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Remarks and Instructions

The complete manual, revision packages, and individual chapters can be accessed at www.wsdot.wa.gov/publications/manuals/m31-16.htm.

Please contact Mark Maurer at 360-705-7260 or maurerm@wsdot.wa.gov with comments, questions, or suggestions for improvement to the manual.

Instructions for Printed Manuals

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**Washington State
Department of Transportation**

TECHNICAL MANUAL

Highway Runoff Manual

M 31-16.02

May 2010

Environmental and Engineering Programs

Design Office

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- Á Noneffective impervious surface
- Á Effective PGIS
- Á Noneffective PGIS
- Á Threshold discharge area (TDA)
- Á Net-new impervious surface

Upgrading by resurfacing state facilities from gravel to bituminous surface treatment (BST or “chip seal”), asphalt concrete pavement (ACP), or Portland cement concrete pavement (PCCP) is considered to be adding new impervious surfaces and is subject to the minimum requirements that are triggered when the thresholds are met.

Basin planning is encouraged and may be used to tailor applicable minimum requirements to a specific basin (see Minimum Requirement 8).

3-2.2 Exemptions

Some types of activities are fully or partially exempt from the minimum requirements. These include some road maintenance/preservation practices and some underground utility projects. The road maintenance and preservation practices that are exempt from all the minimum requirements are:

- Á Pothole and square cut patching.
- Á Overlaying existing bituminous surface treatment (BST or “chip seal”), asphalt concrete pavement (ACP), or Portland cement concrete pavement (PCCP) with BST, ACP, or PCCP without expanding the area of coverage.
- Á Shoulder grading.
- Á Reshaping/regrading drainage systems.
- Á Crack sealing.
- Á Resurfacing with in-kind material without expanding the road prism.
- Á Vegetation maintenance.
- Á Upgrading by resurfacing Washington State Department of Transportation (WSDOT) facilities from BST to ACP or PCCP without expanding the area of coverage.¹

¹ This exemption is applicable only to WSDOT projects; whereas, the “gravel-to-BST” exemption in Ecology’s stormwater management manuals is 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.

