



SCD STORMWATER PROGRAM



PREPARE * PROTECT* PRESERVE*

State of Delaware

Sediment and Stormwater Program

- ❑ Established by Law and Regulation Statewide 1991.
- ❑ Requires all land disturbing activities over 5,000 square ft. to operate under an approved plan.
- ❑ Program is delegated to local municipalities, conservation districts, and DeIDOT.
- ❑ Delaware Department of Natural Resources and Environmental Control (DNREC) responsible for program performance statewide.

In Delaware, you are never very far from water when land is developed. The potential for impacts to ecosystems and natural areas is significant.



Sediment and Stormwater Delegation

- ❑ Sediment & Erosion Control and Stormwater Management Review
- ❑ Construction Inspection
- ❑ Maintenance Inspection
- ❑ Outreach & Education and Technical Assistance



Sediment and Stormwater Plan Review

- Conceptual Design Meeting
- Pre-application Meeting
- Plan Review
 - Stormwater Management
 - Erosion & Sediment Control
 - Downstream Analysis
 - Pollution Prevention
 - As-Built Review
- Technical Assistance



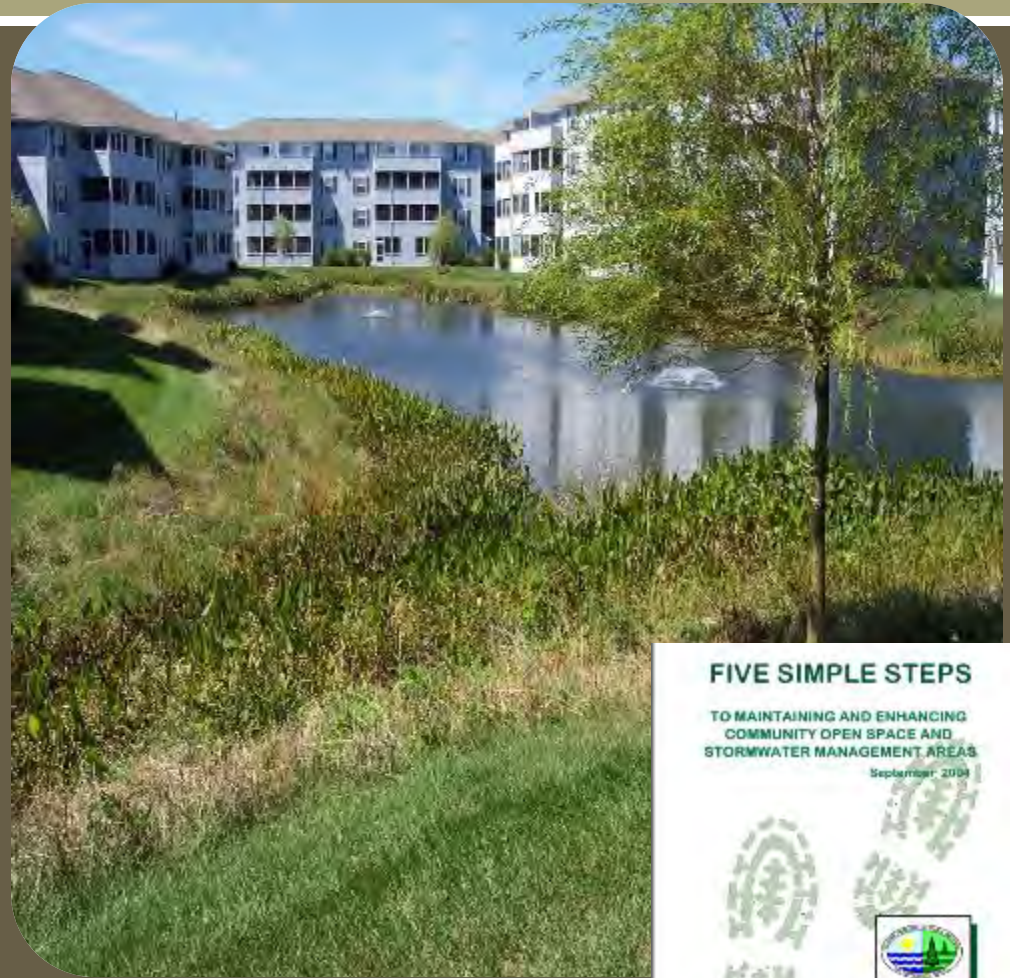
Sediment and Stormwater Inspection

- Pre-construction Meeting
- Routine Site Inspection
- Stormwater Maintenance Inspection
 - ▣ Including follow-up inspection
 - ▣ Meetings with contractors/HOA
- Technical Assistance
- Drainage Complaints
- Outreach Education



Sediment and Stormwater Maintenance

- The District is required to inspect all “closed out” projects and generate an inspection report
- Approximately 2,000 closed out projects
- The District is required to follow-up on maintenance reports and inspect repairs.



