

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.



FIVE SIMPLE STEPS

TO MAINTAINING AND ENHANCING
COMMUNITY OPEN SPACE AND
STORMWATER MANAGEMENT AREAS

September 2004



Information gathered by the Delaware Department
of Natural Resources and Environmental Control
Sediment and Stormwater Program

Types of Stormwater Management Facilities

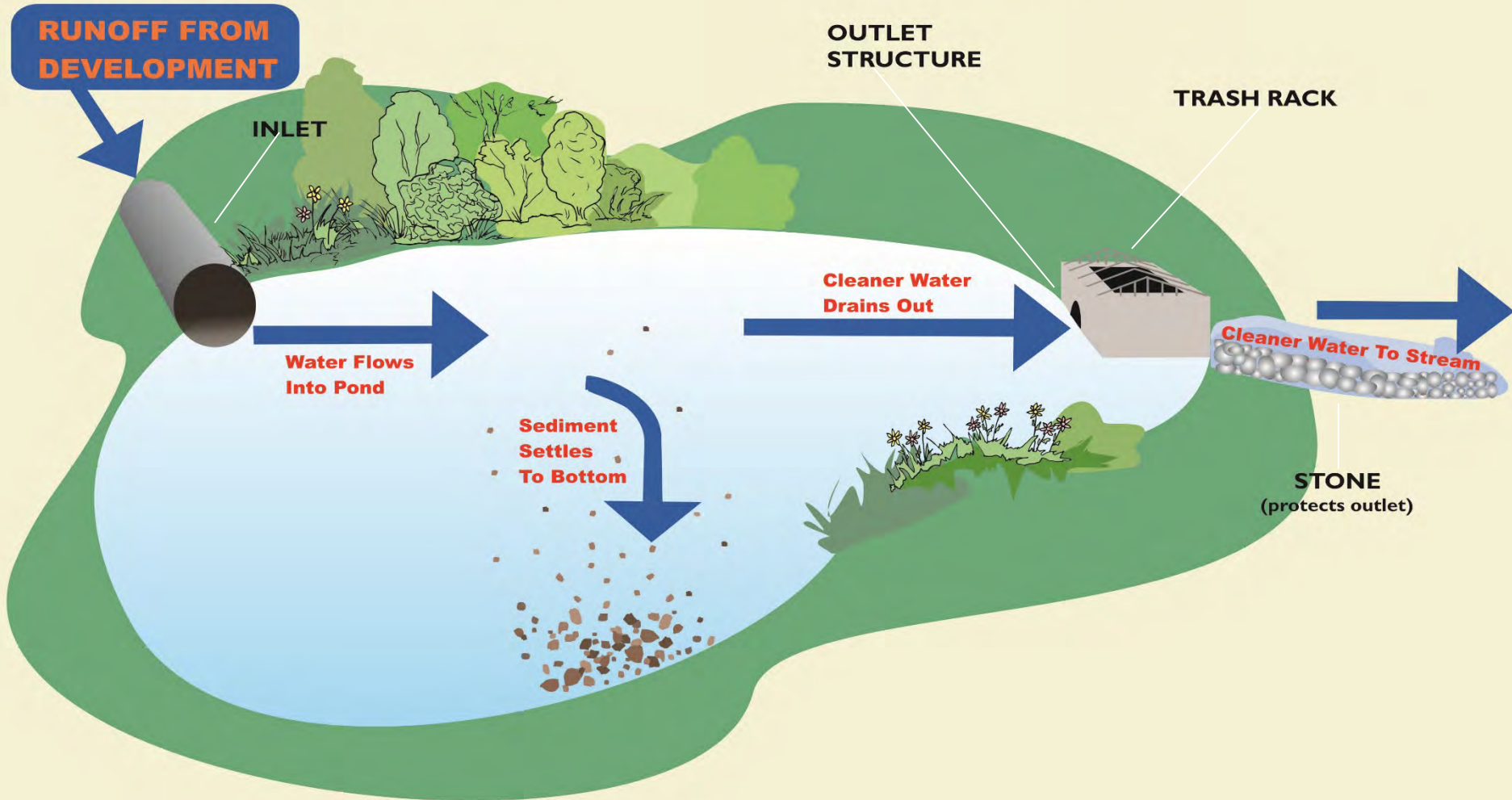
- Wet Ponds
- Dry Ponds
- Infiltration Ponds
- Underground Stormwater Systems
- Bioswales
- Bioretention
- Filter Strips
- Constructed wetlands
- Vegetated Roofs



