Stormwater Management Environmental Performance Standard (EPS)
Technical Criteria and Implementation

[This guidance document is intended to be web-based. The web site is in development.]

This guidance presents the Stormwater Management Environmental Performance Standard (SWEPS), describes when it applies, provides definitions of terms, and explains how the SWEPS can be met. Two components make up the SWEPS, Water Quality and Flow Control.

The SWEPS was developed to comply with the requirements of the 2009 Oregon Jobs and Transportation Act (JTA). It applies to projects authorized on the State Transportation Improvement Plan (STIP). It is in alignment with stormwater conditions in applicable Programmatic Biologic Opinions and permits and certifications of the Clean Water Act.

Maintenance actions are not covered by the SWEPS, but those that require Clean Water Act 404 permits will be subject to conditions that are similar.

Stormwater Management EPS

High-Level Goal

Manage post-construction stormwater runoff from highway projects to protect the receiving waters and support their beneficial uses.

Primary Stormwater Management EPS

- Water Quality: Manage highway stormwater runoff quality to protect the beneficial uses of the receiving surface and ground waters.
- Flow Control: Manage highway stormwater runoff volumes and discharges to protect the form, function and stability of the receiving waters.

Water Quality

The Water Quality portion of the SWEPS (WQ SWEPS) applies to projects that contain elements that could increase the load or concentration of highway runoff pollutants. Also subject to the WQ SWEPS are major projects which do not increase the pollutant load, but are large enough in scope and scale to reasonably include improvements in stormwater treatment. The triggering project elements are described below, followed by exemptions to the triggers.

Project Elements that Trigger WQ EPS

New Impervious Surface Area

This category encompasses projects that place pavement on unpaved ground, such as the addition of new lanes, paved shoulder widening, adding or lengthening turn refuges, realignments and new alignments. This includes road realignments that have no net increase, or may even decrease total impervious area.

Modifications of the Existing Stormwater Management System

Included in this category are relocation of roadside ditches, relocation of storm sewer pipes, narrowing of roadside ditches, enlargement of stormwater conveyance systems (pipes and ditches), the addition of curbs, and the removal or reduction of existing stormwater best management practices (BMPs).

Reconstruction of the Roadway from Base Grade

This category covers projects that reconstruct the highway by completely removing the pavement to the sub-grade and replacing it. Projects that do not enlarge or change the location of the pavement footprint as well as those that widen the roadway are included. This applies to major projects whose primary purpose is to rebuild the highway, not to maintenance actions and spot repairs.

Replacement or Enlargement of Stream Crossing Structures

This category includes bridge replacement, culvert replacement, bridge widening and culvert enlargement.

Exempt Project Elements (do not Trigger the WQ EPS)

Projects are not subject to the Water Quality EPS when they include only elements that do not increase pollutant loads, change conveyance, or are so small in their scale and impact that adding stormwater management is not reasonable.

Elements with No Water Quality Impacts

This category includes paving, grindout and inlays, striping, signage etc. These do not increase impervious surface area or change drainage in any way.

Minor Increases in Impervious Surface Area

The following features are exempt from stormwater management requirements due to their small size and extremely limited or no impact on water quality:

- Guardrail flares

- Bases for signs, including variable message signs, light poles, etc.
- Pull outs for police cars, bus stops and mail boxes.

Sidewalks, Bike Paths, and Walkways

Sidewalks and bike paths are exempt from stormwater management requirements when they are built with permeable ground between the path and the highway, or where they are behind existing curbing

Drainage System Repairs

Repair or replacement of storm sewer pipes does not trigger the WQ SWEPS provided the system is not enlarged or relocated. Also exempt is the replacement of substandard sized storm drain cross culverts with pipes of the current minimum size (for example, from 8 inch to 12 inch pipes).

Relocation of storm drain inlets is exempt so long as the storm drainage system itself is not relocated or enlarged, and the inlets do not capture stormwater from additional impervious surface area (i.e. increase the contributing impervious area).

Modification of roadside ditches as a result of maintenance to maintain ditch capacity and unobstructed flow, or to prevent erosion is not a trigger. Minor, localized changes in ditch configuration to accommodate otherwise non-triggering actions are also exempt.