Types of Stormwater Management Facilities

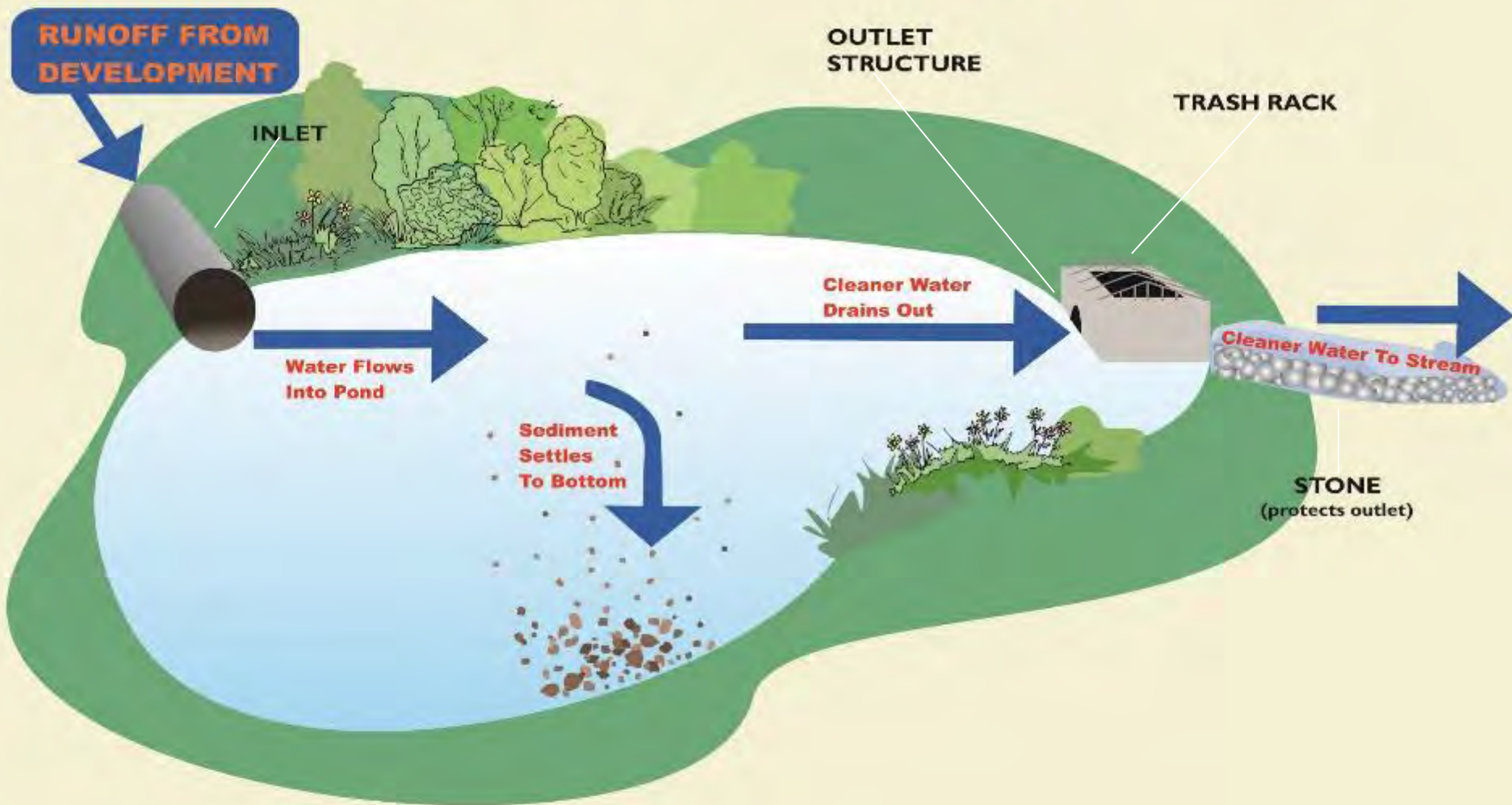
- Wet Ponds
- Dry Ponds
- Infiltration Ponds
- Underground Stormwater Systems
- Bioswales
- Bioretention
- Filter Strips
- Constructed wetlands
- Vegetated Roofs