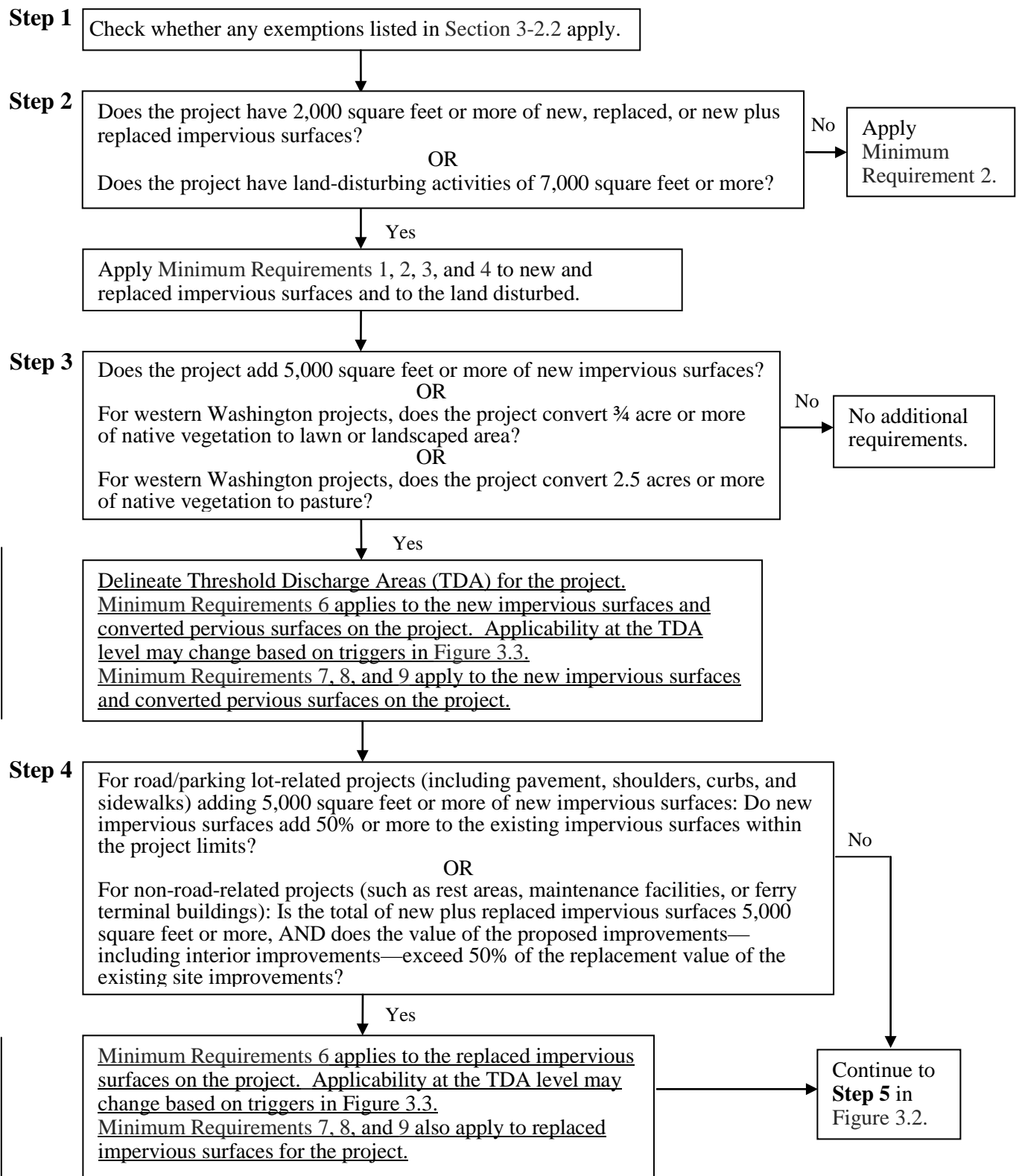


Figure 3.1 Minimum requirement applicability at project level.

