CHAPTER 3

# Minimum Requirements

# List of Tables



# List of Figures

## 3-1 Introduction

*Note to the designer: It is extremely important to take the time to thoroughly understand the minimum requirements presented in this chapter when making stormwater design decisions. A firm grasp of the chapter's terminology is essential; consult the manual's Glossary to clarify the intent and appropriate use of the terms used herein. Direct questions regarding the minimum requirements and terminology to the Region Hydraulics Engineer, the HQ Hydraulics Section, or the HQ Environmental Services Office.*

This chapter describes the nine minimum requirements that apply to the planning and design of stormwater management facilities and best management practices (BMPs) for existing and new Washington State highways, rest areas, park and ride lots, ferry terminals, and highway maintenance facilities. Projects following the stormwater management practices in this manual achieve compliance with federal and state water quality regulations through the *presumptive approach*. Alternatively, see Sections 1-2.2, 3-5, and 5-3.6.3 for use the *demonstrative approach* to protect water resources.

## 3-2 Applying the HRM Minimum Requirements

### 3-2.1 Project Thresholds

This section identifies the thresholds that determine the applicability of the minimum requirements throughout the state. In some instances, the design criteria is slightly different for eastern and western Washington due to different climatic, geologic, and hydrogeological conditions. Regional design criteria are presented in Section 3-3. There may be additional local requirements for projects based on the exceptions listed in HRM Section 1-2.1.

***Note:*** For the purposes of this manual, the boundary between eastern and western Washington is the Cascade Crest, except in Klickitat County, where all of Klickitat County follows eastern Washington stormwater design criteria.

All nonexempt projects (see Section 3-2.2) are required to comply with Minimum Requirement 2. Projects that exceed certain thresholds are required to comply with additional minimum requirements. Use the flowcharts in Figures 3-1 and 3-2 to determine which minimum requirements apply at the project level. Use the flowchart in Figure 3-3 to determine which minimum requirements apply at the TDA level. Review Section 3-3 for detailed information about each minimum requirement. Consult the Glossary to gain a clear understanding of the following terms, which are essential for correctly assessing minimum requirement applicability:

Consult the Glossary to gain a clear understanding of the following terms, which are essential for correctly assessing minimum requirement applicability:

- New impervious surface
- Converted pervious surface
- Pollution-generating impervious surface (PGIS)
- Pollution-generating pervious surface (PGPS)
- Land-disturbing activity
- Native vegetation
- Non-road-related projects
- Existing roadway prism
- Project limits
- Replaced impervious surface
- Effective impervious surface
- Noneffective impervious surface
- Effective PGIS
- Noneffective PGIS
- Threshold discharge area (TDA)
- Net-new impervious surface

WSDOT projects shall use the Stormwater Design Documentation Spreadsheet (SDDS) to document which minimum requirements apply to the project and to each threshold discharge area (TDA), if applicable. The spreadsheet is located at: www.wsdot.wa.gov/Design/Hydraulics/HighwayRunoffManual.htm. An electronic copy of the SDDS must be sent to the HQ Highway Runoff Program Manager once the hydraulic report has been approved and has received concurrence from the WSDOT Region Hydraulics Engineer or HQ Hydraulics Section.

## 3-2.2 Exemptions

Unless otherwise indicated in this section the practices described in this section are exempt from the minimum requirements even if such practices meet the definition of new development or redevelopment.

- Upgrading by resurfacing WSDOT facilities from BST to ACP or PCCP without expanding the amount of existing impervious area.[1] [2]

The following practices are subject only to Minimum Requirement 2, Construction Stormwater Pollution Prevention:

- Underground utility projects that replace the ground surface with in-kind material or materials with similar runoff characteristics.
- Removing and replacing a concrete or asphalt roadway to base course, or subgrade or lower, without expanding or upgrading the impervious surfaces.

---

[1] This exemption is applicable only to WSDOT maintenance projects; whereas, the "gravel-to-BST" exemption in Ecology's stormwater management manuals is only available to local governments. For local governments, upgrades that involve resurfacing from BST to ACP or PCCP are considered new impervious surfaces and are not categorically exempt.

[2] Exemption applies to WSDOT maintenance projects only. Projects done by contractors will be subject to Minimum Requirement 2.

**Step 1**

Check whether any exemptions listed in Section 3-2.2 apply.

**Step 2**

Does the project have 2,000 square feet or more of new, replaced, or new plus replaced impervious surfaces?

OR

Does the project have land-disturbing activities of 7,000 square feet or more?

No → Apply Minimum Requirement 2.

Yes ↓

Apply Minimum Requirements 1, 2, 3, and 4 to new and replaced impervious surfaces and to the land disturbed.

**Step 3**

Does the project add 5,000 square feet or more of new impervious surfaces?

OR

For western Washington projects, does the project convert ¾ acre or more of native vegetation to lawn or landscaped area?

OR

For western Washington projects, does the project convert 2.5 acres or more of native vegetation to pasture?

No → No additional requirements.

Yes ↓

Delineate Threshold Discharge Areas (TDA) for the project. Minimum Requirement 6 applies to the new impervious surfaces and converted pervious surfaces on the project. Applicability at the TDA level may change based on triggers in Figure 3-3.

Minimum Requirements 7, 8, and 9 apply to the new impervious surfaces and converted pervious surfaces on the project.

**Step 4**

For road/parking lot-related projects (including pavement, shoulders, curbs, and sidewalks) adding 5,000 square feet or more of new impervious surfaces: Do new impervious surfaces add 50% or more to the existing impervious surfaces within the project limits?

OR

For non-road-related projects (such as rest areas, maintenance facilities, or ferry terminal buildings): Is the total of new plus replaced impervious surfaces 5,000 square feet or more, AND does the value of the proposed improvements—including interior improvements—exceed 50% of the replacement value of the existing site improvements?

→ Minimum Requirement 6 does not apply to the replaced impervious surfaces on the project. → Continue to **Step 5** in Figure 3-2.

Yes ↓

Minimum Requirement 6 applies to the replaced impervious surfaces on the project. Applicability at the TDA level may change based on triggers in Figure 3-3.

Minimum Requirements 7, 8, and 9 also apply to the replaced impervious surfaces on the project.

→ Continue to **Step 5** in Figure 3-2.

**Figure 3-1 Minimum Requirement applicability at project level.**

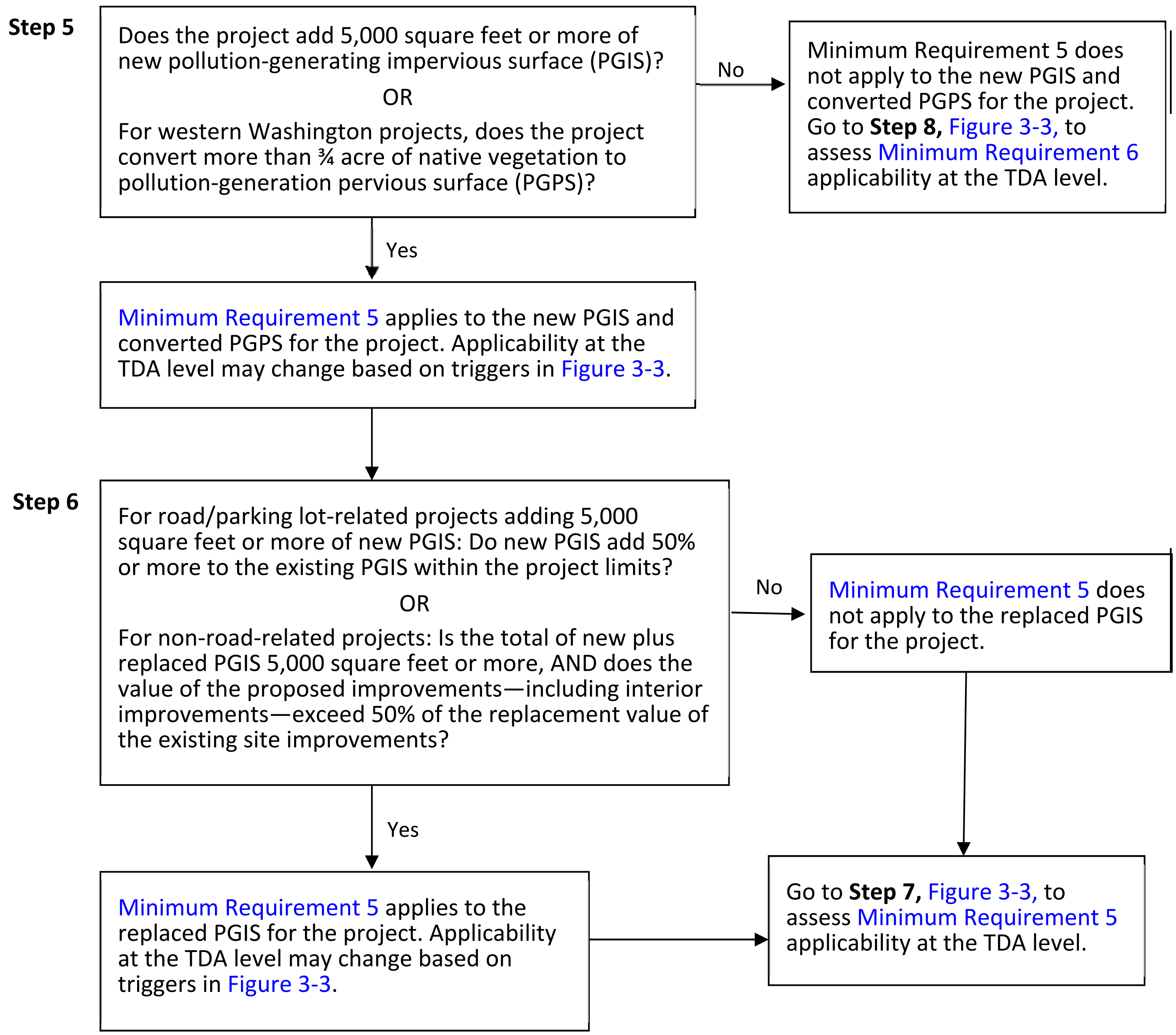
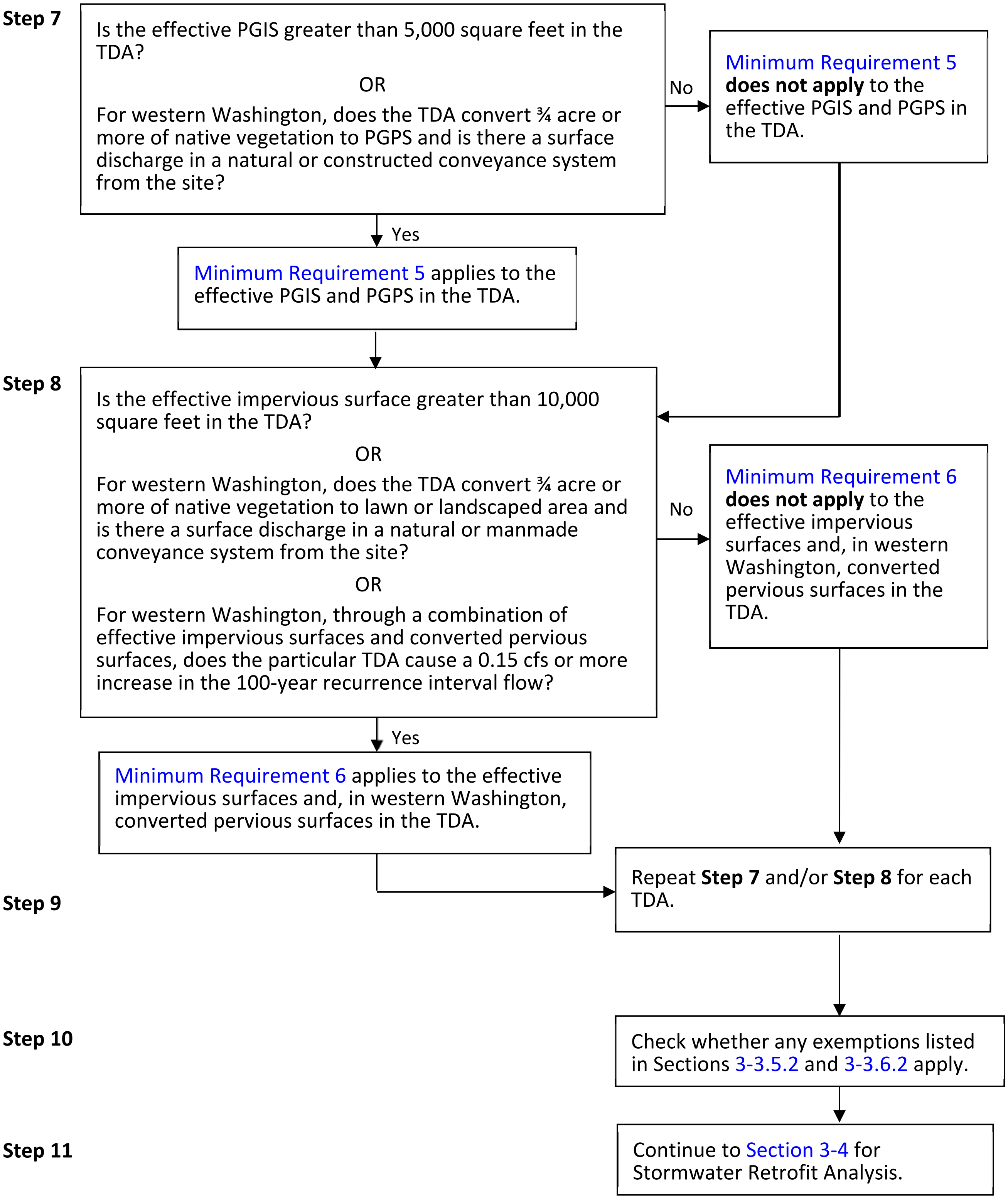