Wet Ponds Provide Quantity Management



Stormwater Pond Function



Wet Ponds: Things that you can do yourself



Routine Maintenance

Mowing



- Mostly landscapers
- 10' access path to pond
- Mow around inlets and outlets
- Leaving buffer is optional (not required but strongly encouraged)



Leaving Buffers

- “No mow zone”
- Work with landscaper
- Must be group decision
 - Width optional
- Benefits:
 - Controls geese
 - Uptakes nutrients
 - Less erosion
 - Better wildlife habitat



Trimming – Maintenance of Vegetation

Remove small saplings

- Inlets
- Outlets
- Embankment



The longer you wait to remove the tree – the more expensive the cost for removal.



Stabilizing Banks

- Buffers - Reduce erosion of side slopes
- Overseed/Stabilize as needed
- Major stabilization – hire a consultant
 - Erosion control matting
 - Choosing durable grass species

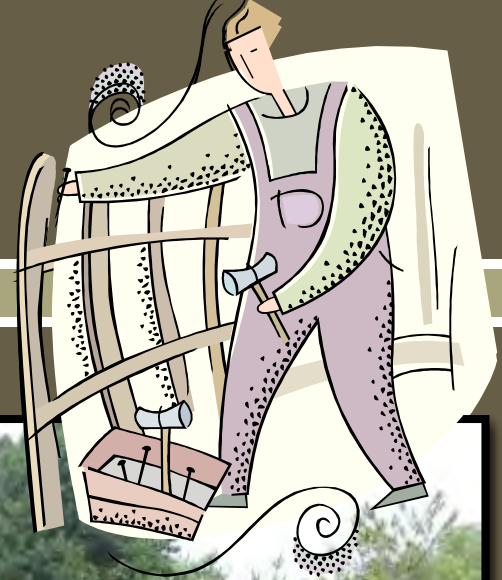


Remove Debris

- Remove trash
- Remove debris from inlets and outlet structures



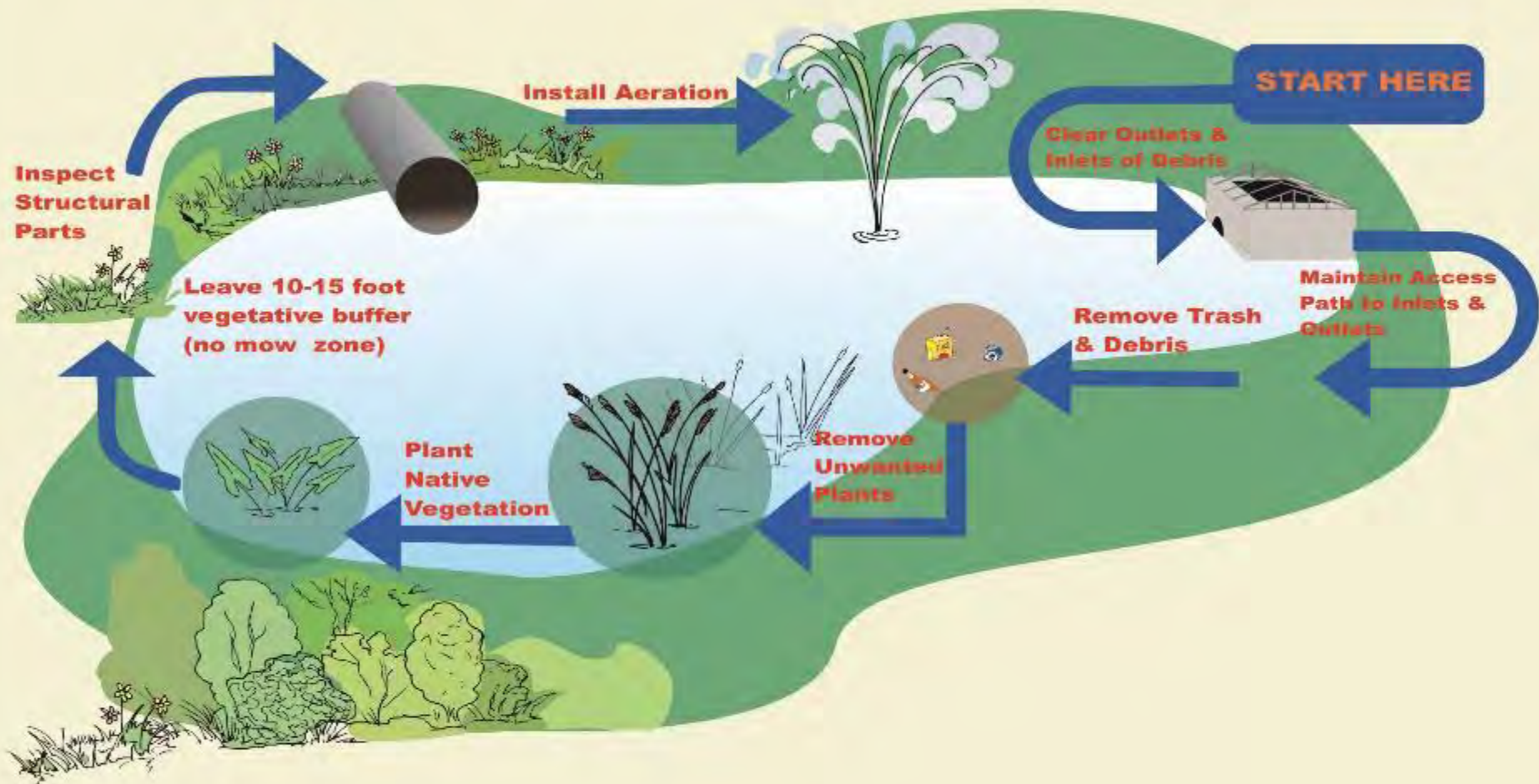
Fencing



- Optional
- Not required
- Not recommended



Stormwater Pond Maintenance



When to Hire a Professional

- Removal of sediment (Forebay cleanout)
- Stabilization
 - Structural (riprap)
 - Vegetative



When to Hire a Professional

- Mosquito Control (DNREC)
 - Kent & Sussex
422-1512



When to Hire a Professional

- Removal of sediment (forebay cleanout)
- Mosquito Control
- Major vegetation removal
 - Algae
 - Non-native species?



When to Hire a Professional

- Removal of sediment (Forebay cleanout)
- Mosquito Control
- Major vegetation removal
- Cracked or broken structural components



Hire a Professional



A photograph of a pond with a concrete block in the water. The text "Hire a Professional" is overlaid in the center. The pond is surrounded by greenery and a paved area. The water is calm, reflecting the sky and surrounding trees. A concrete block is partially submerged in the water, with some algae or debris on its surface. The foreground shows a gravelly bank with some green plants. The background shows a paved area and more greenery.

Hire a Professional



Hire a Professional



