 2-, 10-, and 100-year rates. This level of control did not adequately address the increased duration at which those high flows occur because of the increased volume of water from the developed condition as compared to the predeveloped conditions. To protect stream channels from increased erosion, it is necessary to control the durations over which a stream channel experiences geomorphically significant flows such that the energy imparted to the stream channel does not increase significantly. Geomorphically significant flows are those that are capable of moving sediments. This target will translate into lower release rates and will require significantly larger detention ponds than earlier City standards. The required size of a detention pond can be reduced by changing the extent of disturbance on a site. In addition, engineers and designers are encouraged to look for means to improve or restore natural conditions to complement, or to serve in lieu of, traditional flow control measures. The on-site stormwater management BMPs presented in Chapters 4, 7, and 8 will help accomplish this goal. See also Section 1.5.2.

1.5.5 Runoff Treatment BMPs (Chapter 8)

Runoff treatment BMPs include facilities that remove pollutants by gravity settling of particulate pollutants, centrifugal separation, filtration, biological uptake, and/or media or soil adsorption. Runoff treatment BMPs can accomplish significant levels of pollutant load reductions if properly designed and maintained.

1.5.6 Source Control BMPs (Chapter 9)

Source control BMPs typically prevent pollution, or other adverse effects of stormwater, from occurring at a developed site (source control during construction activities is addressed by the construction BMPs in Chapter 5). Source control BMPs are classified as operational or structural. Examples of source control BMPs include methods as various as using mulches and covers on disturbed soil, putting roofs over outside storage areas, and berming areas to prevent stormwater flow and pollutant runoff.

It is generally more cost-effective to use source controls to prevent pollutants from entering runoff than to treat runoff to remove pollutants. However, since source controls cannot prevent all impacts, some combination of measures will always be needed.

1.6 Maintenance of Stormwater Best Management Practices

The importance of maintenance for the proper functioning of stormwater control facilities cannot be overemphasized. Maintenance is crucial to performance of runoff treatment and flow control BMPs. A substantial portion of failures (clogging of filters, resuspension of sediments, loss of storage capacity, etc.) of such facilities results from inadequate maintenance. In addition, maintenance must be a basic consideration in design and in determination of cost. Therefore, provisions to facilitate maintenance operations must be built into the project when a BMP is installed.

Likewise, for both private and public facilities, it is important to include maintenance personnel early and throughout the design process. During discussions with maintenance personnel, describe the maintenance procedures that will need to be performed on the BMP. This will help ensure that future maintenance work and potential access needs are clearly understood.

The description of each BMP in subsequent chapters includes a brief section on facility maintenance. Chapter 3 outlines the specific elements to be addressed in the Maintenance and Source Control Manual, which is a required project submittal. Chapter 10 includes additional information on stormwater maintenance, including a detailed checklist of maintenance requirements for all drainage facilities.

1.7 Relationship of this Manual to Federal, State, and Local Regulatory Requirements

This section describes some of the local, state, and federal regulations and permits that may apply to your project, depending on the nature of the project and site characteristics. City staff are available to help in determining which permits apply and in helping project applicants through the permitting process.

The City's website has information on the City's permitting process, including online permit information: <https://cityoflacey.org>. Permit information can also be obtained by calling the Community Development Department at (360) 491-5642.

The Joint Aquatic Resources Permit Application (JARPA) is another resource that can help to streamline the environmental permitting process. As noted in the following sections, several of the permits described in this section are included in the JARPA, so they can be covered under a single permit application. Refer to the Access Washington, one-stop e-permitting website for more information: <https://www.epermitting.wa.gov/site/alias__resourcecenter/9978/default.aspx>.

1.7.1 The Manual's Role as Technical Guidance and Requirements

This manual is to be used for identifying, selecting, and designing BMPs and completing submittal requirements to comply with City permits. The requirements of this manual apply to all areas of the City. These requirements also apply to cross-jurisdictional projects (e.g., county, state, or federal government entity) located totally, or in part, within the City, unless one of the following applies:

- Activity is exempted from submittal requirements (see Chapter 2, Section 2.1.3).
- Development/redevelopment and stormwater activities are conducted in accordance with a functionally equivalent stormwater management manual (e.g., WSDOT HRM or Pierce County Stormwater Management Manual and Site Development Manual).

This manual provides technical guidance on measures to control the quantity and quality of stormwater runoff from new development and redevelopment projects. These measures are considered to be necessary to achieve compliance with state water quality standards and to contribute to the protection of the beneficial uses of the receiving waters (both surface and groundwater). Stormwater management techniques applied in accordance with this manual are presumed to meet the technology-based treatment requirement of state law to provide all known available and reasonable methods of treatment, prevention, and control (AKART; Revised Code of Washington [RCW] 90.52.040 and RCW 90.48.010).

The state technology-based treatment requirement does not excuse any discharge from the obligation to apply additional stormwater management practices, as necessary, to comply with state water quality standards and to protect groundwater that is used for public drinking water supplies. The state water quality standards include Chapter 173-200 WAC, Water Quality Standards for Ground Waters of the State of Washington; Chapter 173-201A, Water Quality Standards for Surface Waters of the State of Washington; and Chapter 173-204 WAC, Sediment Management Standards. However, compliance with the standards in this manual does not necessarily mitigate all probable and significant environmental impacts to aquatic biota. Thus, compliance with this manual should not be construed as mitigating all probable and significant stormwater impacts on aquatic biota in streams and wetlands; additional mitigation may be required.

In addition, this manual presents the City's minimum standards for planning and engineering for stormwater management. While the city believes these standards are appropriate for a wide range of development proposals, compliance solely with these requirements does not relieve the professional submitting stormwater plans of his or her responsibility to ensure drainage facilities provide adequate protection for natural resources and public and private property.

Severability

If any provisions of this manual, or their application to any person or property are amended or held to be invalid, the remainder of the provisions in this manual in their application to other persons or circumstances shall not be affected.

Penalties and Enforcement

Penalties and enforcement shall be per Chapter 14.27 LMC.

Appeals

Appeals shall be handled per Chapter 14.27 LMC.

1.7.2 More Stringent Measures

Other stormwater or water quality regulations—such as TMDLs or water cleanup plans—may identify more stringent measures needed to restore water quality in an impaired water body. For more information, see Chapter 8, Section 8.3.5, as well as the Ecology website: <https://ecology.wa.gov/Water-Shorelines/Water-quality/Water-improvement/Total-Maximum-Daily-Load-process>.

1.7.3 Retrofitting

This manual is not a retrofit manual, but it can be helpful in identifying options for retrofitting BMPs to existing development. Retrofitting stormwater BMPs into existing developed areas may be necessary to meet federal Clean Water Act and state Water Pollution Control Act (Chapter 90.48 RCW) requirements. The Puget Sound Action Agenda also includes prioritizing and implementing stormwater retrofits as one objective. In retrofit situations, there frequently are site constraints that make the strict application of these BMPs difficult. In such instances, the BMPs presented here can be modified using best professional judgment to provide reasonable improvements in stormwater management.

1.7.4 Presumptive Versus Demonstrative Approaches to Protecting Water Quality

Wherever a discharge permit or other water-quality-based project approval is required, project applicants may be required to document the technical basis for the design criteria used to design their stormwater management BMPs. This includes: how stormwater BMPs were selected; the pollutant removal performance expected from the selected BMPs; the scientific basis, technical studies, and/or modeling that supports the performance claims for the selected BMPs; and an assessment of how the selected BMP will comply with federal technology-based treatment requirements and state water quality standards, and will satisfy "all known available and reasonable methods by industries and others to prevent and control the pollution of the waters of the State of Washington." This statutory requirement is generally known by the acronym AKART.

The BMPs presented in this manual are approved by the city and are *presumed* to protect water quality and instream habitat—and meet the stated environmental objectives of the regulations described in this chapter— with the exception of deep UICs. Requirements and guidance specific to UICs and deep UICs is provided in Chapter 7, Appendix 7C. Project applicants always have the option of not following the stormwater management practices in this manual. However, if a project applicant chooses not to follow the practices in the manual, then the project applicant will be required to individually *demonstrate* that the project will not adversely impact water quality by collecting and providing appropriate supporting data to show that the alternative approach is protective of water quality and satisfies state and federal water quality laws. Project applicants interested in pursuing the demonstrative approach should contact the City of Lacey Department of Public Works early in the process.

If a project applicant wants to follow the demonstrative approach for a runoff treatment BMP, the 2019 Ecology Manual and Ecology website have more information on setting up an approved water quality monitoring plan to demonstrate that a project will protect water quality and satisfy state and federal laws. Additional city requirements will also apply. Contact the SDM Administrator for additional information.

1.7.5 Phase II – NPDES and State Waste Discharge Stormwater Permits for Municipalities

Certain municipalities and other entities are subject to permitting under the U.S. Environmental Protection Agency (U.S. EPA) Phase II Stormwater Regulations (40 CFR Part 122). In western Washington, Ecology has issued joint NPDES and state waste discharge permits to regulate the discharges of stormwater from the municipal separate storm sewer systems operated by certain medium- and large-sized cities and counties, including the City of Lacey.

The Western Washington NPDES Phase II Municipal Stormwater Permit was reissued on July 1, 2019 and is available on the Ecology website: <https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Municipal-stormwater-general-permits/Western-Washington-Phase-II-Municipal-Stormwater>.

1.7.6 Industrial Stormwater General Permit

Facilities covered under Ecology's Industrial Stormwater General Permit (i.e., NPDES and State Waste Discharge General Permit for Stormwater Discharges Associated With Industrial Activities) must manage stormwater in accordance with specific terms and conditions including: the development and implementation of an Industrial Stormwater Pollution Prevention Plan (Industrial SWPPP), monitoring, reporting, and ongoing adaptive management based on sampling and inspections.

The Industrial Stormwater General Permit (ISGP) requires Industrial SWPPPs to include certain mandatory BMPs, including those BMPs identified as "required," for specific industrial activities in Chapters 8 and 9 of this manual. Facilities with new development

or redevelopment must evaluate whether flow control BMPs are necessary. BMPs must be consistent with this manual, or other stormwater management guidance documents that are approved by Ecology, and incorporated into the ISGP. Facilities may also use alternative BMPs if their Industrial SWPPP includes documentation that the BMPs selected are demonstrably equivalent to practices contained in stormwater technical manuals approved by Ecology, including the proper selection, implementation, and maintenance of all applicable and appropriate BMPs for on-site pollution control.

Ecology's Industrial Stormwater web page <https://ecology.wa.gov/Regulations-Permits/Permits-certifications/Stormwater-general-permits/Industrial-stormwater-permit> has a fill-in-the-blank Industrial SWPPP template for use by industrial facilities.

1.7.7 Construction Stormwater General Permit

Coverage under Ecology's Construction Stormwater General Permit (CSWGP) is generally required for any clearing, grading, or excavating if the project site:

- Discharges stormwater from the site into surface water(s) of the state, or
- Discharges into storm drainage systems that discharge to a surface water(s) of the state. "Surface waters of the state" are broadly defined by state law and include storm drains, ditches, wetlands, creeks, rivers, lakes, and marine waters.

And:

- Disturbs 1 or more acres of land area, or
- Disturbs less than 1 acre of land area, if the project or activity is part of a larger common plan of development or sale.

Any construction activity discharging stormwater that Ecology and/or the city determines to be a significant contributor of pollutants to waters of the state may also require permit coverage, regardless of project size, at the discretion of the agencies.

The CSWGP requires application of stabilization and structural practices to reduce the potential for erosion and the discharge of sediments from the site. The stabilization and structural practices cited in the permit are similar to the requirements for sedimentation and erosion control (Core Requirement #2) in Chapter 2 of this manual. Developers must file a Notice of Intent with Ecology and develop a Construction Stormwater Pollution Prevention Plan (Construction SWPPP) prior to beginning construction. It is the responsibility of the project applicant to contact Ecology to determine if these or other requirements apply to their project. However, to minimize review time and effort by both the project applicant and the city, the Construction SWPPP required by the city has been structured to be consistent with Ecology's Construction SWPPP requirements.

The permit also requires construction sites within western Washington to implement stormwater BMPs contained in stormwater management manuals published or approved

by Ecology, or BMPs that are demonstrably equivalent. Chapter 5 of this manual further describes the requirements and BMPs appropriate for managing construction site stormwater.

1.7.8 Endangered Species Act

With the listing of multiple species of salmon as threatened or endangered across much of Washington State, and the probability of more listings in the future, implementation of the requirements of the Endangered Species Act (ESA) affects many aspects of stormwater management. For example, the Mazama pocket gopher is another ESA-listed species that may affect projects in Lacey and the Lacey Urban Growth Area (UGA). Provisions of the ESA that can apply to stormwater management include the Section 4(d) rules, Section 7 consultations, and Section 10 Habitat Conservation Plans (HCPs).

The ESA can be of particular concern for construction sites because of potential adverse impacts from discharges of sediment, turbidity, or abnormal pH. Specific adverse impacts include:

- Suffocation of eggs or fry
- Displacement and elimination of aquatic invertebrates used for food
- Reduction in the biodiversity of aquatic invertebrates
- Reduction of foraging abilities in turbid water
- Irritation of gill tissue that can lead to disease or death
- Filling of resting or feeding areas, or spawning gravels with sediment

These impacts could be determined to be a “take” under ESA.

The stranding of listed species behind erosion and sediment control features or the impairment of their access into certain areas due to the presence of erosion and sediment control features could also be determined to be a take under ESA.

For more information on ESA and how it affects your project, please contact the National Oceanic and Atmospheric Administration Fisheries Service at: <https://www.fisheries.noaa.gov/topic/laws-policies#endangered-species-act> and the U.S. Fish and Wildlife Service at: <www.fws.gov/endangered/>.

1.7.9 Section 401 Water Quality Certifications (included in JARPA)

For projects that require a fill or dredge permit under Section 404 of the Clean Water Act, Ecology must certify to the permitting agency (the U.S. Army Corps of Engineers) that the proposed project will not violate water quality standards of Section 401 of the Clean Water Act. In order to make such a determination and issue a Section 401 Water Quality

Certification, Ecology may do a more specific review of the potential impacts of a stormwater discharge from the construction phase of the project and from the completed project. As a result of that review, Ecology may condition its certification to require application of the core requirements in this manual, or more stringent requirements.

