



Post-Construction BMPs

Requirements, Alternatives and the **Next 5 Years**
February 2008

What are Post-Construction BMPs?

- Permanent storm water controls
 - Focused on improving water quality of the “first flush”
 - Need to control everyday storm events, not just large ones which cause flooding
- Goals of post-construction BMPs
 - Reduce pollutants
 - Minimize hydrologic impacts to receiving streams

Structural vs Non-Structural

- Structural BMPs
 - Collect and treat runoff before it is discharged
 - Function by settling, filtration or infiltration

Dry Enhanced Swale
- Non-structural BMPs
 - Reduce the volume of runoff generated
 - Function by reducing the creation of runoff or by harvesting runoff

Conservation Subdivision Zoning

Post-construction BMPs are most effective when a combination of structural and non-structural practices are implemented.

Need comprehensive planning and standards for site design as well as treatment devices!

Expectations for MS4 Operators

Establishing an Effective Post-Construction Program

Establish Requirements

- Pass ordinances or resolutions which require post-construction BMPs
 - All new development and redevelopment where “larger common plan of development or sale” disturbs 1 or more acre
 - **DRAFT PERMIT** – Must upgrade local requirements to meet minimum standards established by Ohio EPA NPDES Permit for Construction Activities #OHC000003
 - Within 2 years of reissuance of permit coverage

Draft Performance Standards

- Establish a plan review program
 - Requires coordination between planning commission and engineering department
 - Can use a third party service provider such as SWCD
 - Must have a signed Memorandum of Understanding (MOU)
 - Review 100% of plans
- Inspect sites to assure BMP installation per plan



Long-Term Maintenance

- Develop program to ensure BMPs are maintained
- Ohio EPA recommends system that
 - Creates an inventory of post-construction BMPs and their maintenance plans
 - Provides for inspection of BMPs at least once per year
 - Has an enforcement provision

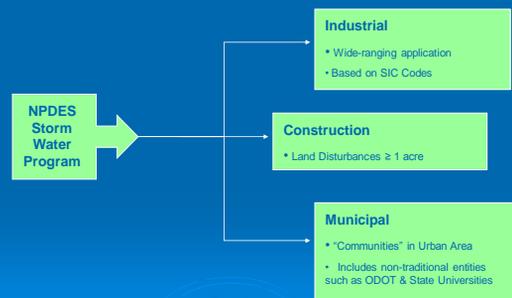


Ohio EPA Minimum Standards

For Post-Construction BMPs

In NPDES Permit for Construction Activities

NPDES Program for Storm Water



Post-Construction Required

- On all developments where "larger common plan" disturbs 1 or more acre except
 - Linear projects where no impervious surfaces are created
 - Underground pipeline installation
 - Stream restoration project
 - Wetland mitigation project
 - Abandoned mine reclamation projects

Non-Structural BMPs

- No minimum except in certain watersheds
 - Riparian setbacks for portions of Chagrin and Grand River watershed planned in future
- Review webcast of MS4 Workshop #3
 - www.epa.state.oh.us/ocapp/storm_workshop.html
- Ohio Lake Erie Commission Balanced Growth Program
 - <http://www.epa.state.oh.us/oleo/bq1/index.html>

Ohio EPA Encourages

- Riparian and Wetland Setbacks
 - Model Ordinances
 - www.noaca.org
 - www.crwip.org
- Conservation Development
- Smart Growth
- Low-Impact Development
- Green Infrastructure



How Non-Structural BMPs Fit with Ohio EPA Requirements

- Decreases the size of structural controls
 - Runoff coefficient is lower
 - Drainage area to BMP can be lower
- May be used to satisfy post-construction requirements in redevelopment scenarios
 - Reduce imperviousness by 20%
 - Create green space
 - Use permeable pavements
 - Green roofs

Structural BMPs

Structural BMP Requirements

- Sized to treat the Water Quality Volume
 - $WQv = 0.75 * C * A/12$
- Designed to drain the WQv in specific time
 - 24 to 48 hours
 - Dependent on BMP
 - Not more than 1/2 WQv in 1/3 drain time
- Provide storage for accumulated pollutants
 - 20% of WQv
 - Is additional volume



Selecting Structural BMPs

BMPs suitable for Drainage Areas < 5 acres

- Bioretention Cells
- Sand Filters
- Infiltration Trenches
- Dry or Wet Enhanced (Water Quality) Swales
- Grass Filter Strips
- Pocket Wetlands

BMPs suitable for Large Drainage Areas

- Dry Extended Detention Pond
- Wet Extended Detention Pond
- Stormwater Wetland with Ext Detention
- Infiltration Basin

- These are standard BMPs suitable for use throughout Ohio
- However, BMPs must be suitable for site and soil conditions!

Selecting Structural BMPs

- **DRAFT** - More flexibility for small residential development
 - Where "larger common plan" disturbs < 5 ac
 - Example: Allow rain gardens rather than bioretention cells



Alternative BMPs

- Any structure not listed on previous slide is an alternative BMP
 - Including hydrodynamic separators, “water quality units” and catch basin inserts



Use of Alternative BMPs

- Must get approval from Ohio EPA on a case-by-case basis
 - Plan for 30 to 60 days additional review time
 - Submit a rationale statement, not just plans
 - Demonstrate why a standard BMP is infeasible
 - Due to physical site constraint or inability to achieve functional design
 - Provide a statement for each standard BMP
- When MS4 operator receives a plan that uses an alternative BMP
 - Consult with Ohio EPA for review

Use of Alternative BMPs

- BMP must be tested via an accepted protocol
 - TARP protocol or US EPA Environmental Technology Verification programs
 - TSS load reduction of 80%
- Unless hydrologic impact is negligible
 - Must be used in conjunction with a BMP that reduces the discharge rate of the WQv