**Figure 3-2 Minimum Requirement applicability at project level (continued).**




***Note:*** For Figure 3-3, Minimum Requirements 1–4 and 7–9 still apply to all TDAs on the project, even though Minimum Requirements 5 and/or 6 may not apply to each TDA.

**Figure 3-3 Minimum Requirement applicability at TDA level.**

# 3-3 Minimum Requirements

This section describes the minimum requirements for stormwater management at project sites. Consult Section 3-2 to determine which requirements apply to a project. See Chapter 5 for BMPs to use in meeting Minimum Requirements 3, 5, 6, 7, and 9, and the *Temporary Erosion and Sediment Control Manual* (TESCM) for BMPs to use in meeting Minimum Requirement 2.

## 3-3.1 Minimum Requirement 1 – Stormwater Planning

Stormwater planning shall consist of  Construction Stormwater Pollution Prevention Planning and Permanent Stormwater Planning.Multiple documents are used to fulfill the objective of this requirement, since addressing stormwater management needs is thoroughly integrated into WSDOT's design, construction, and maintenance programs. WSDOT's construction stormwater pollution prevention planning components consist of Spill Prevention, Control, and Countermeasures (SPCC) plans and Temporary Erosion and Sediment Control (TESC) plans. WSDOT's permanent stormwater control planning components include Hydraulic Reports and aspects of the *Maintenance Manual*.

### 3-3.1.1 Objective

Stormwater planning documents must collectively demonstrate how stormwater management will be accomplished both during project construction and in the final, developed condition.

### 3-3.1.2 Applicability

Minimum Requirement 1 applies to all nonexempt projects (See Section 3-2.2) that meet or exceed the thresholds described in Figure 3-1.

To meet the objectives of the stormwater planning requirement during construction, contractors are required to prepare Spill Prevention, Control, and Countermeasures (SPCC) plans for all projects, since all projects have the potential to spill hazardous materials. All projects that disturb soil must also comply with the 13 Temporary Erosion and Sediment Control (TESC) elements (see the TESCM) and must apply the appropriate best management practices (BMPs) presented in the TESCM. WSDOT prepares a TESC plan if a construction project adds or replaces (removes existing road surface down to base course) more than 2,000 square feet of impervious surface or disturbs more than 7,000 square feet of soil. Projects that disturb fewer than 7,000 square feet of soil must address erosion control and the 13 TESC elements; however, a stand-alone TESC plan is optional and plan sheets are not required. Both the SPCC and TESC plans must be kept on site or within reasonable access of the site during construction and may require updates with changing site conditions.

To meet the objectives of the stormwater planning requirement for the final, developed condition,  all projects that exceed the thresholds for HRM minimum requirements (especially minimum requirement 5 or 6) must prepare a Hydraulic Report and follows guidelines in the HRM, *Hydraulics Manual,* and *Maintenance Manual*. The Hydraulic Report provides a complete record of the engineering justification for all drainage modifications and is prepared for all major and minor hydraulic projects. As noted in the *Hydraulics Manual*, the Hydraulic Report must contain detailed descriptions of the following items:

- Existing and developed site hydrology
- Flow control and runoff treatment BMPs
- Conveyance system analysis and design
- Wetland hydrology analysis, if applicable
- Downstream analysis

### 3-3.1.3 Guidelines

Multiple documents are used to fulfill the objective of this requirement, since addressing stormwater management needs is thoroughly integrated into WSDOT's design, construction, and maintenance programs. WSDOT's construction stormwater pollution prevention planning components consist of SPCC plans and TESC plans. WSDOT's permanent stormwater planning components include Hydraulic Reports and aspects of the HRM, *Hydraulics Manual*, and *Maintenance Manual*.

Instructions on how to prepare SPCC and TESC plans are provided in Minimum Requirement 2 and in the TESCM. Both the SPCC and TESC plans must be kept on site or within reasonable access of the site during construction and may require updates with changing site conditions.

Instructions on how to prepare Hydraulics Reports are provided in Chapter 1 of the *Hydraulics Manual*.

Stormwater runoff treatment and flow control BMP maintenance criteria for each BMP in Chapter 5 are included in Section 5-5. Additional standards for maintaining stormwater BMPs are found in the *Regional Road Maintenance/Endangered Species Act Program Guidelines* (www.wsdot.wa.gov/maintenance/roadside/esa.htm). The criteria and guidelines are designed to ensure all BMPs function at design performance levels and that the maintenance activities themselves are protective of water quality and its beneficial uses.

## 3-3.2 Minimum Requirement 2 – Construction Stormwater Pollution Prevention

WSDOT's construction stormwater pollution prevention (SWPPP) components consist of

1. Temporary Erosion and Sediment Control (TESC) planning
2. Spill Prevention, Control, and Countermeasures (SPCC) planning

Erosion control is required to prevent erosion from damaging project sites, adjacent properties, and the environment. The emphasis of erosion control is to prevent the erosion process from starting by preserving native vegetation, limiting the amount of bare ground, and protecting slopes. A TESC plan must address the following elements, which are the same as the SWPPP elements outlined in Special Condition S9 of Ecology's 2017 *Construction Stormwater General Permit* and in the TESCM:

- Element 1: Mark clearing limits
- Element 2: Establish Construction Access
- Element 3: Control Flow Rates
- Element 4: Install Sediment Controls
- Element 5: Stabilize Soils
- Element 6: Protect Slopes
- Element 7: Protect Drain Inlets
- Element 8: Stabilize Channels and Outlets
- Element 9: Control Pollutants
- Element 10: Control Dewatering
- Element 11: Maintain BMPs
- Element 12: Manage the Project
- Element 13: Protect Low-Impact Development Facilities

A spill prevention control and countermeasures (SPCC) plan is required on all projects to prevent and minimize spills that may contaminate soil or nearby waters of the state. The contractor prepares the SPCC plan in accordance with Standard Specification 1-07.15(1) and submits the plan to the Project Engineer to be reviewed and accepted before starting onsite construction activities. The SPCC plan must contain the following components which further address Element 9: Control Pollutants listed above:

- Site information and project description
- Spill prevention and containment
- Spill response
- Material and equipment requirements
- Reporting information
- Program management
- Plans to contain preexisting contamination, if necessary

Detailed requirements for each of the Elements above are provided in the TESCM.

The TESC and SPCC plans must (1) demonstrate compliance with all of those detailed requirements, or (2) when site conditions warrant the exemption of an element(s), clearly document in the narrative why a requirement does not apply to the project. The TESC and SPCC plans shall be implemented beginning with initial land disturbance and until final stabilization. Sediment and erosion control BMPs shall be consistent with the BMPs contained in TESCM.

### 3-3.2.1 Objective

The objective of construction stormwater pollution prevention is to ensure construction projects do not impair water quality by allowing sediment to discharge from the site or allowing pollutant spills. The emphasis of erosion control is to prevent the erosion process from starting by preserving native vegetation, limiting the amount of bare ground, and protecting slopes.

### 3-3.2.2 Applicability

All nonexempt projects must address Construction Stormwater Pollution Prevention per Standard Specification 1.07.15(1). A SPCC plan is required on all projects to prevent and minimize spills that may contaminate soil or nearby waters of the state. All projects that disturb 7,000 square feet or more of land or add 2,000 square feet or more of new, replaced, or new plus replaced impervious surface must prepare a TESC plan in addition to a SPCC plan.