A photograph of a pond in a park-like setting. The foreground is dominated by a pond with a thick layer of green algae or duckweed on its surface. A small cluster of tall, green reeds grows in the center of the pond. The pond is bordered by a strip of brown mulch and some green grass. In the background, there is a large, open grassy field. Beyond the field, there are several trees, including tall pine trees and deciduous trees. A white building with a brown roof is visible in the distance, along with a blue car and a golf cart. The sky is clear and blue.

Hire a Professional

A photograph of a pond almost completely covered with a thick layer of bright green aquatic plants, likely water hyacinths. The water is dark and reflects the sky and the surrounding trees. In the background, there is a dense forest of various green trees, including a prominent weeping willow. The overall scene suggests a water quality issue or an overgrown pond.

Hire a Professional

A photograph of a calm pond surrounded by dense green trees and foliage. The water reflects the surrounding greenery and the sky. The text "Hire a Professional" is overlaid in the center of the image in a yellow, serif font.

Hire a Professional

A man wearing a light blue long-sleeved shirt, khaki pants, and a white baseball cap is crouching in a field of tall, green reeds. He appears to be working with the plants, possibly measuring or inspecting them. The field is dense with reeds and other vegetation. In the background, there is a thick line of green trees under a bright sky. A utility pole is visible on the right side of the image.

I wish I had hired a
Professional!

Dry Ponds

- Ponds are designed to drain 48 hours after a rain event
- Maintenance Challenges
 - Invasive Plant Management
 - Soggy pond bottoms – difficult to mow
- If the pond is holding water
 - Possible blockage
 - Downstream obstruction
 - Seasonal groundwater



Infiltration Basin

- Ponds typically do not have a discharge outlet
- Rely on permeable soils for infiltration
- Low groundwater table



Infiltration Basin Maintenance

- Crust forms over time
 - Scrape topsoil surface to encourage/revitalize infiltration
- Failure due to poor drainage and improper soils
 - Hire a professional
 - \$\$\$

