



# **WORKSHOP ON GREEN STREETS**

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# Green Streets in a Highway Context

## STORMWATER RUNOFF\*



- Rain and snowmelt create stormwater runoff because not all stormwater “percolates” into the ground
- Stormwater runs over the ground and eventually enters waterbodies (i.e. streams, rivers, or lakes)

## TRANSPORT OF POLLUTANTS\*



- A **pollutant** is a material or chemical that affects water quality of a receiving waterbody
- Pollutants are **transported** during a storm event, and the pollutants are washed off with the stormwater
- Pollutants that are in the stormwater are then **discharged** into waterbodies (lake, river, stream, creek, etc.)

\* From VDOT-CO MS4 Presentation



Virginia Stormwater Management Regulations are found in the Virginia Administrative Code (9VAC25). Virginia Stormwater Management Law is codified in Title 10.1 of the Code of Virginia. The Law and Regulations together provide the authority and the technical criteria for the Virginia Stormwater Management Program (SWM Program).



## OVERVIEW OF VDOT'S Municipal Separate Storm Sewer System (MS4) Program

VDOT is a MS4 Permit Holder and executes Agreement for its Standards and Specifications with VA DEQ which includes SWM Program and Erosion and Sediment Control Program.

VA DEQ reserves the right to randomly select projects for review (in either the design or construction phase) to ensure compliance with the VDOT approved Program.

### VDOT Roles and Responsibilities

- Central office staff will develop MS4 program wide policies and procedures, handle annual reporting, training, and assessment of VDOT's operations
- District staff will be responsible for implementation of various components of the program within the regulated area

➤ **VSMP Construction Permit (from July 1, 2014 to June 30, 2019)**

*Coverage under this permit is required for all land disturbing activities (except those associated with routine maintenance) that equal or exceed the following land disturbance threshold amounts:*

- All areas inside or outside CBPA – 1 Acre or greater

➤ **Storm Water Pollution Prevention Plan (SWPPP)**

**Section 107.16 (e) of the 2007 VDOT R&B Specifications** *requires all land disturbance activities that disturb 10,000 square feet or greater (2500 square feet or greater in the area defined as Tidewater, Virginia in the Chesapeake Bay Preservation Act) to have a SWPPP including appropriate Erosion and Sediment Control Measures (IIM-LD-11 – latest version) .*

➤ **SWPPP General Information Sheets**

*Make sure to include sheets in Plan Assembly (IIM-LD-246 – latest version). These sheets are preamble to all VDOT requirements that have been specifically met for a particular project. These sheets include general information on land disturbance, Erosion and Sediment Control Plans, Notes etc. and Post Construction SWM Plan for a particular project.*



## SWM Requirements

SWM Requirements are applicable for those **regulated land disturbance activities** (RLDA) that disturb **one acre or greater** except in those areas designated as a Chesapeake Bay Preservation Area in which case the land disturbance threshold is **2500 square feet** or greater.

The following land disturbance activities are **exempt** for the VSMP Regulations for linear development projects (i.e., highway construction projects) where **all** the following conditions are met:

- *Less than one acre will be disturbed per outfall or watershed.*
- *There will be insignificant increases in peak flow rates downstream of the discharge point.*
- *There is no existing or anticipated erosion problems downstream of the discharge point.*
- *There is no existing or anticipated flooding problems downstream of the discharge point.*

### **Typically applied on an outfall by outfall basis**

Routine maintenance is those activities that are performed to maintain the original line and grade, hydraulic capacity of the original construction of the project.

## Land Disturbance (as defined in the Regulations):

- **A manmade change to the land surface that potentially changes its runoff characteristics including any clearing, grading or excavation associated with the proposed activity**
  - **Grading of gravel surfaces to maintain travel way generally exempt \***
  - **Pavement milling and/or overlay generally exempt \***

**\* Changes by the 2011 G.A to the VSMP Law (Section 10.1-603.8) classifies paving an impervious surface and the associated shoulder and ditch restoration as routine maintenance activities and, therefore, exempt from VSMP Regulation requirements.**

## SWM Requirements

Per IIM-195.8 dated July 15, 2014:

**Definition of Site (“Applicable Area”) – The area of proposed land disturbance (e.g., the construction limits) plus any right of way acquired in support of the proposed land disturbance activity/project. Any support areas within existing or proposed VDOT right of way associated with the proposed land disturbance activity/project and identified in the pre-construction SWPPP for the proposed land disturbance activity/project shall also be considered a part of the site. Permanent easements and/or other property acquired through the right of way acquisition process in conjunction with the proposed land disturbance activity/project may be considered a part of the site and utilized in the determination of the post-development water quality requirements provided such property will remain under the ownership/control of the VDOT and providing such property is so identified/designated on the proposed land disturbance activity/project plans and is legally encumbered for the purpose of stormwater management.**

# BMP Selection

## Table 1 of IIM-195.8

TABLE 1 BMP SELECTION TABLE		
Water Quality BMP	Target Phosphorus Removal Efficiency	Applicable Percent Impervious Cover of Site
Vegetated filter strip Grassed swale	10% 15%	16-21%
Constructed wetlands Extended detention (2xWQV) Retention basin I (3xWQV)	30% 35% 40%	22-37%
Bioretention basin Bioretention filter Extended detention-enhanced Retention basin II (4xWQV) Infiltration (1xWQV)	50% 50% 50% 50% 50%	38-66%
Sand filter Infiltration (2xWQV) Retention basin III (4xWQV with aquatic bench)	65% 65% 65%	67-100%
Manufactured BMP Systems Hydrodynamic Structures *	20%	
Manufactured BMP Systems Filtering Structures *	50%	
Filterra™ Bioretention Filter System **	74%	

\* See the Virginia SWM Handbook for approved systems. Other systems meeting the definition of a hydrodynamic or filtering structure must be approved by the DEQ prior to use.

\*\* See Technical Bulletin No.6 in the Virginia SWM Handbook.

# SWM Requirements

## Per IIM-195.8:

### Section 5.4.7: Alternative BMPs

#### Section 5.4.7.1:

BMPs included on the **Virginia SWM BMP Clearing House website** may be used with the Performance Based water quality criteria. When doing so, the maximum removal efficiency allowed will be that shown for phosphorus removal by treatment. Any removal efficiency associated with phosphorus removal by run-off reduction will not be allowed.

#### Section 5.4.7.2:

**Other alternative BMPs not included in Table 1 or the Virginia SWM BMP Clearing House website may be allowed at the discretion and approval of the DEQ.**

#### Section 5.4.7.3:

**Approval to use alternative BMPs is to be coordinated between the VDOT District or Central Office SWM Plan Designer and the DEQ Regional Stormwater Manager.** The VDOT State Stormwater Management Program Administrator and the DEQ Central Office Director of the Office of Water Permits shall be copied on any correspondence related to a request for approval of the use of any alternative BMPs.

### Section 5.4.8:

Use of LID and BSD practices are encouraged to the maximum extent practicable in order to reduce the stormwater runoff impacts of proposed development. LID practices include, but are not limited to, the preservation/protection of riparian buffers, wetlands, steep slopes, mature trees, flood plains, woodlands and highly permeable soils. BSD practices include, but are not limited to, reduction of impervious cover, conservation of natural areas and the more effective use of pervious areas to treat stormwater runoff.

