MS4 Toolbox: Compliance, O&M and BMPs for Successful PRPs

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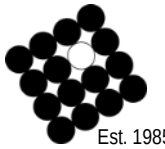

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MS4 Update and BMP Maintenance

- **Introduction – Permit Timeline Review**
- **Current Permit Compliance Tasks - Using Your written Stormwater Management Program (SWMP) to organize compliance activities**
  - Designation of Municipal Staff Responsibilities (Administration, Public Works, Code Enforcement, etc.)
  - Establishment of Documentation Procedures
- **PCSM BMPs for use in PRP Plans**
  - Types of BMPs
  - Effectiveness Values
  - Long-Term Maintenance Considerations
- **Questions**

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Permit Task and Timeline Review

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TIMELINE - 2017 MS4 TASKS

- **Continued Compliance with Current Permit**
  - Update and implement SWMP (Written Plans)
  - Submit Progress Reports to DEP
  - DEP Inspections, if not already done
- **Submit for Renewal for 2018 Permit**
  - NOI or Individual Permit Application
  - PRP and/or TMDL Plans, where applicable
- **Beginning in 2018**
  - Update and implement SWMP (Written Plans)
  - Implement PRP and/or TMDL Plans to achieve reductions by 2023
  - Address Pollutant Control Measure (PCM) requirements
  - Submit Annual Report with $500.00 fee

2018 NPDES MS4 Permit – Permit Renewal

- **Items for Inclusion in Renewal Submittal**
  - Notice of Intent (NOI) or Individual Permit Application
  - Renewal Fee
  - Stormwater Management Program (Written Plan)
  - Stormwater Management Ordinance
  - MS4 Map
  - PRP Plan and/or TMDL Plan (if applicable)

2018 NPDES MS4 Permit – Permit Renewal

- **Permit Types**
  - Individual Permit (IP) – Required for permittees according to the following criteria:
    - A TMDL Plan is required if the MS4 is tributary to waters with an established TMDL with a wasteload allocation (WLA) for either nutrients or sediment
    - The MS4 is tributary to Special Protection (High Quality or Exceptional Value) waters.
    - Required by DEP due to special circumstances
  - General Permit (GP) – MS4s not falling into the above category are eligible for coverage under the State General Permit.

2018 NPDES MS4 Permit – Permit Renewal Dates

- **September 16, 2017**
  - All current General Permittees, regardless of the dates of issuance or expiration of the current permit
  - Administratively extended Individual Permittees
  - All new permittees
- **180 days Prior to Expiration of Current Permit**
  - Current Individual Permittee that have not been administratively extended (permit issued March 2013 or later)
  - MS4s with existing waivers
- **DEP recently published "2018 Permit NOI/Application Due Date Report" table for clarification of due dates.**
  - Available at DEP's Municipal Stormwater website

2018 Permit NOI/Application Due Date Report

2018 MS4 PERMIT NOI/APPLICATION DUE DATE REPORT

REGION	COUNTY	MS4 NAME	PERMIT NUMBER	UPCOMING PERMIT OBLIGATION	FEE AMOUNT	NOI/APPLICATION DUE DATE	TMDL PLAN/PRP
SWRO	Allegheny	EDGEWORTH BORO STORM SEW SYS	PAI136103	MS4 Individual Permit	$2,500	10/2/2018	PRP
	Allegheny	ELIZABETH BORO STORM SEW SYS MS4	PAG136191	PAG-13 General Permit	$500	9/16/2017	PRP
	Allegheny	ELIZABETH TWP STORM SEW SYS MS4	PAG136207	PAG-13 General Permit	$500	9/16/2017	PRP
	Allegheny	EMSWORTH BORO STORM SEW SYS	PAG136314	PAG-13 General Permit	$500	9/16/2017	PRP
	Allegheny	ETNA BORO STORM SEW SYS	PAG136269	PAG-13 General Permit	$500	9/16/2017	PRP
	Allegheny	FAWN TWP STORM SEW SYS MS4	PAG136215	PAG-13 General Permit	$500	1/18/2018	N/A
	Allegheny	FINDLAY TWP STORM SEW SYS MS4	PAG136131	PAG-13 General Permit	$500	9/16/2017	PRP
	Allegheny	FOREST HILLS BORO STORM SEW SYS MS4	PAG136239	PAG-13 General Permit	$500	9/16/2017	PRP
	Allegheny	FORWARD TWP STORM SEW SYS	PAG136363	PAG-13 General Permit	$500	9/16/2017	N/A
	Allegheny	FOX CHAPEL BORO STORM SEW SYS	PAI136102	MS4 Individual Permit	$2,500	8/4/2018	PRP
	Allegheny	FRANKLIN PARK BORO STORM SEW	PAG136175	PAG-13 General Permit	$500	9/16/2017	PRP
	Allegheny	FRAZER TWP	PAG136273	PAG-13 General Permit	$500	9/16/2017	N/A
	Allegheny	GLASSPORT BORO STORM SEW SYS	PAG136312	PAG-13 General Permit	$500	5/28/2019	PRP
	Allegheny	GLEN OSBORNE BORO STORM SEW	PAG136372	PAG-13 General Permit	$500	7/31/2019	N/A

2018 Permit NOI/Application Due Date Report

- **Current Individual Permit**

Allegheny	FOX CHAPEL BORO STORM SEW SYS	PAI136102	MS4 Individual Permit	$2,500	8/4/20

- **Current General Permit**

Allegheny	FINDLAY TWP STORM SEW SYS MS4	PAG136131	PAG-13 General Permit	$500	9/16/2

- **Current Waiver**

Allegheny	GLEN OSBORNE BORO STORM SEW	PAG136372	PAG-13 General Permit	$500	7/31/20

Current Permit Compliance Tasks - Using Your Written Stormwater Management Program (SWMP) to Organize Compliance Activities

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Current Permit Annual Tasks – Plans and Documentation

- **Implementation of Stormwater Management Program (SWMP)**
  - All permittees must develop, implement and enforce a Stormwater Management Program comprised of each of the six Minimum Control Measures.
  - The SWMP should establish the permittee's plan and measureable goals to address each MCM.
  - In addition, using the written SWMP as a tool to organize compliance activities can help to efficiently manage tasks for compliance.

Current Permit Annual Tasks – Plans and Documentation

- **Implementation of Stormwater Management Program (SWMP)**
  - Details and description in the SWMP will help Municipal Staff understand their roles in implementation of SWMP and expectations for tracking and documentation.
  - Each Municipal Staff is different, the plan needs to be best fit to your Municipality and staff roles:
    - Manager/Administration
    - Public Works/Road Department
    - Code Enforcement Office
    - Environmental Compliance/MS4 Coordinator
  - Refine and revise staff responsibilities as part of the annual review and update of the SWMP.

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #1 – Public Education and Outreach on Stormwater Impacts**
  - BMP #1: - Develop and Implement a PEOP
    - Who is responsible to annually review and update the PEOP?
    - Who maintains a record of updates to the PEOP?
    - Typical – Manager/Secretary, MS4 Coordinator
  - BMP #2: Target Audience List
    - Who reviews and updates the Target Audience List?
    - Typical – Manager/Secretary, MS4 Coordinator

Educational Signage at the Hazelwood Library / Website

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #1 – Public Education and Outreach on Stormwater Impacts**
  - BMP #3: - Annually publish a newsletter, website or pamphlet regarding stormwater
  - BMP #4: Distribute Stormwater Educational Materials to Target Audience through two other methods
    - What types of distribution methods are detailed in the plan? Who creates, selects and reviews educational materials for each of the distribution?
    - Who is responsible for tracking of distribution of educational materials? Tracking logs are good tools to document activities and have been recommended by DEP reviewers during compliance inspections.
    - Typical – Manager/Secretary, MS4 Coordinator, Community Development Official

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

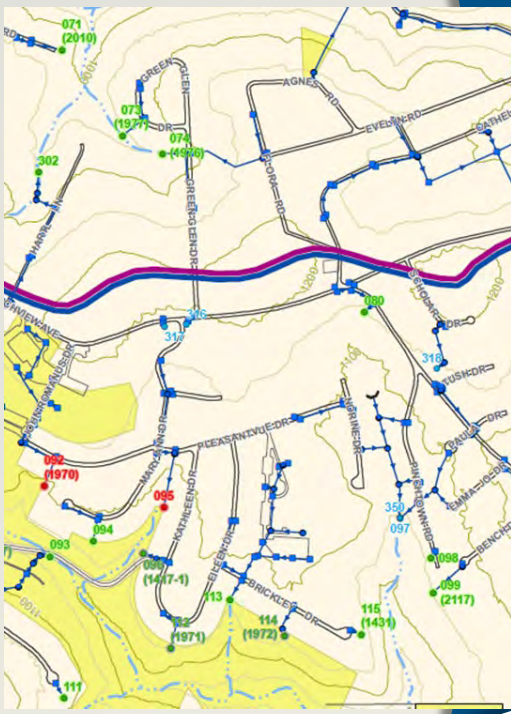
- **MCM #2 – Public Involvement/Participation**
  - BMP #1 - Develop and Implement a PIPP
    - Who is responsible to annually review and update the PIPP?
    - Who maintains a record of updates to the PIPP?
    - Typical – Manager/Secretary, MS4 Coordinator
  - BMP #2 – Advertise and solicit public input on Ordinances, Standard Operating Procedures and PRPs
    - Who places the advertisement and places items on public display?
    - Who is responsible for tracking and document public comment and municipal response to comments received?
    - Typical – Manager/Secretary