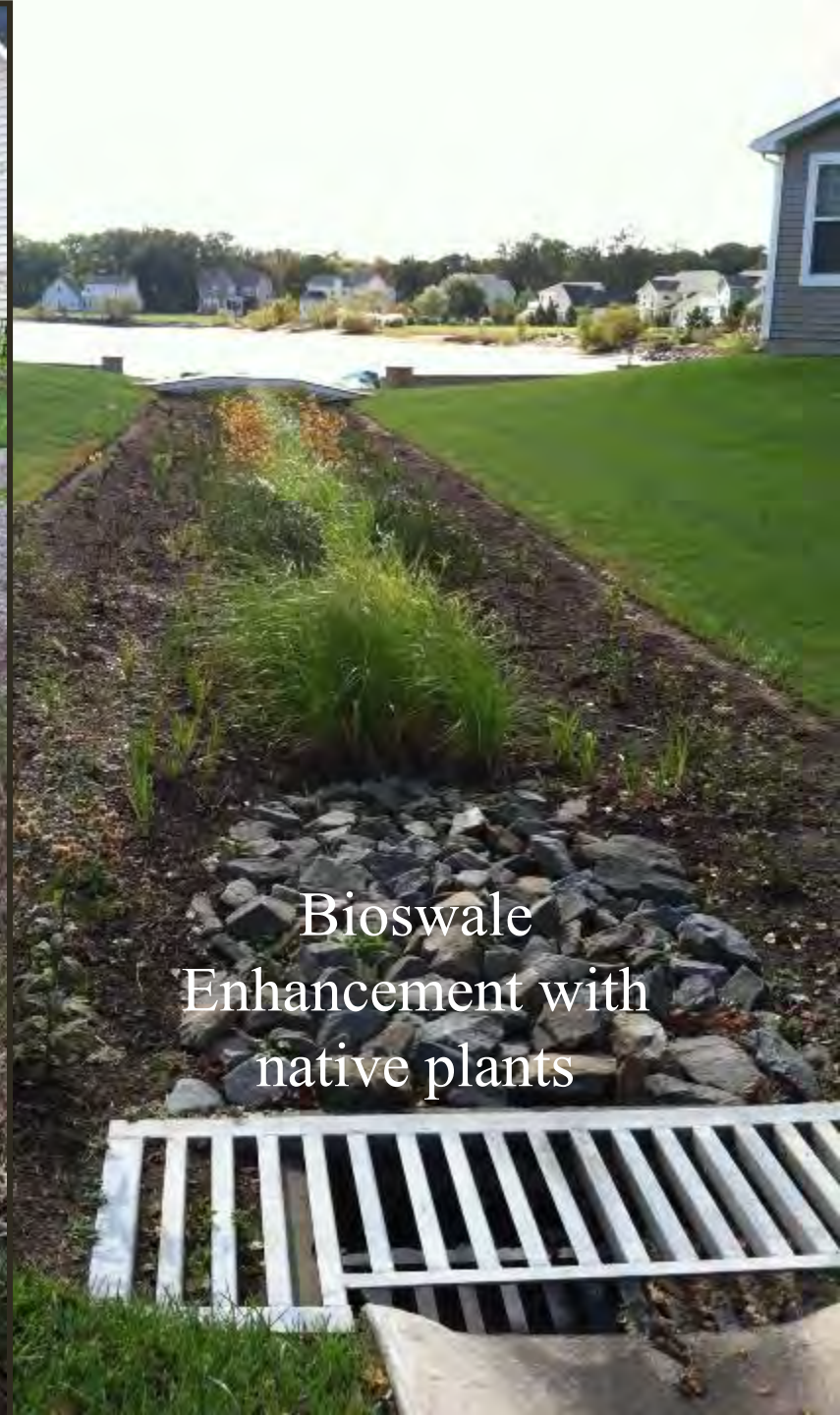
Green Technology: Bioswale

- Provides Water Quality Treatment by removing sediment and nutrients
- Low Maintenance





No-Mowing in the
swale flow line



Bioswale
Enhancement with
native plants

Rain Garden/Bioretention Cell



Bioretention Maintenance

- Maintain as a landscape feature
- Provide routine maintenance
- Inspect for erosion and reseed as needed
- Management of vegetation (No large trees)
- Remove trash & debris
- Add triple shredded hardwood mulch as needed
- If facility does not drain within 48 hours
 - Removal of accumulated sediment
 - Replace biosoil mix (every 15-20 years)
 - Must use DNREC certified soil media supplier