# Retention Basins



# Enhanced Extended Detention Basins

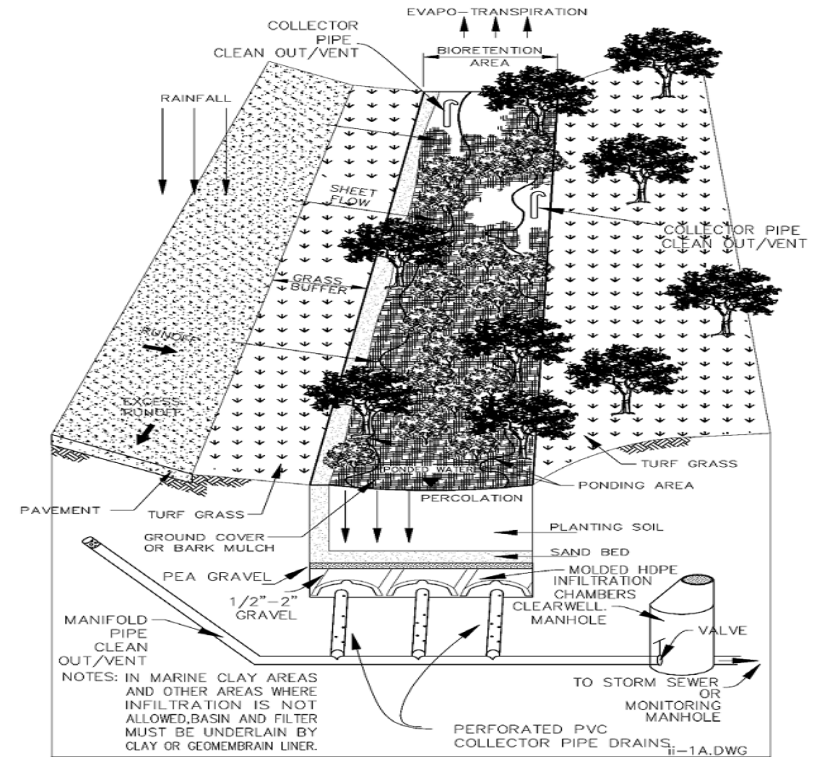


## Grass & Water Quality Swale





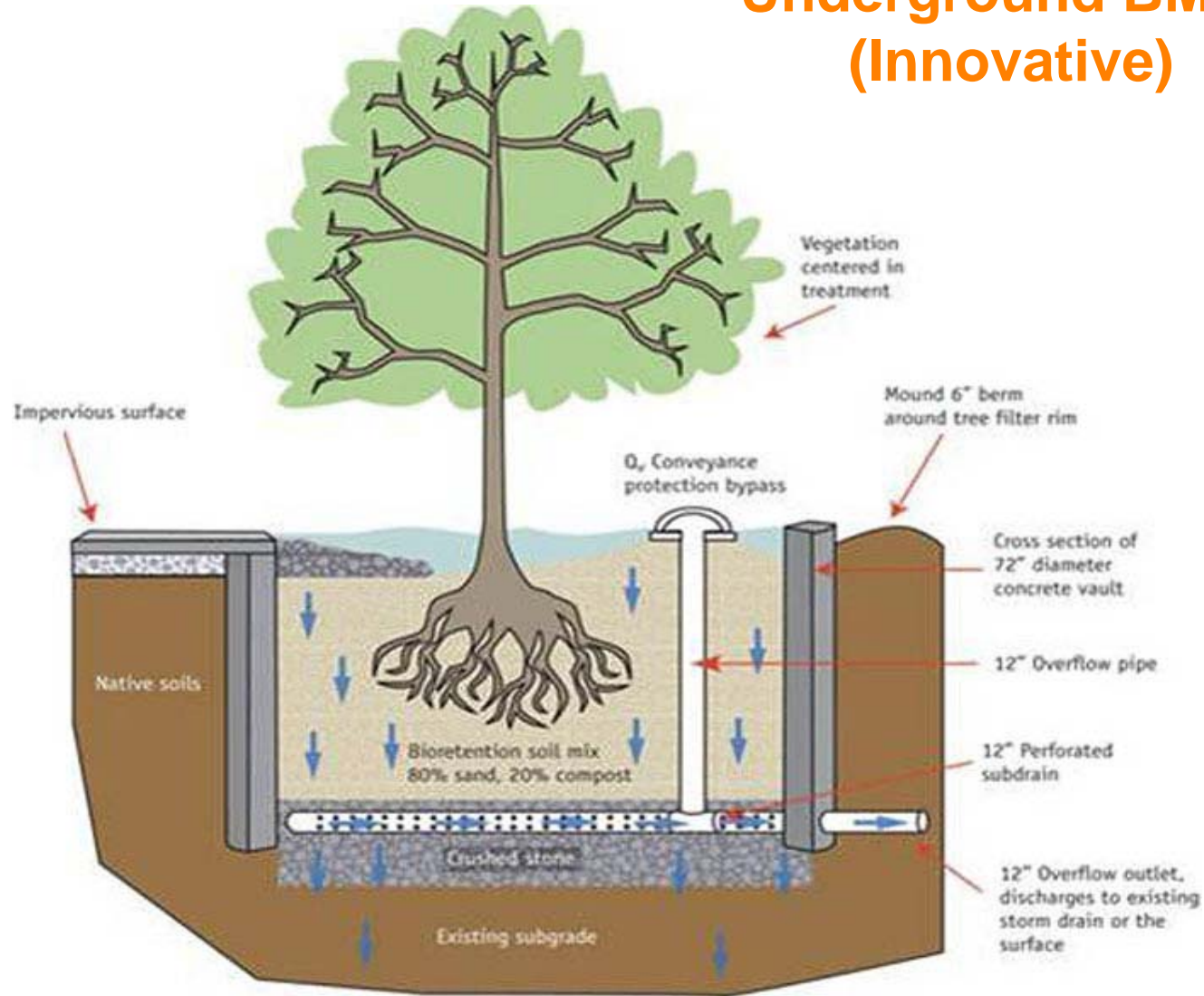