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #2 – Public Involvement/Participation**
  - BMP #3 – Solicit Public Involvement and Participation
    - Who is responsible for coordination of required public meetings?
    - Who is responsible for coordination of public involvement events – cleanups, stenciling, recycling events, etc.?
    - Who is responsible for coordination with adjacent permittees, stormwater partnership groups, watershed organizations, and other organizations?
    - Who maintains the tracking log and supporting documentation for public involvement activities?
    - Typical – Manager/Secretary, MS4 Coordinator, Community Development Coordinator

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #3 – Illicit Discharge Detection and Elimination**
  - BMP #1 - Develop and Implement an IDD&E Program
    - Who is responsible to annually review and update the IDD&E Program?
    - Who maintains a record of updates to the IDD&E Program?
    - Typical – Manager/Secretary, MS4 Coordinator
  - BMP #2 and #3 – Develop and maintain a Municipal MS4 Map
    - Who maintains the Municipal MS4 Map?
    - Who reviews the MS4 map annually for updates?
    - Typical – Manager/Secretary, MS4 Coordinator, Municipal Engineer, Public Works Director



Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #3 – Illicit Discharge Detection and Elimination**
  - BMP #4 – Outfall Screening Program
    - Who conducts the routine annual outfall screening?
    - Who is responsible for oversight of documentation and organization of screening result forms?
    - When illicit discharges are identified, who is responsible for implementing procedures for elimination of the illicit discharge? Who is to maintain documentation of corrective actions?
    - When illicit discharges are discovered outside of routing screening (resident report, observed by staff or police) who is responsible for tracking of initiation of incident documentation and follow through with documentation of resolution? Is this person responsible to maintain a running list of outstanding and resolved illicit discharge incidents?
    - Typical – Manager/Secretary, MS4 Coordinator, Public Works Director, Code Enforcement Officer

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #3 – Illicit Discharge Detection and Elimination**
  - BMP #5 – Ordinance Prohibiting Non-Stormwater Discharges
    - Who is responsible for review and enactment of the Ordinance?
    - Who enforces the Prohibited Discharge Ordinance what violations occur?
    - Typical – Manager/Secretary, MS4 Coordinator, Public Works Director, Code Enforcement Officer, Solicitor

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #3 – Illicit Discharge Detection and Elimination**
  - BMP #6 – Educational Outreach Regarding Illicit Discharges
    - What types of distribution methods are detailed in the plan? Who creates, selects and reviews educational materials for each of the distribution? Who is responsible for educating municipal staff about illicit discharges?
    - Who is responsible for tracking of distribution of educational materials?
    - Typical – Manager/Secretary, MS4 Coordinator, Community Development Official

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #4 – Construction Site Stormwater Runoff Control**
  - BMP #1 and #2– No Building Permit Until Proof of NPDES Permit, Notify DEP and CCD upon receipt of applications proposing earth disturbance in excess on one acre
    - Who is responsible for tracking ongoing and new development within the Municipality and reporting to DEP/CCD as needed?
    - Typical – Manager/Secretary, Code Enforcement Official, Community Development Director, Zoning Officer

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #4 – Construction Site Stormwater Runoff Control**
  - BMP #3– Enact, Implement and Enforce and Ordinance to require E&S Control BMPs, including sanctions for non-compliance
    - Who is responsible for development and maintenance of the Ordinance?
    - Who is responsible for tracking of all active land disturbance development within the Municipality?
    - Who is responsible for monitoring active construction sites to ensure implementation of E&S Controls?
    - Who is responsible for enforcement of violations of the Ordinance? Is this person responsible to keep a tracking log of incidents and resolution of incidents?
    - Typical – Manager/Secretary, MS4 Coordinator, Code Enforcement Official, Community Development Director

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #5 – Post-Construction Stormwater Management (PCSM) in New and Re-Development Activities**
  - BMP #1 and #2: Enact an Ordinance to require PCSM in New and Redevelopment projects. Encourage and expand the use of LID in new and redevelopment
    - Who is responsible for review of new and development projects for conformance with the Municipal Stormwater Ordinance?
    - Typical – Manager/Secretary, Code Enforcement Official, Community Development Director, Zoning Officer, Township Engineer

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #5 – Post-Construction Stormwater Management (PCSM) in New and Re-Development Activities**
  - BMP #3: Ensure adequate O&M of PCSM BMPs
    - Who is responsible for maintaining and inventory of applicable PCSM BMPs?
    - Who is responsible for implementing procedures for ensuring adequate O&M? Is this person responsible for conducting annual inspections? Is this person responsible for tracking of inspection and maintenance statuses?
    - Who is responsible for notifying operators of private BMPs of deficiencies to be addressed? Is this person responsible for issuance of Notices of Violation and tracking of resolution of issues?
    - Typical – Manager/Secretary, MS4 Coordinator Code Enforcement Official, Community Development Director, Zoning Officer, Township Engineer

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #6 – Pollution Prevention/Good Housekeeping**
  - BMP #1 – Develop and document all facilities and operations owned or operated by the permittee that have potential to generate stormwater runoff
    - Who is responsible for annual review and update of the facilities and activities inventory?
    - Typical – Manager/Secretary, MS4 Coordinator, Public Works Director

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #6 – Pollution Prevention/Good Housekeeping**
  - BMP #2 – Develop and document a written O&M Program for those items identified under BMP #1
    - Who is responsible for annual review and update of the O&M Program inventory? Is this person responsible to review the aspects of municipal operations and confirm a standing operating procedure for each?
    - Who is responsible for documentation of compliance with the SOP of each activity? Is this person responsible for tracking of completed activities and maintaining inspection, activity, purchase, material disposal and other records.
    - Typical – Manager/Secretary, MS4 Coordinator, Public Works Director

Current Permit Annual Tasks – Compliance with Permit Minimum Control Measures (MCMs)

- **MCM #6 – Pollution Prevention/Good Housekeeping**
  - BMP #3 – Develop and Implement an Employee Training Program
    - Who is responsible for development of the employee training programs? Is this person responsible for maintaining the list of employees to be included in the training program?
    - Who is responsible for maintaining documentation of training activities. Is this person responsible to maintain a tracking table of completed training activities, participants and topics?
    - Typical – Manager/Secretary, MS4 Coordinator, Public Works Director

BMP Options for Pollutant Reduction Plans

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2018 NPDES MS4 Permit – Pollutant Reduction Plans – Overview

- **MS4s required to Develop PRPs:**
  - All permittees that discharge to waters impaired for the following pollutants require PRPs:
    - Sediment (Siltation, Suspended Solids)
    - Nutrients (Excessive Algal Growth, Organic Enrichment/Low D.O.)
- **Pollutant Reduction Requirements:**
  - The following reductions must be achieved within 5 years of permit issuance (March 2023 for General Permits):
    - Achieve 10% reduction in pollutant loading of sediment
    - Achieve 5% reduction in pollutant loading of nutrients (total phosphorus)
  - Revised PRP Instructions allow for use of presumptive approach:
    - If waters are impaired for both sediment and nutrients the permittee may assume that a 10% sediment reduction will also result in the required 5% nutrient reduction.

2018 NPDES MS4 Permit – TMDL Plans Overview

- **MS4s required to Develop a TMDL Plan:**
  - Required for waters impaired for Nutrients or Sediments with an established Waste Load Allocation (WLA)
- **TMDL Plans Requirements:**
  - Long Term Reduction – Provide general plan to achieve with WLA identified in the TMDL
  - Short Term Reduction – Achieve at least PRP Criteria (10% sediment and/or 5% nutrients within 5 year permit cycle)
  - Presumptive approach is also accepted for TMDL plans

2018 NPDES MS4 Permit – Pollutant Reduction Plans/TMDL Plans – 2017 Requirements

- **Pollutant Reduction Plans (PRPs) and TMDL Plans are due with the NOI (September 16, 2017 for General Permittees) or Individual Permit Application**

- **PRP/TMDL Plan Contents:**
  - Calculation of existing pollutant loadings based on DEP methodology
  - Identification of required reduction in each storm sewershed based on loading calculations

2018 NPDES MS4 Permit – Pollutant Reduction Plans/TMDL Plans – 2017 Requirements

- **PRP/TMDL Plan Contents (cont.):**
  - Identification of BMPs to achieve pollutant reductions:
    - Construction of new BMPs by municipality
    - Retrofit of existing municipally owned BMPs
    - Construction of new BMPs by developers
      - Requires changes to Stormwater Ordinance to specifically required water quality improvements above typical NPDES Permit requirements
    - Retrofit of existing privately owned BMPs
      - May require municipality to take ownership of facility for future maintenance
    - Implementation of non-structural BMPs (i.e. street sweeping)
  - Identification of funding sources for BMP implementation

2018 NPDES MS4 Permit – Pollutant Reduction Plans/TMDL Plans – 2017 Requirements

- **Public Involvement for PRP/TMDL Plans**
  - All PRPs and TMDL Plans must be publicly advertised at least 45 days prior to submission to PADEP.
    - Latest Date for advertisement for GPs is August 2, 2017
  - Once advertised, PRP/TMDL Plan must be on public display for comment. All comments are to be logged. Comments and permittee's response to comments must be submitted to DEP with the PRP/TMDL Plan.
  - A public hearing will be held for comment on the PRP/TMDL Plan.