Roadway Repair from the Sub-grade

Localized excavation through the pavement and subgrade for activities such as accessing utilities, repairing storm drainage, repairing sink holes or other localized structural deficiencies is not a trigger. Limited reconstruction of the roadway in conjunction with a 1R project, such as for impact panels at the end of bridges, is also exempt.

Work on Stream Crossing Structures

Repairs to existing bridges to upgrade structural integrity, including seismic upgrades, that do not widen or otherwise change the bridge deck are not subject to the WQSWEPS.

Other Circumstances

Very minor increases in impervious area may not necessarily trigger the stormwater treatment requirement, particularly if they do not add traffic capacity, do not reduce existing treatment capacity or capability, and do not affect especially sensitive waters (i.e. those with TMDLs or a 303(d) listing for common highway runoff pollutants).

Consult with the Water Resources Program Coordinator to determine if a particular action will be exempt.

Water Quality Treatment Criteria

Treat the stormwater generated by the Water Quality Design Storm (WQDS) from the project's Contributing Impervious Area (CIA) using BMPs that have been shown to be effective at removing the pollutants in highway runoff.

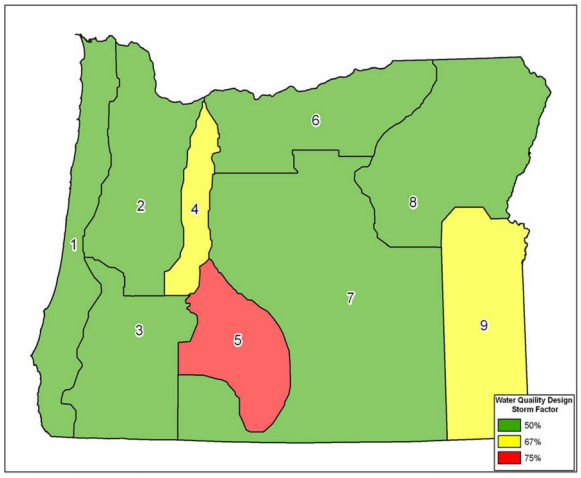
Water Quality Design Storm

The Water Quality Design Storm is used with the CIA to calculate the volume and peak flow rate used to design water quality treatment BMPs

The Water Quality Design Storm is defined as a percentage of the 2-year, 24-hour rainfall at the project site. The percentage of the 2-year event varies by climate zone.

The Water Quality Design Storm is 50 percent of the 2-year, 24-hour event except as follows:

- Climate Zone 4: 67 percent
- Climate Zone 5: 75percent
- Climate Zone 9: 67 percent



The minimum water quality design storm size is 0.7 inch, and the maximum water quality storm size is 2.5 inches.

Detailed information on the Water Quality Design Storm can be found at:

http://cms.oregon.gov/ODOT/HWY/GEOENVIRONMENTAL/pages/storm_management_program_wqsd.aspx, and in the ODOT Hydraulics Manual Chapter 7: ftp://ftp.odot.state.or.us/techserv/Geo-Environmental/Hydraulics/Hydro/Manuals_and_Guidance/HDM%202011/Chapter_07_2011/CHAPTER_07.pdf.

ODOT's interactive Precipitation Viewer shows the 2 year 24 hour event for any location in the state, and identifies the percentage used to determine the water quality design storm. The link for internal ODOT users: \\sn-salemmill-1\GIS\PROJECTS\Precipitation_GIS. (External users: *tbd)*

Contributing Impervious Area

The CIA is the pavement that provides the runoff that is treated by the Water Quality BMPs of a project. It consists of both all of the impervious surfaces within the project limits and ODOT-owned or controlled impervious surfaces outside the project that discharges to a project's drainage system. Note that ODOT has no responsibility for stormwater from areas not under its control, including private property. The formal definition of CIA can be found at http://cms.oregon.gov/ODOT/HWY/GEOENVIRONMENTAL/pages/storm_management_program_cia.aspx.

Special Circumstances:

Projects that only have localized triggering elements may not have to provide treatment for the entire length of the project. Also, some types of projects have a CIA smaller than that defined above. Included are:

Widening on Only a Portion of a Project: Highway projects can consist of long segments of repaving with shorter sections of widening. In these cases the treatment requirement is limited to the CIA of the widened section. Be aware that the CIA can extend beyond the limits of the widening and include a portion of the project that is not adding impervious surface area.