1.7.10 Hydraulic Project Approvals (included in JARPA)

Under Chapter 77.55 RCW, the Hydraulics Act, the Washington Department of Fish and Wildlife (WDFW) has the authority to require actions when stormwater discharges related to a project would change the natural flow or bed of state waters. The implementing mechanism is the issuance of a hydraulic project approval (HPA) permit. In exercising this authority, WDFW may require application of the core requirements in this manual, or more stringent requirements.

1.7.11 Aquatic Lands Use Authorizations (included in JARPA)

The Washington State Department of Natural Resources (WDNR), as the steward of public aquatic lands, may require a stormwater outfall to have a valid use authorization, and to avoid or mitigate resource impacts. Through its use authorizations, which are issued under authority of Chapter 79.90 through 96, Chapter 79.105-79.140 RCW, and in accordance with Chapter 332-30 WAC, WDNR may require application of the core requirements in this manual, or more stringent requirements.

1.7.12 Requirements Identified through Watershed or Basin Planning

A number of the requirements of this manual can be superseded by the adoption of ordinances and rules to implement the recommendations of watershed plans or basin plans. In accordance with the Watershed Management Act (Chapter 90.82 RCW) or the basin planning option per Chapter 400-12 WAC, the state allows the City of Lacey to initiate its own watershed/basin planning processes to identify more stringent or alternative requirements. As long as the actions or requirements identified in those plans and implemented through local or state ordinances or rules comply with applicable state and federal statutes, they can supersede the requirements in this manual. The decisions concerning whether such locally derived requirements comply with federal and state statutes rest with the regulatory agencies responsible for implementing those statutes.

1.7.13 Underground Injection Control – UIC Program

One of the provisions of the Safe Drinking Water Act is to protect underground sources of drinking water (USDW)). In 1984, Ecology received authority from the U.S. EPA to administer the Underground Injection Control (UIC) Program to protect USDW by regulating the discharges of fluids into the subsurface by UIC wells.

Ecology has adopted Chapter 173-218 WAC to implement the program; however, the UIC program rule protects all groundwater, not just USDW. The U.S. EPA organizes UIC wells into six classes. The Washington UIC program regulates Class I through Class V UIC wells, except for wells located on tribal land. UIC wells used to manage

stormwater are considered Class V wells. For more information, visit Ecology's home page for the UIC program <https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Underground-injection-control-program> and "Guidance for UIC Wells that Manage Stormwater".

The UIC program has two requirements:

1. A non-endangerment performance standard must be met, prohibiting discharges that allow movement of fluids containing contaminants to reach groundwater.

2. All UIC facility owners/operators must complete online UIC well registration with Ecology.

The UIC program defines a UIC well as a well that is used to discharge fluids from the ground surface into the subsurface and is one of the following:

1. A bored, drilled, or driven shaft, or

2. A dug hole whose depth is greater than the largest surface dimension, or

3. An improved sinkhole; which is a natural crevice that has been modified, or

4. A subsurface fluid distribution system which contains perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground.

Examples of UIC wells or subsurface infiltration systems are the following:

- Drywells
- Drainfields
- Infiltration trenches with perforated pipe
- Storm chamber systems with the intent to infiltrate
- French drains
- Bioretention systems intending to infiltrate water from a perforated pipe below the treatment soil

Other similar devices that discharge into the ground

The following are not UIC wells:

- Buried pipe and/or tile networks that serve to collect water and discharge that water to a drainage system or to a receiving water

- Surface infiltration basins and flow dispersion stormwater facilities
- Infiltration trenches designed without perforated pipe or a similar mechanism
- Bioretention systems transporting water via a perforated pipe to a drainage system or to a receiving water

Depending upon the manner in which it is accomplished, the discharge of stormwater into the ground can be classified as a Class V injection well. **UIC wells are required to be registered with Ecology** with the exception of UIC wells at single-family homes (or duplexes) that receive only residential roof runoff or for basement flooding control (WAC 173-218-070 (1)(e). The UIC rule (Chapter 173-218 WAC) applies to all Class V UIC wells that receive stormwater discharges. These wells must be sited, designed, constructed, managed, operated, and maintained according to the requirements throughout Chapter 7, Appendix 7C -Underground Injection Control (UIC) Program Guidelines.

If all stormwater runoff from the project site discharges to a Class V UIC well, the Municipal Stormwater Permits do not pertain to the project, and the Minimum Requirements do not apply. The UIC rule (Chapter 173-218 WAC) applies in such cases. See Chapter 7, Appendix 7C – Underground Injection Control (UIC) Program Guidelines for details on the rules, registration requirements, regulations, non-endangerment standard, treatment requirements and operation guidelines.

This manual represents several BMPs to infiltrate stormwater. Additional information on underground injection control and how it applies to infiltration and stormwater management is included in Chapter 7 and Appendix 7C. For more information and for a listing on potential stormwater facilities that may have Class V classification, refer to the UIC Program available at Ecology's website:

<https://ecology.wa.gov/Regulations-Permits/Guidance-technical-assistance/Underground-injection-control-program>

Chapter 1 References

Novotny, V., and H. Olem. 1994. *Water Quality: Prevention, Identification, and Management of Diffuse Pollution*. Van Nostrand-Reinhold, New York, New York.

Washington State Department of Ecology (Ecology). 2019. *Stormwater Management Manual for Western Washington*. Publication Number 19-10-021. July.

Glossary and Abbreviations

Glossary

The following terms are provided for reference and use with this manual. They may be superseded by any other definitions for these terms adopted by City ordinance, unless the terms match the definitions provided by a Washington State WAC or RCW.

Term	Definition
2019 Ecology Manual	See Stormwater Management Manual for Western Washington.
Absorption	The penetration of a substance into or through another, such as the dissolving of a soluble gas in a liquid.
Adjustment	A variation in the application of a core requirement to a particular project. Adjustments provide substantially equivalent environmental protection.
Adsorption	The adhesion of a substance to the surface of a solid or liquid often used to extract pollutants by causing them to be attached to such adsorbents as activated carbon or silica gel. Hydrophobic, or water-repulsing adsorbents, are used to extract oil from waterways when oil spills occur. Heavy metals such as zinc and lead often adsorb onto sediment particles.
Aeration	The process of being supplied or impregnated with air. In waste treatment, the process used to foster biological and chemical purification. In soils, the process by which air in the soil is replenished by air from the atmosphere. In a well-aerated soil, the soil air is similar in composition to the atmosphere above the soil. Poorly aerated soils usually contain a much higher percentage of carbon dioxide and a correspondingly lower percentage of oxygen.
Aerobic	Living or active only in the presence of free (dissolved or molecular) oxygen.
AKART	All known, available, and reasonable methods of treatment, prevention, and control. Under the NPDES Municipal Stormwater Permit, jurisdictions are to use AKART to prevent and control pollution of waters of the state of Washington. See also the State Water Pollution Control Act, Chapter 90.48.010 and 90.48.520 RCW.
Algae	Primitive plants, many microscopic, containing chlorophyll and forming the base of the food chain in aquatic environments. Some species may create a nuisance when environmental conditions are suitable for prolific growth.
Algal Bloom	Proliferation of living algae on the surface of lakes, streams, or ponds often stimulated by phosphate over-enrichment. Algal blooms reduce the oxygen available to other aquatic organisms.
American Association of State Highway and Transportation Officials (AASHTO) Classification	The official classification of soil materials and soil aggregate mixtures for highway construction, used by the American Association of State Highway and Transportation Officials.
American Public Works Association (APWA)	The Washington State Chapter of the American Public Works Association.

Term	Definition
Anti-Seep Collar (or Device)	A device constructed around a pipe or other conduit and placed through a dam, levee, or dike for the purpose of reducing seepage losses and piping failures.
Applicable BMPs	As used in this manual and in Volume IV of the 2019 Ecology Manual, applicable BMPs are those source control BMPs that are expected to be required by local governments at new development and redevelopment sites. Applicable BMPs will also be required if they are incorporated into NPDES permits or are included by local governments in a stormwater program for existing facilities.
Applicant	The person who has applied for a development permit or approval.
Appurtenances	Machinery, appliances, or auxiliary structures attached to a main structure, but not considered an integral part thereof, for the purpose of enabling it to function.
Aquifer	A geologic stratum containing groundwater that can be withdrawn and used for human purposes.
Arterial	A road or street primarily for through traffic. Generally, a major arterial connects an interstate highway to cities and counties, a minor arterial connects major arterials to collectors, a collector connects an arterial to a neighborhood, and a local access road connects individual properties to a collector.
As-Built Drawings	As-constructed engineering plans that include all changes made to a project during construction and submitted to the city. All drawing changes shall be made by a professional engineer or land surveyor. Also referred to as record drawings.
Assessed Value	The value of the existing improvements excluding land as listed in current records at the Thurston County Assessor's Office. Alternately, the applicant may provide current appraisal information and request that it be substituted for the Assessor's records.
Average Daily Traffic	Means the general unit of measurement for traffic defined as the total volume during a given time period (in whole days) greater than 1 day and less than 1 year divided by the number of days in that time period.
Average Annual Daily Traffic (AADT)	A measurement representing the total number of vehicles passing a given location, based upon 24-hour counts taken over an entire year. Mechanical counts are adjusted to an estimate of annual average daily traffic figures, taking into account seasonal variance, weekly changes, and other variables.
Backwater	Water upstream from an obstruction that is deeper than it would normally be without the obstruction.
Baffle	A device to check, deflect, or regulate flow.
Base Flow	The portion of stream discharge that is from groundwater seeping into the stream.
Basin	An area from which surface runoff is concentrated, usually to a single point such as the mouth of a stream.

Term	Definition
Basin Plan	A plan that assesses, evaluates, and proposes solutions to existing and potential future impacts to the beneficial uses of, and the physical, chemical, and biological properties of waters of the state within a basin. Basins typically range in size from 1 to 50 square miles. A plan should include but not be limited to recommendations for: • Stormwater requirements for new development and redevelopment; • Capital improvement projects; • Land Use management through identification and protection of critical areas, comprehensive land use and transportation plans, zoning regulations, site development standards, and conservation areas; • Source control activities including public education and involvement, and business programs; • Other targeted stormwater programs and activities, such as maintenance, inspections and enforcement; • Monitoring; and • An implementation schedule and funding strategy. A plan that is "adopted and implemented" must have the following characteristics: • It must be adopted by legislative or regulatory action of jurisdictions with responsibilities under the plan; • Ordinances, regulations, programs, and procedures recommended by the plan should be in effect or on schedule to be in effect; and, • An implementation schedule and funding strategy that are in progress.
Bedrock	The more or less solid rock in place either on or beneath the surface of the Earth. It may be soft, medium, or hard and have a smooth or irregular surface.
Berm	A constructed barrier typically made of compacted earth, rock, or gravel. In a stormwater facility, a berm may serve as a vertical divider and is typically built up from the bottom.
Best Management Practice (BMP)	The schedules of activities, prohibitions of practices, maintenance procedures, and structural and/or managerial practices that, when used singly or in combination, prevent or reduce the release of pollutants and other adverse impacts to waters of Washington State.
Biodegradable	Capable of being readily broken down by biological means, especially by microbial action. Microbial action includes the combined effect of bacteria, fungus, flagellates, amoebae, ciliates, and nematodes. Degradation can be rapid or may take many years depending upon such factors as available oxygen and moisture.
Bioengineering	The combination of biological, mechanical, and ecological concepts (and methods) to control erosion and stabilize soil with vegetation or in combination with natural and synthetic construction materials.
Biofilter	A designed runoff treatment BMP using a combined soil and vegetation system for filtration, infiltration, adsorption, and biological uptake of pollutants in stormwater when runoff flows over and through the facility. Vegetation growing in these BMPs acts as both a physical filter, which causes gravity settling of particulates by regulating velocity of flow, and as a biological sink when direct uptake of dissolved pollutants occurs. The former mechanism is probably the most important in western Washington where the period of major runoff coincides with the period of lowest biological activity.

Term	Definition
Biofiltration	The process of reducing pollutant concentrations in water by filtering the polluted water through biological materials.
Bioretention Areas	Small-scale, shallow retention/detention facilities dispersed through the development site that utilize specific soil mixes and plant species to infiltrate and filter runoff from developed sites.
Bioretention BMP	Engineered BMPs that store and treat stormwater by passing it through a specified soil profile, and either retain or detain the treated stormwater for flow attenuation. See Chapter 7, Section 7.4.4 for bioretention BMP types and design specifications.
Biosolids	Municipal sewage sludge that is a primarily organic, semisolid product resulting from the wastewater treatment process that can be beneficially recycled and meets all applicable requirements under Chapter 173-308 WAC. Biosolids includes a material derived from biosolids and septic tank sludge, also known as septage, that can be beneficially recycled and meets all applicable requirements under Chapter 173-308 WAC. For the purposes of Chapter 173-308 WAC, semisolid products include biosolids or products derived from biosolids ranging in character from mostly liquid to fully dried solids.
Bollard	A post (may or may not be removable) used to prevent vehicular access.
Bond	A surety bond, cash deposit or escrow account, assignment of savings, irrevocable letter of credit or other means acceptable to or required by the manager to guarantee that work is completed in compliance with all City of Lacey requirements.
Borrow Area	A source of earth fill material used in the construction of embankments or other earth fill structures.
Buffer	The zone contiguous with a sensitive area that is required for the continued maintenance, function, and structural stability of the sensitive area. The critical functions of a riparian buffer (those associated with an aquatic system) include shading, input of organic debris and coarse sediments, uptake of nutrients, stabilization of banks, interception of fine sediments, overflow during high water events, protection from disturbance by humans and domestic animals, maintenance of wildlife habitat, and room for variation of aquatic system boundaries over time due to hydrologic or climatic effects. The critical functions of terrestrial buffers include protection of slope stability, attenuation of surface water flows from stormwater runoff and precipitation, and erosion control.
Catch Basin	An inlet box set into the ground, usually rectangular and made of concrete, with a sump in the bottom to catch sediment, and capped with a grate that allows stormwater to enter. Usually set at the curb line of a street, to admit surface runoff water to a sewer or subdrain.
Catch Line	The point where a steeper slope intercepts a different, gentler slope.
Catchment	Surface drainage area or basin.
Cation Exchange Capacity (CEC)	Cations are positively charged ions such as calcium (Ca^{2+}), magnesium (Mg^{2+}), and potassium (K^{+}), sodium (Na^{+}) hydrogen (H^{+}), aluminum (Al^{3+}), iron (Fe^{2+}), manganese (Mn^{2+}), zinc (Zn^{2+}) and copper (Cu^{2+}). The capacity of the soil to hold on to these cations called the cation exchange capacity (CEC). Units are milliequivalents per 100 grams of soil, typically abbreviated as meq.

