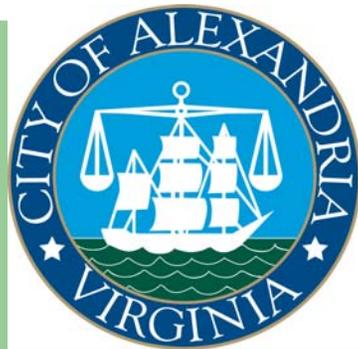


POST-CONSTRUCTION STORMWATER MANAGEMENT: BMP INSPECTION and ENFORCEMENT



CITY OF ALEXANDRIA

Transportation &
Environmental Services

Office of Environmental Quality

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City of Alexandria, VA

- 130,000 residents
- Approximately 15 square miles
- Designated MS4 Phase II
- Program predates new regulations



New Regulatory Requirements: MS4 Phase II Communities

Section II.B.(5)b. Operator Shall:

- 1) Develop and implement strategies-BMPs
- 2) Ordinance, regulation or other mechanism
- 3) Require VSMP Construction General Permit



New Regulatory Requirements – MS4 Phase II Communities (cont.)

- 4) Long-term operation and maintenance
 - Inspection schedule, maintenance agreement and enforcement mechanism
- 5) Conduct inspections and enforcement
- 6) Track facilities



Structural and Non-Structural BMPs

- Development and Redevelopment
- Approximately 400
- Ultra-Urban environment



Ordinances

- 1988 – Chesapeake Bay Preservation Act
- 1992 – Environmental Management Ordinance (EMO)
 - BMPs required
 - Maintenance Agreements required
- Lack of dedicated funding and lack of understanding by property owners



VSMP Construction General Permit

- Erosion & Sediment Control Ordinance
- Plan review conditions
- Pre-construction Checklist



Long-Term Operation & Maintenance

- Inspection Schedule – MS4 Program Plan
 - At least once during permit cycle
 - Create list of facilities based on response
- BMP Maintenance Agreement
- Enforcement Mechanism



Long-Term Operations & Maintenance: Inspection and Enforcement

- Owner Notification through Pre-Inspection Letter
 - Includes brochure



WHY ARE BMPS NECESSARY, WHO MAINTAINS THEM, AND WHY DOES THE CITY INSPECT THEM?

The City of Alexandria Environmental Management Ordinance implements the City's stormwater management program in compliance with the Virginia Stormwater Management Act and Chesapeake Bay Preservation Act. These regulations require the City to control the level of pollutants entering waterways such as the Potomac River and the Chesapeake Bay.

BMPs are designed to reduce pollutants such as sediments, oil, grease and nutrients. Examples of urban stormwater BMPs are *wet and dry ponds, bioretention areas, sand and storm filters, and hydrodynamic separator devices*. Regular maintenance is necessary for proper function and long-term viability.

Ultra urban areas such as the City of Alexandria are densely developed areas with scarce open space and pervious surfaces. Underground stormwater storage and treatment practices such as sand filters and hydrodynamic separators are well suited because they require very little surface space.

As a requirement of development approval, the City requires BMP owners to maintain their facilities (Article XIII, Section 13-109). This is stated in their maintenance agreement. The agreement conveys to successive landowners. City staff conducts inspections of BMPs to ensure facilities are being maintained and functioning properly.

Maintenance needs will vary according to the type of facility and the drainage area contributing to it. Owners should inspect their facilities every few months and after significant rainfall events.

ADDITIONAL INFORMATION

Links to the following resources can be found at: <http://alexandriava.gov/tes/DEQ/deqpublications.html>

- Alexandria Supplement to the Northern Virginia BMP Handbook
- City of Alexandria BMP Maintenance Agreement
- City of Alexandria Environmental Management Ordinance
- City of Alexandria Master Plan Water Quality Management Supplement
- "Stormwater Pollution and Management" brochure

MAINTENANCE SERVICE PROVIDERS

The City's Division of Environmental Quality can provide BMP owners with a list of vendors who have experience in maintaining stormwater management facilities.

Please note that the City makes no representation or warranties regarding the qualifications or suitability of any particular vendor, nor does a vendor's inclusion or non-inclusion on this list constitute any such representation or warranty. You should retain a maintenance company only after making a thorough review of that company's qualifications and its ability to service your particular needs.



For more information about this brochure and stormwater BMPs, contact:

City of Alexandria
Department of Transportation and
Environmental Services
Division of Environmental Quality
301 King Street, Room 3900
Alexandria, VA 22314
Phone: 703-838-4334

<http://www.alexandriava.gov/tes/DEQ/>



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Urban Stormwater Best Management Practices (BMPs) Inspection Program City of Alexandria, Virginia

A stormwater "Best Management Practice" (BMP) is a facility or structure that reduces the water quality impacts of stormwater runoff from developed areas.