Turn Refuges: The treatment requirement is limited to stormwater flowing from or across the new impervious surface.

Culvert Replacements: Stormwater treatment is required only for runoff from the portion of the highway directly above the culvert and any part of the adjacent highway that is replaced or widened due to the culvert replacement.

Delineation: Field and map checking are needed to determine the extent of a project's CIA. In the simplest case, where a project extends from a sag point part way up a grade toward the crest, the CIA would extend to the crest. Uphill impervious area beyond the project limits that does not discharge into the project's drainage system is not part of the

CIA. Also excluded from the CIA is external impervious surface draining to a stormwater conveyance that is not modified by a project and receives only treated stormwater from the project, even if the conveyance is technically within the project area.

The CIA does not extend down-gradient from the project area. However, if the treatment facility is placed down-gradient of the project, all the ODOT water in the conveyance system must be treated, even if it originated below the project.

Types and Selection of Water Quality Best Management Practices

Best Management Practices (BMPs) are features and characteristics of a highway and right-of-way that reduce the pollutant load and concentration in highway runoff. BMPs range from highly engineered facilities to unaltered roadside areas (i.e. unpaved–area along the highway) in the right-of-way.

Low Impact Development (LID) is a comprehensive approach to stormwater management that emphasizes planning and design to minimize the amount of stormwater and pollutants generated by a project, and treatment techniques that use natural hydrologic processes to reduce stormwater volumes and pollutant loads. LID techniques emphasize distributed BMPs that promote infiltration and have vegetated elements.

Selection of BMPs

Choosing the best BMP for a project requires the consideration of multiple factors. The BMP Selection Tool (http://cms.oregon.gov/ODOT/HWY/GEOENVIRONMENTAL/pages/storm_management_program_tts.aspx) takes the user through the selection process and provides guidance on the factors that determine the appropriateness of any particular BMP in a given situation. Descriptions and design information for the various BMPs are found in the ODOT Hydraulics Manual Chapter 14 (ftp://ftp.odot.state.or.us/techserv/Geo-Environmental/Hydraulics/Hydro/Manuals_and_Guidance/HDM%202011/Chapter_14_2011/Chapter_14.pdf).

The requirement to treat highway runoff does not necessarily mean that a treatment facility must be built. The post-construction roadside area may provide adequate treatment. The evaluation of treatment options should go in the following order:

1. Sheet flow over unmodified roadside right-of-way
2. Sheet flow over modified roadside right-of-way
3. Distributed constructed BMPs (i.e., multiple small facilities within the right-of-way)
4. Consolidated constructed BMPs (i.e., project stormwater conveyed to a large facility)
5. Off-project BMPs

In evaluating and selecting potential BMPs for a project, the following factors need to be considered:

Effectiveness: The selected BMP or treatment train must be effective at treating the pollutants in highway runoff. The BMP Selection Tool and Chapter 14 of the Hydraulics Manual have information on effectiveness. Other sources, particularly the International BMP Database (http://www.bmpdatabase.org), are also useful.

Site Suitability: Space, topography, soils, geotechnical stability and climate must all be considered when selecting and siting BMPs on a project. Siting requirements for the various BMPs are found in Chapter 14 of the ODOT Hydraulics Manual.

Constructability: Construction equipment must be able to access the site where the BMP is to be built. Any special materials required for the BMP must be available.

Maintainability: BMPs must be designed and constructed so that ODOT Maintenance can access the facility and all of its elements. Some factors to consider are the anticipated frequency of maintenance and requirements for special materials and special equipment. ODOT District Maintenance should be included in the BMP selection process.

Conflicting Resources: This includes protected or regulated resources, such as wetlands or historic properties; hazards such as landslides, hazmat sites, or vector control issues; factors arising from adjacent land uses; and impacts a BMP may have on public safety.

Cost: This is the life-cycle cost, encompassing construction, right-of-way, and maintenance. There is no formula for determining if a BMP is too expensive. Factors to consider include absolute and relative cost, environmental benefit, permitting timelines, and cost of compensatory mitigation.

Flow Control

The Flow Control component of the SWEPS (Flow Control SWEPS) applies to projects that increase stormwater discharges and could cause increased erosion or other changes in the receiving streams. Managing runoff for flood control is not part of the SWEPS.