2018 NPDES MS4 Permit – Pollutant Reduction Plans/TMDL Plans – 2018-2023 Requirements

- **BMPs identified in the PRP/TMDL Plan must be constructed and the required pollutant reduction achieved within 5 years of permit issuance (March 2023 for GPs)**
- **Municipal budget for each year must include funds for:**
  - Final Design of BMPs – PRP will provide only planning level design
  - Acquisition of property, if needed for BMP construction
  - Construction costs for installation of new BMPs or retrofit of existing BMPs, including bidding costs if constructed by a contractor
  - Annual maintenance of all BMPs
- **Each year's annual report will include documentation and supporting calculations for reductions achieved through implementation of the PRP/TMDL Plan**

2018 NPDES MS4 Permit – Determining Impaired Waters

- **DEP has Published several tools in aiding permittees to determining PRP/TMDL requirements:**
  - MS4 Requirements Table
  - GIS Application
  - Pollutant Aggregation Suggestions for MS4 Requirements Table
- **Recent DEP Updates:**
  - Revised PRP Instructions allow for aggregation of pollutant loadings, generally based on HUC-12 watersheds
  - The Aggregation Table and GIS Application have been updated to clarify acceptable aggregation limits
  - Aggregation provides flexibility for permittees in selecting and locating BMPs to address required pollutant reductions.

2018 NPDES MS4 Permit – Determining Impaired Waters

MS4 Name	NPDES ID	Individual Permit Required?	Reason	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)	Other Cause(s) of Impairment
Allegheny County						
CLAIRTON CITY	PAG136287	No		Peters Creek	Appendix B-Pathogens (5)	Cause Unknown (5)
				Unnamed Tributaries to Monongahela River	Appendix A-Metals (4a), Appendix E-Organic Enrichment/Low D.O. (5)	
				Monongahela River	Appendix C-PCB (4a)	
COLLIER TWP	PAG136204	No		Chartiers Creek	Appendix A-Metals (4a), Appendix C-PCB (4a), Appendix E-Suspended Solids (4a), Appendix E-Siltation (5)	TDS, Turbidity (5)
				McLaughlin Run	Appendix C-Chlordane, PCB (4a), Appendix E-Siltation (5)	Turbidity (5)
				Ohio River	Appendix C-PCB (4a), Appendix B-Pathogens (5)	
				Painters Run	Appendix A-Metals (4a), Appendix C-Chlordane, PCB (4a), Appendix E-Suspended Solids (4a), Appendix E-Siltation (5)	TDS (5)
				Robinson Run	Appendix A-Metals (4a), Appendix E-Suspended Solids (4a), Appendix E-Nutrients, Siltation (5)	TDS (5)
				Thoms Run	Appendix A-Metals (4a), Appendix E-Suspended Solids (4a), Appendix E-Nutrients, Organic Enrichment/Low D.O., Siltation (5)	TDS, Turbidity (5)
				Unnamed Tributaries to Chartiers Creek	Appendix A-Metals (4a), Appendix E-Siltation, Suspended Solids (4a), Appendix E-Nutrients, Siltation (5)	TDS (5)
				Unnamed Tributaries to Painters Run		Turbidity (5)
CORAOPOLIS BORO	PAG136162	No		Ohio River	Appendix C-PCB (4a), Appendix B-Pathogens (5)	
				McCabe Run	Appendix E-Organic Enrichment/Low D.O., Siltation (5)	
				Montour Run	Appendix A-Metals, pH (4a), Appendix E-Nutrients, Organic Enrichment/Low D.O., Siltation (5)	Nonpriority Organics, Un-ionized Ammonia (5)
CRAFTON BORO	PAG136220*	No		Sawmill Run AMD and Sediment	TMDL Plan-Siltation (4a)	
				Ohio River	Appendix C-PCB (4a), Appendix B-Pathogens (5)	
				Chartiers Creek	Appendix A-Metals (4a), Appendix C-PCB (4a), Appendix E-Suspended Solids (4a), Appendix E-Siltation (5)	TDS (5)
				Sawmill Run AMD and Sediment	Appendix A-Metals, pH (4a)	
CRESCENT TWP	PAG136127	No		Spring Run	Appendix E-Organic Enrichment/Low D.O., Siltation (5)	
				Ohio River	Appendix C-PCB (4a), Appendix B-Pathogens (5)	
				Shouse Run	Appendix E-Organic Enrichment/Low D.O., Siltation, Suspended Solids (5)	
				Flaugherty Run	Appendix E-Organic Enrichment/Low D.O., Siltation (5)	
DORMONT BORO	PAG136284	Yes	TMDL Plan	Sawmill Run Nutrients	TMDL Plan-DO/BOD, Nutrients, Organic Enrichment/Low D.O., Siltation (4a)	
				Sawmill Run AMD and Sediment	TMDL Plan-Siltation (4a)	
				Sawmill Run		Water/Flow Variability (4c)
				Ohio River	Appendix C-PCB (4a), Appendix B-Pathogens (5)	
				Sawmill Run AMD and Sediment	Appendix A-Metals, pH (4a)	

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2018 NPDES MS4 Permit – Determining Impaired Waters

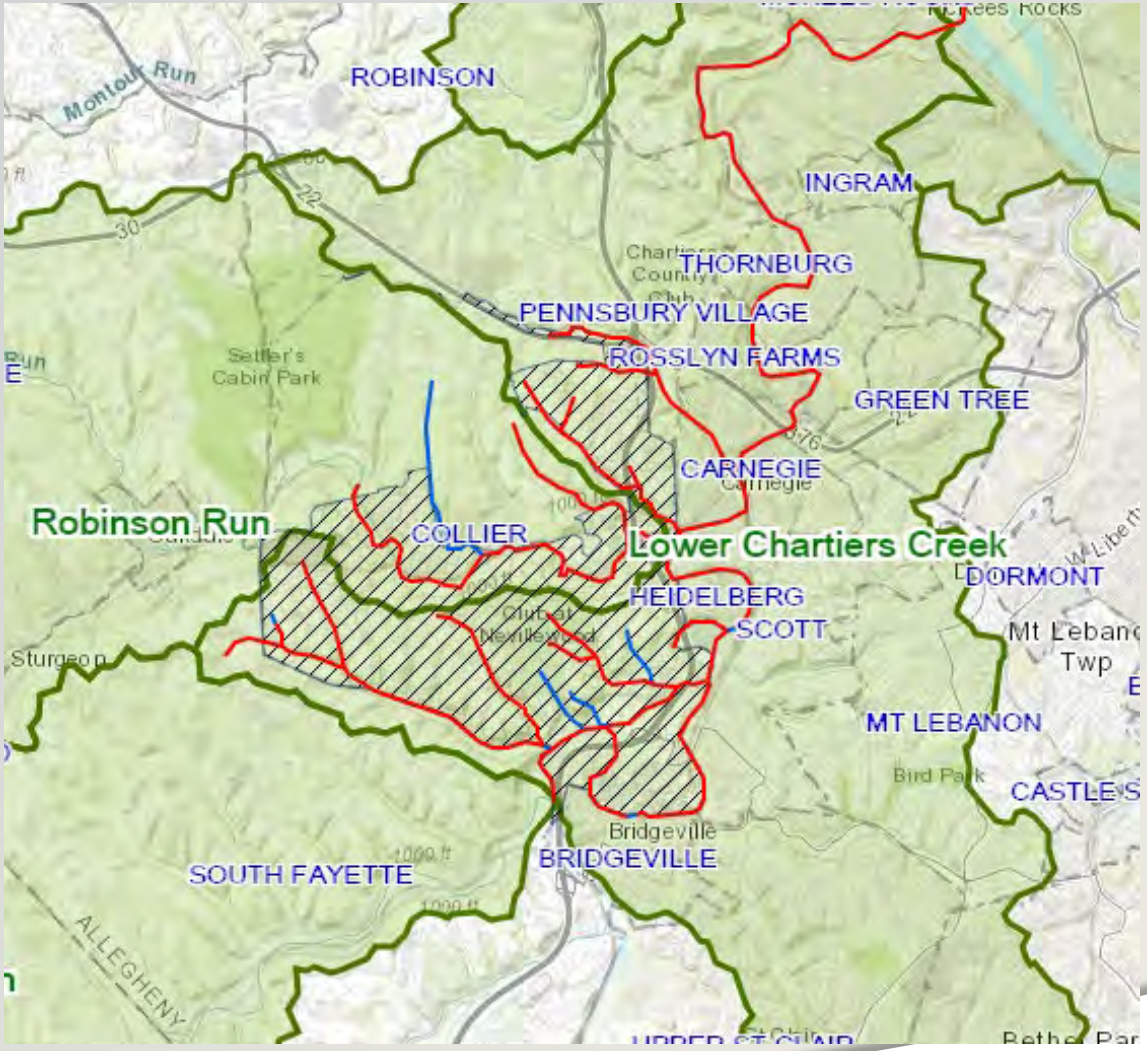
MS4 Name	Permit Number	HUC 12 Name	Impaired Downstream Waters or Applicable TMDL Name	Requirement(s)
Allegheny County				
BRADFORD WOODS BORO	PAG136263	Pine Creek-North Park Lake	Pine Creek	Appendix B-Pathogens, Appendix E-Nutrients, Siltation
		Brush Creek	Brush Creek	Appendix E-Nutrients, Siltation
BRENTWOOD BORO	PAG136271	Streets Run-Monongahela River	Monongahela River, Streets Run	Appendix A-Metals, pH, Appendix B-Pathogens, Appendix C-PCB, Appendix E-Siltation
		Kilbuck Run-Ohio River	Monongahela River, Ohio River	Appendix B-Pathogens, Appendix C-PCB
		Kilbuck Run-Ohio River, Sawmill Run	Sawmill Run AMD and Sediment, Sawmill Run AMD and Sediment, Sawmill Run Nutrients	Appendix A-Metals, pH, TMDL Plan-DO/BOD, Nutrients, Organic Enrichment/Low D.O., Siltation
BRIDGEVILLE BORO	PAG136203	Lower Chartiers Creek, Middle Chartiers Creek	Chartiers Creek, Painters Run	Appendix A-Metals
		Lower Chartiers Creek, Middle Chartiers Creek, Millers Run	Chartiers Creek, McLaughlin Run, Painters Run	Appendix C-Chlordane, PCB, Appendix E-Organic Enrichment/Low D.O., Siltation, Suspended Solids
CARNEGIE BORO	PAG136188	Lower Chartiers Creek	Chartiers Creek, Chartiers Creek, Unnamed Tributaries to Chartiers Creek	Appendix A-Metals, Appendix C-PCB, Appendix E-Siltation, Suspended Solids
		Kilbuck Run-Ohio River	Ohio River	Appendix B-Pathogens, Appendix C-PCB
CASTLE SHANNON BORO	PAG136117	Kilbuck Run-Ohio River	Ohio River	Appendix B-Pathogens, Appendix C-PCB
		Kilbuck Run-Ohio River, Sawmill Run	Sawmill Run AMD and Sediment, Sawmill Run AMD and Sediment, Sawmill Run Nutrients	Appendix A-Metals, pH, TMDL Plan-DO/BOD, Nutrients, Organic Enrichment/Low D.O., Siltation
CHALFANT BORO	PAG136190	Sawmill Run-Turtle Creek	Turtle Creek	Appendix E-Siltation
		Streets Run-Monongahela River	Monongahela River	Appendix B-Pathogens, Appendix C-PCB
CHESWICK BORO	PAG136322	Allegheny River-Ohio River, Chartiers Run-Allegheny River	Allegheny River	Appendix C-Chlordane, PCB
CHURCHILL BORO	PAG136225	Streets Run-Monongahela River	Monongahela River	Appendix B-Pathogens, Appendix C-PCB
		Sawmill Run-Turtle Creek, Thompson Run	Chalfant Run, Sawmill Run, Turtle Creek, Thompson Run	Appendix A-Metals, pH, Appendix E-Siltation
CLAIRTON CITY	PAG136287	Fallen Timber Run-Monongahela River	Monongahela River, Unnamed Tributaries to Monongahela River	Appendix A-Metals, Appendix C-PCB, Appendix E-Organic Enrichment/Low D.O.
		Piney Fork-Peters Creek	Peters Creek	Appendix B-Pathogens
COLLIER TWP	PAG136204	Lower Chartiers Creek, Millers Run	Chartiers Creek, McLaughlin Run, Painters Run	Appendix C-Chlordane, PCB
		Lower Chartiers Creek, Millers Run, Robinson Run	Chartiers Creek, McLaughlin Run, Painters Run, Robinson Run, Thoms Run, Unnamed Tributaries to Chartiers Creek	Appendix E-Nutrients, Organic Enrichment/Low D.O., Siltation, Suspended Solids
		Lower Chartiers Creek, Robinson Run	Chartiers Creek, Painters Run, Robinson Run, Thoms Run, Unnamed Tributaries to Chartiers Creek	Appendix A-Metals
		Kilbuck Run-Ohio River	Ohio River	Appendix B-Pathogens, Appendix C-Chlordane, PCB