Term	Definition
Certification	Means a written engineering opinion, stamped, signed, and dated by an engineer, concerning the progress or completion of work.
Certified Erosion and Sediment Control Lead (CESCL)	An individual who has current certification through an approved erosion and sediment control training program that meets the minimum training standards established by Ecology (see BMP C160 in the 2019 Ecology Manual). A CESCL is knowledgeable in the principles and practices of erosion and sediment control. A CESCL must have the skills to assess site conditions and construction activities that could impact the quality of stormwater and the effectiveness of erosion and sediment control measures used to control the quality of stormwater discharges. Certification is obtained through an Ecology-approved erosion and sediment control course. Course listings are provided online at Ecology's website.
Channel	A feature that conveys surface water and is open to the air.
Channel, Constructed	Channels or ditches constructed (or reconstructed natural channels) to convey surface water.
Channel, Natural	Streams, creeks, or swales that convey surface/groundwater and have existed long enough to establish a stable route and/or biological community.
Channelization	Alteration of a stream channel by widening, deepening, straightening, cleaning, or paving certain areas to change flow characteristics.
Check Dam	Small dam constructed in a channel or other small watercourse to decrease the streamflow velocity, minimize channel scour, and promote deposition of sediment.
Civil Engineer	See Professional Engineer.
Civil Engineering	The application of the knowledge of the forces of nature, principles of mechanics and the properties of materials to the evaluation, design and construction of civil works for the beneficial uses of humankind.
Clearing	The destruction and/or removal of vegetation by manual, mechanical, or chemical methods.
Closed Depression	An area that is low-lying and either has no, or such a limited, surface water outlet that during storm events the area acts as a retention basin.
Cohesion	The capacity of a soil to resist shearing stress, exclusive of functional resistance.
Coliform Bacteria	Microorganisms common in the intestinal tracts of man and other warm-blooded animals; all the aerobic and facultative anaerobic, gram-negative, non-spore-forming, rod-shaped bacteria that ferment lactose with gas formation within 48 hours at 35 degrees Celsius. Used as an indicator of bacterial pollution.
Commercial Agriculture	Those activities conducted on lands defined in RCW 84.34.020(2), and activities involved in the production of crops or livestock for commercial trade. An activity ceases to be considered commercial agriculture when the area on which it is conducted is proposed for conversion to a nonagricultural use or has lain idle for more than five years, unless the idle land is registered in a federal or state soils conservation program, or unless the activity is maintenance of irrigation ditches, laterals, canals, or drainage ditches related to an existing and ongoing agricultural activity.

Term	Definition
Compaction	The densification, settlement, or packing of soil in such a way that permeability of the soil is reduced. Compaction effectively shifts the performance of a hydrologic group to a lower permeability hydrologic group. For example, a group B hydrologic soil can be compacted and be effectively converted to a group C hydrologic soil in the way it performs in regard to runoff. Compaction may also refer to the densification of a fill by mechanical means.
Compost	Organic material that has undergone biological degradation and transformation under controlled conditions designed to promote aerobic decomposition at a solid waste facility in compliance with the requirements of Chapter 173-350 WAC, or biosolids composted in compliance with Chapter 173-308 WAC. Composting is a form of organic material recycling. Natural decay of organic solid waste under uncontrolled conditions does not result in composted material. (Note: Various BMPs have restrictions on the percentage of biosolids in compost, or do not allow biosolids in compost.)
Composted Material	Organic solid waste that has undergone biological degradation and transformation under controlled conditions designed to promote aerobic decomposition at a solid waste facility in compliance with the requirements of Chapter 173-350 WAC. Composting is a form of organic material recycling. Natural decay of organic solid waste under controlled conditions does not result in composted material.
Comprehensive Planning	Planning that takes into account all aspects of water, air, and land resources and their uses and limits.
Conservation District	A public organization created under state enabling law as a special-purpose district to develop and carry out a program of soil, water, and related resource conservation, use, and development within its boundaries, usually a subdivision of state government with a local governing body and always with limited authority. Often called a soil conservation district or a soil and water conservation district.
Constructed Wetland	A wetland intentionally created on non-wetland areas for the primary purpose of stormwater treatment and managed as such. Constructed wetlands are normally considered as part of the stormwater collection and treatment system and are subject to maintenance requirements. (These wetlands are not the same as wetlands created for mitigation purposes, which are viewed in the same manner as natural, regulated wetlands.)
Construction Stormwater Pollution Prevention Plan (SWPPP)	A document that describes the potential for pollution problems on a construction project, and explains and illustrates the measures to be taken on the construction site to control those problems.
Contour	An imaginary line on the surface of the Earth connecting points of the same elevation.
Control Structure	A manhole or similar structure with an orifice or weir to control ponding depth and discharge flow rate from a detention facility.
Converted Vegetation Areas	The surfaces on a project site where native vegetation, pasture, scrub/shrub, or unmaintained nonnative vegetation (e.g., Himalayan blackberry, Scotch broom) are converted to lawn or landscaped areas, or where native vegetation is converted to pasture.
Conveyance	A mechanism for transporting water from one point to another, including but not limited to, pipes, ditches, and channels.

Term	Definition
Conveyance System	The drainage BMPs/facilities, both natural and constructed, that collect, contain, and provide for the flow of surface and stormwater from the highest points on the land down to a receiving water. The natural elements of the conveyance system include swales and small drainage courses, streams, rivers, lakes, and wetlands. The human-made elements of the conveyance system include gutters, ditches, pipes, channels, and most retention/detention BMPs.
Cover	The depth of soil, rock, and paving materials over a utility pipe, vault or structure. The vertical distance between finished grade and the top of the pipe or structure.
Critical Areas	At a minimum, areas that include wetlands; areas with a critical recharging effect on aquifers used for potable water; fish and wildlife habitat conservation areas; frequently flooded areas; geologically hazardous areas, including unstable slopes; and associated areas and ecosystems.
Critical Tree Root Zone	The area surrounding a tree trunk where the roots of the tree should not be disturbed. The radius of the area is usually based on the trunk diameter at breast height and tree species.
CULD	Conditional Use Level Designation, a mid-level approval designation by Ecology for the assessment of new runoff treatment technologies. CULD allows use of a manufactured treatment system during its field testing period, subject to specific conditions.
Culvert	Pipe or concrete box structure that drains open channels, swales, or ditches under a roadway or embankment. Typically has no catch basins or manholes along its length.
Cut	Portion of land surface or area from which earth has been removed or will be removed by excavating; the depth below original ground surface to excavated surface.
Cut Slope	A slope formed by excavating overlying material to connect the original ground surface with a lower ground surface created by the excavation. A cut slope is distinguished from a bermed slope, which is constructed by importing soil to create the slope.
Cut and Fill	Process of earth moving by excavating part of an area and using the excavated material for adjacent embankments or fill areas.
Dead Storage	The volume available in a depression in the ground below any conveyance system, or surface drainage pathway, or outlet invert elevation that could allow the discharge of surface and stormwater runoff.
Dedication (of Land)	Setting aside land for a specific use or function. More specifically, the deliberate appropriation of land by an owner for any general and public uses, reserving to him- or herself no other rights than such as are compatible with the full exercise and enjoyment of the public uses to which the property has been devoted. The intention to dedicate land within a subdivision or short subdivision shall be evidenced by the owner by the presenting for filing a final plat or short plat showing the dedication thereon; and the acceptance by the public shall be evidenced by the approval of such plat for filing by the appropriate governmental unit. See RCW 58.17.020(3).

Term	Definition
Degradation	The breakdown (biological or chemical) of complex organic or other chemical compounds into simpler substances, usually less harmful than the original compound, as with the degradation of a persistent pesticide. The (geological) wearing down by erosion. The lowering of the water quality of a watercourse by an increase in the pollutant loading.
Degraded (Disturbed) Wetland (Community)	A wetland (community) in which the vegetation, soils, and/or hydrology have been adversely altered, resulting in lost or reduced functions and values. Generally, implies topographic isolation; hydrologic alterations such as hydroperiod alteration (increased or decreased quantity of water), diking, channelization, and/or outlet modification; soils alterations such as presence of fill, soil removal, and/or compaction; accumulation of toxicants in the biotic or abiotic components of the wetland; and/or low plant species richness with dominance by invasive weedy species.
Denitrification	The biochemical reduction of nitrates or nitrites in the soil or organic deposits to ammonia or free nitrogen.
Design Engineer	The professional civil engineer licensed in Washington State who prepares the analysis, design, and engineering plans for an applicant's permit or approval submittal.
Design Storm Frequency	The anticipated period in years that will elapse, based on average probability of storms in the design region, before a storm of a given intensity and/or total volume will recur; thus a 10-year recurrence interval storm can be expected to occur on the average once every 10 years. Conveyances designed to handle flows that occur under such storm conditions would be expected to be surcharged by any storms of greater amount or intensity.
Design Storm (Design Event)	A prescribed hyetograph and total precipitation amount (for a specific duration recurrence frequency) used to estimate runoff for a hypothetical storm of interest or concern for the purposes of analyzing existing drainage, designing new drainage facilities or assessing other impacts of a proposed project on the flow of surface water. (A hyetograph is a graph of percentages of total precipitation for a series of time steps representing the total time during which the precipitation occurs.)
Design Year Average Daily Traffic	The planned average daily traffic 5 years after the road is scheduled to be built.
Detention	The release of stormwater runoff from the site at a slower rate than it is collected by the stormwater facility system, the difference being held (detained) in temporary storage.
Detention BMP	An above or below ground BMP, such as a pond or tank, that temporarily stores stormwater runoff and subsequently releases it at a slower rate than it is collected by the drainage BMP system. There is little or no infiltration of stored stormwater.
Detention Pond	A detention BMP in the form of an open pond.
Detention Time	The theoretical time required to displace the contents of a stormwater treatment facility at a given rate of discharge (volume divided by rate of discharge).
Developer	The person or legal entity who holds title to the property or has a sufficient interest in the project to propose the project. The developer of the project.
Development	New development, redevelopment, or both. See definitions for each.

Term	Definition
Director	The Director of City of Lacey Public Works, or designee, as necessary to ensure compliance with the requirements of this manual (or its technical equivalent) unless explicitly referenced otherwise.
Discharge	Runoff leaving a new development or redevelopment via overland flow, built conveyance systems, or infiltration facilities. A hydraulic rate of flow, specifically fluid flow; a volume of fluid passing a point, per unit of time, commonly expressed as cubic feet per second, cubic meters per second, gallons per minute, gallons per day, or millions of gallons per day.
Dispersion	The release of surface and stormwater runoff such that the flow spreads over a wide area and is located so as not to allow flow to concentrate anywhere upstream of a drainage channel with erodible, underlying, granular soils.
Disturbed Area	An area inside project boundaries altered from its natural state.
Disturbed Soils	An area inside the project boundaries where the soils have reduced infiltration, retention, and soil permeability, compared to what would be present in a forested or prairie state, due to previous development or land use.
Ditch	A long narrow excavation dug in the earth for drainage with its top width less than 10 feet at design flow.
Drain	A buried pipe or other conduit (closed drain). A ditch (open drain) for carrying off surplus surface water or groundwater.
(To) Drain	To provide channels, such as open ditches or closed drains, so that excess water can be removed by surface flow or by internal flow. To lose water (from the soil) by percolation.
Drainage	Refers to the collection, conveyance, containment, and/or discharge of surface and stormwater runoff.
Drainage Basin	A geographic and hydrologic subunit of a watershed.
Drainage Channel	A drainage pathway with a well-defined bed and banks indicating frequent conveyance of surface and stormwater runoff.
Drainage Course	A pathway for watershed drainage characterized by wet soil vegetation; often intermittent in flow.
Drainage Easement	A legal encumbrance that is placed against a property's title to reserve specified privileges for the users and beneficiaries of the drainage facilities contained within the boundaries of the easement.
Drainage Path	The route that surface and stormwater runoff follows downslope as it leaves any part of the site.
Drainage Review	An evaluation by City of Lacey staff of a proposed project's compliance with the drainage requirements in this manual (or its technical equivalent) and other applicable criteria.
Drainage System	Refers to the combination of BMPs, collection, conveyance, retention, detention, treatment, and outfall features or structures on a project.
Drawdown	Lowering of the water surface (in basins or open channel flow), water table, or piezometric surface (in groundwater flow) resulting from a withdrawal of water.