Wet Ponds Provide Quantity Management



Stormwater Pond Function



Wet Ponds: Things that you can do yourself



Routine Maintenance

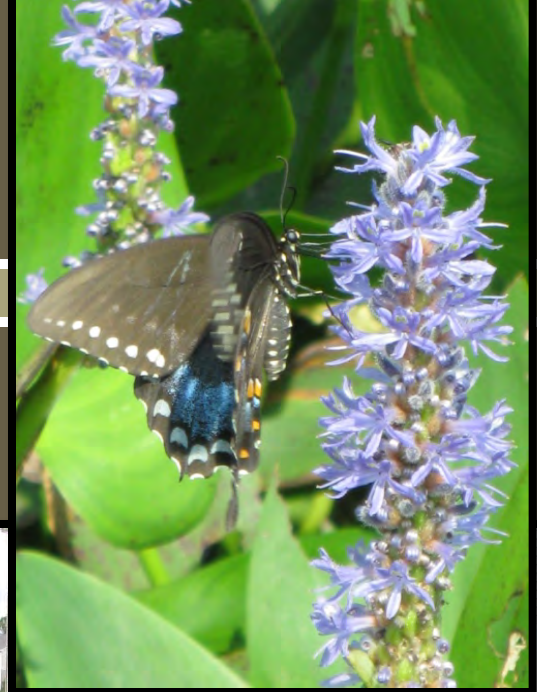
Mowing

- 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

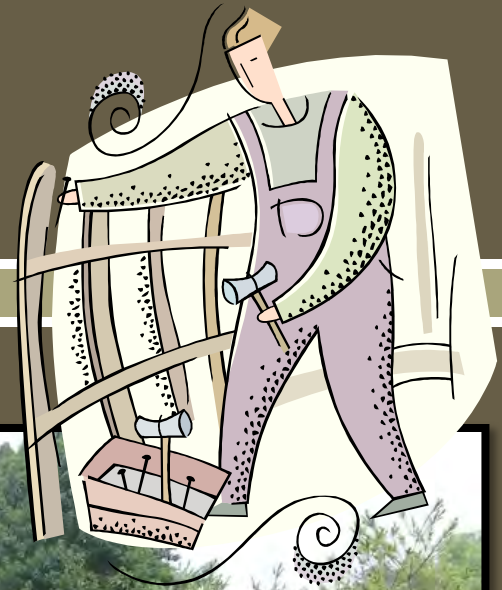


Remove Debris

- Remove trash
- Remove debris from inlets and outlet structures



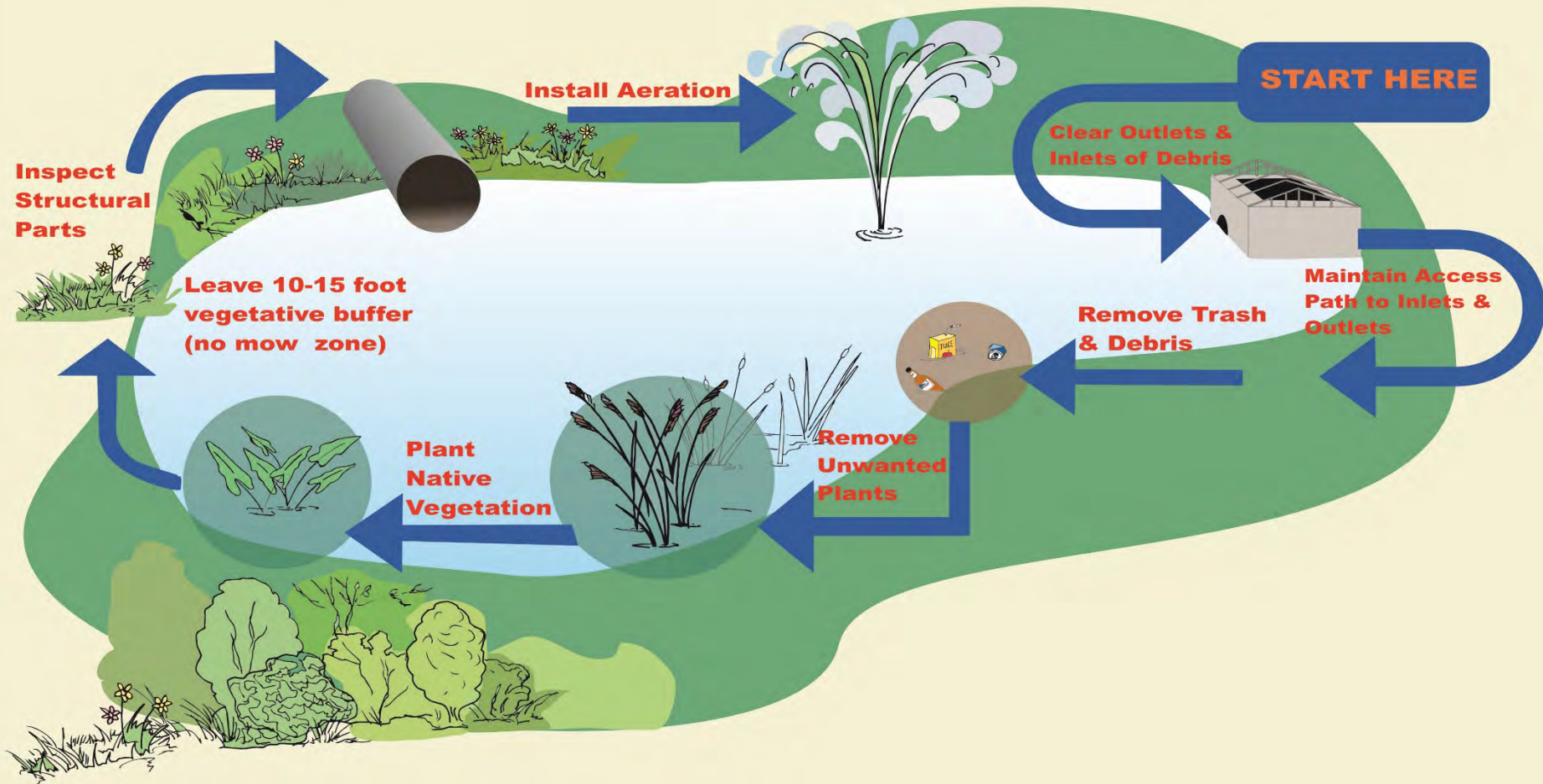
Fencing



- 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 slab floating in the water. The water is calm, reflecting the sky and surrounding greenery. In the foreground, there are lily pads and some dark foliage. The text "Hire a Professional" is overlaid in the center of the image.

Hire a Professional



Hire a Professional



A photograph of a pond with green algae and reeds, with a grassy field and trees in the background. The pond is in the foreground, filled with green algae and some reeds. The background shows a grassy field, trees, and some buildings. The text "Hire a Professional" is overlaid on the image.

Hire a Professional

A photograph of a pond almost completely covered by a dense layer of bright green aquatic plants, likely water hyacinths. The water is dark and still, reflecting the surrounding green trees and the sky. In the background, a white, cylindrical object, possibly a barrel or a small structure, sits on a grassy bank. The scene is surrounded by a thick forest of various green trees and shrubs.

Hire a Professional

A photograph of a calm pond or stream flowing through a dense forest. The water is still, reflecting the surrounding green trees and foliage. The banks are lined with tall, slender trees and thick undergrowth. The scene is peaceful and natural. The text "Hire a Professional" is centered over the middle of the image in a serif font.