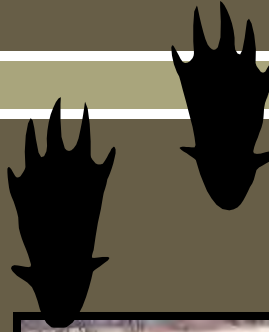
Maintenance Inspection

Maintenance Inspection Report

POND COMPONENTS

Embankment and Emergency spillway

1. Vegetation and ground cover adequacy
2. Embankment erosion
3. Animal burrows
4. Unauthorized plantings
5. Cracking, bulging or sliding of dam
6. Slope protection or riprap failures
7. Emergency spillway clear of obstructions and debris



Maintenance Inspection Report

Riser and Principal Spillway

- Low flow orifice obstructed
- Weir trash rack maintenance debris removal necessary
- Excessive sediment accumulations inside riser
- Pipe condition
- Outfall channels functioning



Maintenance Inspection Report

DRY PONDS

- Adequacy of vegetation
- Undesired vegetative growth
- Woody vegetation
- Low flow channels clear of obstructions
- Standing water or wet spots
- Sediment and or trash accumulation
- Erosion problems
- Forebay – status of sediment
- Pond functionality
- Encroachments on pond



Maintenance Inspection Report

INFILTRATION PONDS

- Adequacy of vegetation
- Undesired vegetative growth
- Woody vegetation
- Infiltrating between storms
- Sediment and or trash accumulation
- Erosion problems
- Forebay – status of sediment
- Pond functionality
- Encroachments on pond
- Upstream areas stabilized



Maintenance Before and After



Maintenance Before & After



Maintenance Inspection

Debris & Cleanout

Pond is overgrown with vegetation including invasive species and woody vegetation



Overgrown vegetation can obstruct drainage

Maintenance Inspection



Maintenance Inspection





Trash racks and low flow orifices are blocked by debris and overgrown vegetation



Erosion of Stormwater Facilities

- Riprap outlet is designed to convey 100-year storms non-erosively. Events that exceed “design storms” have the potential to erode.



Erosion of Stormwater Facilities

EROSION

- Change in upstream watershed
- Highly erodible soils
- Improper installation
- Significant rain event



1. Can Compromise the storage capacity
2. Added maintenance costs
3. Creates instability around the outlet structure
4. Down stream impacts



**Sediment-Laden Runoff into
Stormwater Pond increases
future maintenance costs**









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Successful Maintenance















Homeowner Technical Resources

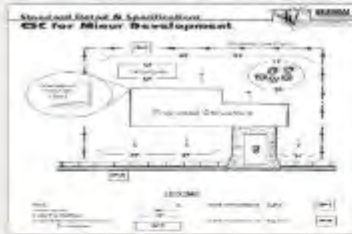
[Sussex Conservation District Website:](#)

Sussexconservation.org



The screenshot shows the homepage of the Sussex Conservation District website. At the top left is the logo for the Sussex Conservation District, which includes a stylized green and blue circular emblem and the text "Sussex conservation district" with the tagline "PREPARE. PROTECT. PRESERVE." below it. To the right of the logo are social media icons for Facebook and Twitter. Further right is a search bar labeled "Keyword Search" with a magnifying glass icon. Below the header is a dark green navigation bar with white text for "PROGRAMS", "SERVICES", "RESOURCES", "ABOUT US", and "REQUEST FOR AUDIT PROPOSAL". The main content area features a large background image of a wetland with tall grasses and a pond. On the left side of this area is a smaller inset image of a pond with waterfowl. To the right of the inset image, the text reads "DEVELOPING LAND - LET THE DISTRICT GUIDE THE WAY IN REGULATION COMPLIANCE" in bold orange letters, followed by "Find Checklists, Policies and Operating Procedures" in black. Below this text is a green button that says "Find out more". At the bottom of the page, the text "WELCOME TO THE SUSSEX CONSERVATION DISTRICT" is displayed in bold green letters, followed by a paragraph of introductory text: "Since 1944, The Sussex Conservation District has provided Soil and Water Conservation services to the citizens of Sussex County, Delaware. This service continues today through our Agriculture Conservation, Heavy Equipment, and Sediment & Stormwater Programs."

District Shop – Plants/Signage



APPLICATIONS

1 Product



AQUATICS

17 Products



CONSERVATION SIGNAGE

2 Products



GRASSES

18 Products



HERBACEOUS FLOWERING

43 Products



SALT TOLERANT

11 Products



TREES AND SHRUBS

10 Products

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□ **PREPARE * PROTECT* PRESERVE***