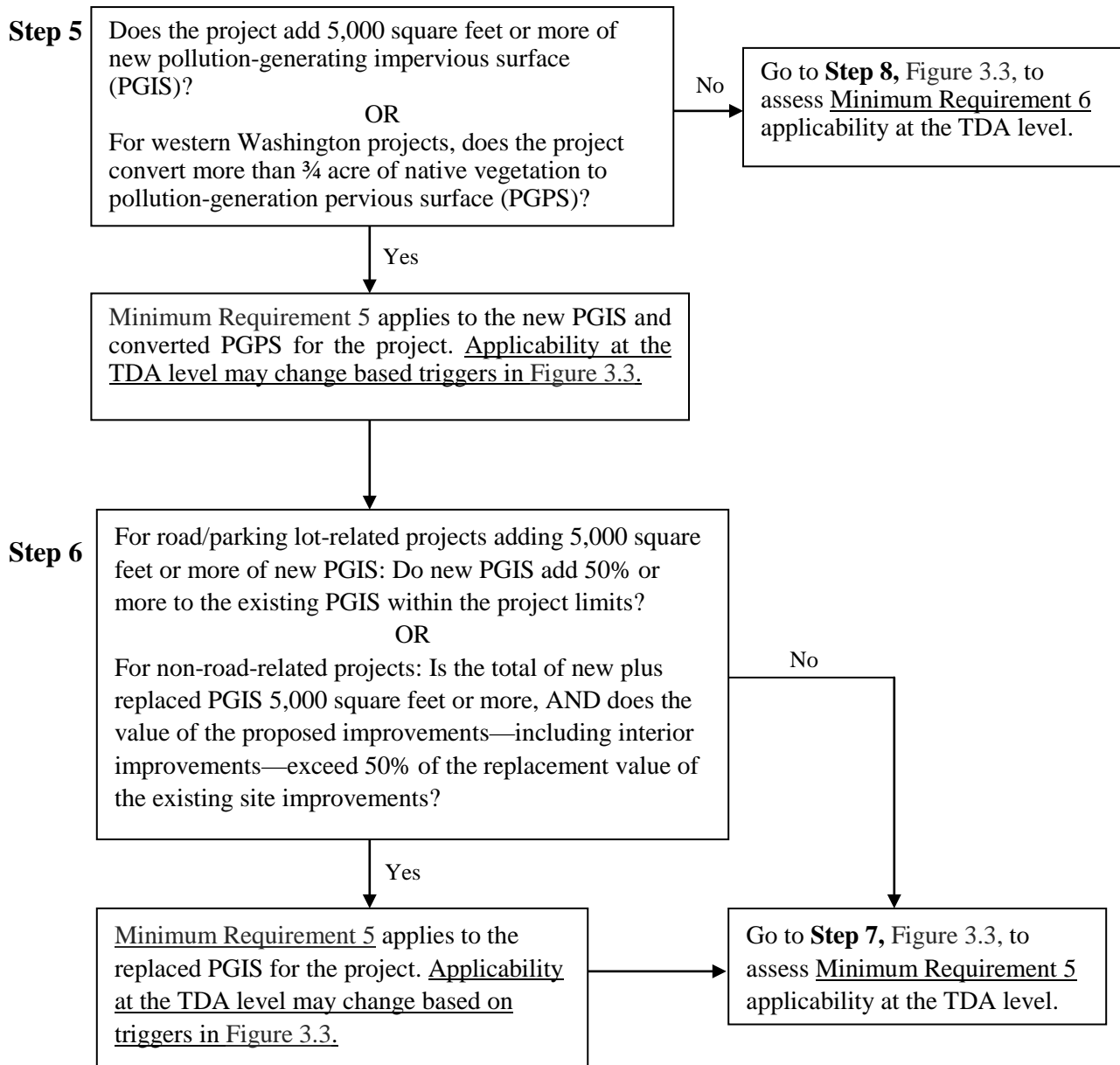
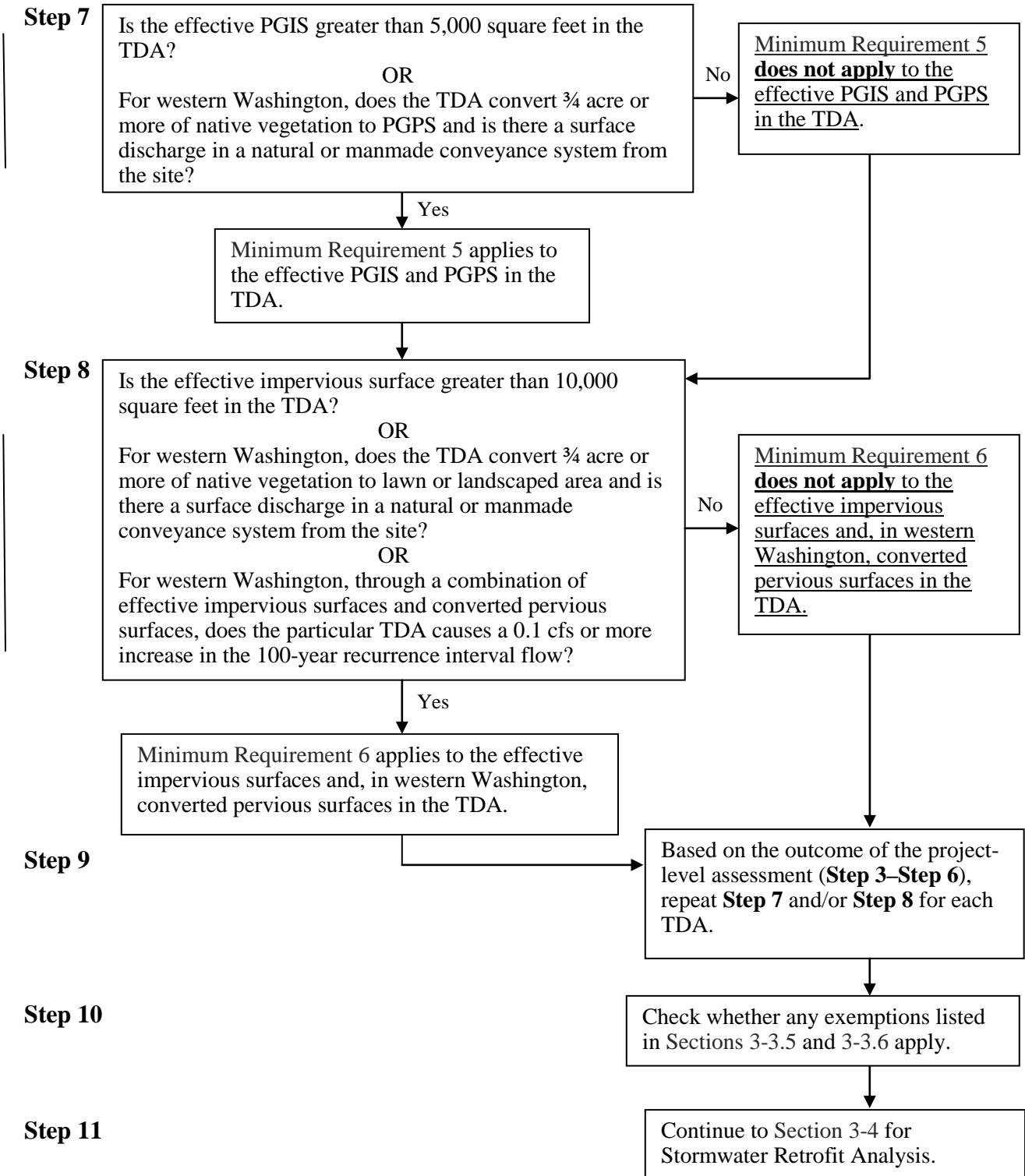