### 3-3.2.3 Guidelines

Instructions on how to prepare SPCC and TESC plans are provided in the TESCM and Standard Specification 1-07.15(1).

## 3-3.3 Minimum Requirement 3 – Source Control of Pollutants

All known, available, and reasonable source control BMPs must be applied and must be selected, designed, and maintained in accordance with this manual.

### 3-3.3.1 Objective

The intention of source control is to prevent pollutants from coming into contact and mixing with stormwater. In many cases, it is more cost-effective to apply source control than to remove pollutants after they have mixed with runoff. This is certainly the case for erosion control and spill prevention during the construction phase.

### 3-3.3.2 Applicability

Minimum Requirement 3 applies to all nonexempt projects that meet or exceed the thresholds described in Figure 3-1. Source control (erosion control and spill prevention) applies to all projects during the construction phase per Minimum Requirement 2. Post construction source controls are employed programmatically via WSDOT's maintenance program. In instances where structural source control BMPs may not be sufficient, consult with the environmental support staff of the HQ Maintenance and Operations Office to explore operational source control BMP options that may be available to meet regulatory requirements.

Certain types of activities and facilities may require source control BMPs. Determine whether there are pollutant-generating activities or facilities in the project that warrant source controls. Source control BMPs for the activities listed in Section 5-2.1 must be specified to reduce pollutants. For detailed descriptions of the source control BMPs, see Chapter 2 of Volume IV of Ecology's *Stormwater Management Manual for Western Washington* (SWMMWW) or Chapter 8 of the *Stormwater Management Manual for Eastern Washington* (SWMMEW). Any deviations from the source control BMPs listed in either the SWMMWW or the SWMMEW must provide equivalent pollution source control benefits. The hydraulic report must include documentation for why the deviation is considered equivalent. Section 5-3.6.3 describes the process for seeking approval of such deviations. The project may have additional source control responsibilities per the exceptions listed in HRM 1-2.1.

### 3-3.3.3 Guidelines

Source control BMPs include operational and structural BMPs:

- Operational BMPs are nonstructural practices that prevent (or reduce) pollutants from entering stormwater. Examples include preventative maintenance procedures; spill prevention and cleanup; and inspection of potential pollutant sources.
- Structural BMPs are physical, structural, or mechanical devices or facilities intended to prevent pollutants from entering stormwater. Examples include installation of vegetation for temporary and permanent erosion control; putting roofs over outside storage areas; and putting berms around potential pollutant source areas to prevent both stormwater run-on and pollutant run-off.

Many source control BMPs combine operational and structural characteristics. A construction phase example is slope protection using various types of covers: temporary covers (structural) and the active inspection and maintenance needed for effective use of the covers (operational). A post construction phase example is street sweeping: a sweeper (mechanical) and the sweeping schedule and procedures for its use (operational) collectively support the BMP.

For criteria on the design of construction-related source control BMPs, see the TESCM. For criteria on the design of source control BMPs for the post construction phase, see Section 5-2.1.

## 3-3.4 Minimum Requirement 4 – Maintaining the Natural Drainage System

To the maximum extent practicable, natural drainage patterns must be maintained and discharges from the site must occur at the natural discharge locations. The manner by which runoff is discharged must not cause downstream erosion in receiving waters and downgradient properties. Discharge locations may require dispersal systems and/or energy-dissipation BMPs per *Hydraulics Manual* guidelines.

### 3-3.4.1 Objective

The intent of maintaining the natural drainage system is to (1) preserve and utilize natural drainage systems to the fullest extent because of the multiple benefits such systems provide, and (2) prevent erosion at, and downstream of, the discharge location.

### 3-3.4.2 Applicability

Minimum Requirement 4 applies to all nonexempt projects that meet or exceed the thresholds described in Figure 3-1, to the maximum extent practicable.

### 3-3.4.3 Guidelines

When projects affect subsurface and/or surface water drainage, use strategies that minimize impacts and maintain hydrologic continuity. For example, road cuts on hill slopes or roads bisecting wetlands or ephemeral streams can affect subsurface water drainage. Ditching, channel straightening, channel lining, channel obliteration, and roads that bisect wetlands or perennial streams change surface water drainage and stream channel processes. Use the best available design practices to maintain hydrologic function and drainage patterns based on site geology, hydrology, and topography.

If flows for a given discharge location are not channeled in the existing (preproject) condition, runoff concentrated by the proposed project must be discharged overland through a dispersal system or to surface water through an energy dissipater BMP before leaving the project. Typical *dispersal systems* are rock pads, dispersal trenches, level spreaders, and diffuser pipes. Typical *energy dissipaters* are rock pads and drop structures. These systems are listed in Sections 5-4.3.5 and 5-4.3.6.

In some instances, a diversion of flow from the existing (preproject) TDA may be beneficial to the downstream properties or receiving water bodies. Examples of where the diversion of flows may be warranted include (1) areas where preproject drainage conditions are contributing to active erosion of a stream channel in a heavily impervious basin, and (2) areas where preproject drainage patterns are exacerbating flooding of downstream properties. If it is determined that a diversion of flow from the natural discharge location may be warranted, contact the Region Hydraulics Engineer or HQ Hydraulics staff. The diversion of flow from one TDA to another would be a deviation from Minimum Requirement 4 and would follow the guidelines in Section 3-5.

## 3-3.5 Minimum Requirement 5 – Runoff Treatment

Stormwater runoff treatment facilities shall be selected, designed, and maintained in accordance with the HRM.

### 3-3.5.1 Objective

The purpose of runoff treatment is to reduce pollutant loads and concentrations in stormwater runoff using physical, biological, and chemical removal mechanisms to maintain or enhance beneficial uses of receiving waters. When site conditions are appropriate, infiltration can potentially be the most effective BMP for runoff treatment.

### 3-3.5.2 Runoff Treatment Exemptions

Any of the runoff treatment exemptions below may be negated by requirements set forth in a Total Maximum Daily Load (TMDL) or Ecology-approved Basin Plan.

- Discharges to underground injection control (UIC) facilities may not require basic runoff treatment if the vadose zone matrix between the bottom of the facility and the water table provides adequate treatment capacity (see Section 4-5.4).

### 3-3.5.3 Applicability[3]

Minimum Requirement 5 applies to all nonexempt projects that meet or exceed the thresholds described in Figures 3-1, 3-2, and 3-3. Even if the threshold is not triggered, runoff from the applicable pollution-generating impervious surfaces (PGIS) and pollution-generating pervious surfaces (PGPS) must be dispersed and infiltrated to adjacent pervious areas when practicable. The extension of the roadway edge and the paving of gravel shoulders and lanes are new PGIS.

Existing natural dispersion BMPs (BMP FC.01) must be identified along the project as a part of determining whether the particular TDA exceeds thresholds in Figure 3-3, Step 7. Those effective PGIS areas that are flowing to an existing (preproject) natural dispersion BMP can be subtracted as noneffective PGIS.

Equivalent area treatment is allowable for PGIS areas that are within the same TDA. The equivalent PGIS area must have an ADT that is greater than or equal to the original PGIS area. While the equivalent area will receive treatment, the new or expanded discharge must not cause a violation of surface water quality standards. Additional information on equivalent area treatment is provided in Section 4-3.5.4.

[3] Consult the Glossary for the following key terms: *converted pervious surface*, *impervious surface*, *new PGIS*, *PGPS*, *project limits*, *replaced impervious surface*, *effective PGIS*, *noneffective PGIS*, and *threshold discharge area (TDA)*.

Projects not triggering the runoff treatment minimum requirement still have the option to provide runoff treatment. Any treatment provided in this case would be considered an opportunity-based stormwater retrofit. Retrofits should be considered especially if a high stormwater retrofit priority is identified within the project limits through the I-4 Stormwater Retrofit program. The decision to retrofit is made by the PEO in collaboration with Region and Headquarters Hydraulics, Region Program Management, and the HQ Environmental Services Office. Additional information on opportunity-based stormwater retrofit is provided in Section 3-4.3.

### 3-3.5.4 Guidelines

Runoff treatment design involves the following three steps:

1. Determine the specific runoff treatment requirements (basic treatment, enhanced treatment, oil control, and/or phosphorus control). Refer to *Treatment Targets* below.
2. Choose the method(s) of runoff treatment that will best meet the treatment requirements, taking into account the constraints/opportunities presented by the project's context and operation and maintenance. Refer to Sections 2-4, 4-3.1, 5-3.5, and 5-5.
3. Design runoff treatment facilities based on the sizing criteria. Refer to *Criteria for Sizing Runoff Treatment Facilities* below and Section 5-4.1.

WSDOT's stormwater management design philosophy (see Section 2-3.2) seeks to mimic natural hydrology, where feasible, through the dispersion and infiltration of runoff using low-impact development (LID) practices. The extent to which runoff flow rates and volumes can be (or remain) dispersed and then infiltrated determines the types and sizing of runoff treatment options available. This aspect of runoff treatment planning and design is discussed in detail in Sections 2-3.2, 4-3.5, 5-2, and 5-3.

Existing low class wetlands may be considered for runoff treatment if the wetlands meet the criteria for hydrologic modification (see Minimum Requirement 6 and Section 4-6 on wetland hydroperiods) and Minimum Requirement 7.

Sections 4-3 (western Washington) and 4-4 (eastern Washington) provide design criteria for sizing runoff treatment facilities, including a description of how to conduct the hydrological analysis to derive treatment volumes and flow rates for treatment facilities. Section 5-4 provides direction on how to design the treatment facilities chosen for the project.

### *Treatment Targets*

There are four runoff treatment targets: *Basic Treatment* (total suspended solids removal), *Enhanced Treatment* (dissolved metals removal), *Oil Control*, and *Phosphorus Control*. Table 3-1 describes applicable treatment targets and performance goals for roadway projects. For nonroadway applications, refer to Ecology's SWMMEW or SWMMWW. Table 3-2 identifies receiving waters that only require Basic Treatment for direct discharges.

Section 5-3.6 provides information on alternative BMP options available to meet each of the four treatment targets. Per Figure 5-3, the PEO must exhaust all approved runoff treatment BMP options before using an alternative BMP option from Section 5-3.6. Treatment facilities, designed in accordance with the design criteria presented in this manual, are presumed to meet the applicable performance goals.