Term	Definition
Driveway	A vehicle driving surface within a single lot or parcel that connects a building or structure with a road, shared access facility, alley, or vehicle driving surface within an ingress/egress easement (or tract). A driveway begins at the right-of-way line, private road easement (or tract) line, shared access easement (or tract) line, alley easement (or tract) line, or ingress/egress easement (or tract) line, and extends to the building or structure.
Driveway Approach	A privately maintained vehicle driving surface that provides a transition between a road and a driveway, a road and a shared access facility, or a road and an alley.
Earth/Earth Material	Any rock, natural soil or fill and/or any combination thereof. Earth material shall not be considered topsoil used for landscape purposes. Topsoil used for landscaped purposes shall comply with ASTM D5268 specifications. See also Engineered Soil.
Earthwork	Means any operation involving the excavation, grading, filling, or moving of earth materials.
Easement	The legal right to use a described parcel of land for a particular purpose. It does not include fee ownership, but may restrict the owner's use of the land.
Ecology	Washington State Department of Ecology.
Effective Impervious Surface	Those impervious surfaces that are connected via sheet flow or discrete conveyance to a drainage system. See also Ineffective Impervious Surface.
Embankment	A structure of earth, gravel, or similar material raised to form a pond bank or foundation for a road, building pad, or similar fill for a particular use.
Emergency Spillway	A channel used to safely convey flood discharges in excess of the capacity of the principal outlet, or in the event of a failure of the outlet to function as designed, e.g., a blockage.
Emergent Plants/ Vegetation	Aquatic plants that are rooted in the sediment but whose leaves are at or above the water surface. These wetland plants often have high habitat value for wildlife and waterfowl, and can aid in pollutant uptake.
Emerging Technology	Treatment technologies that have not been evaluated with approved protocols, but for which preliminary data indicate that they may provide a necessary function(s) in a stormwater treatment system. Emerging technologies need additional evaluation to define design criteria to achieve, or to contribute to achieving, state performance goals, and to define the limits of their use.
Energy Dissipator	Any means by which the total energy of flowing water is reduced. In stormwater design, they are usually mechanisms that reduce velocity prior to, or at, discharge from an outfall in order to prevent erosion. They include rock splash pads, drop manholes, concrete stilling basins or baffles, and check dams.
Energy Gradient	The slope of the specific energy line (i.e., the sum of the potential and velocity heads).
Engineer	A professional engineer currently licensed in Washington State in civil engineering, retained by and acting on behalf of the applicant. The term "engineer" also means design engineer and project engineer.

Term	Definition
Engineered Soil	A self-sustaining soil and plant system that simultaneously supports plant growth, soil microbes, water infiltration, nutrient and pollutant adsorption, sediment and pollutant biofiltration, water interflow, and pollution decomposition. The system shall be protected from compaction and erosion, and shall be planted and/or mulched as part of the installation. The engineered soil/plant system shall have the following characteristics: a. Be protected from compaction and erosion. b. Have a plant system to support a sustained soil quality. c. Possess permeability characteristics of not less than 6.0, 2.0, and 0.6 inches/hour for hydrologic soil groups A, B, and C, respectively (per ASTM D3385). D is less than 0.6 inch/hour. d. Possess minimum percent organic matter of 12, 14, 16, and 18 percent (dry-weight basis) for hydrologic soil groups A, B, C, and D, respectively (per ASTM D2974).
Engineering Geologist	A geologist who, by reason of his or her knowledge of engineering geology, acquired by education and practical experience, is qualified to engage in the practice of engineering geology, has met the qualifications in engineering geology established under Chapter 18.220 RCW, and has been issued a license in engineering geology (L.E.G.) by the Washington State geologist licensing board.
Engineering Plan	A plan prepared and stamped by a professional civil engineer.
Environmental Impact Statement	A document that discusses the likely significant adverse impacts of a proposal, ways to lessen the impacts, and alternatives to the proposal. They are required by the national and state environmental policy acts when projects are determined to have significant environmental impact.
Environmentally Sensitive Area (Sensitive Area)	See Chapter 16.54 LMC.
Erodible Soils	Soil materials that are easily eroded and transported by running water, typically fine or medium grained sand with minor gravel, silt, or clay content. Such soils are commonly described as Everett or Indianola series soil types in the NRCS classification. Also included are any soils showing examples of existing severe stream channel incision as indicated by unvegetated stream banks standing over 2 feet high above the base of the channel.
Erodible or Leachable Materials	Wastes, chemicals, or other substances that measurably alter the physical or chemical characteristics of runoff when exposed to rainfall. Examples include erodible soils that are stockpiled, uncovered process wastes, manure, fertilizers, oily substances, ashes, kiln dust, and garbage dumpster leakage.

Term	Definition
Erosion	The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep. Also, detachment and movement of soil or rock fragments by water, wind, ice, or gravity. The following terms are used to describe different types of water erosion: • Accelerated erosion – Erosion much more rapid than normal or geologic erosion, primarily from the influence of the activities of man or, in some cases, of the animals or natural catastrophes that expose bare surfaces (e.g., fires). • Geological erosion – The normal or natural erosion caused by geological processes acting over long geologic periods and resulting in the wearing of mountains, the building up of floodplains, coastal plains, etc. Synonymous with natural erosion. • Gully erosion – The erosion process whereby water accumulates in narrow channels and, over short periods, removes the soil from this narrow area to considerable depths, ranging from 1 to 2 feet to as much as 75 to 100 feet. • Natural erosion – Wearing away of the Earth's surface by water, ice, or other natural agents under natural environmental conditions of climate, vegetation, etc., undisturbed by man. Synonymous with geological erosion. • Normal erosion – The gradual erosion of land used by man that does not greatly exceed natural erosion. • Rill erosion – An erosion process in which numerous small channels only several inches deep are formed; occurs mainly on recently disturbed and exposed soils. See Rill. • Sheet erosion – The removal of a fairly uniform layer of soil from the land surface by runoff. • Splash erosion – The spattering of small soil particles caused by the impact of raindrops on wet soils. The loosened and spattered particles may or may not be subsequently removed by surface runoff.
Erosion and Sediment Control	Any temporary or permanent measures taken to reduce erosion, control siltation and sedimentation, and ensure that sediment-laden water does not leave the site.
Erosive	To permit or cause erosion; tending to erode.
Eutrophication	Refers to the process where nutrient over-enrichment of water leads to excessive growth of aquatic plants, especially algae.
Evapotranspiration	The collective term for the processes of evaporation and plant transpiration by which water is returned to the atmosphere.
Excavation	The mechanical removal of earth material.
Exception	Relief from the application of a core requirement to a project.
Exfiltration	The downward movement of runoff through the bottom of an infiltration BMP into the soil layer or the downward movement of water through soil.

Term	Definition
Existing Site Conditions	Existing site conditions may be described as follows: • For previously developed sites with stormwater facilities that have been constructed to meet the standards of this manual, this shall mean the current conditions on the site. • For previously developed sites that do not have stormwater facilities that meet the standards of this manual, existing site conditions shall be considered under redevelopment regulations • For undeveloped sites, this shall mean the condition of the site prior to the influence of Euro-American settlement. The predeveloped condition shall be assumed to be forested land cover unless reasonable, historical information is provided that indicates the site was prairie prior to settlement. • Exception: If the site is located in a critical and/or sensitive area that affects drainage as defined by city ordinances, the Director may require that a more restrictive definition of existing site conditions be utilized for calculating runoff characteristics.
Fertilizer	Any material or mixture used to supply one or more of the essential plant nutrient elements.
Fill	“Fill or fill material” means the deposit of organic or inorganic material by human or mechanical means.
Filter Fabric	A woven or non-woven, water-permeable material generally made of synthetic products, such as polypropylene, and used in stormwater management and erosion and sedimentation control applications to trap sediment or prevent the clogging of aggregates by fine soil particles.
Filter Strip	A grassy area with gentle slopes that treats stormwater runoff from adjacent paved areas before it concentrates into a discrete channel.
Flocculation	The process by which suspended colloidal or very fine particles are assembled into larger masses or floccules that eventually settle out of suspension. This process occurs naturally but can also be caused by such chemicals as alum.
Flood	“Flood” or “flooding” means a general and temporary condition of partial or complete inundation of normally dry land areas from: 1) the overflow of inland or tidal waters, and/or 2) the unusual and rapid accumulation of runoff of surface waters from any source.
Flood Control	Methods or facilities for reducing flood risks and the extent of flooding.
Flood Hazard Areas	Those areas subject to inundation by the base flood. Includes, but is not limited to streams, lakes, wetlands, and closed depressions. Also referred to as special flood hazard areas.
Flood Protection Facility	Any levee, berm, wall, enclosure, raise bank, revetment, constructed bank stabilization, or armoring, that is commonly recognized by the community as providing significant protection to a property from inundation by flood waters.
Flood Stage	The stage at which overflow of the natural banks of a stream begins.
Floodplain	The total area subject to inundation by a flood including the flood fringe and floodway.

Term	Definition
Flow Control BMP	A drainage BMP designed to mitigate the impacts of increased surface and stormwater runoff flow rates generated by development. Flow control BMPs are designed either to hold water for a considerable length of time and then release it by evaporation, plant transpiration, and/or infiltration into the ground, or to hold runoff for a short period of time, releasing it to the conveyance system at a controlled rate.
Flow Duration	The aggregate time that peak flows are at or above a particular flow rate of interest. For example, the amount of time that peak flows are at or above 50 percent of the 2-year recurrence interval peak flow rate for a period of record.
Flow Frequency	The inverse of the probability that the flow will be equaled or exceeded in any given year (the exceedance probability). For example, if the exceedance probability is 0.01 or 1 in 100, that flow is referred to as the 100-year recurrence interval flow.
Flow Path	The route that surface water follows between two points of interest.
Forebay	An easily maintained, extra storage area provided near an inlet of a BMP to trap incoming sediments before they accumulate in a pond or wetland BMP.
Forest Practice	Any activity conducted on or directly pertaining to forest land and relating to growing, harvesting, or processing timber, including but not limited to: road and trail construction, harvesting, final and intermediate, precommercial thinning, reforestation, fertilization, prevention and suppression of diseases and insects, salvage of trees, brush control.
Freeboard	The vertical distance between the highest designed water surface elevation and the elevation of the crest of the facility. For example, in pond design, freeboard is the vertical distance between the emergency overflow water surface and the crest of the facility.
Functions (Wetland)	The ecological (physical, chemical, and biological) processes or attributes of a wetland. Functions are often defined in terms of the processes that provide value to society, but they can be defined on processes that are not value based. Wetland functions include food chain support, provision of ecosystem diversity and fish and wildlife habitat, flood flow alteration, groundwater recharge and discharge, water quality improvement, and soil stabilization.
Gabion	A rectangular or cylindrical wire mesh cage filled with rock and used as a protecting agent, revetment, etc., against erosion. Soft gabions, often used in stream bank stabilization, are made of geotextiles filled with dirt, in between which cuttings are placed.
Gauge	A measure of the thickness of metal. Also, a measuring device for registering precipitation, water level, discharge, velocity, pressure, temperature, etc.
Geologist	A person who has earned a degree in geology from an accredited college or university or who has equivalent educational training and has at least 5 years of experience as a practicing geologist or 4 years of experience and at least 2 years of post-graduate study, research, or teaching. The practical experience shall include at least 3 years of work in applied geology and landslide evaluation, in close association with qualified practicing geologists or geotechnical professional/civil engineers. Per RCW 18.220.010, a “geologist” is a person who, by reason of his or her knowledge of geology, mathematics, the environment, and the supporting physical and life sciences, acquired by education and practical experience, has met the qualifications established under Chapter 18.220 RCW, and has been issued a certificate of licensing as a geologist (L.G.) by the Washington State geologist licensing board.

Term	Definition
Geology	The science of the Earth's physical properties, composition, history, and processes by which it evolves. The science of geology includes: the origin and history of the Earth; the investigation of the Earth's constituent rocks, minerals, solids, and fluids, including surface and underground waters, gases, and other materials; and the study of the natural agents, forces and processes that cause changes in the Earth.
Geometrics	The mathematical relationships between points, lines, angles, and surfaces used to measure and identify areas of land.
Geotechnical Professional	A person with experience and training in analyzing, evaluating, and mitigating any of the following: landslide, erosion, seismic, and/or mine hazards, or fluvial geomorphology and river dynamics. A geotechnical professional shall be licensed in Washington State as an engineering geologist or professional engineer. Per WAC 308-15-140 and 196-27-020, engineering geologists and professional engineers shall affix their signatures or seals only to plans or documents dealing with subject matter in which they are qualified by training or experience.
Geotechnical Engineer	A civil engineer who has specialized in the design and construction aspects of earth materials. A practicing geotechnical/civil engineer licensed as a professional civil engineer with Washington State who has at least 4 years of professional employment as a geotechnical engineer in responsible charge, including experience with landslide evaluation.
Glacial Till	A glacial deposit consisting of a poorly-sorted, unstratified mixture of clay, silt, sand, gravel, and cobbles that has been deposited under glacial ice. As "basal till," compressed under glacial weight, and commonly found in the Lacey area as a shallow subsurface layer having an extremely low permeability. See also Hardpan.
Grade	The slope of a road, channel, or natural ground. The finished surface of a canal bed, roadbed, top of embankment, or bottom of excavation; any surface prepared for the support of construction such as paving or the laying of a conduit.
(To) Grade	To finish the surface of a ditch, roadbed, top of embankment or bottom of excavation.
Gradient Terrace	An earth embankment or a ridge-and-channel constructed with suitable spacing and an acceptable grade to reduce erosion damage by intercepting surface runoff and conducting it to a stable outlet at a stable nonerosive velocity.
Grading	Any excavating, filling, clearing, or creating of hard surfaces or combination thereof.
Grassed Waterway	A natural or constructed waterway, usually broad and shallow, covered with erosion-resistant grasses, used to conduct surface water from an area at a reduced flow rate. See also Biofilter.
Groundwater	Water in a saturated zone or stratum beneath the land surface or a surface water body.
Groundwater Recharge	Inflow to a groundwater reservoir.