Hire a Professional

A man wearing a blue long-sleeved shirt, khaki pants, and a white baseball cap is crouching in a field of tall, green reeds and brush. He is holding a long, thin stick or pole. The field is overgrown with various plants, including tall reeds and dense brush. In the background, there is a dense forest of green trees. A utility pole with wires is visible on the right side of the image. The text "I wish I had hired a Professional!" is overlaid in the center 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



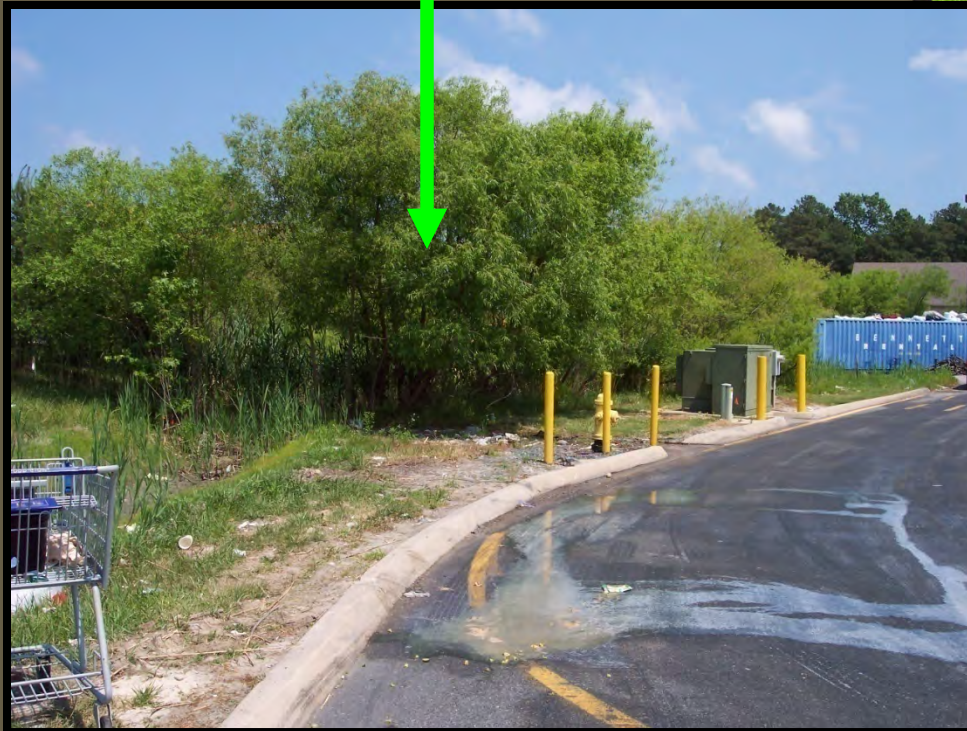
Maintenance Before & After



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











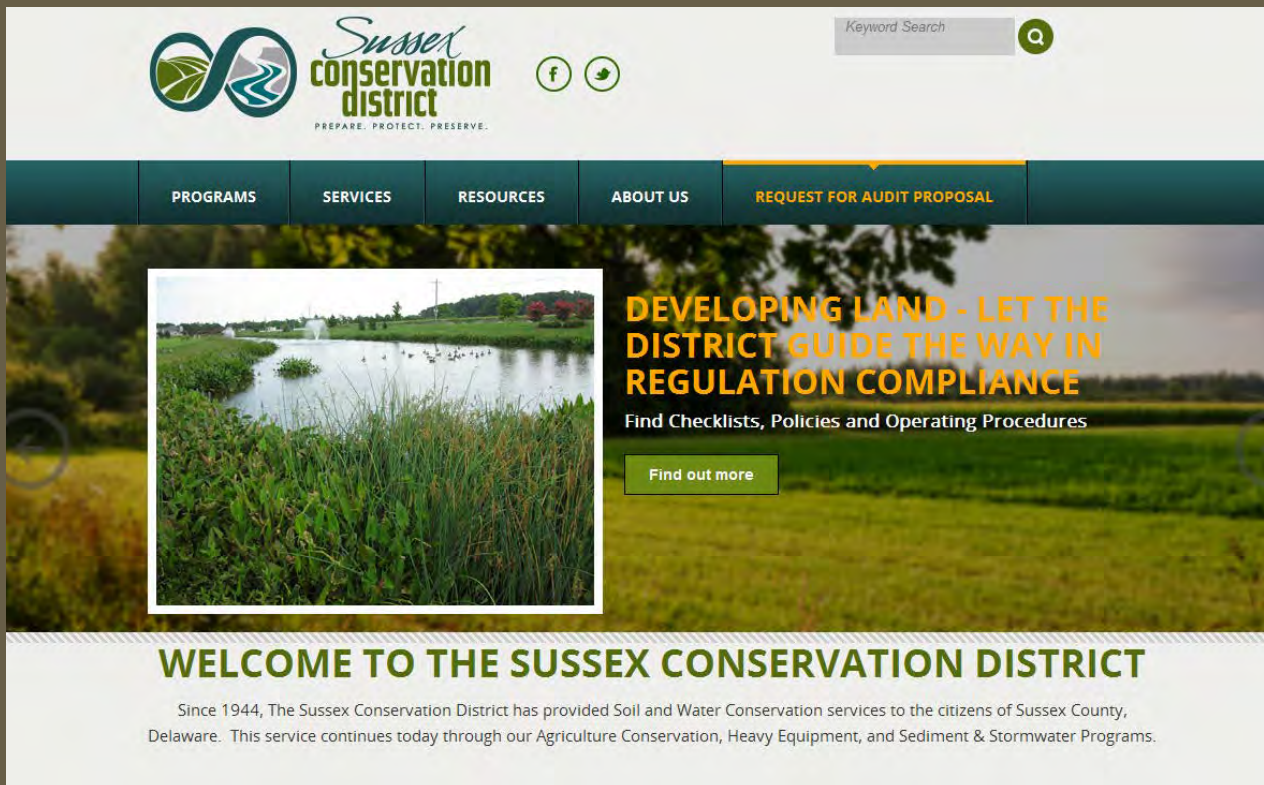




Homeowner Technical Resources

Sussex Conservation District Website:

Sussexconservation.org



The screenshot shows the homepage of the Sussex Conservation District website. At the top, there is a header with the district's logo on the left, which includes a stylized 'S' with a landscape inside 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 'Keyword Search' bar with a magnifying glass icon. Below the header is a dark teal navigation bar with white text links: 'PROGRAMS', 'SERVICES', 'RESOURCES', 