**Table 3-1 Runoff treatment targets and applications for roadway projects.**

| Treatment Target | Application | Performance Goal |
|---|---|---|
| Basic Treatment | All project TDAs where runoff treatment threshold is met or exceeded. Table 3 2 identifies receiving waters that only require Basic Treatment for direct discharges. | 80% removal of total suspended solids (TSS) |
| Enhanced Treatment (dissolved metals) | Same as for Basic Treatment AND does not discharge to Basic Treatment receiving water body (listed in Table 3-2) AND<br>1. Roadways within *Urban Growth Areas* (UGAs):<br>• Fully controlled or partially controlled limited access highways with a design year ADT[1] ≥ 15,000 OR<br>• All other roadways with a design year ADT[1] ≥ 7,500 OR<br>2. Roadways outside of UGAs:<br>• Roads with a design year ADT ≥ 15,000<br>3. Required by an Ecology-approved Basin Plan or TMDL, as described in Sections 2-4.2 and 2-4.7. | Provide a higher rate of removal of dissolved metals than Basic Treatment facilities for influent concentrations ranging from 0.005 to 0.02 mg/L for dissolved copper and 0.02-0.3 mg/L for dissolved zinc |
| Oil Control | Same as for Basic Treatment AND<br>1. There is an intersection with existing ADTs where either ≥15,000 vehicles (ADT) must stop to cross a roadway with ≥25,000 vehicles (ADT) or vice versa[2] excluding projects proposing primarily pedestrian or bicycle improvements OR<br>2. Rest areas with an expected trip end count greater than or equal to 300 vehicles per day[3] OR<br>3. Maintenance facilities that park, store, or maintain 25 or more vehicles (trucks or heavy equipment) that exceed 10 tons gross weight each[3] OR<br>4. Eastern Washington roadways with ADT >30,000. | No ongoing or recurring visible sheen and 24-hr average total petroleum hydrocarbon concentration of not greater than 10 mg/L with a maximum of 15 mg/L for a discrete (grab) sample |
| Phosphorus Control | Same as for Basic Treatment AND the project is located in a designated area requiring phosphorus control as prescribed through an Ecology-approved Basin Plan or TMDL.[4] | 50% removal of total phosphorus (TP) for influent concentrations ranging from 0.1 to 0.5 mg/L TP |

[1] The design year ADT is determined using Chapter 1103 of the WSDOT Design Manual.
[2] Treatment is required for these high-use intersections for lanes where vehicles accumulate during the signal cycle, including through, left-turn lanes, and right-turn lanes. If no turn pocket exists, the treatable area must begin at a distance equal to three car lengths from the stop line. If runoff from the intersection drains to more than two collection areas that do not combine within the intersection, treatment may be limited to any two of the collection areas where the cars stop. See HRM FAQ for additional information.
[3] For rest areas and maintenance facilities, oil control BMPs are required for the PGIS subject to the oil control threshold activities listed in Table 3-1. All-day parking areas do not require oil control. Oil Control BMPs must be sized to treat all water directed to them.
[4] Contact region hydraulics or environmental staff to determine whether phosphorus control is required for a project.

### Table 3-2 Basic Treatment receiving water bodies.[1]

| | |
|---|---|
| **1. All saltwater bodies** | |
| **2. Rivers (only Basic Treatment required downstream of the confluence of the two water bodies)** | |
| Baker (Anderson Creek) | Queets (Clearwater River) |
| Bogachiel (Bear Creek) | Quillayute (Bogachiel River) |
| Cascade (Marblemount) | Quinault (Lake Quinault) |
| Chehalis (Bunker Creek) | Sauk (Clear Creek) |
| Clearwater (Town of Clearwater) | Satsop (Middle and East Fork confluence) |
| Columbia (Canadian Border) | Similkameen |
| Cowlitz (Skate Creek) | Skagit (Cascade River) |
| Elwha (Lake Mills) | Skokomish (Vance Creek) |
| Green (Howard Hanson Dam) | Skykomish (Beckler River) |
| Grand Ronde | Snake |
| Hoh (South Fork Hoh River) | Snohomish (Snoqualmie River) |
| Humptulips (West and East Fork confluence) | Snoqualmie (Middle and North Fork confluence) |
| Kalama (Italian Creek) | Sol Duc (Beaver Creek) |
| Kettle | Spokane |
| Klickitat | Stillaguamish (North and South Fork confluence) |
| Lewis (Swift Reservoir) | North Fork Stillaguamish (Boulder River) |
| Methow | South Fork Stillaguamish (Canyon Creek) |
| Moses | Suiattle (Darrington) |
| Muddy (Clear Creek) | Tilton (Bear Canyon Creek) |
| Naches | Toutle (North and South Fork confluence) |
| Nisqually (Alder Lake) | North Fork Toutle (Green River) |
| Nooksack (Glacier Creek) | Washougal (Washougal) |
| North River (Raymond) | White (Greenwater River) |
| South Fork Nooksack (Hutchinson Creek) | Wenatchee |
| Okanogan | Wind (Carson) |
| Pend Oreille | Wynoochee (Wishkah River Road Bridge) |
| Puyallup (Carbon River) | Yakima |
| **3. Streams with a Strahler order of 4 or higher (as determined using 1:24,000 scale maps to delineate stream order) receiving discharges from roadway outside UGAs with ADT <30,000** | |
| **4. Non-fish-bearing streams tributary to Basic Treatment receiving waters** | |
| **5. Lakes (county location)** | |
| Banks (Grant) | Silver (Cowlitz) |
| Chelan (Chelan) | Whatcom (Whatcom) |
| Moses (Grant) | Washington (King) |
| Potholes Reservoir (Grant) | Union (King) |
| Sammamish (King) | |
| **6. Discharges to groundwater via rule-authorized UIC facilities or surface infiltration[2]** | |

[1] These are receiving waters not requiring Enhanced Treatment for direct discharges (or, indirectly through a municipal storm sewer system). The initial criteria for this list are rivers whose mean annual flow exceeds 1,000 cubic feet per second and lakes whose surface area exceeds 300 acres. Local governments may petition Ecology for the addition of waters to this list, but waters should have sufficient background dilution capacity to accommodate dissolved metals additions from build-out conditions in the watershed under the latest Comprehensive Land Use Plan and zoning regulations.

[2] Contact region hydraulics or environmental staff to determine whether an underground injection control (UIC) facility is authorized by the rules under the UIC program (WAC 173-218). In western Washington, surface

infiltration must meet the site suitability criteria (SSC) 7 Soil Physical and Chemical Suitability for Treatment when within ¼ mile of surface waters that require the application of Enhanced Treatment. In certain situations, Ecology may approve surface infiltration that would not need enhanced runoff treatment on a case-by-case basis.

### *Criteria for Sizing Runoff Treatment Facilities*

Two sets of criteria exist for sizing runoff treatment facilities—one for western Washington (Table 3-3) and one for eastern Washington (Table 3-4). (See Sections 4-3.1 and 4-4.1 for a detailed discussion of on-line and off-line BMPs.)

**Table 3-3 Criteria for sizing runoff treatment facilities in western Washington.**

| Facility Type | Criteria | Model |
|---|---|---|
| Flow-based: upstream of flow control facility (on-line and off-line) | Size treatment facility or facilities so that 91% of the annual average runoff will receive treatment at or below the design loading criteria, under postdeveloped conditions for each TDA. If the flow rate is split upstream of the treatment facility, use the off-line flow rates. | Approved continuous simulation model using 15-minute time steps |
| Flow-based: downstream of flow control facility | Size treatment facility or facilities using the full 2-year release rate from the detention facility, under postdeveloped conditions for each TDA. | Approved continuous simulation model using 15-minute time steps |
| Volume-based (on-line) | *Wetpool* – Size the wetpool to store the 91$^{st}$ percentile, 24-hour runoff volume as calculated by MGSFlood.<br>Other volume-based infiltration and filtration facilities – Size the facility to treat 91% of the estimated runoff file for the postdeveloped condition. | Approved continuous simulation model with 15-minute time steps |

**Table 3-4 Criteria for sizing runoff treatment facilities in eastern Washington.**

| Facility Type | Criteria | Model |
|---|---|---|
| Volume-based | Size facility using the runoff volume predicted for the 6-month, long-duration* storm event under postdeveloped conditions. | Single-event model (SCS or SBUH)<br>Climatic Regions 1–4 Regional Storm; OR Type 1A for Climatic Regions 2 & 3 (10-minute time step) |
| Flow-based: upstream of detention/retention facility | Size facility using the peak flow rate predicted for the 6-month, short-duration storm under postdeveloped conditions. | Single-event model (SCS or SBUH)<br>Short-duration storm (5-minute time step) |
| Flow-based: downstream of detention facility | Size facility using the full 2-year release rate from the detention facility, under postdeveloped conditions. | Single-event model (SCS or SBUH)<br>Short-duration storm OR the appropriate long-duration storm depending on the Climate Region, whichever produces the greatest flow |

* For more information on long-duration and short-duration storms, see Section 4-4.7.

If the BMP receives runoff from areas other than the effective PGIS requires treatment) cannot be separated and flow to the BMP, treatment facilities must be sized to treat this additional runoff.

## 3-3.6 Minimum Requirement 6 – Flow Control

### 3-3.6.1 Stormwater flow control facilities shall be selected, designed, and maintained in accordance with the HRM. Objective

The objective of flow control is to prevent increases in the stream channel erosion rates beyond those characteristic of natural or reestablished conditions. The objective is also to prevent cumulative future impacts from increased stormwater runoff volumes and flow rates on streams. Wherever possible, dispersion and infiltration are the preferred methods of flow control. Meeting flow control requirements may also be achieved through regional detention facilities.

### 3-3.6.2 Flow Control Exemptions

Regardless of whether an exemption applies, TDAs need to take advantage of on-site opportunities to disperse and infiltrate storm runoff to the greatest extent feasible.

The following TDA discharges are exempt from flow control requirements:

1. A TDA is able to disperse stormwater without discharging runoff either directly or indirectly through a conveyance system to surface waters per the Dispersion BMP guidelines in Section 5-2.2.2.
2. TDAs discharging stormwater directly or indirectly through a conveyance system into any of the flow control exempt surface water bodies shown in Table 3-5.
3. TDAs discharging stormwater from over-the-water structures such as bridges, docks, and piers in or over fresh water are exempt up to the 2-year flood plain elevation; OR that portion of an over-the-water structure that is over the ordinary high water mark.
4. Portions of a roadway that cut through the 2-year flood plain elevation.
5. TDAs discharging stormwater directly or indirectly through a conveyance system into a wetland. However, flow control may still be required to maintain wetland hydrology (depth/duration of inundation) per Minimum Requirement 7.