Term	Definition
Groundwater Table	The free surface of the groundwater, that surface subject to atmospheric pressure under the ground, generally rising and falling with the season, the rate of withdrawal, the rate of restoration, and other conditions. It is seldom static.
Grubbing	Means the removal and disposing of all unwanted vegetative matter from underground, such as sod, stumps, roots, buried logs, or other debris.
GULD	General Use Level Designation, the highest-level approval designation by Ecology for the assessment of new runoff treatment technologies. GULD allows use of a manufactured treatment system under specific conditions of approval.
Gully	A channel caused by the concentrated flow of surface and stormwater runoff over unprotected, erodible land.
Habitat	The specific area or environment in which a particular type of plant or animal lives. An organism's habitat must provide all of the basic requirements for life and should be protected from harmful biological, chemical, and physical alterations.
Hard Surface	An impervious surface, a permeable pavement, or a vegetated roof.
Hardpan	A layer of soil that has become relatively hard and impermeable, and impenetrable by roots, usually through the decomposition of minerals. Sometimes used in casual reference to glacial till.
Head (Hydraulics)	The height of water above any plane of reference. The energy, either kinetic or potential, possessed by each unit weight of a liquid, expressed as the vertical height through which a unit weight would have to fall to release the average energy possessed. Used in various compound terms such as pressure head, velocity head, and head loss.
Head Loss	Energy loss due to friction, eddies, changes in velocity, or direction of flow.
Heavy Metals	Metals of high specific gravity, present in municipal and industrial wastes that pose long-term environmental hazards. Examples include cadmium, chromium, cobalt, copper, lead, mercury, nickel, and zinc.
High-Use Site	High-use sites are those that typically generate high concentrations of oil due to high traffic turnover or the frequent transfer of oil. High-use sites include: • An area of a commercial or industrial site subject to an expected average daily traffic count equal to or greater than 100 vehicles per 1,000 square feet of gross building area; • An area of a commercial or industrial site subject to petroleum storage and transfer in excess of 1,500 gallons per year, not including routinely delivered heating oil; • An area of a commercial or industrial site subject to parking, storage or maintenance of 25 or more vehicles that are over 10 tons gross weight (trucks, buses, trains, heavy equipment, etc.); • A road intersection with a measured count of 25,000 vehicles or more on the main roadway and 15,000 vehicles or more on any intersecting roadway, excluding projects proposing primarily pedestrian or bicycle use improvements.
Highway	A main public road connecting towns and cities.
Hog Fuel	See Wood-Based Mulch.

Term	Definition
Hydraulic Conductivity	The quality of saturated soil that enables water or air to move through it; a permeability coefficient, related to the fluid density and viscosity, describing the rate at which water can move through a permeable medium. The coefficient, K, has units of length/time, or velocity.
Hydraulic Gradient	Slope of the potential head relative to a fixed datum. The change in total head per change in distance, in the direction of decreasing head. Also referred to as the hydraulic grade line.
Hydrogeology	The study of the interrelationships of geologic materials and processes with water, especially groundwater. Hydrogeology is a science that involves the study of the waters of the Earth, including the occurrence, circulation, distribution, chemistry, and quality of water, and its role as a natural agent that causes changes in the Earth, and the collection of data concerning waters and their interaction with other materials in the atmosphere, on the Earth's surface, or in the interior of the Earth.
Hydrograph	A graph of runoff rate, inflow rate or discharge rate, past a specific point over time.
Hydrologic Cycle	The circuit of water movement from the atmosphere to the Earth and return to the atmosphere through various stages or processes as precipitation, interception, runoff, infiltration, percolation, storage, evaporation, and transpiration.
Hydrologic Soil Groups	A soil characteristic classification system defined by the NRCS in which a soil may be categorized into one of four soil groups (A, B, C, or D) based upon infiltration rate and other properties. • Type A: Low runoff potential. Soils having high infiltration rates, even when thoroughly wetted, and consisting chiefly of deep, well drained to excessively drained sands or gravels. These soils have a high rate of water transmission • Type B: Moderately low runoff potential. Soils having moderate infiltration rates when thoroughly wetted, and consisting chiefly of moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission. • Type C: Moderately high runoff potential. Soils having slow infiltration rates when thoroughly wetted, and consisting chiefly of soils with a layer that impedes downward movement of water, or soils with moderately fine to fine textures. These soils have a slow rate of water transmission. • Type D: High runoff potential. Soils having very slow infiltration rates when thoroughly wetted, and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a hardpan, till, or clay layer at or near the surface, soils with a compacted subgrade at or near the surface, and shallow soils or nearly impervious material. These soils have a very slow rate of water transmission (Novotny and Olem 1994).
Hydrological Simulation Program—Fortran (HSPF)	A continuous simulation hydrologic model that transforms an uninterrupted rainfall record into a concurrent series of runoff or flow data by means of a set of mathematical algorithms that represent the rainfall-runoff process at some conceptual level.
Hydrology	The science of the behavior of water in the atmosphere, on the surface of the earth, and underground.

Term	Definition
Hydroperiod	A seasonal occurrence of flooding and/or soil saturation, generally used in reference to wetlands; it encompasses depth, frequency, duration, and seasonal pattern of inundation.
Hyetograph	A graph of rainfall intensity (often in inches per hour) over time at a single point.
Illicit Connection	Any infrastructure connection to the MS4 that is not intended, permitted, or used for collecting and conveying stormwater or non-stormwater discharges allowed as specified in the city's NPDES Municipal Stormwater Permit.
Illicit Discharge	All non-stormwater discharges to stormwater drainage systems that cause or contribute to a violation of state water quality, sediment quality or groundwater quality standards, including but not limited to sanitary sewer connections, industrial process water, interior floor drains, car washing, and greywater systems.
Impermeable Liner (or Low-Permeability Liner)	A layer of compacted till or clay, or a synthetic geomembrane, intended to restrict infiltration.
Impervious	A surface that cannot be easily penetrated. For instance, rain does not readily penetrate paved surfaces.
Impervious Surface	A non-vegetated surface area that either prevents or retards the entry of water into the soil mantle as under natural conditions prior to development. A non-vegetated surface area that causes water to run off the surface in greater quantities or at an increased rate of flow from the flow present under natural conditions prior to development. Common impervious surfaces include, but are not limited to, rooftops, walkways, patios, driveways, parking lots or storage areas, concrete or asphalt paving, gravel roads, packed earthen materials, and oiled, macadam or other surfaces that similarly impede the natural infiltration of stormwater. Open, uncovered retention/detention facilities shall not be considered as impervious surfaces for the purposes of determining whether the thresholds for application of core requirements are exceeded. Open, uncovered retention/detention facilities shall be considered impervious surfaces for purposes of runoff modeling.
Impoundment	A natural or constructed containment for surface water.
Improvement	Streets (with or without curbs or gutters), sidewalks, crosswalks, parking lots, water mains, sanitary and storm sewers, drainage facilities, street trees, and other appropriate items.
Industrial Activities	Material handling, transportation, or storage; manufacturing; maintenance; treatment; or disposal. Areas with industrial activities include plant yards, access roads and rail lines used by carriers of raw materials, manufactured products, waste material, or by-products; material handling sites; refuse sites; sites used for the application or disposal of process wastewaters; sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to stormwater.

Term	Definition
Ineffective Impervious Surfaces	Impervious surfaces are considered ineffective if: 1. The runoff is dispersed through at least 100 feet of native vegetation in accordance with Full Dispersion as described in Chapter 7, Section 7.4.2; 2. Residential roof runoff is infiltrated in accordance with Downspout Infiltration Systems Chapter 7, Section 7.4.10; or 3. Approved continuous runoff modeling methods indicate that the entire runoff file is infiltrated.
Infiltration	The downward movement of water from the land surface into and through the upper soil layers to the subsoil.
Infiltration Facility (or System)	A drainage facility designed to use the hydrologic process of surface and stormwater runoff soaking into the ground, commonly referred to as a percolation, to dispose of surface and stormwater runoff.
Infiltration Rate	The rate, usually expressed in inches/hour, at which water moves downward (percolates) through the soil profile. Short-term infiltration rates may be inferred from soil analysis or texture or derived from field measurements. Long-term infiltration rates are affected by variability in soils and subsurface conditions at the site, the effectiveness of pretreatment or influent control, and the degree of long-term maintenance of the infiltration facility.
Ingress/Egress	The points of access to and from a property.
Inlet	A form of connection between surface of the ground and a drain or MS4 for the admission of surface and stormwater runoff.
Insecticide	A substance, usually chemical, that is used to kill insects.
Interception (Hydraulics)	The process by which precipitation is caught and held by foliage, twigs, and branches of trees, shrubs, and other vegetation. Often used for “interception loss” or the amount of water evaporated from the precipitation intercepted.
Interflow	That portion of rainfall that infiltrates into the soil and moves laterally through the upper soil horizons until intercepted by a stream channel or until it returns to the surface, for example, in a roadside ditch, wetland, spring, or seep. Interflow is a function of the soil system depth, permeability, and water-holding capacity.
Intermittent Stream	A stream where portions flow continuously only at certain times of the year, for example, when it receives water from a spring, groundwater source, or surface source, such as melting snow (i.e., seasonal). At low flow there may be dry segments alternating with flowing segments.
International Building Code (IBC)	The most recent version of the International Building Code adopted by the City of Lacey.
Invasive Species	Opportunistic plant species (either native or nonnative) that colonize disturbed ecosystems and come to dominate the plant community in ways that are commonly viewed as reducing the values provided by the previous plant community. Most often, opportunistic plants are considered invasive if they reduce the value of an area as habitat for valuable species.
Invert	The lowest point on the inside of a pipe or other conduit.
Invert Elevation	The vertical elevation of a pipe or orifice in a pond that defines the water level.
Isopluvial Map	A map with lines representing constant depth of total precipitation for a given return frequency and duration.

Term	Definition
Junction	Point where two or more drainage pipes or channels converge (e.g., manhole).
Lake	An area permanently inundated by water in excess of 2 meters deep and greater than 20 acres in size as measured at the ordinary high water marks.
Land-Disturbing Activity	Any activity that results in a change in the existing soil cover (both vegetative and nonvegetative) and/or the existing soil topography. Land-disturbing activities include, but are not limited to, clearing, grading, filling, and excavation. Compaction that is associated with stabilization of structures and road construction shall also be considered a land-disturbing activity. Vegetation maintenance practices, including landscape maintenance and gardening, are not considered land-disturbing activity. Stormwater facility maintenance is not considered land-disturbing activity if conducted according to established standards and procedures.
Landscaping	The improvement or installation on a parcel or portion thereof of objects or vegetation for decorative or ornamental effect. Examples include trees, bushes, shrubs, flowers, grass, weeds, ornamental rocks or figures, low-lying ground cover, sprinkler systems, sidewalks, and lighting fixtures.
Landslide	Episodic downslope movement of a mass of soil or rock that includes but is not limited to rockfalls, slumps, mudflows, and earthflows. For the purpose of this manual, snow avalanches are considered to be a special case of landsliding.
Landslide Hazard Areas	Those areas subject to a severe risk of landslide.
Leachable Materials	Those substances that, when exposed to rainfall, measurably alter the physical or chemical characteristics of the rainfall runoff. Examples include erodible soils, uncovered process wastes, manure, fertilizers, oil substances, ashes, kiln dust, and garbage dumpster leakage.
Leaching	Water or other liquid that has been contaminated by dissolved or suspended materials due to contact with solid waste or gases.
Legume	A member of the legume or pulse family, *Leguminosae*, one of the most important and widely distributed plant families. Practically all legumes are nitrogen-fixing plants.
Level Pool Routing	The basic technique of storage routing used for sizing and analyzing detention storage and determining water levels for ponding water bodies. The level pool routing technique is based on the continuity equation: Inflow – Outflow = Change in storage.
Level Spreader	A device used to spread out stormwater runoff uniformly over the ground surface as sheet flow (i.e., not through channels). The purpose of level spreaders is to prevent concentrated, erosive flows from occurring, and to enhance infiltration.
Live Storage	The amount of storage in a stormwater facility that is intended to completely drain after a storm event.
Local Government	Any county, city, town, or special purpose district having its own incorporated government for local affairs, such as the City of Lacey.
Lot	A designated parcel, tract, or area of land established by plat, subdivision, or as otherwise permitted by law, to be used, developed, or built upon as a unit.

Term	Definition
Low Impact Development (LID)	A stormwater and land use management strategy that strives to mimic predisturbance hydrologic processes of infiltration, filtration, storage, evaporation and transpiration by emphasizing conservation, use of on-site natural features, site planning, and distributed stormwater management practices that are integrated into a project design.
Low Impact Development Best Management Practices (LID BMPs)	Distributed stormwater management practices, integrated into a project design, that emphasize predisturbance hydrologic processes of infiltration, filtration, storage, evaporation, and transpiration. LID BMPs include, but are not limited to: bioretention, rain gardens, permeable pavements, roof downspout controls, dispersion, post-construction soil quality and depth, minimal excavation foundations, vegetated roofs, and rainwater harvesting.
Maintenance	Activities conducted on currently serviceable structures, facilities, and equipment that involves no expansion or use beyond that previously existing and resulting in no significant adverse hydrologic impact. Maintenance includes those usual activities taken to prevent a decline, lapse, or cessation in the use of structures and systems. Those usual activities may include replacement of dysfunctional facilities, including cases where environmental permits require replacing an existing structure with a different type of structure, as long as the functioning characteristics of the original structure are not changed. One example is the replacement of a collapsed, fish blocking, round culvert with a new box culvert under the same span, or width, of roadway. In regard to stormwater facilities, maintenance includes assessment to ensure ongoing proper operation, removal of built-up pollutants (i.e., sediments), replacement of failed or failing treatment media, and other actions taken to correct defects as identified in the maintenance checklists of Chapter 10.
Manning's Equation	An equation used to predict the velocity of water flow in an open channel or pipelines: $V = \frac{1.486R^{2/3}S^{1/2}}{N}$ where: V is the mean velocity of flow in feet per second R is the hydraulic radius in feet S is the slope of the energy gradient or, for assumed uniform flow, the slope of the channel in feet per foot; and N is Manning's roughness coefficient or retardance factor of the channel lining.
Manual, The	The City of Lacey Stormwater Design Manual including all amendments, corrections, and changes made through subsequent city ordinance.
Material	Any solid or semi-solid substance that displaces volume.
Maximum Extent Practicable	Refers to a paragraph of the federal Clean Water Act, which reads (in part): "Permits for discharges from municipal storm sewers shall require controls to reduce the discharge of pollutants to the maximum extent practicable, including management practices, control techniques, and system, design and engineering methods … for the control of such pollutants."