Figure 3.2 Minimum requirement applicability at project level (continued).



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.

3-4.1 Retrofitting Existing Impervious Surfaces and Stand-Alone Priority Stormwater Retrofit Projects Outside the Puget Sound Basin

3-4.1.1 Existing Impervious Surfaces

As described in [Section 1-2.3](#), the ultimate goal is to provide practicable stormwater management for runoff from existing impervious surfaces that do not have treatment or flow control or for which treatment or flow control is substandard. As designers scope (or revise the scope of) affected projects, they will need to determine whether it is cost-effective to provide stormwater management retrofits beyond what is called for under the HRM's minimum requirements. In making this decision, WSDOT needs to follow an approach that ensures it does not circumvent the Legislature's authority to determine where to invest financial resources. At the same time, the department's goal is to retrofit existing impervious surfaces where a significant amount of pavement is added on a project.

WSDOT has adopted a departmental budget structure with a specific category for retrofitting existing impervious surfaces in order to meet one of the requirements of [WAC 173-270-060](#). This budget structure allows the department to include the work from one project category in another category if it does not add significant cost to the project. In accordance with this guideline, the HQ Strategic Planning and Programming Office has established the following guidelines when making decisions about adding stormwater retrofits of existing impervious surfaces into new improvement and preservation projects:

1. Mobility projects (I-1 subprogram) can always consider including the cost of retrofitting existing impervious surfaces.
2. Safety projects (I-2 subprogram) can include the retrofitting of existing impervious surfaces only if the cost to retrofit all existing impervious surfaces does not exceed an additional 20% of the cost of treating new impervious surfaces. The region may request a variance from this limit for extenuating circumstances.
3. Economic Initiatives (I-3 subprogram, *except for* Four-Lane Trunk projects) can include the retrofitting of existing impervious surfaces only if the cost to retrofit all existing impervious surfaces does not exceed an additional 20% of the cost of treating new impervious surfaces. The region may request a variance from this limit for extenuating circumstances.
4. Four-Lane Trunk projects in the I-3 subprogram can always consider including the retrofitting of existing impervious surfaces.
5. Environmental Retrofit projects (I-4 subprogram, *except for* the Stormwater Retrofit category) do not add new impervious surfaces and cannot retrofit existing impervious surfaces. The region may request a variance from this limit for extenuating circumstances.