2018 NPDES MS4 Permit – Determining Impaired Waters

COLLIER TWP	PAG136204	No		Chartiers Creek	Appendix A-Metals (4a), Appendix C-PCB (4a), Appendix E-Suspended Solids (4a), Appendix E-Siltation (5)
				McLaughlin Run	Appendix C-Chlordane, PCB (4a), Appendix E-Siltation (5)
				Ohio River	Appendix C-PCB (4a), Appendix B-Pathogens (5)
				Painters Run	Appendix A-Metals (4a), Appendix C-Chlordane, PCB (4a), Appendix E-Suspended Solids (4a), Appendix E-Siltation (5)
				Robinson Run	Appendix A-Metals (4a), Appendix E-Suspended Solids (4a), Appendix E-Nutrients, Siltation (5)
				Thoms Run	Appendix A-Metals (4a), Appendix E-Suspended Solids (4a), Appendix E-Nutrients, Organic Enrichment/Low D.O., Siltation (5)
				Unnamed Tributaries to Chartiers Creek	Appendix A-Metals (4a), Appendix E-Siltation, Suspended Solids (4a), Appendix E-Nutrients, Siltation (5)
				Unnamed Tributaries to Painters Run	

COLLIER TWP	PAG136204	Lower Chartiers Creek, Millers Run	Chartiers Creek, McLaughlin Run, Painters Run	Appendix C-Chlordane, PCB
		Lower Chartiers Creek, Millers Run, Robinson Run	Chartiers Creek, McLaughlin Run, Painters Run, Robinson Run, Thoms Run, Unnamed Tributaries to Chartiers Creek	Appendix E-Nutrients, Organic Enrichment/Low D.O., Siltation Suspended Solids
		Lower Chartiers Creek, Robinson Run	Chartiers Creek, Painters Run, Robinson Run, Thoms Run, Unnamed Tributaries to Chartiers Creek	Appendix A-Metals
		Kilbuck Run-Ohio River	Ohio River	Appendix B-Pathogens, Appendix C-Chlordane, PCB

2018 NPDES MS4 Permit – Determining Impaired Waters



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How To Achieve Pollutant Reductions – Implementation of Stormwater BMPs

- **What is a Stormwater BMP?**
  - Best Management Practices - Activities, facilities, designs, measures, or procedures used to manage stormwater impacts
- **Types of BMPs to consider as part of PRP or TMDL Plans:**
  - Structural BMPs
    - BMPs in New Development
    - New BMP Retrofits
    - Existing BMP Retrofits
  - Non-Structural BMPs
  - Stream Restoration

What to Consider When Selecting BMPs

- **Initial Costs**
  - Design Costs
  - Construction Costs
    - Are savings available by retrofitting existing facilities rather than building new
  - Property Acquisition, if needed for new construction
- **Effectiveness/Pollutant Reduction provided by BMPs**
- **Long Term Operation and Maintenance Costs**

Selecting Stormwater BMPs – Structural BMPs

- **Determining Effectiveness of Structural BMPs**
  - PADEP BMP Effectiveness Table
    - Provides static effectiveness percentage based on type of BMP
    - Simpler to use than Expert Panel Report

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Wet Ponds and Wetlands	20%	45%	60%	A water impoundment structure that intercepts stormwater runoff then releases it to an open water system at a specified flow rate. These structures retain a permanent pool and usually have retention times sufficient to allow settlement of some portion of the intercepted sediments and attached nutrients/toxics. Until recently, these practices were designed specifically to meet water quantity, not water quality objectives. There is little or no vegetation living within the pooled area nor are outfalls directed through vegetated areas prior to open water release. Nitrogen reduction is minimal.
Dry Detention Basins and Hydrodynamic Structures	5%	10%	10%	Dry Detention Ponds are depressions or basins created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Hydrodynamic Structures are devices designed to improve quality of stormwater using features such as swirl concentrators, grit chambers, oil barriers, baffles, micropools, and absorbent pads that are designed to remove sediments, nutrients, metals, organic chemicals, or oil and grease from urban runoff.
Dry Extended Detention Basins	20%	20%	60%	Dry extended detention (ED) basins are depressions created by excavation or berm construction that temporarily store runoff and release it slowly via surface flow or groundwater infiltration following storms. Dry ED basins are designed to dry out between storm events, in contrast with wet ponds, which contain standing water permanently. As such, they are similar in construction and function to dry detention basins, except that the duration of detention of stormwater is designed to be longer, theoretically improving treatment effectiveness.

SELECTING STORMWATER BMPS – STRUCTURAL BMPS

- **Determining Effectiveness of Structural BMPs**
  - Chesapeake Bay Expert Panel Reports
    - Provides effectiveness percentage based on type of BMP (Runoff Reduction or Stormwater Treatment) and depth of runoff captured