# Bioretention Facilities



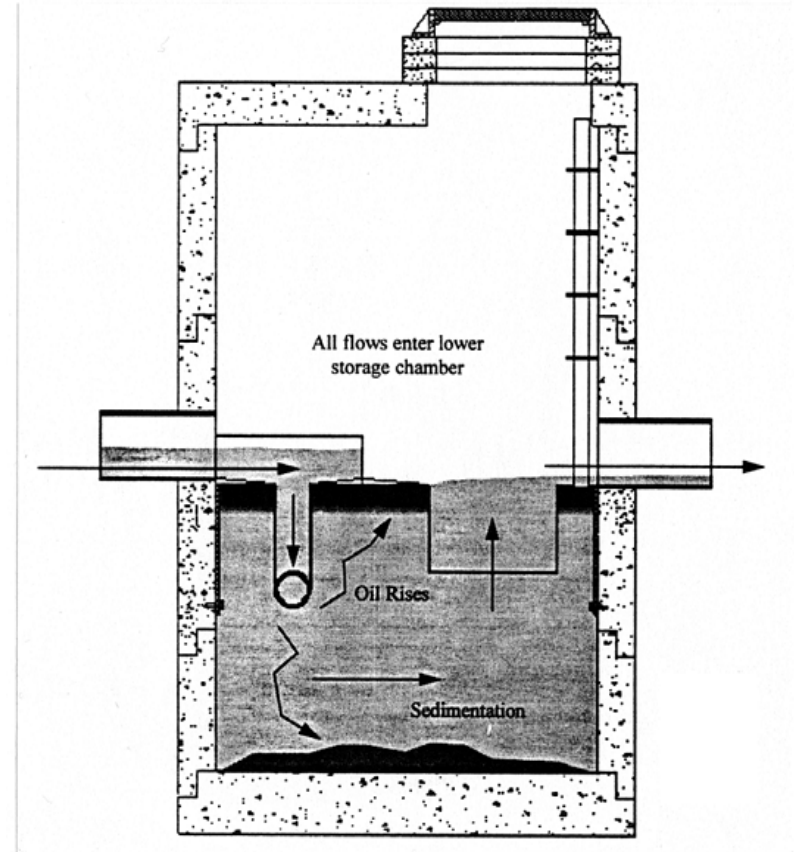
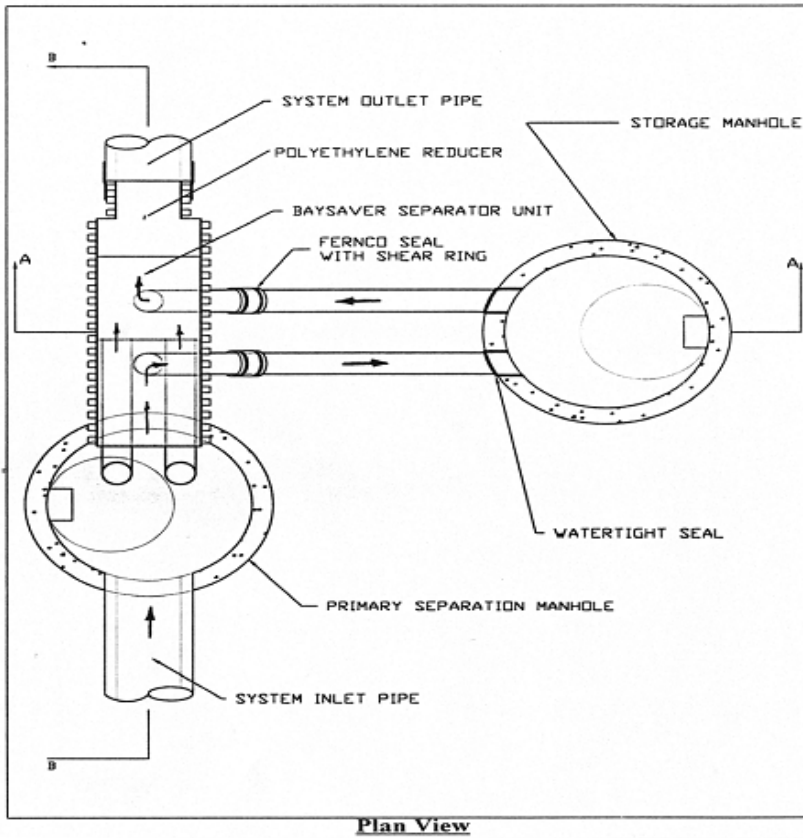
## Underground BMPs (Innovative)