Threshold for Requiring Flow Control

Projects are subject to flow control if (a) the peak discharge increase from the 10-year, 24-hour precipitation event is 0.5 cfs or greater compared to pre-project conditions and (b) the stormwater is discharged into streams with an upstream watershed of less than 100 mi^2.

This is the increase in peak discharge into the receiving water from the project, not the total increase in flow from the pavement. Infiltration along the drainage system may eliminate the need for structural flow control methods.

Exemptions to Flow Control

Discharges to lakes, reservoirs, estuaries, and the ocean are exempt from the Flow Control SWEPS.

On a case-by-case basis, discharges to small ponds, small impoundments, and wetlands may be exempt. They must have the capacity and capability to moderate the flow so the downstream channel is not adversely affected.

For wetlands to be exempt the additional stormwater must not disturb their ecological integrity. Unmodified discharges to forested wetlands are usually not acceptable. Wetland mitigation sites may receive treated, but hydrologically unmodified flows, if they are designed with those discharges in mind. Use of wetlands as receiving waters must be coordinated with the project's wetland specialist.

Flow Control Criteria

The flow control criteria apply to a range of events designated by a lower and upper limit. These endpoints are defined as percentages of rainfall events with a 24-hour duration and a specified return interval. Meeting the flow control criteria entails maintaining the pre-project frequency and duration of flows between the lower and upper endpoints.

The lower endpoint is 42% of the 2-year, 24-hour storm for projects west of the Cascades, and 50% of the 2-year, 24-hour storm for projects east of the Cascades.

The upper endpoint depends on the degree of incision. For receiving streams with an entrenchment ratio (Rosgen, D., 1996) of less than 2.2, the upper endpoint is the 10 year 24 hour storm. For streams with an entrenchment ratio of 2.2 or greater, the upper endpoint is the 24 hour storm with the same return interval as the bank overtopping event, but no more than the 10 year 24 hour event.

Flow Control Techniques

Detention is the most common technique for meeting flow control requirements. Design of detention facilities is covered in Chapter 12 of the ODOT Hydraulics Manual (ftp://ftp.odot.state.or.us/techserv/Geo-Environmental/Hydraulics/Hydro/Manuals_and_Guidance/HDM%202011/Chapter_12_2011/CHAPTER_12.pdf). Detention facilities can be stand alone, or they can incorporate water quality treatment features. Mitigation wetlands can also be used as detention

facilities if the stormwater is treated before it is discharged into the wetland. Use of mitigation wetlands must be coordinated with the Wetlands Specialist.

Infiltration reduces runoff volume and peak flow raters. Infiltration BMPs include Bio-infiltration basins, Underground Injection Controls (UICs), and roadside filter strips. Guidance on infiltration is available in the appendices to Chapter 14 of the ODOT Hydraulics Manual. Washington DOT has developed a procedure for determining the width of a roadside filter strip needed to infiltrate highway runoff from a storm of a given intensity (WSDOT Highway Runoff Manual, Chapter 5). This procedure is authorized by WashDOT for use only in eastern Washington.

Note that UICs must be permitted by DEQ under the Safe Drinking Water Act. See (http://www.deq.state.or.us/wq/uic/uic.htm) for information on what constitutes a UIC under DEQ rules. ODOT has submitted an application for a system wide UIC permit. Until that permit is issued, new UICs should be recorded, but do not need an individual permit.

Selection and Siting

The factors considered when selecting the type and location of flow control BMPs are mostly the same as those for water quality BMPs. These are effectiveness, site suitability (particularly geotechnical stability and soil characteristics), constructability, maintainability, conflicting resources, and cost.

The Presumed Approach and the Basic Goals Approach to Meeting the Stormwater Management Environmental Performance Standard

There are two ways to meet the SWEPS: the Presumed Approach and the Basic Goals Approach. The Presumed Approach requires that the Water Quality Criteria and the Flow Control Criteria be met. If they are, then it is “presumed” that the SWEPS has been achieved, and no further demonstration is necessary. The Basic Goals Approach is appropriate both when on-site treatment is insufficient so mitigation is needed, and when off-project treatment is both cheaper and at least as beneficial as on-site treatment. The Basic Goals Approach allows for greater flexibility, but also requires that an argument be presented that the project is incorporating features and actions that do in fact achieve the environmental goals of the SWEPS. Both on-project and off-site elements may be included in the Basic Goals Approach.