'ABOUT US', and 'REQUEST FOR AUDIT PROPOSAL'. The 'REQUEST FOR AUDIT PROPOSAL' link is highlighted in orange. The main content area features a large background image of a wetland. On the left side of this area is a smaller inset image of a pond with reeds. To the right of the inset image, the text 'DEVELOPING LAND - LET THE DISTRICT GUIDE THE WAY IN REGULATION COMPLIANCE' is displayed in large, bold, orange letters. Below this text, in smaller white font, is 'Find Checklists, Policies and Operating Procedures'. A green button with white text 'Find out more' is positioned below the text. At the bottom of the page, a white banner contains the heading 'WELCOME TO THE SUSSEX CONSERVATION DISTRICT' in bold green letters, followed by a paragraph: '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.'

Sussex conservation district
PREPARE. PROTECT. PRESERVE.

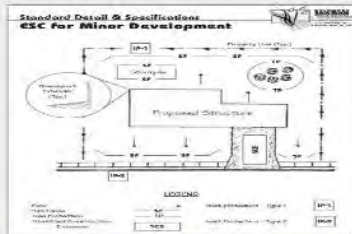
Keyword Search

PROGRAMS SERVICES RESOURCES ABOUT US REQUEST FOR AUDIT PROPOSAL

DEVELOPING LAND - LET THE DISTRICT GUIDE THE WAY IN REGULATION COMPLIANCE
Find Checklists, Policies and Operating Procedures
[Find out more](#)

WELCOME TO THE SUSSEX CONSERVATION DISTRICT
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*