- 6.Á For those safety and economic initiative projects that exceed the 20% limit, and where the HQ Project Control and Reporting Office and region concur, the region can submit a request for funding from the I-4 Stormwater Retrofit category. These requests will be prioritized with the other stormwater retrofit needs already identified for funding by the Legislature.
- 7.Á Paving projects (P-1 subprogram) can only consider retrofitting existing impervious surfaces for projects involving the total replacement of existing concrete lanes. On projects that only replace the existing asphalt shoulder with concrete, retrofitting is not required.

Questions on applying the above guidelines should be directed through the Region Program Management Office, with backup (if needed) to the HQ Strategic Planning and Programming Systems' Analysis and Program Development Office. Finally, budget implications and Ecology-approved basin plan status must be considered prior to including retrofit as part of a project's scope.

Associated costs for providing flow control for all the runoff from new, replaced, and existing impervious areas must be recorded in the project's Hydraulic Report. The extent and type of any stormwater retrofit activity needs to be documented in the Hydraulic Report and the Stormwater Design Documentation Spreadsheet at:

☞ www.wsdot.wa.gov/Environment/WaterQuality/Runoff/HighwayRunoffManual.htm

3-4.1.2 I-4 Subprogram Environmental Retrofit Stormwater Projects

I-4 subprogram environmental retrofit stormwater projects located within the project limits must be evaluated for incorporation by the project office.

3-4.2 Retrofitting Existing Impervious Surfaces and Stand-Alone Priority Stormwater Retrofit Projects Within the Puget Sound Basin

Highway projects in the Puget Sound basin that add 5,000 square feet or more of new impervious surfaces, and are located in medium- to high-priority locations for stormwater retrofit, shall retrofit all existing impervious surfaces within the project limits for both flow control and runoff treatment if feasible and cost-effective.

Retrofitting is feasible if 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, shallow water tables, or other applicable factors contained in Appendix 2A, Engineering and Economic Feasibility for Construction of Stormwater Management Facilities.

Retrofitting for stormwater treatment and flow control is cost-effective if the cost to retrofit all the existing impervious surfaces does not exceed 20% of the cost to meet stormwater treatment and flow control requirements for the new impervious surfaces. The WSDOT region may request a variance to exceed this limit for extenuating circumstances such as the project is in a high-priority location for retrofit, the project has realized reduced costs in other project elements, and/or the cost is not significantly above 20% (see Figure 3.5).

The feasibility and cost-effectiveness exercises above do not apply to any project-triggered retrofit requirements needed to comply with Section 3.2 (see examples listed on the HRM website: www.wsdot.wa.gov/Environment/WaterQuality/Runoff/HighwayRunoffManual.htm).

If retrofitting is not feasible or cost-effective, one of the following must occur:

- 1.Á Retrofit the amount of existing impervious surface within the project limits that can be retrofitted for the amount of money equal to 20% of the cost to meet stormwater requirements for the new impervious surfaces, as outlined in the paragraphs above.
- 2.Á Retrofit an equivalent amount of existing impervious surface off-site, at a high- or medium-priority location, at a cost of up to 20% of the cost to meet stormwater requirements for the new impervious surfaces as outlined in the paragraphs above.
- 3.Á Transfer an amount of money, equal to 20% of the cost to meet stormwater requirements for the new impervious surfaces, as outlined in the paragraphs above, to fund stand-alone stormwater retrofit projects (I-4 Stormwater Retrofit Program).

Highway projects in the Puget Sound basin that add more than 5,000 square feet of new impervious surface, and are located in low-priority locations for stormwater retrofit, shall transfer an amount of money, as specified below, to the stand-alone stormwater retrofit program. The amount of money for flow control shall be based on 20% of the cost to meet stormwater requirements for the new impervious surfaces. For runoff treatment, the amount of money shall be based on 20% of the cost to meet stormwater requirements for the new PGIS.