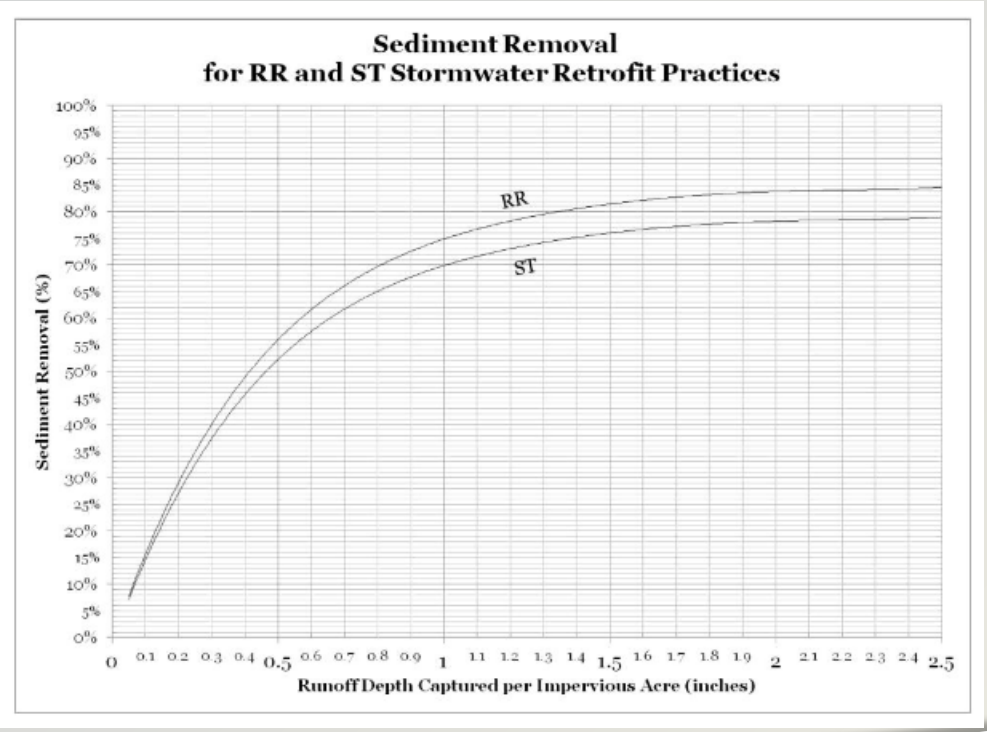
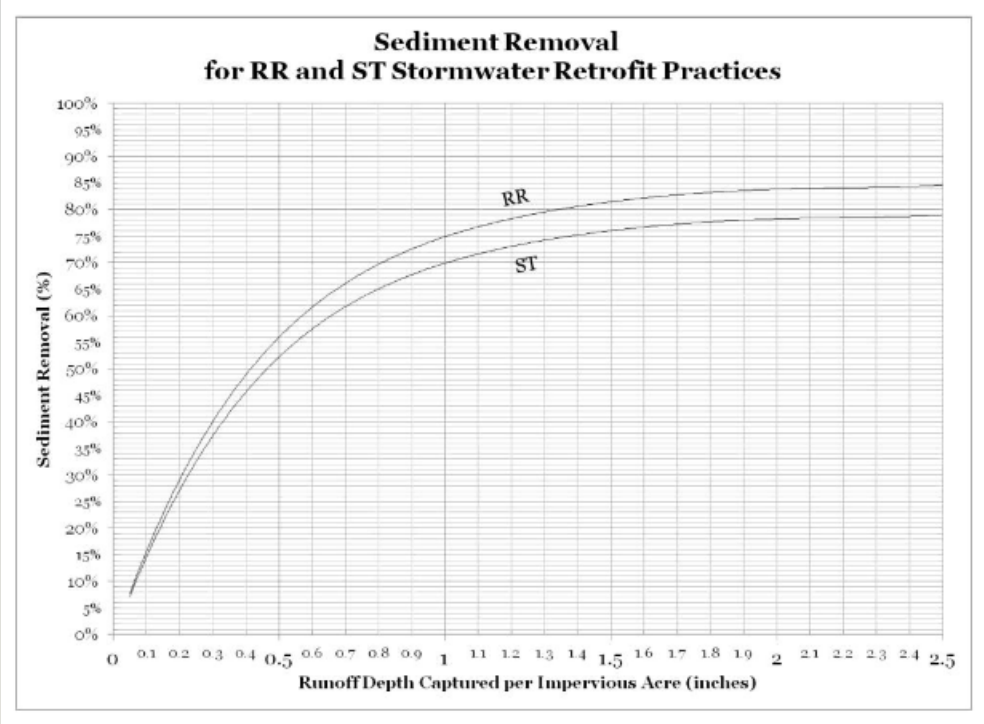


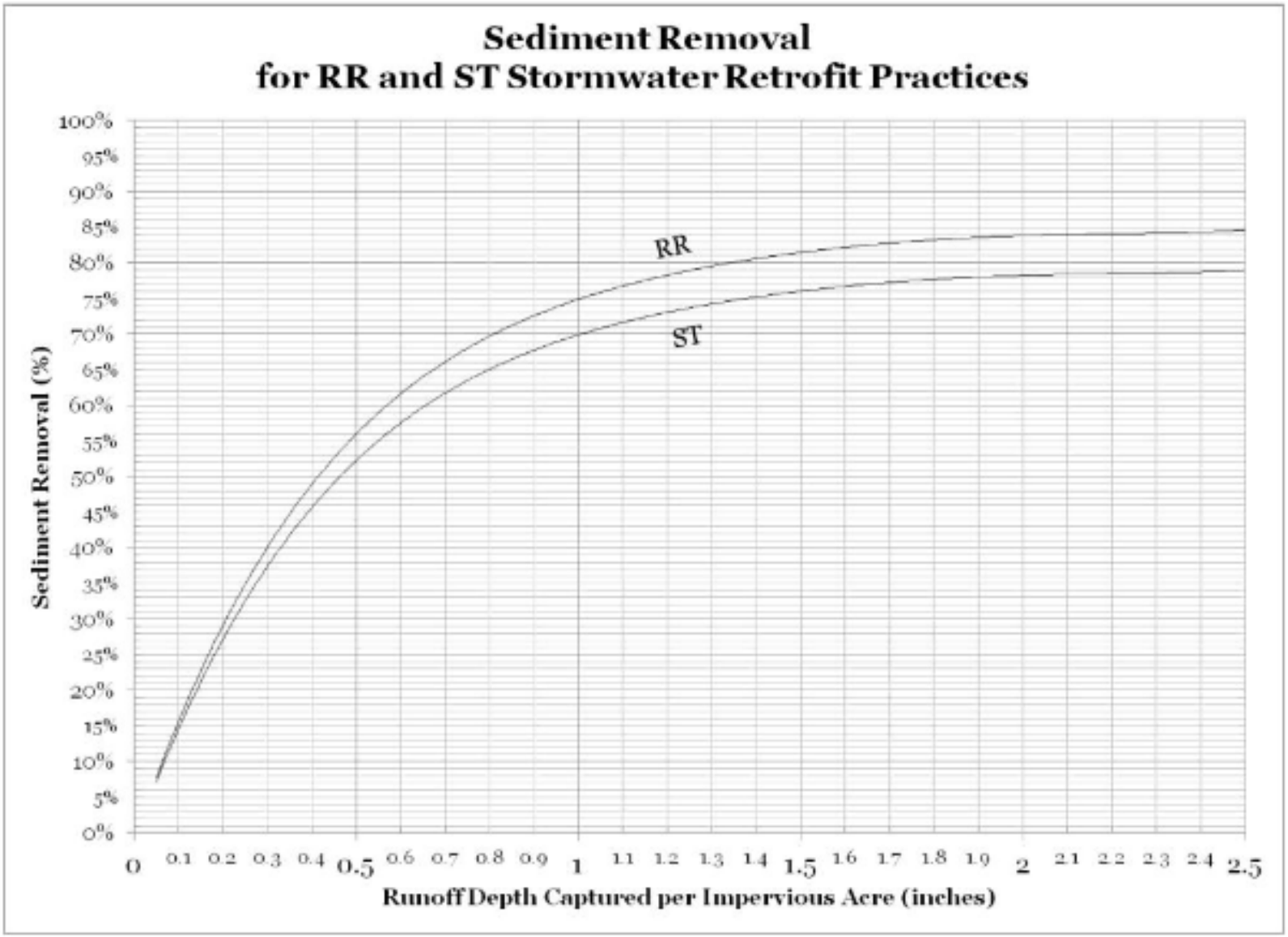
Table 2 Classification of BMPs based on Runoff reduction capability[1]	
Runoff Reduction Practices (RR)	*Stormwater Treatment Practices (ST)* [2]
Site Design/Non-Structural Practices	
Landscape Restoration/Reforestation	
Riparian Buffer Restoration	Constructed Wetlands
Rooftop Disconnection (aka Simple Disconnection to Amended Soils, to a Conservation Area, to a Pervious Area, Non-Rooftop Disconnection)	Filtering Practices (aka Constructed Filters, Sand Filters, Stormwater Filtering Systems)
Sheetflow to Filter/Open Space* (aka Sheetflow to Conservation Area, Vegetated Filter Strip)	Proprietary Practices (aka Manufactured BMPs)
All Non-structural BMPS – Chapter 5 of the 2006 Pennsylvania Stormwater BMP Manual	Wet Ponds (aka Retention Basin)
Practices	Wet Swale
All ESD practices in MD 2007	
Bioretention or Rain Garden (Standard or Enhanced)	
Dry Channel Regenerative Stormwater Conveyance (aka Step Pool Storm Conveyance)	
Dry Swale	
Expanded Tree Pits	
Grass Channels (w/ Soil Amendments, aka Bioswale, Vegetated Swale)	
Green Roof (aka Vegetated Roof)	
Green Streets	
Infiltration (aka Infiltration Basin, Infiltration Bed, Infiltration Trench, Dry Well/Seepage Pit, Landscape Infiltration)	
Permeable Pavement (aka Porous Pavement)	
Rainwater Harvesting (aka Capture and Re-use)	
*May include a berm or a level spreader [1]Refer to DC, MD, PA, VA or WV State Stormwater Manuals for more information [2] Dry ED ponds have limited removal capability , their efficiency is calculated using rates in Table A-4, Appendix A	

Selecting Stormwater BMPs – Structural BMPs

- **Determining Effectiveness of Structural BMPs**
  - Chesapeake Bay Expert Panel Reports
    - Design considerations to take into account point on diminishing returns on effectiveness choice – i.e. oversizing a single BMP for a given drainage area may not result in increased efficiency rate.



