

“engineered” by adjusting the grade and/or amending the soil profile. They are set aside and designated as stormwater treatment facilities. Many such areas are present along existing highways but have not yet been formally recognized. Maintenance requirements include: maintain so that flows are uniformly distributed through entire dispersion area, and control nuisance weeds.

**49 Infiltration Trenches** - Infiltration trenches are rock-lined linear trenches for dispersing runoff and letting it soak into the ground. Maintenance requirements include:



remove trash, remove accumulated sediment when it exceeds two inches, clean or replace gravel when percolation is reduced, mow if grass is greater than 10 inches, and nuisance weed removal.

**15 Oil/Water Separators** – Oil/water separators are underground devices for removing oil from stormwater runoff. They are often installed at facilities where vehicles are parked such as park and ride lots. Maintenance requirements include: remove and properly dispose accumulated sediment and oil/water when sediment exceeds six inches or oil exceeds one inch in depth, remove trash and debris, repair joints and cracks in pipes/baffles/structure, and ensure access ladders and manhole covers are safe and functional.

**5 Sand Filters** – Sand filters are large vaults or ponds filled with sand to filter pollutants out of the runoff. Sand filters are very expensive to build and maintain. Maintenance requirements include: remove sediment when it exceeds one-half inch



on sand, remove sediment in pre-settling vault when it is six inches deep or greater than the design standard, remove trash and debris accumulations from sand filter bed and cleanouts, scrape and remove several inches of sand or entire sand bed if draw down takes greater than 24 hours, ensure flow and percolation of water through sand filter is uniform and dispersed across the entire filter area, repair erosion to slopes, repair inlet and outlet pipes when damaged.

**156 Miscellaneous Devices** – This category includes a variety of devices for storing water and removing pollutants. Many are proprietary, and installed underground in urban areas where space is limited. Examples of these miscellaneous devices include Vortech System Pre Treatment Vaults, Contech Manhole Stormfilters, and detention catch basins. Maintenance requirements vary depending on the device.

# WSDOT Improving Stormwater Management—Implementing a New Permit



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The Washington State Department of Transportation's (WSDOT) management of stormwater runoff from highways has traditionally been focused on maintaining safe driving conditions and preserving the condition of the roadway. While safety and preservation continue to be top priorities for WSDOT, we also recognize that stormwater runoff from highways and other transportation facilities can contribute to growing water quality problems.



Problems associated with stormwater runoff include water pollution, erosion, and flooding. WSDOT's paved surfaces are part of the problem and we are working together with the state Department of Ecology (Ecology) to be part of the solution. Improvements in stormwater management will help reduce pollutant loads in our streams and rivers, contribute to salmon and Puget Sound recovery efforts, and reduce downstream flooding and erosion.

## WSDOT is expanding its stormwater runoff management to facilities to a greater degree, over a larger geographic area

The 2009 permit regulates stormwater runoff from state highways, rest areas, park-and-ride lots, ferry terminals, and maintenance facilities in urban areas throughout the state. This includes:

- 1,600 centerline miles of state highways
- 11 ferry terminals
- 12 Park and Ride lots
- 6 Safety Rest Areas
- 32 maintenance facilities

The permit replaces and expands WSDOT's prior coverage under the Phase I municipal general permits for large and medium sized urban areas issued by Ecology in 1995. With the 2009 municipal stormwater permit, the geographic scope now includes small urban areas across the state.



## Major elements of the 2009 permit

The 2009 WSDOT Stormwater Permit significantly expands the maintenance requirements for stormwater Best Management Practices (BMPs) and increases resource needs for equipment, monitoring, and personnel. Some of the major elements of the 2009 permit include:

- Inventory and mapping - In order to adequately manage stormwater, WSDOT must complete an inventory and map all of its stormwater facilities within the permit area. These facilities include:
  - Open ditches – estimated to consist of 7,250 linear miles, some with multiple ditches draining both sides of the highway and within the median
  - Storm sewer pipelines – there is a vast network of pipelines that carry water away from roadway surfaces and bridges
  - Outfalls – estimated at 15,000 to 25,000 stormwater outfalls where runoff leaves the right of way and enters a variety of receiving waters including Puget Sound, lakes, rivers, streams, ponds, and wetlands

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- Connections between WSDOT and other municipal storm sewer systems
- Catch basins – estimated at 30,000
- Stormwater treatment and flow control facilities, also known as stormwater Best Management Practices (BMPs), minimum of 1,893

- Stormwater management for new transportation facilities – all new transportation facilities include stormwater BMPs built to current Ecology-approved design standards. Stormwater management BMPs are used to remove pollutants and control the rate and volume of runoff. Three of the stormwater treatment BMPs most commonly used by WSDOT are detention ponds, vegetated filter strips parallel to highways, and wide-bottomed grass ditches, which are called bioswales.
- Maintenance and inspection of stormwater management BMPs – WSDOT is responsible for annual inspection and maintenance of all of its BMPs. Currently most are maintained on an “as needed” basis or when they require repair.
- Monitoring stormwater runoff and BMP performance – WSDOT is required to monitor a number of highway, safety rest area, ferry terminal, and maintenance facilities to characterize runoff water quality. In addition, a selected number of stormwater BMPs will be evaluated for pollutant-removal effectiveness.