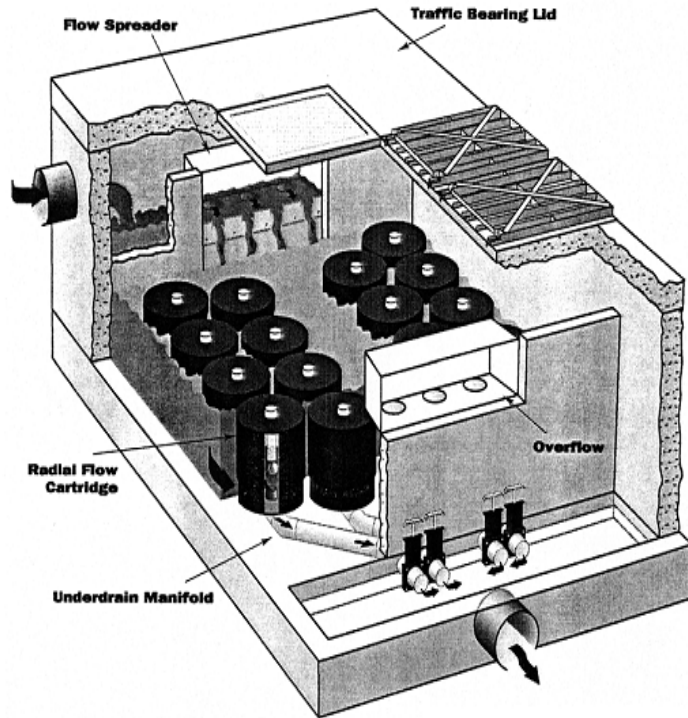
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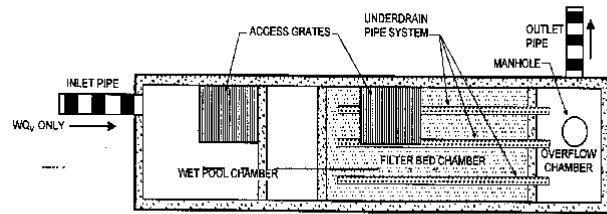
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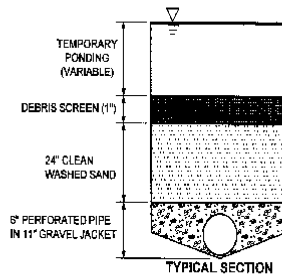
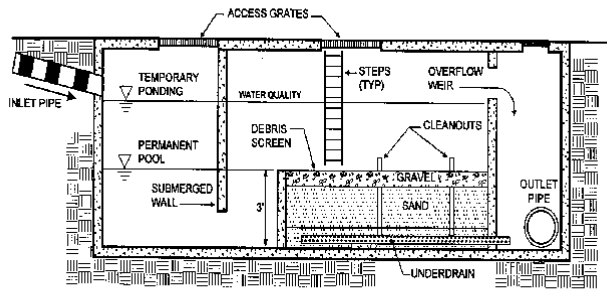
Storm Filter