Term	Definition
Metals	Elements, such as mercury, lead, nickel, zinc and cadmium, which are of environmental concern because they can be toxic to life in high enough concentrations and do not degrade over time. Although many are necessary nutrients, they are sometimes magnified in the food chain. Some are also referred to as heavy metals.
Microbes	The lower trophic levels of the soil food web. They are normally considered to include bacteria, fungi, flagellates, amoebae, ciliates, and nematodes. These in turn support the higher trophic levels, such as mites and earthworms. Together they are the basic life forms that are necessary for plant growth. Soil microbes also function to bioremediate pollutants such as petroleum, nutrients, and pathogens.
Mitigation	Means, in the following order of preference: a. Avoiding the impact altogether by not taking a certain action or part of an action; b. Minimizing impacts by limiting the degree or magnitude of the action and its implementation, by using appropriate technology, or by taking affirmative steps to avoid or reduce impacts; c. Rectifying the impact by repairing, rehabilitating or restoring the affected environment; d. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and e. Compensating for the impact by replacing, enhancing, or providing substitute resources or environments.
Modification, Modified (Wetland)	A wetland whose physical, hydrological, or water quality characteristics have been purposefully altered for a management purpose, such as by dredging, filling, forebay construction, and inlet or outlet control.
Monitor	To systematically and repeatedly measure something in order to track changes.
Monitoring	The collection of data by various methods for the purposes of understanding natural systems and features, evaluating the impacts of development proposals on such systems, and assessing the performance of mitigation measures imposed as conditions of development.
MS4	Municipal separate storm sewer system. A system of conveyances (including streets, curbs, gutters, catch basins, pipes and ditches) owned or operated by a city or other public entity, that is used for collecting or conveying stormwater (excluding combined sewers).
Mulch	A layer of organic material or aggregate applied to the surface of soil. Its purpose is any or all of the following: • To conserve soil moisture or temperature • To improve the fertility and health of the soil • To reduce weed growth • To hold fertilizer, seed, and soil in place • To enhance the visual appeal of the area. Types of mulches used in this manual include: Chipped site vegetation, compost, hydromulch, wood-based or wood straw, wood strand, straw, and aggregate.

Term	Definition
Multifamily	Three or more living units under the same ownership where land has not been divided (i.e., triplex, quadraplex, condominiums, housing cooperatives and apartment units).
National Pollutant Discharge Elimination System (NPDES)	The part of the Clean Water Act that requires point source dischargers to obtain permits. These permits are referred to as NPDES permits and, in Washington, are administered by Ecology.
Native Growth Protection Easement	An easement granted for the protection of native vegetation within a sensitive area or its associated buffer. The native growth protection easement shall be recorded on the appropriate documents of title and filed with the Thurston County Records Division.
Native Vegetation	Vegetation comprising plant species, other than noxious weeds, that are indigenous to the coastal region of the Pacific Northwest and that reasonably could have been expected to naturally occur on the site. Examples include trees such as Douglas-fir, western hemlock, western red cedar, alder, big-leaf maple, and vine maple; shrubs such as willow, elderberry, salmonberry and salal; and herbaceous plants such as sword fern, foam flower, and fireweed.
Natural Channel	Stream, creek, river, lake, wetland, estuary, gully, swale, ravine, or any open conduit where water will concentrate and flow intermittently or continuously. Only includes constructed channels designed to mimic natural systems.
Natural Hydrologic Function	Refers to the processing of precipitation over and through the landscape in a forest or prairie condition. Includes evapotranspiration by on-site vegetation, storage of rainfall in the soil structure or on the soil surface within depressions in the topography, and the release of stormwater through either infiltration, interflow, or surface flow off the site.
Natural Location	The location of those channels, swales, and other non-constructed conveyance systems as defined by the first documented topographic contours existing for the subject property, from either maps or photographs, or such other means as appropriate. In the case of outwash soils with relatively flat terrain, no natural location of surface discharge may exist.
Natural Resources Conservation Service (NRCS)	Formerly the Soil Conservation Service (SCS), NRCS is an agency of the United States Department of Agriculture (USDA) that provides technical and financial assistance to farmers and other private landowners and managers.
New Development	Land-disturbing activities, including Class IV general forest practices that are conversions from timber land to other uses; structural development, including construction or installation of a building or other structure; creation of hard surfaces; and subdivision, short subdivision, and binding site plans, as defined and applied in Chapter 58.17 RCW. Projects meeting the definition of redevelopment shall not be considered new development.

Term	Definition
New Hard Surface	Hard surface created on or added to a site or structural development including construction, installation, or expansion of a building or other structure. Includes the addition of a hard or compacted surface like roofs, pavement, gravel, or dirt; or resurfacing by upgrading from dirt to gravel, asphalt, or concrete; upgrading from gravel to asphalt, or concrete; or upgrading from a bituminous surface treatment ("chip seal") to asphalt or concrete. New hard surface may also include existing hard surface that is removed and replaced. To be considered new, the removal and replacement activity must result in significant changes in hard surface locations, grade, and/or drainage system features, and/or must involve construction, installation, or expansion of a building or structure after complete or substantial intentional demolition thereof by or for the benefit of the applicant.
New Impervious Surface	A surface that is: • changed from a previous surface to an impervious surface (e.g., resurfacing by upgrading from dirt to gravel, a bituminous surface treatment ("chip seal"), asphalt, concrete, or an impervious structure); or • upgraded from gravel to chip seal, asphalt, concrete, or an impervious structure; or • upgraded from chip seal to asphalt, concrete, or an impervious structure. Note that if asphalt or concrete has been overlaid by a chip seal, the existing condition should be considered as asphalt or concrete.
Nitrate	A form of nitrogen that is an essential nutrient to plants. It can cause algal blooms in water if all other nutrients are present in sufficient quantities. It is a product of bacterial oxidation of other forms of nitrogen, from the atmosphere during electrical storms and from fertilizer manufacturing.
Nitrogen, Available	Usually ammonium, nitrite, and nitrate ions, and certain simple amines available for plant growth. A small fraction of organic or total nitrogen in the soil is available at any time.
Nonpoint Source Pollution	Pollution that enters a water body from diffuse origins on the watershed and does not result from discernible, confined, or discrete conveyances.
Normal Depth	The depth of uniform flow. This is a unique depth of flow for any combination of channel characteristics and flow conditions. Normal depth is calculated using Manning's Equation.
Notice of Intent	The application for coverage under a general stormwater permit in Washington State.
NPDES	The National Pollutant Discharge Elimination System as established by the Clean Water Act.
NRCS Method	A single-event hydrologic analysis technique for estimating runoff based on the Curve Number method. The Curve Numbers are published by NRCS in Technical Release No. 55: Urban Hydrology for Small Watersheds, 1986. May be referred to as the NRCS Method.
Nutrients	Essential chemicals needed by plants or animals for growth. Excessive amounts of nutrients can lead to degradation of water quality and algal blooms. Some nutrients can be toxic at high concentrations.

Term	Definition
NWTPH-Dx and NWTPH-Gx	Northwest Total Petroleum Hydrocarbon Analytical Methods used for compliance with the MTCA. NWTPH-Dx is a qualitative and quantitative method (extended) for semi-volatile (Diesel-range organics and heavy oils) petroleum products in water. NWTPH-Gx is a qualitative and quantitative method (extended) for volatile (gasoline-range organics) in water. See Ecology publication number ECY 97-602.
Off-Line Facilities	Runoff treatment facilities to which stormwater runoff is restricted to some maximum flow rate or volume by a flow-splitter.
Off Site (adverb)	Any area lying upstream of the (project) site that drains onto the site and any area lying downstream of the site to which the site drains. (Note: When used as an adjective, off site is hyphenated. For example: off-site storage.)
Oil-Water Separator	A vault, usually underground, designed to provide a quiescent environment to separate oil from water. See Chapter 8 for design criteria.
On-Line Facilities	Runoff treatment BMPs that receive all of the stormwater runoff from a drainage area. Flows above the water quality design flow rate or volume are passed through at a lower percent removal efficiency.
On Site (adverb)	The entire property that includes the proposed development. (Note: When used as an adjective, on site is hyphenated. For example: on-site vegetation.)
On-Site Stormwater Management BMPs	As used in this manual, a synonym for LID BMPs.
Operational BMPs	Operational BMPs are a type of Source Control BMP. They are schedules of activities, prohibition of practices, and other managerial practices to prevent or reduce pollutants from entering stormwater. Operational BMPs include formation of a pollution prevention team, good housekeeping, preventive maintenance procedures, spill prevention and cleanup, employee training, inspections of pollutant sources and BMPs, and record keeping. They can also include process changes, raw material/product changes, and recycling wastes.
Ordinary High Water Mark	The line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank; shelving; changes in the character of soil destruction on terrestrial vegetation, or the presence of litter and debris; or other appropriate means that consider the characteristics of the surrounding area. The mark on all lakes, streams, and tidal water that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation. In any area where the ordinary high water mark cannot be found, the ordinary high water mark adjoining fresh water shall be the line of mean high water.

Term	Definition
Organic Matter	Organic matter is decomposed animal or vegetable matter. It is measured by ASTM D2974. Organic matter is an important reservoir of carbon and a dynamic component of soil and the carbon cycle. It improves soil and plant efficiency by improving soil physical properties including drainage, aeration, and other structural characteristics. It contains the nutrients, microbes, and higher-form soil food web organisms necessary for plant growth. The maturity of organic matter is a measure of its beneficial properties. Raw organic matter can release water-soluble nutrients (similar to chemical fertilizer). Beneficial organic matter has undergone a humification process either naturally in the environment or through a composting process.
Orifice	An opening with closed perimeter, usually sharp-edged, and of regular form in a plate, wall, or partition through which water may flow, generally used for the purpose of measurement or control of water.
Outlet	Point of water disposal from a stream, river, lake, tidewater, or artificial drain.
Outlet Channel	A waterway constructed or altered primarily to carry water from artificial structures, such as terraces, tile lines, and diversions.
Outwash Soils	Soils formed from highly permeable sands and gravels deposited by glacial meltwater.
Overflow	A pipeline or conduit device, together with an outlet pipe, that provides for the discharge of portions of combined sewer flows into receiving waters or other points of disposal, after a regular device has allowed the portion of the flow that can be handled by interceptor sewer lines and pumping and treatment facilities to be carried by and to such water pollution control structures.
Overtopping	Flowing over the limits of a containment or conveyance element.
Parcel	Any portion, piece, or division of land. Fractional part or subdivision of block, according to plat or survey; portion of platted territory measured and set apart for individual and private use and occupancy.
Particle Size	The effective diameter of a particle as measured by sedimentation, sieving, or micrometric methods.
Pasture	Pasture vegetation is typically found in rural areas where the forest has been cleared and replaced with shrub or grass lots. Some pasture areas may be used to graze livestock. The interception storage and soil evapotranspiration capacity of pasture are less than forest. Soils may have also been compressed by mechanized equipment during clearing activities. Livestock can also compact soil. Pasture areas typically produce more runoff (particularly surface runoff and interflow) than forest areas.
Paved Road	A road that has been treated or covered with asphalt to create an oil mat surface; a road that has a bituminous surface treatment, asphalt, or cement concrete surface.
Peak Discharge	The maximum instantaneous rate of flow during a storm, usually in reference to a specific design storm event.
Percolation	The movement of water through soil.
Percolation Rate	The rate, often expressed in inches/hour, at which clear water, maintained at a relatively constant depth, will seep out of a standardized test hole that has been previously saturated. The term percolation rate is often used synonymously with infiltration rate (short-term infiltration rate).

Term	Definition
Permanent Stabilization	Permanent site stabilization is the covering of exposed surfaces through paving, gravels, landscaping materials, sodding, seeding, etc., but shall not mean the temporary use of erosion/sediment control materials unless used in conjunction with the above measures to aid in seed or landscaping vegetation establishment.
Permanent Stormwater Control Plan	A plan that includes permanent BMPs for the control of pollution from stormwater runoff after construction and/or land-disturbing activity has been completed.
Permeable Pavement	Pervious concrete, porous asphalt, permeable pavers or other forms of pervious or porous paving material intended to allow passage of water through the pavement section. It often includes an aggregate base that provides structural support and acts as a stormwater reservoir.
Permeable Soils	Soil materials with a sufficiently rapid infiltration rate to greatly reduce or eliminate surface and stormwater runoff. These soils are generally classified as NRCS hydrologic soil types A and B.
Person	Any individual, partnership, corporation, association, organization, cooperative, public or municipal corporation, agency of the state, or local government unit, however designated.
Pervious Surface	A surface material that allows stormwater to infiltrate into the ground. Examples include lawn, landscape, pasture, native vegetation areas, and permeable pavements.
Pesticide	A general term used to describe any substance—usually chemical—used to destroy or control organisms; includes herbicides, insecticides, rodenticides, algicides, fungicides, and others. Many of these substances are manufactured and are not naturally found in the environment. Others, such as pyrethrum, are natural toxins that are extracted from plants and animals.
pH	A measure of the alkalinity or acidity of a substance that is based on measuring the concentration of hydrogen ions in the substance. A pH of 7.0 indicates neutral water. A 6.5 reading is slightly acid.
Planned Unit Development (PUD)	A special classification authorized in some zoning ordinances, in which a unit of land under control of a single developer may be used for a variety of uses and densities, subject to review and approval by the local governing body. The locations of the zones are usually decided on a case-by-case basis.
Plat	A map or representation of a subdivision, short subdivision, large lot or binding site plan, showing thereon the division of a tract or parcel of land into lots, blocks, streets and alleys, or other divisions and dedications.
Point Discharge	The release of collected and/or concentrated surface and stormwater runoff from a pipe, culvert, or channel.
Point of Compliance	The location at which compliance with a discharge performance standard or a receiving water quality standard is measured.
Polishing	Additional treatment of a waste stream that has already received one or more stages of treatment by other means. This is also called advance treatment. The conditions present across a landscape after a specific stormwater management project (e.g., raising the outlet, building, and outlet control structure) are placed in the wetland or a land use change that occurs in the landscape unit that will potentially affect the wetland.