When retrofitting all existing areas is deemed either infeasible per Appendix 2A or not cost-effective, or if the money is transferred to fund stand-alone retrofit projects, the cost information developed to ensure compliance with this requirement shall be included in the *Stormwater Design Documentation Spreadsheet*.

Contact the HQ ESO Stormwater and Watersheds Program for a list of high-, medium-, or low-priority stormwater retrofit locations.

Stormwater Retrofit Analysis for WSDOT Projects in the Puget Sound Basin

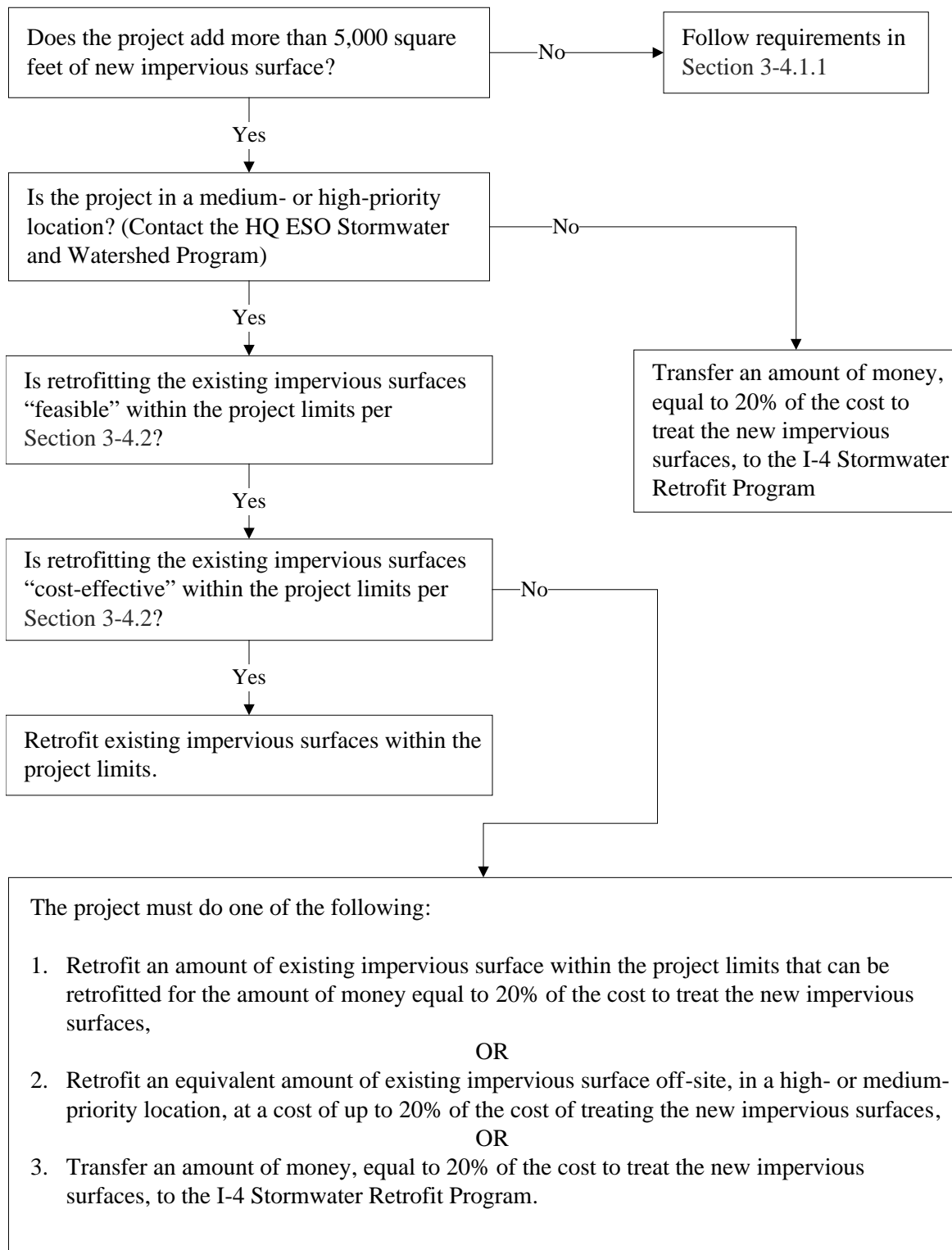


Figure 3.5 Stormwater Retrofit Process for Projects Within the Puget Sound Basin.