Storm Filter BMP on Old Bridge Rd project

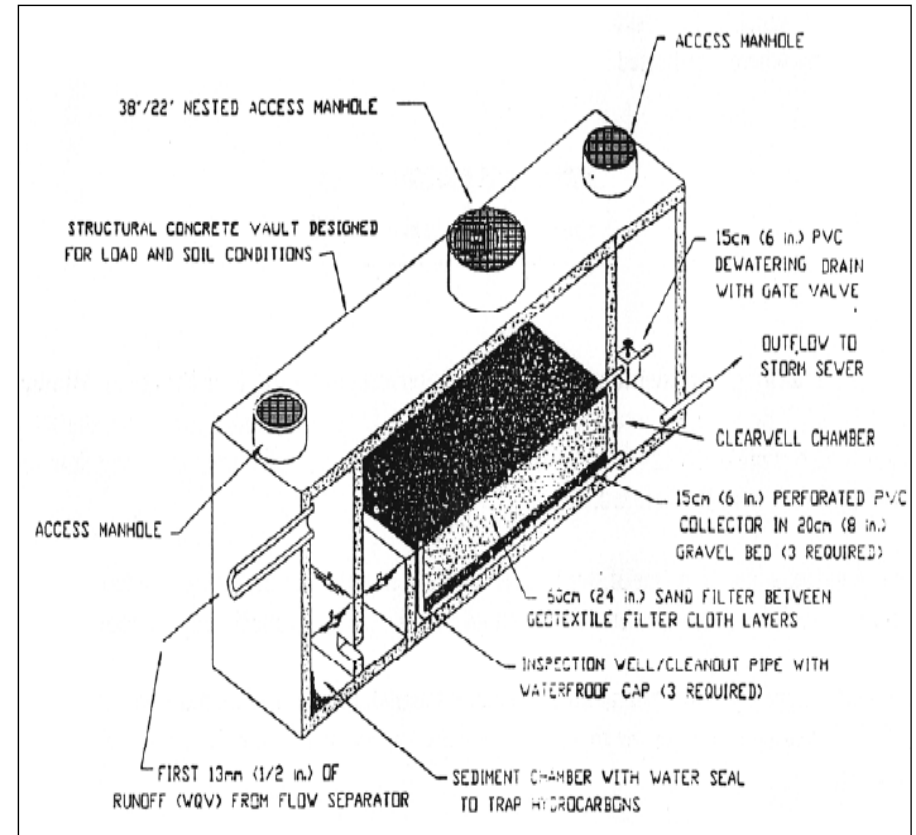


PLAN VIEW



PROFILE

Figure 2. Underground Sand Filter



Washington D.C. Underground Vault Sand Filter  
 (*Virginia Stormwater Management Handbook, 1999, Et seq.*)

## Underground BMPs (Innovative)



## **Underground BMPs (Maintenance)**

## As-Built Certifications

### As-Built Certification of Stormwater Management Facilities (BMPs):

The Contractor **shall provide** 'As-Built' drawings of all stormwater management facilities. The 'As-Built' drawings shall show the actual finished ground contours, outlet structure dimensions and elevations, etc as they exist at the completion of the project. These drawings shall be signed and sealed by the Professional Engineer or Land Surveyor registered in the State of Virginia. All costs shall be included under Construction Surveying.

"The Contractor **shall provide** certification from an independent source that all proposed BMP facilities were constructed in accordance with applicable and current industry standards, and the manufacturer's specifications. All costs shall be included under Construction Surveying."

"The contractor **shall be** responsible for maintaining the proposed BMP once all connections have been accomplished, and shall certify that the BMP has been maintained per industry standards prior to transfer to VDOT."





## Reference Documents for VDOT relative to ESC, SWM & VPDES (Design, Construction & Maintenance)

- **2007 Road and Bridge (R&B) Specifications (also include any supplemental sections).**
- **2008 Road and Bridge (R&B) Standards and its latest updated version.**
- **Adopted April 2002 VDOT Drainage Manual (latest version in July 2014)**
- **Informational and Instructional Memorandums:**
  - ❖ IIM-LD-11.28 (for Erosion and Sediment Control)
  - ❖ IIM-LD-110.24 (General Notes)
  - ❖ IIM-LD-195.8 (for Storm water Management Requirements)
  - ❖ IIM-LD-233 (for Natural Channel Design)
  - ❖ IIM-LD-242.4 (for VSMP Construction Permit)
  - ❖ IIM-LD-246.3 (for Stormwater Pollution Prevention Plan (SWPPP))
- **Locally Administered Projects Manual**
- **Design Build Manual**
- **Other manuals (for Design, Construction and Maintenance) which can be checked in at:**  
**<http://www.virginiadot.org/business/manuals-default.asp>**

**Questions?**

**Thank You.**