Term	Definition
Pollution	Contamination or other alteration of the physical, chemical, or biological properties, of waters of the state, including change in temperature, taste, color, turbidity, or odor of the waters, or such discharge of any liquid, gaseous, solid, radioactive, or other substance into any waters of the state as will or is likely to create a nuisance or render such waters harmful, detrimental, or injurious to the public health, safety or welfare, or to domestic, commercial, industrial, agricultural, recreational, or other legitimate beneficial uses, or to livestock, wild animals, birds, or fish or other aquatic life.
Pollution-Generating Hard Surface (PGHS)	Those hard surfaces considered to be a significant source of pollutants in stormwater runoff. See the listing of surfaces under Pollution-Generating Impervious Surface.
Pollution-Generating Impervious Surface (PGIS)	Those impervious surfaces considered to be a significant source of pollutants in stormwater runoff. Such surfaces include those that receive direct rainfall or run-on or blow-in of rainfall and are subject to: vehicular use; industrial activities (as further defined in this glossary); or storage of erodible or leachable materials, wastes, or chemicals. In addition, metal roofs unless they are coated with an inert, non-leachable material (e.g., baked-on enamel coating); or roofs that are subject to venting significant amounts of dusts, mists, or fumes from manufacturing, commercial, or other indoor activities are considered PGIS. A surface, whether paved or not, shall be considered subject to vehicular use if it is regularly used by motor vehicles. The following are considered regularly-used surfaces: roads, unvegetated road shoulders, bike lanes within the traveled lane of a roadway, driveways, parking lots, unfenced fire lanes, vehicular equipment storage yards, and airport runways. The following are not considered regularly-used surfaces: paved bicycle pathways separated from and not subject to drainage from roads for motor vehicles, restricted access fire lanes, and infrequently used maintenance access roads.
Pollution-Generating Pervious Surface (PGPS)	Any pervious surface subject to any of the following: • vehicular use, • industrial activities (as further defined in this glossary), • storage of erodible or leachable materials, wastes or chemicals, and that receive direct rainfall or run-on or blow-in of rainfall, • use of pesticides and fertilizers, or • loss of soil. Typical PGPS include permeable pavement subject to vehicular use, lawns, and landscaped areas including: golf courses, parks, cemeteries, and sports fields (natural and artificial turf).
Postproject	For use with Appendix I-C of the 2019 Ecology Manual. The conditions present across a landscape after a specific stormwater management project (e.g., raising the outlet, building an outlet control structure) is completed that will potentially affect wetlands.
Postdevelopment Condition	The condition of site after the project has been constructed.
Pothole	A closed basin. See also Closed Depression.
Preproject	For use with Appendix I-C of the 2019 Ecology Manual. The conditions present across a landscape before a specific project is constructed.

Term	Definition
Predeveloped Condition	The native vegetation and soils that existed at a site prior to the influence of Euro-American settlement. The predeveloped condition shall be assumed to be forested land cover unless reasonable, historical information is provided that indicates the site was prairie prior to settlement.
Preliminary Plat	A neat and approximate drawing of a proposed subdivision showing the general layout of streets, alleys, lots, blocks, and restrictive covenants to be applicable to the subdivision, which shall furnish a basis for the approval or disapproval of the general layout of a subdivision.
Pretreatment	The removal of material such as solids, grit, grease, and scum from flows prior to physical, biological, or physical treatment processes to improve treatability. Pretreatment may include screening, grit removal, settling, oil/water separation, or application of a basic treatment BMP prior to infiltration.
Private Road	A roadway facility in private ownership providing private access and used for travel of vehicles by the owner(s) or those having express or implied permission from the owner(s), but not by other persons.
Professional Engineer (PE)	A person currently licensed and registered in Washington State as a professional engineer in civil engineering.
Project	Any proposed action to alter or develop a site. The proposed action of a permit application or an approval.
Project Engineer	Professional Engineer.
Project Site	That portion of a property, properties, or right-of-way subject to land-disturbing activities, new hard surfaces, or replaced hard surfaces.
Rain Garden	A non-engineered shallow, landscaped depression, with compost-amended native soils and adapted plants. The depression is designed to pond and temporarily store stormwater runoff from adjacent areas, and to allow stormwater to pass through the amended soil profile. See Chapter 7, Section 7.4.5 of this manual for design criteria.
Rational Method	A means of computing storm drainage flow rates (Q) by use of the formula Q = CIA, where C is a coefficient describing the physical drainage area, I is the rainfall intensity and A is the area. This method is only allowed for sizing conveyances in certain small basins.
Reach	A length of channel with uniform characteristics.
Receiving Waters (or Receiving Water Body)	Bodies of water or surface water systems to which surface runoff is discharged via a point source of stormwater or via sheet flow. Ground water to which surface runoff is directed by infiltration.
Recharge	The addition of water to the zone of saturation (i.e., an aquifer).
Recommended BMPs	As used in reference to Source Control (Chapter 9 of this manual, and Volume IV of the 2019 Ecology Manual, recommended BMPs are those BMPs that are not expected to be mandatory by local governments at new development and redevelopment sites. However, they may improve pollutant control efficiency, and may provide a more comprehensive and environmentally effective stormwater management program.

Term	Definition
Redevelopment	On a site that is already substantially developed (i.e., has 35 percent or more of existing hard surface coverage), the creation or addition of hard surfaces; the expansion of a building footprint or addition or replacement of a structure; structural development including construction, installation or expansion of a building or other structure; replacement of hard surface that is not part of a routine maintenance activity; and land-disturbing activities.
Regional	An action or facility (for stormwater management purposes) that involves more than one discrete property.
Regional Detention (or Retention) Facility	A stormwater quantity control structure designed to correct existing surface water runoff problems of a basin or subbasin. The area downstream has been previously identified as having existing or predicted significant and regional flooding and/or erosion problems. This term is also used when a detention or retention facility is sited to detain or infiltrate stormwater runoff from a number of new developments or areas within a catchment.
Replaced Hard Surface	For structures, the removal and replacement of hard surfaces down to the foundation. For other hard surfaces, the removal down to bare soil or base course and replacement.
Replaced Impervious Surface	For structures, the removal and replacement of impervious surfaces down to the foundation. For other impervious surfaces, the removal down to bare soil or base course and replacement.
Restoration	Actions performed to re-establish wetland functional characteristics and processes that have been lost by alterations, activities, or catastrophic events in an area that no longer meets the definition of a wetland.
Retention	The process of collecting and holding surface and stormwater runoff with no surface outflow.
Retention Pond	A retention facility that is an open pond.
Retention/Detention BMP	A type of drainage BMP designed either to hold water for a considerable length of time and then release it by evaporation, plant transpiration, and/or infiltration into the ground; or to hold surface and stormwater runoff for a short period of time and then release it to the stormwater drainage system.
Retrofitting	The renovation of an existing structure or facility to meet changed conditions or to improve performance.
Return Frequency	A statistical term for the average time of expected interval that an event of some kind will equal or exceed given conditions (e.g., a stormwater flow that occurs every 2 years).
Rill	A small intermittent watercourse with steep sides, usually only a few inches deep. Often rills are caused by an increase in surface water flow when soil is cleared of vegetation.
Riparian	Pertaining to the banks of streams, wetlands, lakes, or tidewater.
Riparian Areas	Transition zones between water bodies and upland areas that exhibit vegetation or soil characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian areas.

Term	Definition
Riprap	A facing layer or protective mound of rocks placed to prevent erosion or sloughing of a structure or embankment due to flow of surface and stormwater runoff.
Riser	A vertical pipe extending from the bottom of a pond BMP that is used to control the discharge rate from a BMP for a specified design storm.
Roadway Width	The sum of the traveled way width and the shoulder width measured at its narrowest location.
Runoff	Water originating from rainfall and other precipitation that is found in drainage facilities, rivers, streams, springs, seeps, ponds, lakes, and wetlands, as well as shallow groundwater. As applied in this manual, it also means the portion of rainfall or other precipitation that becomes surface flow and interflow.
Runoff Treatment BMP	A BMP that is intended to remove pollutants from stormwater. A few examples of runoff treatment BMPs are wet ponds, wet vaults, oil-water separators, biofiltration swales, and constructed wetlands.
Salmonid	A member of the fish family *Salmonidae*. Chinook, coho, chum, pink, and sockeye salmon; cutthroat, brook, brown, rainbow, and steelhead trout; Dolly Varden, kokanee, and char are examples of salmonid species.
Sand Filter	A constructed depression or basin with a layer of sand that treats stormwater as it percolates through the sand.
Scour	Erosion of channel banks due to excessive velocity of the flow of surface and stormwater runoff.
SCS	Soil Conservation Service (now the Natural Resources Conservation Service), United States Department of Agriculture.
SCS Method	See NRCS Method.
SDM Administrator	City of Lacey Stormwater Design Manual Administrator. See Director.
Seasonal High Groundwater Level	The upper level at which the groundwater table normally is located during the season of the year when such levels are at their highest (typically December 1 through April 30).
Section 401; Section 404	Section 401 and Section 404 of the Clean Water Act. Under Section 401, an activity involving a discharge into waters of the U.S. authorized by a federal permit must receive water quality certification from the appropriate certifying agency (Ecology), indicating the activity will comply with applicable water quality standards. Under Section 404, the USACE regulates the discharge of dredged or fill material into waters of the U.S., including wetlands.
Sediment	Fragmented material that originates from weathering and erosion of rocks or unconsolidated deposits, and is transported by, suspended in, or deposited by water.
Sedimentation	The depositing or formation of sediment.
Sensitive Area	Those areas designated by resolution or ordinance of the Lacey City Council pursuant to WAC 197-11-908 and Chapter 16.54 LMC or the most recent amendments thereto. See Environmentally Sensitive Area.
Settleable Solids	Those suspended solids in stormwater that separate by settling when the stormwater is held in a quiescent condition for a specified time.

Term	Definition
Shared Access Facility	A privately-owned drivable surface that serves up to and including four lots in the rural area or two lots in the urban area for access to single-family and two-family dwelling units.
Sheet Flow	Runoff that flows over the ground surface as a thin, even layer, not concentrated in a channel.
Short-Circuiting	The passage of runoff through a BMP in less than the design treatment time.
Siltation	The process by which a river, lake, or other water body becomes clogged with sediment. Silt can clog gravel beds and prevent successful salmon spawning.
Site	The area defined by the legal boundaries of a parcel or parcels of land that is (are) subject to new development or redevelopment. For road projects, the length of the project site and the right-of-way boundaries define the site.
Slope	Degree of deviation of a surface from the horizontal measured as a numerical ratio, percent, or in degrees. Expressed as a ratio, the first number is the horizontal distance (run) and the second is the vertical distance (rise), as 2:1. A 2:1 slope is a 50 percent slope. Expressed in degrees, the slope is the angle from the horizontal plane, with a 90-degree slope being vertical (maximum) and 45-degree being a 1:1 or 100 percent slope.
Sloughing	The sliding of overlying material. It is the same effect as caving, but it usually occurs when the bank or an underlying stratum is saturated or scoured.
Soil	The unconsolidated mineral and organic material on the immediate surface of the Earth that serves as a natural medium for the growth of land plants. See also Topsoil and Engineered Soil.
Soil Group, Hydrologic	A classification of soils by the NRCS into four runoff potential groups. The groups range from A soils, which are very permeable and produce little or no runoff, to D soils, which are not very permeable and produce much more runoff.
Soil Horizon	A layer of soil, approximately parallel to the surface, which has distinct characteristics produced by soil-forming factors.
Soil Permeability	The ease with which gases, liquids, or plant roots penetrate or pass through a layer of soil.
Soil Profile	A vertical section of the soil from the surface through all horizons, including C horizons.
Soil Stabilization	The use of measures such as rock lining, vegetation or other engineering structures to prevent the movement of soil when loads are applied to the soil.
Soil Structure	The relation of particles or groups of particles that impart to the whole soil a characteristic manner of breaking; types include crumb structure, block structure, platy structure, and columnar structure.
Soil Texture Class	The relative proportion, by weight, of particle sizes, based on the USDA soil textural class system, of individual soil grains less than 2 mm equivalent diameter in a mass of soil. The basic texture classes in the approximate order of increasing proportions of fine particles include sand, loamy sand, sandy loam, loam, silt loam, silt, clay loam, sandy clay, silty clay, and clay.
Soils Professional	A person certified by the Soil Science Society of America (or an equivalent national program); a locally licensed on-site sewage designer; or a suitably trained person working under the supervision of a professional engineer, geologist, hydrogeologist, or engineering geologist registered in Washington State.

Term	Definition
Sorption	The physical or chemical binding of pollutants to sediment or organic particles.
Source Control BMP	A structure or operation that is intended to prevent pollutants from coming into contact with stormwater through physical separation of areas or careful management of activities that are sources of pollutants. This manual separates source control BMPs into two types. Structural source control BMPs are physical, structural, or mechanical devices or facilities that are intended to prevent pollutants from entering stormwater. Operational BMPs are non-structural practices that prevent or reduce pollutants from entering stormwater. See Chapter 9 of this manual for details.
Spill Control Device	A T-section or turned-down elbow designed to retain a limited volume of pollutant that floats on water, such as oil or antifreeze. Spill control devices are passive and must be cleaned-out for the spilled pollutant to be removed.
Spillway	A passage such as a paved apron or channel for surplus water over or around a dam or similar obstruction. An open or closed channel, or both, used to convey excess water from a reservoir. It may contain gates, either manually or automatically controlled, to regulate the discharge of excess water.
State Environmental Policy Act (SEPA)	The Washington law (RCW 43.21c) intended to minimize environmental damage. SEPA requires that state agencies and local governments consider environmental factors when making decisions on activities, such as development proposals over a certain size, and comprehensive plans. As part of this process, environmental documents are prepared and opportunities for public comment are provided.
Storage Routing	A method to account for the attenuation of peak flows passing through a detention facility or other storage feature.
Storm Drains	The enclosed conduits that transport surface and stormwater runoff toward points of discharge (sometimes called storm sewers).
Storm Sewer	A sewer that carries stormwater and surface water, street wash, and other washwaters or drainage, but excludes sewage and industrial wastes. Also called a storm drain. Local storm sewers may flow to stormwater treatment ponds, but they do not flow to sewage treatment plants (as sanitary sewers do).
Stormwater	Surface runoff due to precipitation or snowmelt. That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes and other features of the stormwater drainage system to a surface water body or constructed stormwater BMP.
Stormwater Drainage System	Constructed and natural features that function together as a system to collect, convey, channel, hold, inhibit, retain, detain, infiltrate, divert, treat, or filter stormwater.
Stormwater BMP/Facility	A constructed component of a stormwater drainage system designed or constructed to perform a particular function, or multiple functions. Stormwater BMPs/facilities include, but are not limited to, pipes, swales, ditches, culverts, street gutters, detention ponds, retention ponds, constructed wetlands, infiltration devices, catch basins, oil-water separators, bioretention, permeable pavement, and biofiltration swales.
Stormwater Management Manual for Western Washington	The stormwater manual issued by Ecology to provide guidance on measures necessary in western Washington to control the quantity and quality of stormwater runoff from new development and redevelopment. The current manual is the 2019 *Stormwater Management Manual for Western Washington*, also referred to as the 2019 Ecology Manual.