### What are WSDOT’s funding needs to implement the 2009 permit?

A number of required activities in the permit will significantly increase WSDOT’s stormwater management costs. These activities are listed below:

#### Roadway Maintenance and Operations

- Annual inspection and maintenance of all catch basins
- Annual inspection and maintenance of roadway stormwater BMPs for managing highway runoff
- Purchasing three additional vacor trucks, which are used to clean catch basins and stormwater BMPs such as ponds
- Constructing new decant facilities to properly handle solids and liquids removed from catch basins and stormwater BMPs

#### Testing, Mapping, and Reporting

- Testing stormwater runoff samples for water quality, flow, and toxicity
- Inventorying and mapping WSDOT’s stormwater drainage system
- Reporting results which requires organizing large volumes of data
- Prioritizing stormwater retrofit locations on the highway system

#### Highway Maintenance, Rest Area Facilities and Park and Ride Lots

- Developing and implementing stormwater pollution prevention plans tailored to each facility, which typically result in making operational and structural improvements
- Building structures and following practices that prevent stormwater from coming into contact with potential pollutants. Examples include placing permanent covers over pollution-generating materials and building vehicle wash bays
- Ongoing inspection and maintenance of stormwater management structures and practices at these facilities

### Washington State Ferry Terminals

- Inventorying and mapping of stormwater drainage systems and outfalls at ferry terminals
- Developing a stormwater pollution prevention plan that covers all ferry terminals and tracking implementation of identified improvements
- Conducting annual inspections and maintenance of stormwater management BMPs

Inspection and maintenance activities will be ongoing in future budget cycles. We can also expect that our inventory of stormwater facilities will continue to grow with new highway construction projects, where older highways are “retrofitted” to add stormwater BMPs where none existed previously, and where existing BMPs are substandard.

### What are the next steps for WSDOT?

We have begun implementing the 2009 permit using initial funding that was provided by the Legislature in the 2009-11 biennial budget and the FY 2011 supplemental budget. However, key requirements including inspecting and maintaining stormwater BMPs, testing stormwater runoff, inventorying the stormwater system, among others, require additional funding.

### Statewide Stormwater Management Facility Information

Stormwater management facilities, also known as stormwater Best Management Practices (BMPs) are basically any combination of landscape and structural features that slow, filter, or infiltrate runoff after a rainfall. As of 2010 WSDOT had 1,893 stormwater management BMPs and the number can grow by about 200 a year. Some of these are considered Low Impact Development (LID) BMPs. Existing facilities include:

**679 Stormwater Ponds** - Stormwater ponds hold back runoff to let pollutants settle out, reduce peak flows to prevent stream erosion, and often allow water to infiltrate into the ground. Maintenance requirements



include: remove and properly dispose pond sediment, unplug clogged inlet/outlet pipes, repair erosion of pond sides/bottom, line or repair wet ponds so they retain water, repair settlement of dike/berms, remove accumulated trash, repair fencing, mow/ remove vegetation as necessary to allow inspection/access, and repair access roads.

**454 Bioswales** – Bioswales are broad, grassy channels. They remove pollutants by spreading the water across a shallow depth so the grass can filter pollutants out of the runoff. Bioswales often infiltrate a great amount of the runoff and some are designed as infiltration facilities. Maintenance requirements include: remove and properly dispose sediment if it exceeds two inches in depth, maintain so that flows are uniformly distributed through entire filter, replant areas that have poor vegetative growth, control nuisance weeds, mow grass if it exceeds 10 inches in height, trim over-hanging limbs and remove brushy vegetation on adjacent slopes if grass



cover is poor due to shading, un-plug inlet/ outlet pipe, repair erosion of swale bottom, and remove trash accumulation.

**191 Dry Wells** - Dry wells are large, deep wells built below grade with perforated walls that allow stormwater to soak into the ground. The inlet grate is the only visible part of a drywell. Dry wells only work in areas with well-draining soils. New regulations often require that runoff be



pre-treated before it can go into dry wells. Maintenance requirements include: remove and properly dispose sediment from the structure twice a year with vacuum truck and repair any structural deficiencies.

**82 Vegetated Filter Strips** - Vegetated filter strips are vegetated roadside slopes where runoff is kept in a shallow depth so grass can filter out pollutants. Vegetated filter strips may often infiltrate much of the



runoff. Maintenance requirements include: remove and properly dispose sediment if it exceeds two inches in depth, maintain so that flows are uniformly distributed throughout entire filter, mow grass if it exceeds 10 inches in height, control nuisance weeds, repair eroded areas, and remove trash accumulation.

**137 Media Filter Drains (formerly known as Ecology Embankments)** – Media Filter Drains are long, linear trenches designed to remove sediments and dissolved metals



as the runoff flows through a “media mix” layer in the trench. Media Filter Drains often infiltrate much of the water through the bottom of the trench. Maintenance requirements include: remove accumulated sediment when it exceeds two inches or if uneven grading, maintain so that flows are uniformly distributed through entire filter, reseed or plug sparse or bare vegetative areas, mow if grass height is greater than 10 inches, control nuisance weeds, remove trash, and replace media mix if water starts to pond.

**63 Vaults** – Vaults function like ponds but they are installed underground. Vaults are expensive to build and maintain. Maintenance requirements include: keep air vents free of debris, remove and properly



dispose accumulated sediment when it exceeds 10 percent of the diameter of the storage area for half the length of the vault, repair joints and cracks in pipes/ baffles/ structure, and ensure access ladders and manhole covers are safe and functional.

**62 Natural and Engineered Dispersion Areas** – These are vegetated areas that provide treatment by filtering and infiltration, either in their natural state or