Because highway projects are linear, crossing varying terrain and conditions, a project may use the Presumed Approach for one segment, but need to resort to the Basic Goals approach for another.

Several steps are needed to utilize the Basic Goals approach:

1. Quantify the shortfall in meeting the Water Quality and Flow Control criteria

2. Identify and document the constraints (see below) that prevent meeting the SWEPS on-site.
3. Identify feasible options for off-site actions to compensate for the shortfalls in stormwater management and analyze the resulting benefits.
4. Prepare documentation of the compensatory action for inclusion in permit submittals and the project Biological Assessment.

All Basic Goals proposals need to be coordinated and approved by the appropriate regulatory agencies before a final decision is made on the particular mitigation actions.

Water Quality Mitigation

The preferred option for water quality mitigation is treatment of stormwater from an equivalent impervious area with similar traffic volumes that discharges into the same receiving water as the project. There cannot already be a project planned for the mitigation site.

An alternative is to treat a larger storm size for a portion of a project that is getting treatment. The annual volume of stormwater treated should be the same or greater than what would be treated if the entire project met the Water Quality criteria.

Flow Control Mitigation

Off project flow control mitigation should provide the same level of flow control within the same watershed as the project. While this is usually most easily done by managing flows from existing impervious surfaces, conversion of relatively high runoff unpaved land, such as lawns or pasture, to low runoff land like forests or wetlands is also an option.

Documentation

Operations and Maintenance Manuals

All constructed stormwater BMPs are required to have assigned Drainage Facility Identification (DFI) numbers and Stormwater Facility Operation and Maintenance Manuals (O&M Manual). The final O&M Manual is completed immediately following construction. See the ODOT Hydraulics Manual for information on applying for a DFI and the contents of the O&M Manual.

Clean Water Act Section 401 Water Quality Certification

Projects that have Clean Water Act Section 404 permits for fill in wetlands or waterways must receive Section 401 Certification from the Oregon DEQ. Permitted projects that involve impervious surface area must prepare and receive approval of a Stormwater

Management Plan. Projects covered by a Nationwide 404 Permit with a pre-certified 401 Certification are reviewed and approved by ODOT's Geo-Environmental Section. Projects with Individual 404 permits submit the Stormwater Management Plan to DEQ for approval.

DEQ has provided a checklist of required elements in a Stormwater Management Plan for 401 Certification on their website:
http://www.deq.state.or.us/wq/sec401cert/docs/stormwaterGuidelines.pdf.
ODOT's Stormwater Management Plan template, based on the DEQ checklist, is available at ftp://ftp.odot.state.or.us/techserv/Geo-Environmental/Environmental/Other%20Enviromental%20Materials/Stormwater_Program/final_SWMP_template.doc.

Endangered Species Act Section 7 Compliance

Projects that may have stormwater effects on aquatic species listed as threatened or endangered under the federal Endangered Species Act (ESA) must include a description of stormwater management. Most highway projects will be covered by the Federal Aid Highway Programmatic ESA Consultation (FAHP). The Project Notification Form for the FAHP includes a section on stormwater management. Projects needing an Individual Biological Assessment should use the ODOT Stormwater Management Plan template to provide information on water quality treatment and flow control. No-Effect memos for projects with stormwater triggers must describe how the highway runoff is managed to avoid all impacts. A No-Effect requires that there is either no stormwater trigger, or that all (not just the design storm volume) of the stormwater is infiltrated and there is no conveyance to a surface water. Treating to the SWEPS is not sufficient for a No-Effect determination.

Basic Goals Documentation

Additional documentation is necessary if the Basic Goals approach is being used to meet ESA requirements. The Biological Assessment or Programmatic Project Notification Form must include quantification of the shortfall in on-site treatment, the constraints that prevented the SWEPS criteria from being met on-site (or the reason for going with the Basic Goals Approach), the proposed compensatory action, and an analysis showing that the compensatory action will result in an equal or greater benefit.

Documentation of constraints must be specific. It is not sufficient to simply state that there is "insufficient area" or a "resource conflict." Explicitly describe the landscape elements or other factors that prevent meeting the stormwater management criteria on-site.

References

Rosgen, D., 1996. Applied Fluvial Geomorphology. Wildland Hydrology.