Selecting Stormwater BMPs – Structural BMPs



PCSM BMP Maintenance

- **Every BMP should have a specific Operations and Maintenance (O&M) Plan**
- **The O&M Plan details the specific maintenance schedule for the BMP**
- **In developing PRP and TMDL plans long term O&M costs must be considered. Unlike one-time design and construction O&M Costs are annual and permanent.**
- **For all new privately-owned BMPs, an O&M Agreement must be executed and recorded**
  - Agreement recorded with County as part of property records
  - Agreement attachment includes copy of O&M Plan

PCSM BMP Maintenance

- **O&M Costs to consider:**
  - Public Works Staff Labor
  - Public Works Equipment – Both new equipment purchases and maintenance costs for existing equipment
  - Materials – Soil Mix, Rip-Rap, Seed, Planting, etc.
  - Contracted Services

Selecting Stormwater BMPs

- **Types of BMPs to consider as part of PRP or TMDL Plans:**
  - **Structural BMPs**
  - Non-Structural BMPs
  - Stream Restoration

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Selecting Stormwater BMPs – Structural BMPs

- **Types of Pollutant Reduction Structural BMPs**
  - Rain Gardens/Bio-Retention Areas
  - Bio-Swales
  - Retention Basins (Wet Ponds)
  - Infiltration Practices
    - Infiltration Basins
    - Infiltration Beds/Trenches
    - Dry Well/Seepage Pits
  - Permeable Paving
  - Rainwater Harvesting (Re-use)
  - Hydrodynamic Structures/Proprietary Manufactured BMPs

Structural BMPs– Rain Gardens/Bio-Retention Areas

PCSM BMP Selection – Rain Gardens/Bio-Retention Areas

- **Rain Gardens/Bio-Retention**
  - DEP Effectiveness Value Table Description: "An excavated pit backfilled with engineered media, topsoil, mulch, and vegetation. These are planting areas installed in shallow basins in which the storm water runoff is temporarily ponded and then treated by filtering through the bed components, and through biological and biochemical reactions within the soil matrix and around the root zones of the plants"

PCSM BMP Maintenance – Rain Gardens/Bio-Retention Areas – Operation and Maintenance

- **Vegetation**
  - Different than detention basins, rain gardens often have specific plantings (grasses, shrubs, trees) installed as part of the BMP design
  - Maintenance of vegetation is specific to the planting and identified in the facility's O&M Plan
    - Routine mowing, like done to detention basins, should not be assumed to be the proper maintenance

PCSM BMP Maintenance – Rain Gardens/Bio-Retention Areas

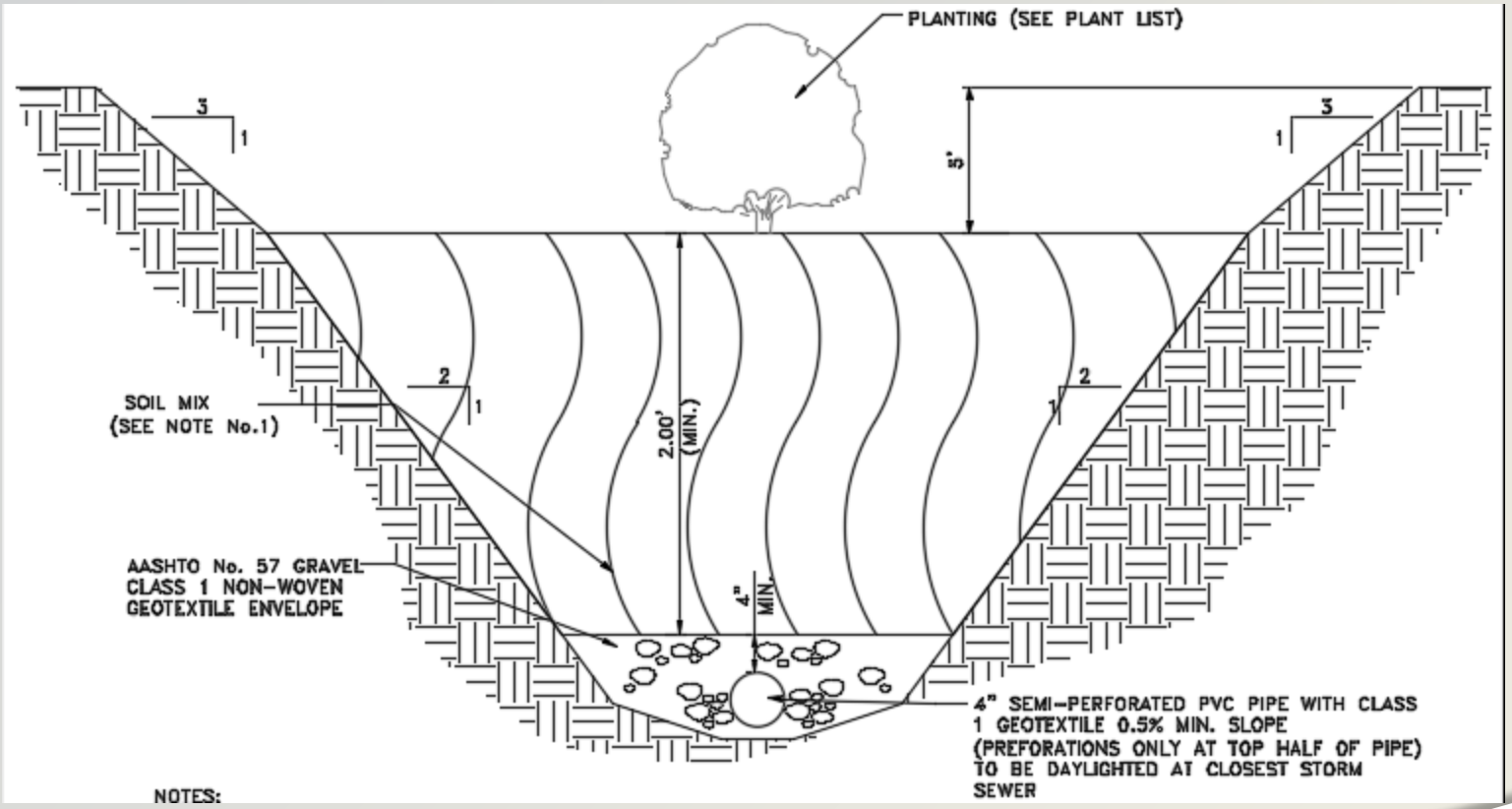
- **Vegetation**

PCSM BMP Maintenance – Rain Gardens/Bio-Retention Areas

- **Soil Mix/Infiltrative Media**
  - Rain gardens often contain a special soil mix to promote infiltration of collected runoff
  - The soil mix should be replaced periodically as its infiltrative properties diminish

PCSM BMP Maintenance – Rain Gardens/Bio-Retention Areas

- **Soil Mix/Infiltrative Media**



PCSM BMP Maintenance – Rain Gardens/Bio-Retention Areas

- **Soil Mix/Infiltrative Media**

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PCSM BMP Maintenance – Rain Gardens/Bio-Retention Areas

- **General Maintenance**
  - Address erosion areas
  - Remove and dispose of sediment, garbage and debris from rain garden
  - Keep outlet structure or overflow yard drain free of debris

PCSM BMP Maintenance – Rain Gardens/Bio-Retention Areas – BMP Effectiveness

- **Expert Panel Report**
  - Runoff Reduction Practice (Higher Effectiveness Value)
    - Maximum Effectiveness ~ 85%
- **BMP Effectiveness Tables**

BMP Name	BMP Effectiveness Values		
	TN	TP	Sediment
Bioretention – Raingarden (C/D soils w/ underdrain)	25%	45%	55%
Bioretention / Raingarden (A/B soils w/ underdrain)	70%	75%	80%
Bioretention / Raingarden (A/B soils w/o underdrain)	80%	85%	90%

Structural BMPs– Vegetated Channels and Bio Swales

PCSM BMP Selection – Vegetated Channels and BioSwales

- **Vegetated Channels**
  - DEP Effectiveness Value Table Description: "Open channels are practices that convey stormwater runoff and provide treatment as the water is conveyed, includes bioswales. Runoff passes through either vegetation in the channel, subsoil matrix, and/or is infiltrated into the underlying soils."

PCSM BMP Selection – Vegetated Channels and BioSwales

- **Bio Swales**
  - DEP Effectiveness Value Table Description: "With a bioswale, the load is reduced because, unlike other open channel designs, there is now treatment through the soil. A bioswale is designed to function as a bioretention area."
  - Bioswales are vegetated channels with soil mix similar to that used in rain gardens/bio-retention areas.

PCSM BMP Selection – Vegetated Channels and BioSwales

- **Vegetated Channel and Bio Swale Maintenance**
  - Maintenance similar to that of Rain Gardens and Bioretention Areas
  - Monitor vegetation overgrowth and maintain plantings installed as part of the design.
  - Replace soil mix periodically as its infiltrative properties diminish

PCSM BMP – Rain Gardens/Bio-Retention Areas – BMP Effectiveness

- **Expert Panel Report**
  - Runoff Reduction Practice (Higher Effectiveness Value)
    - Maximum Effectiveness ~ 85% (Sediment)

- **BMP Effectiveness Tables**

BMP Name	BMP Effectiveness Values		
	TN	TP	Sediment
Vegetated Open Channels (C/D Soils)	10%	10%	50%
Vegetated Open Channels (A/B Soils)	45%	45%	70%
Bioswale	70%	75%	80%

Structural BMPs – Infiltration Practices

- **Infiltration Practices can be constructed in many forms:**
  - Infiltration Basins
  - Infiltration Beds/Galleries
  - Infiltration Trenches
  - Dry Wells/Seepage Pits
- **Effectiveness Table Description;**
  - "A depression to form an infiltration basin where sediment is trapped and water infiltrates the soil. No underdrains are associated with infiltration basins and trenches, because by definition these systems provide complete infiltration. Design specifications require infiltration basins and trenches to be built in good soil, they are not constructed on poor soils, such as C and D soil types. Engineers are required to test the soil before approval to build is issued. To receive credit over the longer term, jurisdictions must conduct yearly inspections to determine if the basin or trench is still infiltrating runoff."