Wet pond treating stormwater from a shopping center

Trash inside an overflow riser



Maintaining an underground BMP



This brochure was developed to help individuals and property owners understand what BMPs are, their maintenance requirements, and the role of the City's inspection program.

BMPs are an important component of the City's stormwater management program which aims to reduce the impacts of stormwater pollution on local water resources.

Department of Transportation and Environmental Services, Division of Environmental Quality
<http://www.alexandriava.gov/tes/DEQ/>



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SAND FILTERS

Urban sand filters are located in underground concrete vaults that have multiple chambers. The first chamber is for settling, the second chamber has the filter and underlying drainage system, and the third is a discharge chamber or clear well. As stormwater flows into the first chamber, large particles settle out, finer particles and other pollutants are removed as stormwater flows through the filter medium. Pollutants are removed by physical filtration, adsorption, and bacterial uptake.

There are several design variations of sand filters including: Delaware, DC, Austin, Alexandria Compound, and Dry Vault filters.



STORM FILTERS

These BMPs are comprised of an underground concrete vault that houses media-filled filter cartridges. Pollution removal occurs through mechanical filtration, ion exchange, and adsorption to the filter media. The vault has an under-drain system to release treated stormwater. Examples of this type of BMP are StormFilter™ and VortFilter™.



Maintenance for Sand and Storm Filters:

- Remove trash and sediment from chambers
- Remove oil layer from permanent pool
- Remove and replace top layer of sand filter and underlying filter fabric
- Keep inlets and outlets clear of debris
- Maintain wiring and pumps (if applicable)
- Replace media-filled filter cartridges
- Maintain access areas (doors, grates, covers)

BMP INSPECTION AND MAINTENANCE NEEDS

BIORETENTION AREAS

Bioretention areas, often referred to as rain gardens, are landscape features that store and treat stormwater runoff. Surface runoff is directed into shallow, vegetated depressions with underlying layers of soil, sand, and gravel. These areas are designed to mimic natural ecosystems where pollutant removal occurs through soil infiltration and plant uptake. They are commonly located in parking lot islands or in residential open spaces.



Maintenance:

- Maintain vegetation and replace mulch as needed
- Remove trash and sediment
- Watch for water standing > 72 hours which can indicate clogging of subsurface layers and under-drain system

HYDRODYNAMIC SEPARATOR DEVICES

Hydrodynamic separators are flow-through structures that have an insert chamber to trap sediments, oil and other pollutants. Water enters the vault insert and drops through a weir / pipe into a settling chamber where large particles settle out. Examples of these devices are Stormceptor™, Vortech™, AquaShield™, BaySaver™, and Downstream Defender™.

Maintenance:

- Check oil and sediment levels
- Clean out chamber when unit has reached capacity (this is performed with a sump vac or vacuum truck, depending on type of unit). See device's operation manual
- Remove trash and keep access areas clear of debris



WET PONDS

Wet detention ponds are constructed basins that have a permanent pool of water throughout the year, or at least during periods of normal rainfall. Pollutant removal occurs through settling, as stormwater runoff is stored in the pond. Additional pollutant uptake of nutrients also occurs through biological activity (i.e. algal uptake). Wet ponds are among the most cost-effective and widely used BMP when space is available.



Maintenance:

- Conduct routine mowing
- Keep embankments stable / fill animal burrows
- Remove sediment from pond when necessary
- Manage vegetation / seed and stabilize bare spots
- Inspect and clean any mechanical components
- Keep free of debris / remove trash
- Keep risers, spillways and outlets clear

DRY PONDS

Dry detention ponds are basins with outlets that have been designed to store stormwater runoff for a specified period of time, usually 48 hours, to allow



particles and pollutants to settle. Unlike wet ponds, these facilities do not have a large permanent pool. Dry ponds can be planted with wetland vegetation to provide additional nutrient and pollutant uptake.