Any of the exempted areas must meet the following requirements:

- Direct discharge to the exempt receiving water does not result in the diversion of drainage area from perennial streams classified as Types 1, 2, 3, or 4 in the State of Washington Interim Water Typing System; or Types “S,” “F,” or “Np” in the Permanent Water Typing System; or from any Category I, II, or III wetland; AND

- Flow-splitting devices or drainage BMPs are applied to route natural runoff volumes from the TDA to any downstream Type 5 stream or Category IV wetland:
  - Design of flow-splitting devices or drainage BMPs will be based on continuous hydrologic modeling analysis (western Washington only). The design will ensure flows delivered to Type 5 stream reaches will approximate, but in no case exceed, durations ranging from 50% of the 2-year to the 50-year peak flow.
  - Flow-splitting devices or drainage BMPs that deliver flow to category IV wetlands will also be designed using continuous hydrologic modeling to preserve preproject wetland hydrologic conditions unless specifically waived or exempted by regulatory agencies with permitting jurisdiction; AND
- The TDA must be drained by a conveyance system that is comprised entirely of constructed conveyance elements (such as pipes, ditches, or drainage channels) that extends to the ordinary high water mark of the exempt receiving water, unless, in order to avoid construction activities in sensitive areas, flows are properly dispersed before reaching the buffer zone of the sensitive or critical area; AND
- The conveyance system between the TDA and the exempt receiving water must have a hydraulic capacity sufficient to convey discharges under future build-out conditions (under current zoning) from all contributing areas to the TDA, if applicable (see the *Utilities Manual*, Section 120.05, for storm drainage requirements), from which runoff is collected; AND
- Any erodible elements of the constructed conveyance system must be adequately stabilized to prevent erosion under the conditions listed above

The following **additional** exemptions (or partial exemptions) are available in eastern Washington:

1. A site with less than 10-inch average annual rainfall that discharges to a seasonal stream that is not connected via surface flow to a nonexempt surface water by runoff generated during the 2-year regional storm for Climatic Regions 1–4 OR during the 2-year Type 1A storm for Climatic Regions 2 and 3.
2. Discharges to a stream that flows only during runoff-producing events. The runoff carried by the stream following the 2-year regional storm in Climatic Regions 1–4 OR during the 2-year Type 1A storm for Climatic Regions 2 and 3, must not discharge via surface flow to a nonexempt surface water. The stream may carry runoff during an average annual snowmelt event, but must not have a period of base flow during a year of normal precipitation.
3. Discharges to stream reaches consisting primarily of irrigation return flows and not providing habitat for fish spawning and rearing.

To seek exemptions in additional geographic areas, the PEO should submit a DAT proposal for consideration. Such a petition must justify the proposed exemption based on a hydrologic analysis demonstrating that the potential stormwater runoff from the exempted area will not significantly increase the erosion forces on the stream channel, nor have near-field impacts. Contact the Region Hydraulics Engineer to determine the feasibility of potential exemption candidates.

The DAT proposal may consider diversions of flow from perennial streams and from wetlands if significant existing (preproject) flooding, stream stability, water quality, or aquatic habitat problems would be solved or significantly mitigated by bypassing stormwater runoff, rather than providing stormwater detention and discharge to natural drainage features. Bypassing is not an alternative to applicable flow control or treatment if the flooding, stream stability, water quality, or habitat problem to be solved would be caused by the project. In addition, ensure the DAT proposal does not exacerbate other water quality/quantity problems such as inadequate low flows or inadequate wetland water elevations.

The PEO must document the existing problems and their solutions or mitigation as a result of the direct discharge after review of any available drainage reports, Basin Plans (see Minimum Requirement #8), or other relevant literature. The restrictions in this minimum requirement on conveyance systems that transfer water to exempt receiving waters are applicable in these situations. All regulatory authorities with permitting jurisdiction must be in support of the DAT proposal for the flow control exemption and/or movement of flows between areas on the project.

Additional streams in eastern Washington may be exempt by applying the following criteria:

- Any river or stream that is Strahler fifth order or greater as determined from a 1:24,000 scale map; OR
- Any river or stream that is Strahler fourth order or greater as determined from a 1:100,000 or larger scale map.

### 3-3.6.3 Applicability[4]

Minimum Requirement 6 applies to all nonexempt projects that meet or exceed the thresholds described in Figures 3-1, 3-2, and 3-3 and discharge stormwater directly or indirectly through a conveyance system to a surface freshwater body. The threshold for triggering the flow control requirement takes into account the project’s effective impervious surfaces and converted pervious surfaces.

Application of the “net-new impervious surface” concept only applies to Minimum Requirement 6 at the TDA level (Figure 3-3, Step 8). Application of the concept does not extend to any other minimum requirement. When applying the net-new impervious approach, the

[4] Consult the Glossary for the following key terms: *converted pervious surface*, *new impervious surfaces*, *effective impervious surface*, *net-new impervious surface*, *project limits*, *replaced impervious surface*, and *threshold discharge area (TDA)*.

pavement permanently removed by the project needs to be reverted to a pervious condition per the guidelines in Section 4-3.5.3.

**Table 3-5 Flow control exempt surface waters list.**

| Water Body | Upstream Point/Reach for Exemption (if applicable) |
|---|---|
| Alder Lake | |
| Asotin Creek | Downstream of confluence with George Creek |
| Baker Lake | |
| Baker River | Baker River/Baker Lake downstream of confluence with Noisy Creek |
| Banks Lake | |
| Bogachiel River | 0.4 miles downstream of Dowans Creek |
| Bumping Lake | |
| Bumping River | Downstream of confluence with American River |
| Calawah River | Downstream of confluence with South Fork Calawah River |
| Capital Lake/Deschutes River | Downstream of Tumwater Falls |
| Carbon River | Downstream of confluence with South Prairie Creek |
| Cascade River | Downstream of Found Creek |
| Cedar River | Downstream of confluence with Taylor Creek |
| Chehalis River | 1,500 feet downstream of confluence with Stowe Creek |
| Chehalis River, South Fork | 1,000 feet upstream of confluence with Lake Creek |
| Cispus River | Downstream of confluence with Cat Creek |
| Clearwater River | Downstream of confluence with Christmas Creek |
| Cle Elum River | Downstream of Cle Elum Lake |
| Coal Creek Slough | Boundary of Consolidated Diking and Irrigation District #1 to confluence with the Columbia River |
| Columbia River | Downstream of Canadian border |
| Columbia River Reservoirs | |
| Colville River | Downstream of confluence with Chewelah Creek |
| Conconully Reservoir | |
| Consolidated Diking and Irrigations District #1 | Waters that lie within the area bounded by the Columbia River on the south, the Cowlitz River on the east, Ditch No. 10 to the west, and Ditch No. 6 to the north. |
| Consolidated Diking and Irrigation District #3 | Ditches served by these pump stations: Tam O'Shanter #1 and #2, Coweeman, Baker Way, Elk's |
| Coweman River | Downstream of confluence with Gobble Creek |
| Cowlitz River | Downstream of confluence of Ohanapecosh River and Clear Fork Cowlitz River |
| Crescent Lake | |
| Dickey River | Downstream of confluence with Coal Creek |
| Dosewallips River | Downstream of confluence with Rocky Brook |
| Dungeness River, main channels | Downstream of confluence with Gray Wolf River |
| Duwamish/Green River | Downstream of River Mile 6 (S. Boeing Access Road) |
| Elwha River | Downstream of confluence with Goldie River |
| Erdahl Ditch in Fife | Downstream of pump station |
| First Creek in Tacoma | |
| Grande Ronde River | Entire reach from the Oregon to Idaho border |
| Grays River | Downstream of confluence with Hull Creek |
| Green River (WRIA 26 – Cowlitz) | 3.5 miles upstream of Devils Creek |
| Hoh River | 1.2 miles downstream of Jackson Creek |
| Humptulips River | Downstream of confluence with West and East Forks |
| Johns Creek | Downstream of Interstate-405 East Right of way |
| Kalama River | 2.0 miles downstream of Jacks Creek |

| Water Body | **Upstream Point/Reach for Exemption** (if applicable) |
|---|---|
| Kettle River | Downstream of confluence with Boulder Creek |
| Klickitat River | Downstream of confluence with West Fork |
| Lacamas Lake | |
| Latah Creek (formerly Hangman Creek) | Downstream of confluence with Rock Creek (in Spokane County) |
| Lake Chelan | |
| Lake Cle Elum | |
| Lake Cushman | |
| Lake Kachess | |
| Lake Keechelus | |
| Lake Quinault | |
| Lake River (Clark County) | |
| Lake Shannon | |
| Lake Sammamish | |
| Lake Union & Union Bay | King County |
| Lake Wenatchee | |
| Lake Washington, Montlake Cut, Ship Canal, & Salmon Bay | |
| Lake Whatcom | |
| Lewis River | Downstream of confluence with Quartz Creek |
| Lewis River, East Fork | Downstream of confluence with Big Tree Creek |
| Lightning Creek | Downstream of confluence with Three Fools Creek |
| Little Spokane River | Downstream of confluence with Deadman Creek |
| Little White Salmon River | Downstream of confluence with Lava Creek |
| Lower Crab Creek | Entire reach |
| Mayfield Lake | |
| Mercer Slough | |
| Methow River | Downstream of confluence with Early Winters Creek |
| Moses Lake | |
| Muddy River | Downstream of confluence with Clear Creek |
| Naches River | Downstream of confluence with Bumping River |
| Naselle River | Downstream of confluence with Johnson Creek |
| Newaukum River | Downstream of confluence with South Fork Newaukum River |
| Nisqually River | Downstream of confluence with Big Creek |
| Nooksack River | Downstream of confluence of North and Middle Forks |
| Nooksack River, North Fork | Downstream of confluence with Glacier Creek, at USGS gage 12205000 |
| Nooksack River, South Fork | 0.1 miles upstream of confluence with Skookum Creek |
| North River | Downstream of confluence with Vesta Creek |
| Ohanapecosh River | Downstream of confluence with Summit Creek |
| Okanogan River | Downstream of Canadian border |
| Osoyoos Lake | |
| Pacific Ocean | |
| Palouse River | Downstream of confluence with South Fork Palouse River |
| Pend Oreille River | Idaho to Canadian border |
| Pend Oreille River Reservoirs | |
| Pothole Reservoir | |
| Puget Sound | |
| Puyallup River | Half-mile downstream of confluence with Kellog Creek |