STRUCTURAL BMPS – INFILTRATION PRACTICES

STRUCTURAL BMPS – INFILTRATION PRACTICES

Structural BMPs – Infiltration Practices

STRUCTURAL BMPS – INFILTRATION PRACTICES

PCSM BMP – Infiltrative Practices– BMP Effectiveness

- **Expert Panel Report**
  - Runoff Reduction Practice (Higher Effectiveness Value)
    - Maximum Effectiveness ~ 85% (Sediment)

- **BMP Effectiveness Tables**

BMP Name	BMP Effectiveness Values		
	TN	TP	Sediment
Infiltration Practices w/ Sand, Veg.	85%	85%	95%

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PCSM BMP – Infiltrative Practices – Long Term Maintenance

- **Infiltrative Properties must be annually monitored and confirmed to continue to receive pollutant reduction credit.**
- **As with Bioretention areas, when soil mix is used periodic replacement is needed**

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PCSM BMP – Infiltrative Practices – Retrofit Opportunities

- Traditional Dry Detention Basins build as rate control facilities can often be retrofitted to provide pollutant reduction
- First step in selecting an existing BMP for retrofitting is often completing maintenance and repairs to restore its original functionality

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PCSM BMP Maintenance – Detention Basin

- **Outlet Structure**
  - Remove debris from orifices, grates and trash racks

PCSM BMP Maintenance – Detention Basin

- **Outlet Structure**
  - Clear of debris or obstruction from invert
  - Repair structural damage

PCSM BMP Maintenance – Detention Basin

- **Vegetation**
  - Maintain consistent vegetative growth
  - Remove trees and woody vegetation along the embankment or in the detention area
  - Seed areas with no growth to prevent erosion

PCSM BMP Maintenance – Detention Basin

- **Vegetation**
  - Mowed periodically to prevent overgrowth of brush

PCSM BMP Maintenance – Detention Basin

- **Vegetation**
  - Area below red line should be free of trees
  - This applies to both interior and exterior embankment

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PCSM BMP Maintenance – Detention Basin

- **Embankment**
  - Evaluate stability of slope
  - Look for signs of erosion or slides

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PCSM BMP Maintenance – Detention Basin

- **Embankment**
  - Reseed area without vegetation or where evident erosion exists
  - Address burrow holes

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PCSM BMP Maintenance – Detention Basin

- **Endwalls/Discharge Points**
  - Remove and dispose of accumulated sediment and debris

PCSM BMP Maintenance – Detention Basin

- **Endwalls/Discharge Points**
  - Address erosion
  - Restore rip-rap aprons

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PCSM BMP – Infiltrative Practices – Retrofit Opportunities

- **Traditional Dry Detention Basins provide limited pollutant reduction.**
- **Retrofitting options can be a cost effective way to repurpose as infiltration BMPs for pollutant reduction capabilities:**
  - Installation of forebays
  - Adjustment of outlet structure orifices to create infiltration basin conditions
  - Excavation of natural soil and installation of soil mix or gravel beds to provide additional storage for infiltration

PCSM BMP – Retention Basins – Retrofit Opportunities

- If natural soils are not conducive to infiltration, retention basins (wet ponds) may be considered for new construction or retrofit BMPs
- For retrofits, design must confirm that creation of the permanent pool for pollutant reduction does not diminish rate control properties of the original design

PCSM BMP – Infiltrative Practices– BMP Effectiveness

- **Expert Panel Report**
  - Retention Basin are considered Stormwater Treatment practices (Higher Effectiveness Value)
    - Maximum Effectiveness ~ 79% (Sediment)
  - Lesser reduction that for infiltration practices, a Runoff Reduction practice, so infiltration should be used when conditions allow
- **BMP Effectiveness Tables**

BMP Name	BMP Effectiveness Values		
	TN	TP	Sediment
Wet Ponds and Wetlands	20%	45%	60%

Structural BMPs – Hydrodynamic Structures/Manufactured BMPs

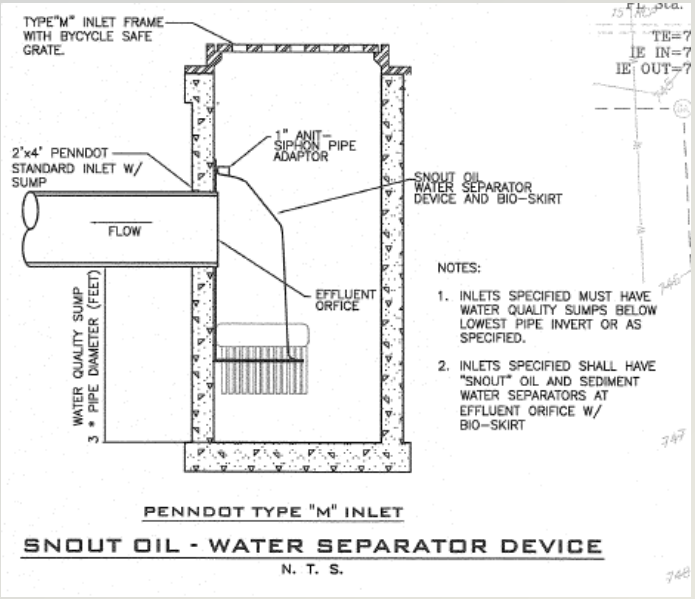
- Often proprietary BMPs aimed to reduce pollutants.
- Commonly used as retrofits to existing storm sewer infrastructure where space is not available for other BMPs
- Considered Stormwater Treatment Practices in Expert Panel Report – lesser maximum efficiency rating than Runoff Reduction Practices

Structural BMPs – Hydrodynamic Structures

- **Stormceptor**
  - Used in urbanized area where space is not available for rain gardens or surface BMPs
  - Sediment and oils trapped by bottom chamber must vactored out routinely

Structural BMPs – Hydrodynamic Structures

- **Inlet Snouts**
  - Used to filter oils and pollutants from entering the storm sewer system
  - Maintenance includes periodic vactoring out of collected oil and debris



Structural BMPs – Pervious Pavements

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Structural BMPs – Pervious Pavements – BMP Effectiveness

- **BMP Effectiveness Value Description:**
  - Pavement or pavers that reduce runoff volume and treat water quality through both infiltration and filtration mechanisms. Water filters through open voids in the pavement surface to a washed gravel subsurface storage reservoir, where it is then slowly infiltrated into the underlying soils or exits via an underdrain.

- **Long Term Maintenance**
  - Permeability of void space must be maintained for continued operation
  - Typical maintenance includes periodic vacuuming of pavers/pavement to remove accumulated debris or sediment

Structural BMPs – Pervious Pavements

- **Expert Panel Report**
  - Runoff Reduction Practice (Higher Effectiveness Value)
    - Maximum Effectiveness ~ 85% (Sediment)

- **BMP Effectiveness Tables**

BMP Name	BMP Effectiveness Values		
	TN	TP	Sediment
Permeable Pavement w/ Sand or Veg. (A/B Soils w/o underdrain)	80%	80%	85%
Permeable Pavement w/ Sand or Veg. (C/D Soils w/ underdrain)	20%	20%	55%

BMP Name	BMP Effectiveness Values		
	TN	TP	Sediment
Permeable Pavement w/o Sand or Veg. (C/D Soils w/ underdrain)	10%	20%	55%
Permeable Pavement w/o Sand or Veg. (A/B Soils w/ underdrain)	45%	50%	70%
Permeable Pavement w/o Sand or Veg. (A/B Soils w/o underdrain)	75%	80%	85%
Permeable Pavement w/ Sand or Veg. (A/B Soils w/ underdrain)	50%	50%	70%

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Selecting Stormwater BMPs – Structural BMPs

- **Types of BMPs to consider as part of PRP or TMDL Plans:**
  - Structural BMPs
  - **Non-Structural BMPs**
  - Stream Restoration

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Non Structural BMPs – Street Sweeping

Non Structural BMPs – Street Sweeping BMP Effectiveness

- **BMP Effectiveness Values Table**
  - For credit street sweeping must occur at least 25 times annually
  - Reduction credit is given to the acreage associated with swept streets
  - Designation is not made to differentiate sweeping technologies when using the Effectiveness Value Table

BMP Name	BMP Effectiveness Values		
	TN	TP	Sediment
Street Sweeping	3%	3%	9%

Non Structural BMPs – Street Sweeping BMP Effectiveness

- **Expert Panel Report**
  - Efficiency ratings vary based on sweeping frequency and sweeping technology:
    - Mechanical Broom Sweepers (MBS)
      - Sweeper equipped with water tanks, sprayers, brooms and a vacuum system pump
    - Advanced Sweeping Technology (AST)
      - Regenerative Air Sweepers (RAS)
      - Vacuum Assisted Sweepers (VAS)
  - Credit Given for less frequent sweeping schedules than BMP Effectiveness Table
    - Year-round efficiencies
    - Seasonal efficiencies

Non Structural BMPs – Street Sweeping BMP Effectiveness

Pollutant Reductions Associated with Different Street Cleaning Practices					
Practice #	Description [1]	Approx Passes/Yr [2]	TSS Removal (%)	TN Removal (%)	TP Removal (%)
SCP-1	AST- 2 PW	~100	21	4	10
SCP-2	AST- 1 PW	~50	16	3	8
SCP-3	AST- 1 P2W	~25	11	2	5
SCP-4	AST- 1 P4W	~10	6	1	3
SCP-5	AST- 1 P8W	~6	4	0.7	2
SCP-6	AST- 1 P12W	~4	2	0	1
SCP-7	AST- S1 or S2	~15	7	1	4
SCP-8	AST- S3 or S4	~20	10	2	5
SCP-9	MBT- 2PW	~100	0.7	0	0
SCP-10	MBT- 1 PW	~50	0.5	0	0
SCP-11	MBT- 1 P4W	~10	0.1	0	0

AST: Advanced Sweeping Technology MBT: Mechanical Broom Technology
[1] See Table 15 for the codes used to define street cleaning frequency
[2] Depending on the length of the winter shutdown, the number of passes/yr may be 10 to 15% lower than shown

Six different fixed sweeping schedules

2PW = 2 passes per week	1P4W = 1 pass every 4 weeks
1PW = 1 pass every week	1P8W = 1 pass every 8 weeks
1P2W = 1 pass every 2 weeks	1P12W = 1 pass every 12 weeks

Four seasonal sweeping schedules (more intensive in Spring or Fall)