Term	Definition
Stormwater Program	Either the basic stormwater program or the comprehensive stormwater program (as appropriate to the context of the reference) called for under the Puget Sound Water Quality Management Plan.
Stormwater Site Plan	The comprehensive report containing all of the technical information and analysis necessary for regulatory agencies to evaluate a proposed new development or redevelopment project for compliance with stormwater requirements. Contents of the Stormwater Site Plan will vary with the type and size of the project, and individual site characteristics. It includes a Construction Stormwater Pollution Prevention Plan (Construction SWPPP) and a Permanent Stormwater Control Plan. Guidance on preparing a Stormwater Site Plan is contained in Chapter 3 of this manual.
Stream Banks	The usual boundaries, not the flood boundaries, of a stream channel. Right and left banks are named facing downstream.
Streams	Those areas where surface waters flow sufficiently to produce a defined channel or bed. A defined channel or bed is an area that demonstrates clear evidence of the passage of water and includes, but is not limited to, indicated by hydraulically sorted sediments or the removal of vegetative litter or loosely rooted vegetation by the action of moving water. The channel or bed need not contain water year-round. This definition is not meant to include irrigation ditches, canals, stormwater runoff devices, or other entirely constructed watercourses, unless they are used to convey streams naturally occurring prior to construction. Those topographic features that resemble streams but have no defined channels (i.e., swales) shall be considered streams when hydrologic and hydraulic analyses done pursuant to a development proposal predict formation of a defined channel after development.
Structural Source Control BMPs	Physical, structural, or mechanical devices or facilities that are intended to prevent pollutants from entering stormwater. Structural source control BMPs typically include: • Enclosing and/or covering the pollutant source (building or other enclosure, a roof over storage and working areas, temporary tarp, etc.). • Segregating the pollutant source to prevent run-on of stormwater, and to direct only contaminated stormwater to appropriate runoff treatment BMPs.
Structure	A catch basin or manhole in reference to a storm drainage system.
Stub-Out	A short length of pipe provided for future connection to a stormwater drainage system.
Subbasin	A drainage area that drains to a point contained within a larger basin.
Subgrade	A layer of stone or soil used as the underlying base for a BMP or road.
Subsoil	The B horizons of soils with distinct profiles. In soils with weak profile development, the subsoil can be defined as the soil below the plowed soil (or its equivalent of surface soil), in which roots normally grow. Although a common term, it cannot be defined accurately. It has been carried over from early days when “soil” was conceived only as the plowed soil and that under it as the “subsoil.”
Substrate	The natural soil base underlying a BMP.

Term	Definition
Surface and Stormwater	Water originating from rainfall and other precipitation that is found in drainage facilities, rivers, streams, springs, seeps, ponds, lakes, and wetlands, as well as shallow groundwater.
Suspended Solids	Organic or inorganic particles that are suspended in and carried by the water. The term includes sand, mud, and clay particles (and associated pollutants), as well as solids, in stormwater.
Swale	A shallow drainage conveyance with relatively gentle side slopes, generally with flow depths less than 1 foot.
Terrace	An embankment or combination of an embankment and channel across a slope to control erosion by diverting or storing surface runoff instead of permitting it to flow uninterrupted down the slope.
Threatened or Endangered Species	Plant or animal species that are nearing endangered status, or whose existence is in immediate jeopardy and is usually restricted to highly specific habitats. Threatened and endangered species are officially listed by federal and state authorities.
Threshold Discharge Area	An area within a project site draining to a single natural discharge location or multiple natural discharge locations that combine within 0.25 mile downstream (as determined by the shortest flowpath). The examples in Chapter 4, Figure 4.1 illustrate this definition. The purpose of this definition is to clarify how the thresholds of this manual are applied to project sites with multiple discharge points.
Tightline	A continuous length of pipe that conveys water from one point to another (typically down a steep slope) with no inlets or collection points in between.
Tile, Drain	Pipe made of burned clay, concrete, or similar material, in short lengths, usually laid with open joints to collect and carry excess water from the soil.
Till	See Glacial Till.
Time of Concentration	The time necessary for surface runoff to reach the outlet of a subbasin from the hydraulically most remote point in the tributary drainage area.
Topography	General term to include characteristics of the ground surface such as plains, hills, mountains, degree of relief, steepness of slopes, and other physiographic features.
Topsoil	The upper portion of a soil, usually dark colored and rich in organic material. It is more or less equivalent to the upper portion of an A horizon in an ABC soil.
Total Maximum Daily Load (TMDL) – Water Cleanup Plan	A calculation of the maximum amount of a pollutant that a water body can receive and still meet water quality standards, and an allocation of that amount to the pollutant's sources. A TMDL (also known as a water cleanup plan or water quality improvement program) is the sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. The calculation must include a margin of safety to ensure that the water body can be used for the purposes the state has designated. The calculation must also account for seasonable variation in water quality. Water quality standards are set by states, territories, and tribes. They identify the uses for each water body, for example, drinking water supply, contact recreation (swimming), and aquatic life support (fishing), and the scientific criteria to support that use. The Clean Water Act, Section 303, establishes the water quality standards and TMDL programs.

Term	Definition
Total Suspended Solids	That portion of the solids carried by stormwater that can be captured on a standard glass filter.
Toxic	Poisonous, carcinogenic, or otherwise directly harmful to life.
Total Phosphorus	A water quality parameter.
TPH	Total petroleum hydrocarbons. A water quality parameter.
TR-55	Technical Release No. 55 of the USDA Natural Resources Conservation Service, Conservation Engineering Division, June 1986, titled *Urban Hydrology for Small Watersheds*, which describes procedures for estimating runoff and peak discharges. See NRCS Method.
Tract	A legally created parcel of property designated for special nonresidential and noncommercial uses.
Trash Rack	A structural device used to prevent debris from entering a spillway or other hydraulic structure.
Travel Time	The estimated time for surface water to flow between two points of interest.
Traveled Way	That portion of the roadway used for the movement of vehicles exclusive of the portion of the roadway width that is used, or available for parking of vehicles. The traveled way does not include curbs and gutters.
Treatment Liner	A layer of soil that is designed to slow the rate of infiltration and provide sufficient pollutant removal to protect groundwater quality.
Treatment Train	A combination of two or more treatment facilities connected in series.
Turbidity	Dispersion or scattering of light in a liquid, caused by suspended solids and other factors; commonly used as a measure of suspended solids in a liquid.
U.S. EPA	The United States Environmental Protection Agency.
UIC	Underground injection control. Used in reference to an Ecology program regulating injection wells and specific types of infiltration systems.
UIC Well	A UIC well is defined as a structure built to discharge fluids from the ground surface into the subsurface; a bored, drilled, or driven shaft whose depth is greater than the largest surface dimension; or an improved sinkhole, which is a natural crevice that has been modified; or a subsurface fluid distribution system that includes an assemblage of perforated pipes, drain tiles, or other similar mechanisms intended to distribute fluids below the surface of the ground. Examples of UIC wells or subsurface infiltration systems include drywells, drain fields, infiltration trenches with perforated pipe, storm chamber systems with the intent to infiltrate, French drains, bioretention systems intended to distribute water to the subsurface by means of perforated pipe installed below the treatment soil, and other similar devices that discharge to the ground.
Underdrain	Plastic pipes with holes or slots drilled through the top, installed within the bottom of an infiltration BMP to collect and remove excess runoff.
Unpaved Road	A road that consists of gravel, crushed surfacing top course, or other dirt surface that has not received a surfacing coat of asphalt. A road treated with only a dust preventative or dust treatment shall be considered an unpaved road.
Unstable Slopes	Those sloping areas of land that have in the past exhibited, are currently exhibiting, or will likely in the future exhibit, mass movement of earth.

Term	Definition
Values (Wetland)	Wetland processes or attributes that are valuable or beneficial to society (also see Functions). Wetland values include support of commercial and sport fish and wildlife species, protection of life and property from flooding, recreation, education, and aesthetic enhancement of human communities.
Variance	Relief from the application of a core requirement to a project.
Vegetated Flow Path	Well-established lawn or pasture, landscaping with well-established groundcover, native vegetation with natural groundcover, or an area that meets Post-Construction Soil Quality and Depth (Chapter 7, Section 7.4.1). The groundcover shall be dense enough to help disperse and infiltrate flows and to prevent erosion.
Vegetation	Any organic plant life growing on the surface of the earth.
Vehicular Use	Regular use of an impervious or pervious surface by motor vehicles. The following are subject to regular vehicular use: • roads, • unvegetated road shoulders, • bike lanes within the traveled lane of a roadway, • driveways, • parking lots, • unrestricted access fire lanes, • vehicular equipment storage yards, and • airport runways. The following are not considered subject to regular vehicular use: • sidewalks not subject to drainage from roads for motor vehicles, • paved bicycle pathways separated from and not subject to drainage from roads for motor vehicles, • restricted access fire lanes, and • infrequently used maintenance access roads.
Water Body	Surface waters including rivers, streams, lakes, marine waters, estuaries, and wetlands.
Water Cleanup Plan	See Total Maximum Daily Load.
Water Quality	The chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose.
Water Quality Design Storm	The 24-hour rainfall amount with a 6-month return frequency. Commonly referred to as the 6-month, 24-hour storm.
Water Quality Standards	Minimum requirements of purity of water for various uses; for example, water for agricultural use in irrigation systems should not exceed specific levels of sodium bicarbonate, pH, total dissolved salts, etc. In Washington State, Ecology sets water quality standards.
Water Table	The upper surface or top of the saturated portion of the soil or bedrock layer indicates the uppermost extent of groundwater.
Watercourse	A river, stream, creek, or other course of flowing water that flows intermittently or perennially and discharges into another watercourse or body of water.
Waters of the State	Those waters as defined in 40 CFR Subpart 122.2 and Chapter 90.48 RCW.

Term	Definition
Watershed	A geographic region within which water drains into a particular river, stream, or body of water. Watersheds can be as large as those identified and numbered by the State of Washington Water Resource Inventory Areas (WRIAs) as defined in Chapter 173-500 WAC.
Weir	Device for measuring or regulating the flow of water, by having the water flow over a specifically-designed spillway.
Wet Ponds and Wet Vaults	Runoff treatment BMPs that contain permanent pools of water that are filled during the initial runoff from a storm event. They are designed to optimize water quality by providing retention time in order to settle out particles of fine sediment to which pollutants such as heavy metals absorb, and to allow biologic activity to occur that metabolizes nutrients and organic pollutants. See Chapter 8 for design criteria.
Wet Pool	A pond or constructed wetland that stores runoff temporarily and whose normal discharge location is elevated so as to maintain a permanent pool (i.e., a wet pool) of water between storm events.
Wetlands	Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those constructed wetlands intentionally created from non-wetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention BMPs, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those constructed wetlands intentionally created from non-wetland areas to mitigate the conversion of wetlands. (Water bodies not included in the definition of wetlands as well as those mentioned in the definition are still waters of the state.)

Abbreviations

Abbreviation	Definition
AADT	average annual daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
AKART	all known, available, and reasonable methods of treatment, prevention, and control
API	American Petroleum Institute
APWA	American Public Works Association (Washington State Chapter)
ASTM	American Society for Testing and Materials
BMP	best management practice
CARA	critical aquifer recharge area
CAVFS	compost-amended vegetated filter strip
CEC	cation exchange capacity
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act (commonly known as Superfund)
CESCL	Certified Erosion and Sediment Control Lead
cfs	cubic feet per second
CPEP	corrugated polyethylene pipe
CPESC	Certified Professional in Erosion and Sediment Control
CSWGP	Construction General Stormwater Permit
C-TAPE	Chemical Technology Assessment Protocol – Ecology
CULD	Conditional Use Level Designation
DBH	diameter at breast height
DG&PWS	Development Guidelines and Public Works Standards
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FS	factor of safety
ft/sec	feet per second
GULD	General Use Level Designation
HDPE	high-density polyethylene
HPA	hydraulic project approval
HRM	Highway Runoff Manual
HSPF	Hydrological Simulation Program—Fortran

Abbreviation	Definition
HSG	hydrologic soil group
IBC	International Building Codes
in/hr	inches per hour
ISGP	Industrial Stormwater General Permit
JARPA	Joint Aquatic Resources Permit Application
LF (or lf)	linear feet
LID	low impact development
LMC	Lacey Municipal Code
MFD	media filter drain
mg/L	milligrams per liter
MS4	municipal separate storm sewer system
MSDS	material safety data sheets
MTCA	Model Toxics Control Act
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWTPH	Northwest Total Petroleum Hydrocarbons
O.C.	on center
O&M	operation and maintenance
OSHA	Occupational Safety and Health Administration
PAM	polyacrylamide
PDF	Portable Document Format
PE	professional engineer
PGHS	pollution-generating hard surface
PGIS	pollution-generating impervious surface
PGPS	pollution-generating pervious surface
PIT	pilot infiltration test
PUD	planned unit development
PVC	polyvinyl chloride
RCW	Revised Code of Washington
SA	surface area
SBUH	Santa Barbara Urban Hydrograph
SCS	Soil Conservation Service (now Natural Resources Conservation Service)

Abbreviation	Definition
SDM	Stormwater Design Manual (City of Lacey)
SEPA	State Environmental Policy Act
SF (or sf)	square feet
SWPPP	Stormwater Pollution Prevention Plan
TAPE	Technology Assessment Protocol – Ecology
TMDL	total maximum daily load
TPH	total petroleum hydrocarbons
TR-55	Technical Release No. 55 of the USDA Natural Resources Conservation Service
TSS	total suspended solids
UGA	urban growth area
UIC	underground injection control
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
U.S. EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WDNR	Washington State Department of Natural Resources
WQ	water quality
WRIA	Water Resource Inventory Area
WSDOT	Washington State Department of Transportation
WWHM	Western Washington Hydrology Model, 2012 or newest version