Maintenance:

- Conduct routine mowing
- Keep embankments and slopes stable
- Remove sediment as necessary
- Manage vegetation, seed and stabilize bare spots
- Fill animal burrows
- Keep trenches / basin free of debris and trash
- Keep risers, spillways and outlets clear
- Watch for water standing > 72 hours

Long-Term Operations & Maintenance: Inspection and Enforcement

- Record information in MS4 ASIST and EXCEL
- Post-Inspection Letter to Owner
- EMO and BMP Maintenance Agreement
- Owner Education
- Locate and Educate Home Owners Associations and Management Companies



Tracking and Database Management

- Access and MS4 ASIST database. ASIST database is linked to our GIS database
 - Project Number
 - Type
 - Watershed
 - Impaired water, if applicable
 - Number acres treated



- Facilities/BMPs
 - 1992000401 PRKNG LOT
 - 1992000801 BLESSED SA
 - 1992001101 FOXCHASE S
 - 1992001301 FRANKLIN S
 - 1992001302 FRANKLIN S
 - 1992001303 FRANKLIN S
 - 1992001601 COLONIAL P.
 - 1992001901 BJS WHOLES
 - 1992001902 BJS WHOLES
 - 1992001903 BJS WHOLES
 - 1992001904 BJS WHOLES
 - 1993000301 RIVERGATE
 - 1993000401 COMP USA (
 - 1993000402 COMP USA (
 - 1993000801 KINGSGATE
 - 1993000802 KINGSGATE
 - 1993000901 POWHATAN
 - 1993000902 POWHATAN
 - 1993000903 POWHATAN
 - 1993001101 CAMERON S
 - 1993001201 QUANTRELL
 - 1993001202 QUANTRELL
 - 1994000301 IHS OF NOV
 - 1994000401 BLK A CARL
 - 1994000601 ALEX YMCA
 - 1994000602 ALEX YMCA
 - 1994000603 ALEX YMCA
 - 1994001001 HINDS & V CA

Descriptive Information

ID:	1992000801 BLESSED SACR	Next Inspection Due:	9/22/2006
Control Type:	<Unknown>	Inspection Frequency:	12 Months
Description:	Dry Detention Pond	Drains To:	<None>
Material:	Unknown	Drainage Class:	<Unknown>
Priority Status:	Not Applicable	Permit Number:	1992000801
Drainage Basin:	Cameron Run	Is this a monitoring site?:	NO
Sub-Basin:	Timber Branch Run	Sedimentation Threshold:	0 %
Receiving Water:	Cameron Run	Drainage Area:	5.67 (ac)

Location/Physical Information

Map Number:	K4	APN:	<N/A>
Side of Road:	<N/A>	Offset Distance:	0 (ft)
Zip Code:	22302	Milepost:	0

[View/Edit Coords >>](#)
[View Driving Directions >>](#)
[View Location Description >>](#)

Dimensional Measurements

dia	0 (in)	width	0 (in)	invert	0 (in)	volume	0.00 (in3)
lgth	0 (ft)	hgt	0 (in)				
Footprint Area:		0 (ac)	Mowing Area:		0 (ac)		

Facility Information
[Additional Facility Information](#)
[Additional BMPs](#)

City of Alexandria Stormwater BMPs 2008



- Legends**
- BMPs**
- all other values
- Description**
- CDS Hydrodynamic Device
 - ▲ 1" Storage
 - ▲ 1/2" Storage
 - ◇ -Unknown-
 - ◇ AS-3
 - Alexandria Compound Sand Filter
 - Alexandria Dry Vault Sand Filter
 - Alexandria Inlet Filter
 - Alexandria Sand Filter
 - Aquashield
 - Aquaswirl
 - Austin Sand Filter
 - ★ Bay Saver
 - Bioretention Filter
 - CB Storm Filter
 - CDS Hydrodynamic Device
 - CSO
 - Cartridge Filter
 - Catchbasin
 - Cistern
 - Compost Filter
 - Compound Sand Filter
 - Compound Uplow Sand Filter
 - DC Sand Filter
 - Delaware Sand Filter
 - Detention
 - Downstream Defender
 - ★ Dry Detention Pond
 - Dry Pond
 - Dry Vault Sand Filter
 - ◇ Enlargement
 - ◇ Fee-in-lieu
 - Filter Strip
 - Filterra
 - Grass Swale
 - Hydro Dynamic BMP
 - Hydro Dynamic StormCeptor
 - Infiltration
 - Offsite
 - Oil/Grit Separator
 - Peat Sand Filter
 - Pond
 - Pool Deck
 - ▲ Rain Garden
 - Regional Dry Pond
 - Regional Wet Pond
 - Sand Filter
 - Sand Filter
 - Sanitary Sewer
 - Storm Filter
 - Storm Water Storage Tank
 - Stormceptor
 - Subsurface Interceptor Drain
 - Trench Sand Filter
 - ◇ Unknown
 - Up-flt Filter
 - Vegetated Buffer
 - Vegetated Filter Strip
 - ★ Vortechinics
 - Water Quality Volume Tank
 - Wet Pond
 - Wet Retention Pond
 - lake
 - Stream
 - Road
 - Metro
 - RPA
 - IntReach50



Future of the Program

- Remain in compliance with new state permit
- Increase awareness and compliance of maintenance requirements



Questions?

Contact

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