S1: Spring – One pass every week from March to April. Monthly otherwise
S2: Spring – One pass every other week from March to April. Monthly otherwise
S3: Spring and fall – One pass every week (March to April, October to November). Monthly otherwise
S4: Spring and fall – One pass every other week during the season. Monthly otherwise

Two Levels of Sweeper Technology

MBC = Mechanical broom cleaning	VAC = Vacuum assisted cleaning

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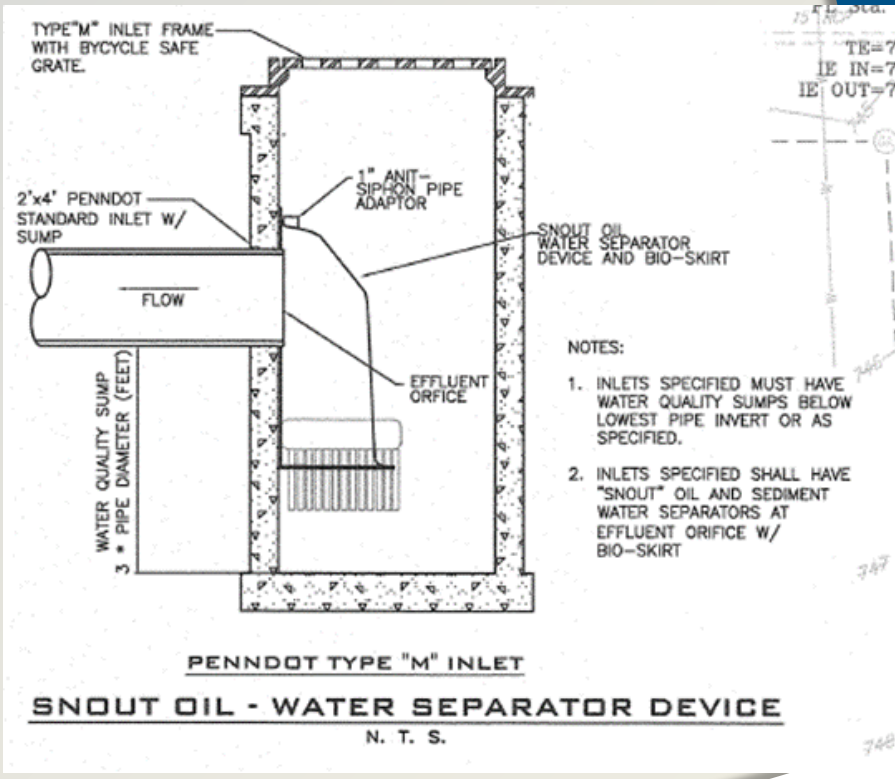
Non Structural BMPs – Street Sweeping BMP Effectiveness

- **Expert Panel Report – Treated Areas**
  - Mass Loading Approach – Actual material collected must be weighed and multiplied by reduction factors noted in the Expert Panel Report
  - Qualifying Street Lanes Approach - When calculating treated areas, the Expert Panel Report defines the following parameters:
    - Sweeping one curb mile (one lane) is equivalent to one area of one impervious acre
    - Municipal and Commercial Parking Lots may be included for pollutant reduction credit

Non Structural BMPs – Street Sweeping BMP Effectiveness

- **Cost Considerations for Street Sweeping**
  - Equipment Costs
    - Purchase, Operation and Maintenance
    - Rental or Contracted Services
  - Labor Cost
    - Public Works/Road Department Crew
    - Contracted Sweeper Operator
  - Waste Material Disposal
    - Dumpster, hauling and disposal fees
    - Material Testing, as required

NON STRUCTURAL BMPS – STORM DRAIN CLEANING



Non Structural BMPs – Storm Sewer System Solids Removal

- **BMP Effectiveness Value Description**
  - This BMP (also referred to as “Storm Drain Cleaning”) involves the collection or capture and proper disposal of solid material within the storm system to prevent discharge to surface waters. Examples include catch basins, stormwater inlet filter bags, end of pipe or outlet solids removal systems and related practices. Credit is authorized for this BMP only when proper maintenance practices are observed (i.e., inspection and removal of solids as recommended by the system manufacturer or other available guidelines). The entity using this BMP for pollutant removal credits must demonstrate that they have developed and are implementing a standard operating procedure for tracking the material removed from the sewer system. Locating such BMPs should consider the potential for backups onto roadways or other areas that can produce safety hazards.

Non Structural BMPs – Storm Drain Cleaning

- **Storm Drain Cleaning/Solids Removal**
  - Silt Sacks
  - Filter Bags
  - Catch Basins (Sumps)
  - End of Pipe Collection BMPs

Non Structural BMPs – Storm Drain Cleaning

- **Methodology in determining Pollutant Reduction is the same for both Effectiveness Value Table and Expert Panel Report:**
  - Based on actual weight of material collected
  - Multiply by factor to convert capture weight to dry weight
    - 0.7 if collected material is predominantly sediment
    - 0.2 if collected material is predominantly organic (leafs, yard waste, etc.)
  - Multiply dry weight by concentration factors for pollutants
- **Storm Drain Cleaning can not be the only BMP selected as part of the PRP or TMDL Plan. A maximum of 50% of the required reduction can be achieved with this BMPs.**

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NON STRUCTURAL BMPS – STORM DRAIN CLEANING

BMP Name	BMP Effectiveness Values			BMP Description
	TN	TP	Sediment	
Storm Sewer System Solids Removal	0.0027 for sediment, 0.0111 for organic matter	0.0006 for sediment, 0.0012 for organic matter	1 – TN and TP concentrations	This BMP (also referred to as "Storm Drain Cleaning") involves the collection or capture and proper disposal of solid material within the storm system to prevent discharge to surface waters. Examples include catch basins, stormwater inlet filter bags, end of pipe or outlet solids removal systems and related practices. Credit is authorized for this BMP only when proper maintenance practices are observed (i.e., inspection and removal of solids as recommended by the system manufacturer or other available guidelines). The entity using this BMP for pollutant removal credits must demonstrate that they have developed and are implementing a standard operating procedure for tracking the material removed from the sewer system. Locating such BMPs should consider the potential for backups onto roadways or other areas that can produce safety hazards. To determine pollutant reductions for this BMP, these steps must be taken: 1) Measure the weight of solid/organic material collected (lbs). Sum the total weight of material collected for an annual period. Note – do not include refuse, debris and floatables in the determination of total mass collected. 2) Convert the annual wet weight captured into annual dry weight (lbs) by using site-specific measurements (i.e., dry a sample of the wet material to find its weight) or by using default factors of 0.7 (material that is predominantly wet sediment) or 0.2 (material that is predominantly wet organic matter, e.g., leaf litter). 3) Multiply the annual dry weight of material collected by default or site-specific pollutant concentration factors. The default concentrations are shown in the BMP Effectiveness Values columns. Alternatively, the material may be sampled (at least annually) to determine site-specific pollutant concentrations. DEP will allow up to 50% of total pollutant reduction requirements to be met through this BMP. The drainage area treated by this BMP may be no greater than 0.5 acre unless it can be demonstrated that the specific system proposed is capable of treating stormwater from larger drainage areas. For planning purposes, the sediment removal efficiency specified by the manufacturer may be assumed, but no higher than 80%.

Non Structural BMPs – Storm Drain Cleaning

- **Cost Considerations for Storm Drain Cleaning**
  - Equipment Costs
    - Purchase, Operation and Maintenance
    - Rental or Contracted Services – Vactor Service
  - Labor Cost
    - Public Works/Road Department Crew
    - Contracted Sweeper Operator
  - Material Cost
    - Replacement of silt sacks or other collection devices.
  - Waste Material Disposal
    - Dumpster, hauling and disposal fees
    - Material Testing, as required

Selecting Stormwater BMPs – Structural BMPs

- **Types of BMPs to consider as part of PRP or TMDL Plans:**
  - Structural BMPs
  - Non-Structural BMPs
  - **Stream Restoration**

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Stream Restoration Projects

Stream Restoration Projects

- **BMP Effectiveness Value Description**
  - An annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that otherwise would be delivered downstream from an actively enlarging or incising urban stream. Applies to 0 to 3rd order streams that are not tidally influenced. If one of the protocols is cited and pounds are reported, then the mass reduction is received for the protocol.

Stream Restoration Projects

- **BMP Effectiveness**
  - PRP Instructions provide guidelines for Effectiveness Values
  - When using Simplified Method to calculate existing loadings, the Effectiveness Value Table and Expert Panel Reports define the same reductions as shown:

BMP Name	BMP Effectiveness Values		
	TN	TP	Sediment
Stream Restoration	0.075 lbs/ft/yr	0.068 lbs/ft/yr	44.88 lbs/ft/yr

  - When using modeling at a local watershed scale to calculate existing loadings a sediment reduction rate of 115 lb/ft/yr may be used.

Stream Restoration Projects

- **Stream Restoration Project Considerations**
  - Streams are often on private property. Access for restoration projects may require acquisition of property or right-of-way
  - Annual routine maintenance may be less intensive than other structural BMPs. Maintenance for stream restoration may entail annual inspections of completed improvement and repairs to vegetative, rip-rap or vegetative lining as needed.

BMP Summary and Anticipated Costs

- **Typical Structural BMP Costs:**
  - 1-20 Acres Urban Areas - $15,000 - $25,000 per acre (typically requires utilizing Stormceptors, inlet filters, green roofs, etc)
  - 20-150 Acres Medium Density Areas - $7,000 - $15,000 per acre (mixture of urban and low density BMPs)
  - 150+ Acres Areas with Significant Open Space - $2,500 - $7,500.00 (typically rain gardens, bioswales and retrofits)

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