| Water Body | **Upstream Point/Reach for Exemption** (if applicable) |
|---|---|
| Queets River | Downstream of confluence with Tshletshy Creek |
| Quillayute River | Downstream of Bogachiel River |
| Quinault River | Downstream of confluence with North Fork Quinault River |
| Riffe Lake | |
| Rimrock Lake | |
| Rock Creek | In Whitman County, downstream of confluence with Cottonwood Creek |
| Round Lake | |
| Ruby Creek | Ruby Creek at State Route 20 crossing downstream of Granite and Canyon Creeks |
| Sammamish River | Downstream of Lake Sammamish |
| Satsop River | Downstream of confluence of Middle and East Forks |
| Satsop River, East Fork | Downstream of confluence with Decker Creek |
| Sauk River | Downstream of confluence of South Fork and North Fork |
| Sauk River, North Fork | North Fork Sauk River at Bedal Campground |
| Silver Lake | Cowlitz County |
| Similkameen River | Downstream of Canadian border |
| Skagit River | Downstream of Canadian border |
| Skokomish River | Downstream of confluence of North and South Forks |
| Skokomish River, South Fork | Downstream of confluence with Vance Creek |
| Skokomish River, North Fork | Downstream of confluence with McTaggert Creek |
| Skookumchuck River | 1 mile upstream of Bucoda at State Route 507, milepost 11.0 |
| Skykomish River | Downstream of South Fork |
| Skykomish River, South Fork | Downstream of confluence of Tye and Foss Rivers |
| Snake River | Entire reach along Idaho border to the Columbia River |
| Snake River Reservoirs | |
| Snohomish River | Downstream of confluence of Snoqualmie and Skykomish Rivers |
| Snohomish River Estuary | |
| Snoqualmie River | Downstream of confluence of the Middle Fork |
| Snoqualmie River, Middle Fork | Downstream of confluence with Rainy Creek |
| Sol Duc River | Downstream of confluence of North and South Fork Soleduck River |
| Spokane River | Downstream of Idaho border |
| Spokane River Reservoirs | |
| Stillaguamish River | Downstream of confluence of North and South Forks |
| Stillaguamish River, North Fork | 7.7 highway miles west of Darrington on State Route 530, downstream of confluence with French Creek |
| Stillaguamish River, South Fork | Downstream of confluence of Cranberry Creek and South Fork |
| Suiattle River | Downstream of confluence with Milk Creek |
| Sultan River | 0.4 miles upstream of State Route 2 |
| Swift Creek Reservoir | |
| Teanaway River | Downstream of confluence of North and West Forks |
| Thunder Creek | Downstream of confluence with Neve Creek |
| Tieton River | Downstream of Rimrock Lake |
| Tilton River | Downstream of confluence with North Fork Tilton River |
| Toppenish Creek | Downstream of confluence with Wanity Slough |
| Touchet River | Downstream of confluence with Patit Creek |
| Toutle River | North and South Fork confluence |
| Toutle River, North Fork | Downstream of confluence with Hoffstadt Creek |

| Water Body | **Upstream Point/Reach for Exemption** (if applicable) |
|---|---|
| Toutle River, South Fork | Downstream of confluence with Thirteen Creek |
| Tucannon River | Downstream of confluence with Pataha Creek |
| Union Bay | |
| Vancouver Lake | |
| Walla Walla River | Downstream of confluence with Mill Creek |
| Wenatchee River | Downstream of confluence with Icicle Creek |
| White River | Downstream of confluence with Huckleberry Creek |
| White Salmon River | 0.15 miles upstream of confluence with Trout Lake Creek |
| Willapa River | Downstream of confluence with Mill Creek |
| Wind River | Downstream of confluence with Cold Creek |
| Wynochee Lake | |
| Wynoochee River | Downstream of confluence with Schafer Creek |
| Yakima River | Downstream of Lake Easton |

Natural dispersion areas meeting the requirements of BMP FC.01 must be identified within the project limits as a part of determining whether the particular TDA exceeds thresholds in Figure 3-3, Step 8. Those effective impervious surface areas that are flowing to an existing (preproject) dispersion area can be subtracted as noneffective impervious surfaces.

The analysis for Step 8 in Figure 3-3 is based on “existing land cover” (what is currently seen at the project site) conditions for the predeveloped modeling scenario and the post construction (after the project is completed) land cover conditions for the developed modeling conditions. Run the analysis at 15-minute time steps to see if the difference is more than 0.15 cfs. Model permeable pavement as grass in this analysis. When using the Single Scaling Factor Approach (called “Station Data” option in MGSFlood) to perform this analysis, contact the HQ Hydraulics Section, since the data station may not be able to produce the 100-year flow due to insufficient rainfall data. Refer to Section 4 of the MGSFlood *User's Manual* for additional information on the Single Scaling Factor Approach: www.wsdot.wa.gov/design/hydraulics/training.htm

### 3-3.6.4 Guidelines

Infiltration or dispersion is the preferred method to control flow. If infiltration or dispersion cannot be achieved at the project site, refer to the appropriate design criteria listed below and in Chapter 4.

Do not place flow control BMPs or the live storage portion of a combination flow control/runoff treatment BMP below the seasonal high water table. As an alternative, first look for equivalent areas within the same TDA to provide the necessary flow control. If a feasible location cannot be identified within the TDA, seek out equivalent areas—within WSDOT right of way—upstream of the TDA that discharges to the same receiving water body to provide the necessary flow control. Lastly, if a feasible location upstream of the TDA cannot be identified, seek out equivalent areas—within WSDOT right of way—downstream of the TDA that discharges to the same receiving water body to provide the necessary flow control. Document these constraints using the Engineering and Economic Feasibility (EEF) Evaluation Process (see Appendix 2A).

If none of the above options is feasible within the project site, then explore alternative flow control mitigation in the watershed (for example, purchasing land and converting it back to a forested condition or restoring wetlands in close proximity to the project site). Refer to Section 2-4.7 for more information on watershed-based approaches and Section 3-5 for stormwater deviations to the HRM.

Avoid placing BMPs in wetlands, 100-year floodplains, and intertidal areas. These natural systems have a higher net environmental benefit than engineered stormwater management systems. If the placement of a required flow control BMP would impact such a sensitive area, consult the Region Hydraulics Engineer as early as possible for aid in properly analyzing the effects of various flow control options. The Region Hydraulics Engineer and Environmental offices will also coordinate with the appropriate state, local, tribal, and federal agencies to ensure adequate protection of all natural resources and obtain the required permits.

Design specifications for conveyance and flood prevention are reviewed with the assistance of the Region Hydraulics Engineer or HQ Hydraulics Section.

### *Western Washington Design Criteria*

Ensure stormwater discharges match developed discharge durations to predeveloped durations for the range of predeveloped discharge rates from 50% of the 2-year peak flow up to the full 50-year peak flow. Also, check the 100-year peak flow rate for downstream flooding and property damage using an approved continuous simulation model.

Refer to Section 4-3.5.4 for the appropriate modeling process. Also, reference the same section for the modeling process to address mitigated and nonmitigated areas on projects in on-site and off-site flow bypass situations.

### *Predeveloped Condition for Stormwater Hydrology Modeling*

The project site's predeveloped conditions for effective impervious surfaces are to assume "historic" land cover conditions unless one of the following conditions applies:

- Reasonable, historic information is provided that indicates the site was prairie prior to settlement (modeled as "pasture" in MGSFlood).
- The drainage area of the immediate stream and all subsequent downstream basins has had at least 40% total impervious area since 1985. In this case, the predeveloped condition to be matched must be the existing land cover condition. Where basin-specific studies determine a stream channel to be unstable, even though the above criterion is met, the predeveloped condition assumption must be the "historic" land cover condition or a land cover condition commensurate with achieving a target flow regime identified by an Ecology-approved basin study. More information on qualifying basins is available in I-3.4.7 Volume I of Ecology's SWMMWW.

Table 3-6 summarizes flow control criteria for western Washington.

**Table 3-6 Western Washington flow control criteria.**

| Facility Type | Criteria | Model |
|---|---|---|
| Infiltration facilities | Size facility to infiltrate sufficient volumes so that the overflow matches the duration standard, and check the 100-year peak flow to estimate the potential for downstream property damage, or infiltrate the entire runoff file up to the 100-year event. | Continuous simulation model using 15-minute time steps |
| Detention/combination treatment and detention facilities | Provide storage volume required to match the duration of predeveloped peak flows from 50% of the 2-year up to the 50-year storm flow, using a flow restrictor (such as an orifice or weir), and check the 100-year peak flow for property damage. | Continuous simulation model using 15-minute time steps |

Establish an alternative flow control standard by applying watershed-scale hydrologic modeling and supporting field observations. Possible justifications for an alternative flow control standard include:

1. Establishment of a stream-specific threshold of significant bedload movement other than the assumed 50% of the 2-year peak flow; OR
2. Zoning and Land Clearing Ordinance restrictions that, in combination with an alternative flow control standard, maintain or reduce the naturally occurring erosive forces on the stream channel, with local jurisdiction approval; OR
3. A duration control standard is not necessary for protection, maintenance, or restoration of designated and existing beneficial uses or Clean Water Act compliance.

### *Eastern Washington Design Criteria*

Using a single-event model, flow control design requirements for projects must limit the peak release rate of the postdeveloped 2-year peak flow to 50% of the predeveloped 2-year peak flow and maintain the predeveloped 25-year peak runoff rate. Check the 100-year event for downstream flooding and property damage.

### *Predeveloped Condition for Stormwater Hydrology Modeling*

The project site's predeveloped conditions for effective impervious surfaces are to assume an existing land cover. Table 3-7 summarizes flow control criteria for eastern Washington.

**Table 3-7 Eastern Washington flow control criteria.**

| Facility Type | Criteria | Model |
|---|---|---|
| Infiltration facilities | Size facility to infiltrate sufficient runoff volumes that the overflow does not exceed the 25-year peak flow requirement. Check the 100-year peak flow to estimate the potential for downstream property damage, or infiltrate the entire runoff file up to the 100-year event. | Single-event model (SCS or SBUH) Climatic Regions 1–4 Regional Storm; OR<br>Type 1A Storm for Climatic Regions 2 & 3 only |
| Detention/combination treatment and detention facilities | Provide storage volume required to match ½ of the 2-year predeveloped peak flow rate, match the predeveloped 25-year peak flow rate, and check the 100-year peak flow for property damage. | Single-event model (SCS or SBUH) Climatic Regions 1–4 Regional Storm; OR<br>Type 1A Storm for Climatic Regions 2 & 3 only |

Estimate predevelopment and postdevelopment runoff volumes and flow rates in accordance with Table 3-7 and Section 4-4.2 using the Regional Storm for Climatic Regions 1–4, OR Type 1A Storm for Climatic Regions 2 and 3.