Hydrologic Impact Negligible if:

- The entire WQv is recharged (infiltrated) to groundwater
- Larger common plan of development or sale creates < 1 ac of impervious surfaces
- Redevelopment in an ultra-urban area, i.e., imperviousness is already 100%
- Discharge is to a large stream ($\geq 4^{\text{th}}$ Order) or lake and development area < 5% of watershed upstream of site
 - Not available in areas where TMDL identifies a problem

New Options in DRAFT Permit

- Off-site mitigation of post-construction BMPs
 - Example: Retrofit of an existing flood control structure in an already-developed area of community
- Non-structural BMPs in lieu of structural BMPs
 - Example: Limiting the size of rear yard to preserve a riparian setback along stream (where not required by local regulations)
- Approval is required from Ohio EPA
 - MS4 operator should assure Ohio EPA has approved these options
 - Issuance of NPDES permit to developer is not proof of plan approval

Redevelopment

Redevelopment

- Projects are considered redevelopment if
 - On land where impermeable surfaces exist from previous development
 - No increase in runoff coefficient
 - use Table 1 on page 21 of NPDES permit
- For redevelopment projects
 - Reduce impervious area by 20%
 - Provide structural BMPs to treat 20% of WQv
 - Do a combination of first two options to provide same net effect

Reducing Impervious Area



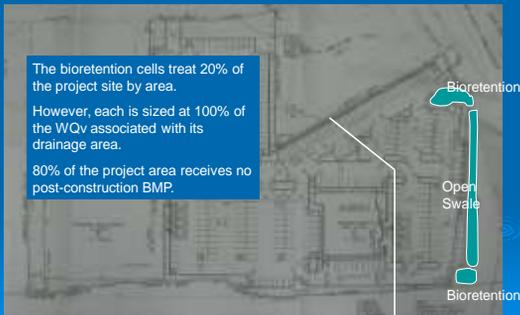
Existing Condition
100% Imperviousness



After Redevelopment
80% Imperviousness

Treating 20% of WQv

The bioretention cells treat 20% of the project site by area. However, each is sized at 100% of the WQv associated with its drainage area. 80% of the project area receives no post-construction BMP.



DRAFT

Transportation Projects

Transportation BMP Standards

- Only for public road projects by public entities
 - Including state, county, township and city road projects
- Use ODOT Location & Design Manual Volume 2
 - January 2008 Update
 - Section 1117 – BMP Toolbox



DRAFT

Special Requirements for Discharges to Wetlands

Review Criteria

- Runoff must enter wetland as sheet flow
 - Level spreaders may be used to convert flow
- Post- and Pre- hydroperiods remain same
- Maintain wetland hydrology by
 - Provide vegetative buffer or natural setback
 - Preserve intermittent and ephemeral streams which flow to wetland
 - Minimize impervious area creation within DA of wetland

References

References

- Ohio EPA Website
 - www.epa.state.oh.us/dsw/storm/index.html
 - Post-Construction Q&A Document
 - Ohio EPA General Storm Water NPDES Permit for Construction Activities #OHC000002
- Ohio BMP Design Manual
 - *Rainwater and Land Development* (2006)
 - <http://www.dnr.state.oh.us/soilandwater/>
- US EPA Webcasts
 - www.epa.gov/npdes/training

BMP Reference Manuals

Georgia Stormwater Manual	www.epa.state.ga.us/npdes/stormwater/
2004 Connecticut Stormwater Quality Manual	www.dep.state.ct.us/npdes/stormwater/ctstormwater.htm
California BMP Handbook for New Development and Redevelopment	www.calbmp.com/handbook.html
Guidance Manual for On-Site Stormwater Quality Control Measures	www.ecoform.com/npdes/consol/consol/01/01_01a.html
Urban Small Sites BMP Manual	www.mnrc.state.oh.us/npdes/waterbody/waterbody/manual.htm
New York Stormwater Management Design Manual	www.ecoform.com/npdes/consol/consol/01/01_01a.html
<i>Operation, Maintenance & Management of Stormwater Management Systems</i>	Watershed Management Institute, 1997 Not available on-line. Call (850) 926-5310

US EPA References

- US EPA Urban BMP Performance Tool
 - <http://cfpub.epa.gov/npdes/stormwater/urbanbmp/bmpeffectiveness.cfm>
- Managing Wet Weather with Green Infrastructure
 - http://cfpub.epa.gov/npdes/home.cfm?program_id=298
- *How Development Density Affects Watersheds*
 - http://www.epa.gov/smartgrowth/pdf/protect_water_higher_density.pdf

US EPA References

- ***Smart Growth Principles as Storm Water BMPs***
 - http://www.epa.gov/smartgrowth/pdf/sg_stormwater_BMP.pdf
 - <http://www.epa.gov/smartgrowth/pdf/EPAParkingSpaces06.pdf>
- National Post-Construction BMP Manual
 - Coming Spring 2008!

For More Information

Websites

Ohio EPA

www.epa.state.oh.us/dsw/storm/index.html

USEPA

http://cfpub.epa.gov/npdes/home.cfm?program_id=6

Ohio EPA Northeast District Office

Dan Bogoevski (330) 963-1145

dan.bogoevski@epa.state.oh.us

Kelvin Rogers (330) 963-1117

(Summit & Portage Co.)

kelvin.rogers@epa.state.oh.us

Chris Moody (330) 963-1118

(Medina, Geauga, Trumbull & Ashtabula Co.)

chris.moody@epa.state.oh.us

Ohio EPA Central Office

Mike Joseph (614) 752-0782

John Morrison (614) 644-2259