3-4.3 Effective Impervious Surface in Western Washington

For every TDA that requires flow control per Figure 3.3, Step 8, the predeveloped conditions for the effective impervious surfaces need to be examined. Where the predeveloped condition for the effective impervious surfaces is considered to be an “existing land cover” (usually pasture or grass) and not assumed to be a “historic land cover,” a flow control volumetric difference needs to be determined and documented between the two conditions.

Using MGSFlood or other Ecology-approved continuous simulation model, the designer should perform two analyses to determine the required flow control volumes for the two different predeveloped conditions in the TDA. Subtracting the two volumes will give the volumetric difference between using “existing land cover” conditions and “historic land cover” conditions for the TDA. This number needs to be recorded as part of the Stormwater Retrofit Analysis. The designer must record the quantity in cubic feet on the Stormwater Design Documentation Spreadsheet at:

☞ www.wsdot.wa.gov/Environment/WaterQuality/Runoff/HighwayRunoffManual.htm

This volumetric difference constitutes a stormwater retrofit obligation for the project that can be met off-site by providing an equivalent volume of detention in a targeted stormwater retrofit priority location. Contact the HQ ESO Stormwater and Watersheds Program for assistance in identifying eligible highway segments to meet this off-site retrofit obligation.

3-4.4 Replaced Impervious Surface

If thresholds in Figure 3.1, Step 4, are exceeded and for each TDA that exceeds thresholds in Figure 3.3, Step 8, after providing as much flow control as possible on the project site, the designer must record the amount of replaced impervious surface that does not receive flow control. The designer must record quantities by using the Stormwater Design Documentation Spreadsheet at:

☞ www.wsdot.wa.gov/Environment/WaterQuality/Runoff/HighwayRunoffManual.htm. The area must be recorded to the nearest tenth of an acre.

The amount of replaced impervious surface that does not received flow control constitutes a stormwater retrofit obligation for the project that can be met off-site by retrofitting an equivalent area of state highway for flow control in a targeted stormwater retrofit priority location. Contact the HQ ESO Stormwater and Watersheds Program for assistance in identifying eligible highway segments to meet this off-site retrofit obligation.

3-4.5 Replaced PGIS

If thresholds in Figure 3.2, Step 6, are exceeded and for each TDA that exceeds thresholds in Figure 3.3, Step 7, after providing as much runoff treatment as possible on the project site, the designer must record the amount of replaced PGIS that does not receive runoff treatment. Designers must record quantities using the Stormwater Design Documentation Spreadsheet at: ☞ www.wsdot.wa.gov/Environment/WaterQuality/Runoff/HighwayRunoffManual.htm.

The area must be recorded to the nearest tenth of an acre. The type of treatment needed in the TDA must also be recorded along with the TDA's projected ADT and other information supporting the required runoff treatment type (basic, enhanced, phosphorous control, and/or oil control).

The extent and type of any stormwater retrofit activity needs to be documented in the Hydraulic Report and the Stormwater Design Documentation Spreadsheet at:

☞ www.wsdot.wa.gov/Environment/WaterQuality/Runoff/HighwayRunoffManual.htm

The amount of replaced PGIS that does not received runoff treatment constitutes a stormwater retrofit obligation for the project that can be met off-site by retrofitting an equivalent area of state highway for runoff treatment in a targeted stormwater retrofit priority location. Contact the HQ ESO Stormwater and Watersheds Program for assistance in identifying eligible highway segments to meet this off-site retrofit obligation.