In some instances, the 2-year predeveloped flow rate is zero cubic feet per second or the flow rate is so small that it is impracticable to design a pond to release at the prescribed flow rate from an engineered outlet structure. In these cases, the total postdeveloped 2-year storm runoff volume must be infiltrated (preferred) or stored in a retention pond for evaporation and the detention pond designed to release the predeveloped 10- and 25-year flow rates. (See BMP FC.03, Detention Pond, in Section 5-4.2.3 for pond and release structure design information.)

Infiltration facilities for flow control must be designed based on postdeveloped runoff volumes, and must be designed to infiltrate the entire volume of the criteria noted in Table 3-7. If full infiltration is not possible, ensure all surface discharges match the following criteria:

- If the 2-year postdeveloped outflow volume discharged to a surface water is less than or equal to the 2-year predeveloped outflow volume, then the postdeveloped 2-year flow rate must be less than or equal to the 2-year predeveloped flow rates. The flows for the 25- and 100-year events must meet the criteria in Table 3-7, row 2.
- If the 2-year postdeveloped outflow volume is greater than the 2-year predeveloped outflow volume, then all surface water discharges must match the flow rate standards in Table 3-7, row 2.

The justification from Ecology for matching one-half the preexisting flow rate is the added work done on the natural channel by the excess volume released in a typical “detention/retention” pond system. If infiltration disposes of the extra volume produced by the added impervious areas, then releasing flow at the preexisting 2-year rate mimics the existing hydrologic conditions.

## 3-3.7 Minimum Requirement 7 – Wetlands Protection

Stormwater discharges to wetlands must maintain the wetland's hydrologic conditions (particularly hydroperiod), hydrophytic vegetation, and substrate characteristics that are necessary to maintain existing wetland functions and values.

### 3-3.7.1 Objective

The objective of wetlands protection is to ensure wetlands receive the same level of protection as any other waters of the state.

### 3-3.7.2 Applicability

Minimum Requirement 7 applies to all nonexempt projects that meet or exceed the thresholds described in Figure 3-1 and where stormwater discharges into a wetland, either directly or indirectly, through a conveyance system.

All stormwater discharges to wetlands must comply with the runoff treatment and flow control requirements in this manual.

### 3-3.7.3 Guidelines

Take steps during design to maximize natural water storage and infiltration opportunities within the project site and outside existing wetlands. Do not use natural wetlands as pollution control facilities in lieu of runoff treatment BMPs.

Stormwater runoff treatment and flow control facilities shall not be built within a wetland or its natural vegetated buffer, except for:

- Necessary conveyance systems as allowed by applicable permit(s); OR
- As allowed in wetlands approved for hydrologic modification or treatment in accordance with Ecology guidance. For western Washington projects, refer to Volume I Appendix I-C of Ecology's SWMMWW. For eastern Washington projects, refer to Core Element #5 Runoff Treatment and Core Element #5 Flow Control in Ecology's SWMMEW; OR
- Projects with approved permits from the appropriate resource agencies.

The PEO may use an Ecology-approved Basin Plan (see Minimum Requirement 8) or a Total Maximum Daily Load (TMDL) to develop requirements for wetlands that are tailored to a specific basin.

Apply the thresholds identified in Minimum Requirement 5 (Runoff Treatment) and Minimum Requirement 6 (Flow Control) for discharges to wetlands. In addition, perform a hydroperiod analysis and show that the discharge will not adversely affect the wetland hydroperiod.

When considering constructing new wetlands or using existing wetlands for flow control or runoff treatment, or when looking for guidelines on protecting wetlands from stormwater impacts, seek input from the appropriate in-house experts in the environmental, biological, wetlands, and landscape architectural disciplines. For projects in the Puget Sound basin, refer to Appendix I-C of Ecology's SWMMWW. Refer to Section 2-4.1.1 regarding special wetland design considerations, Section 4-6 for additional information on wetland hydroperiod analysis, and Section 5-4.1.4 for additional information on the Constructed Stormwater Treatment Wetland (see BMP RT.13).

## 3-3.8 Minimum Requirement 8 – Incorporating Approved Basin Plans Into Stormwater Management

Incorporate Ecology-approved basin plans into stormwater management.

### 3-3.8.1 Objective

Approved basin plans may be used by a local jurisdiction to revise minimum requirements for runoff treatment, flow control, and/or wetlands protection. Approved basin plans provide a mechanism to evaluate and refine minimum requirements and applicable BMPs based on an analysis of a basin or watershed. Approved basin plans may be used to develop control strategies to address impacts from future development and to correct specific problems when sources are known or suspected. Approved basin plans can be effective at addressing both long-term cumulative impacts of pollutant loads and short-term acute impacts of pollutant concentrations, as well as hydrologic impacts to streams, wetlands, and ground water resources. The objective of incorporating approved basin plans into WSDOT's stormwater management process is to promote watershed-based stormwater management.

### 3-3.8.2 Applicability

Minimum Requirement 8 applies where approved basin plans, meeting the criteria described below, are in effect for all nonexempt projects that meet or exceed the thresholds described in Figure 3-1. Only those Ecology-approved basin plans listed in Ecology's SWMMWW Appendix 1-B are applicable to WSDOT. New Ecology-approved basin plans may be added upon NPDES Municipal Stormwater Permit reissuance in 2024.

### 3-3.8.3 Guidelines

While Minimum Requirements 1 through 7 establish general standards for individual sites, they do not evaluate the overall pollution impacts and protection opportunities that could exist at a watershed scale. In order for an approved basin plan to revise the standards of one or more of the minimum requirements, the following conditions must be met:

- The basin plan must be formally adopted by all jurisdictions with responsibility under the plan; and

- All ordinances or regulations called for by the approved basin plan must be in effect; and
- The basin plan must be reviewed and approved by Ecology.

Ecology-approved basin plans may also be used to demonstrate an equivalent level of runoff treatment, flow control, and/or wetland protection through the construction and use of regional stormwater facilities.

(See Section 2-4.7 for further guidelines on approved Basin Plans.) Refer to Ecology's SWMMWW for examples of how approved Basin Plans can alter the Minimum Requirements of this manual.

## 3-3.9 Minimum Requirement 9 – Operation and Maintenance

Operation and maintenance must be applied to all projects that require stormwater facilities or BMPs and shall be accomplished programmatically via WSDOT's maintenance program. WSDOT must provide an operation and maintenance manual that is consistent with the criteria in Section 5-5 for all proposed stormwater facilities and BMPs. A record of maintenance activities that indicate what actions were taken shall be kept.

### 3-3.9.1 Objective

The objective of operation and maintenance is to achieve appropriate preventive maintenance and performance checks to ensure stormwater facilities are adequately maintained and properly operated to:

- Remove pollutants and/or control flows as designed.
- Permit the maximum use of the roadway.
- Prevent damage to the highway structure.
- Protect natural resources.
- Protect abutting property from physical damage.

### 3-3.9.2 Applicability

Minimum Requirement 9 applies to all projects that require stormwater facilities or BMPs and is accomplished programmatically via WSDOT's maintenance program.

### 3-3.9.3 Guidelines

Inadequate maintenance is a common cause of stormwater management facility degraded performance or failure. Section 5-5 provides criteria for BMP maintenance. The *Maintenance Manual* provides further guidelines on stormwater management-related operation and maintenance activities.

# 3-4 Stormwater Retrofit Guidelines

WSDOT intends to manage stormwater runoff from all state highways and protect the quality of receiving waters. WSDOT retrofits existing pavement that does not have stormwater treatment or flow control, or for which treatment or flow control is not to current standards contained in the HRM using stand-alone, project-triggered, and opportunity-based stormwater retrofits.

This section provides guidelines to assess stormwater retrofit obligations for WSDOT projects and identify stormwater retrofit opportunities, and provides guidance on how to document stormwater retrofits after they occur.

## 3-4.1 Stand-Alone Stormwater Retrofit Projects

Standalone stormwater retrofits, funded through the Environmental Retrofit sub-program (I-4), occur when projects are initiated to address stormwater treatment and/or flow control at a prioritized location defined by the stormwater needs prioritization process. Stand-alone stormwater retrofits include Total Maximum Daily Load (TMDL) retrofit obligations assigned in Appendix 3 of WSDOT's NPDES Municipal Permit (WSDOT's Permit), and potentially Superfund remediation triggered retrofits[5], as the highest priorities (i.e., these two situations result in the highest scores during the prioritization process). WSDOT's Permit describes stormwater retrofit-related requirements. WSDOT's associated Stormwater Management Program Plan (SWMPP) describes how WSDOT implements those stormwater retrofit requirements. Section 6.6 and Table 6-1 in the SWMPP defines WSDOT's Stormwater Retrofit Prioritization Scheme (i.e. needs prioritization process) for stand-alone stormwater retrofit segments. It involves a qualitative and quantitative process for assigning a retrofit priority value (high, medium, or low) to specific highway segment locations. Prioritized highway segments are used in the stand-alone and Puget Sound Basin project-triggered stormwater retrofit processes.

Statewide stand-alone stormwater retrofit funding is appropriated in I-4 by the Legislature. Puget Sound basin specific stand-alone stormwater retrofits also receive funds that are transferred from projects within the Puget Sound basin (Project-Triggered retrofit) as described in Section 3-4.2.2 below.

## 3-4.2 Project-Triggered Stormwater Retrofit Projects

There are two types of project-triggered retrofits that could occur on a project. The first type is statewide and has to do with replaced impervious surfaces and replaced PGIS. The second type has to do with projects within the Puget Sound Basin.

[5] A Superfund site is a contaminated location included on the National Priorities List by the EPA that has been or will be remediated (cleaned up) – more information at: Superfund Cleanup Process | Superfund | US EPA.

### 3-4.2.1 Project-Triggered Stormwater Retrofits Statewide

Statewide, projects may have the requirements where the replaced impervious surface requirements (Figure 3-1 Step 4) and/or replaced PGIS (Figure 3-2 Step 6) are applicable and are subject to flow control and/or runoff treatment. These situations constitute a project-triggered retrofit and should be documented in the SDDS.

### 3-4.2.2 Project-Triggered Retrofits within the Puget Sound Basin

A WSDOT project within the Puget Sound Basin has additional project-triggered stormwater retrofit requirements when the project adds new impervious surface and meets or exceeds the thresholds that trigger runoff treatment or flow control requirements (i.e., Minimum Requirements 5 or 6) in any threshold discharge area.

The PEO must perform a Stormwater Retrofit Cost-Effectiveness and Feasibility (RCEF) analysis to determine and document the extent to which retrofit obligations can be met within the project limits. The RCEF analysis will determine if it is cost-effective[6] and feasible[7] to retrofit all existing impervious surfaces and existing PGIS within the project. If the RCEF analysis shows it is not cost-effective or feasible to treat all existing impervious surfaces and existing PGIS within the project, then the PEO has three options:

- Retrofit, at a minimum, the amount of existing impervious surface and existing PGIS within the project limits that equates to 20% of the cost to meet stormwater requirements for the new impervious surfaces and new pollutant generating impervious surface (i.e., 20% cost obligation);
- Transfer an amount of money equal to the 20% cost obligation to fund stand-alone stormwater retrofit projects within the Puget Sound Basin; however, projects with high priority retrofit areas (see Section 3-4.1 for a discussion on stormwater retrofit prioritization) falling within their project boundaries cannot use this option; OR
- Meet the 20% cost obligation within the project site to the extent feasible and transfer funds equivalent to the unmet balance to fund stand-alone stormwater retrofit projects within the Puget Sound Basin.

The PEO Accounting and Reporting for project-triggered retrofits within the Puget Sound Basin: Project designers must perform a Stormwater Retrofit Cost-Effectiveness[7] and Feasibility[6] (RCEF) analysis to determine and document the extent to which retrofit obligations can be met within the project limits. Project designers must document the amount of stormwater retrofit done on each project along with applicable stormwater retrofit cost information in the

[6] Retrofitting for stormwater treatment and flow control is cost-effective if the cost to retrofit all the existing impervious surfaces and existing pollution generating impervious surfaces on the project does not exceed 20% of the cost to meet stormwater treatment and flow control requirements for the new impervious surfaces and new pollution generating impervious surfaces on the project.

[7] Feasible means there are no physical site limitations such as geographic or geologic constraints, steep slopes, soil instability, proximity to water bodies, presence of significant cultural resources, or shallow water tables (or other applicable factors contained in WSDOT's RCEF analysis document)

Stormwater Design Documentation Spreadsheet available at: http://www.wsdot.wa.gov/Design/Hydraulics/HighwayRunoffManual.htm.must document the amount of stormwater retrofit completed on the project along with other applicable stormwater retrofit information in the SDDS available at:
🖱 http://www.wsdot.wa.gov/Design/Hydraulics/HighwayRunoffManual.htm

WSDOT regions may request a variance to exceed the 20% cost obligation for extenuating circumstances such as the project falls within a high-priority retrofit location, the project has realized reduced costs in other project elements, and/or the cost exceedance is not significantly above 20%.

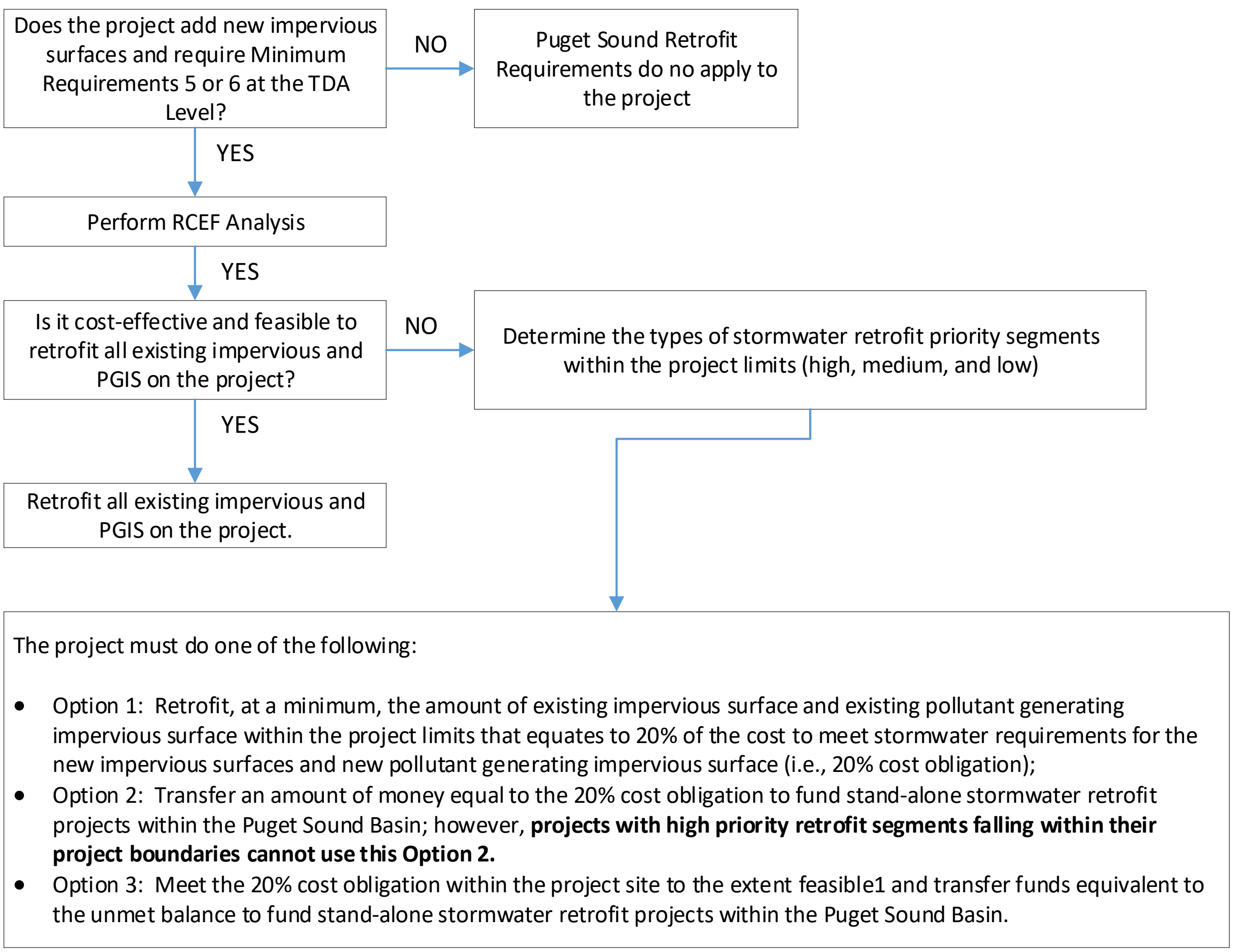



**Figure 3-4 Stormwater retrofit process for WSDOT projects within the Puget Sound basin.**

### 3-4.3 Opportunity-Based Stormwater Retrofits

Opportunity-based stormwater retrofits occur when projects elect to go beyond the HRM Minimum Requirements and provide stormwater treatment and flow control for runoff from existing impervious surfaces and existing PGIS. Opportunity-based retrofits help WSDOT achieve its goal to treat all existing highway pavement. The retrofit should strive for full HRM standards if feasible. In many cases, the stormwater retrofit opportunity may be maximized by building stormwater BMPs to partial HRM standards. The stormwater BMP used for opportunity based retrofit should be documented as designed to full or partial HRM standards in the SDDS and the Stormwater BMP Specifications (SWABS) web application. SWABS is only accessible to WSDOT staff.

## 3-5 Stormwater Adjustments and Deviations to the HRM

Instances exist where the HRM's policies and guidelines do not seem appropriate for a particular project situation. There are two ways the PEO can take towards compliance in these situations. The first path is for the PEO to seek an **Adjustment to the HRM**. The second pathway is for the PEO to seek a stormwater **Deviation to the HRM**.

### 3-5.1 Adjustments

Adjustments to the Minimum Requirements may be granted by WSDOT provided that a written finding of fact is prepared, that addresses the following:

- The adjustment provides substantially equivalent environmental protection.
- Based on sound Engineering practices, the objectives of safety, function, environmental protection, and facility maintenance are met.

### 3-5.2 Deviations

For these situations, WSDOT's *Demonstrative Approach Team* (DAT), which includes staff from Ecology and WSDOT, reviews and approves (if appropriate) alternative stormwater design proposals. While stormwater deviations rarely relieve the project from minimum requirement obligations, the DAT can approve an alternate compliance pathway to meeting the intent of the minimum requirements using a project-specific demonstrative approach. However, prior to considering the demonstrative approach pathway, explore whether the equivalent area approach, described in Sections 3-3.5 and 3-3.6, will allow the project to meet the manual's requirements.

Highway projects seeking an alternative compliance pathway typically experience site-specific limitations (e.g., infrastructural, geographical, geotechnical, hydraulic, environmental, or benefit/cost related) that present an obstacle to fully meeting minimum requirements, particularly runoff treatment and flow control, within the project right of way. An example might involve efforts to avoid building a detention pond in a heavily forested area and instead opting for an off-site in-kind (nonforested) location to achieve the required flow control obligation.

The PEO must make a formal assessment to identify constraints on meeting the minimum requirements in the TDA. Appendix 2A includes guidelines for this assessment, referred to as an *engineering and economic feasibility* (EEF) evaluation. Perform the EEF assessment as early as possible in project development to document the basis for seeking an alternative compliance pathway. The PEO must also formulate a workable alternative stormwater design (deviation) that will meet the intent of the HRM (i.e., does not adversely affect the water quality and satisfies state and federal water quality laws). Contact the Region Hydraulics Engineer and the HQ Hydraulics Section to begin the demonstrative approach process.[11]

Scale the documentation below to the complexity of the problem. Provide a brief memo or report that describes why typical HRM BMPs or processes cannot be used on site and how the proposed alternative meets the intent of the HRM. Include sufficient photos, calculations, plans, drawings, or other backup documentation that supports the conclusions that the demonstrative approach is necessary and the proposed solution meets the intent of the HRM.

The steps below describe the general process for seeking a HRM deviation review and approval:

1. The PEO identifies the requirements or guidelines in the HRM that the project proposes to deviate from and consults with Region Hydraulics Engineer and Headquarters Hydraulics Section for concurrence and the required documentation.
2. The PEO provides the justification for the deviation using the EEF evaluation. The PEO also provides the alternative design and shows how it achieves the intent of the HRM policy or guidance. Consult with the Region Hydraulics Engineer and HQ Hydraulics Section for assistance on possible alternative designs.
3. The PEO submits the documentation (#1 and #2 above) to the DAT for review and approval.
4. If approved, the DAT issues a joint WSDOT and Ecology letter to the PEO authorizing the alternative stormwater compliance approach.

If approved, the PEO shall include all of the above documentation in the appendix of the project's Hydraulic Report.

The PEO should coordinate potential DAT submittals with the DAT team leader as early as possible. For design-build-bid projects, this would occur during project development. For design-build projects, this would occur during the Request for Proposal (RFP) development.

[11] In addition to initiating the demonstrative approach, the Region Hydraulics Engineer or the HQ Hydraulics Section staff may be able to provide guidance or alternatives that allow the project to meet its stormwater requirements without engaging the DAT.