


Stormwater Management

Educational Workshop for Homeowners




Presented by Paul Sebo and Katie Wilson of Washington County Natural Resources Department

Agenda

- ▶ Introduction to stormwater
- ▶ Stormwater practice descriptions
- ▶ Washington County Stormwater Ordinance
- ▶ Maintenance
- ▶ Next Steps for Landowners

Stormwater Basics

- ▶ What is stormwater?
- ▶ Why is it important to know about?
 - ▶ Much of today's water pollution comes from many sources resulting from our own everyday activities.



Sources and Solutions: Stormwater | US EPA

Rainwater and Infiltration

runoff amounts are:
1. small in volume
2. pre-treated
3. native in the creek
slowly after a rain event

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Stormwater and Development

Runoff from 1.5\" Rain on 1 acre

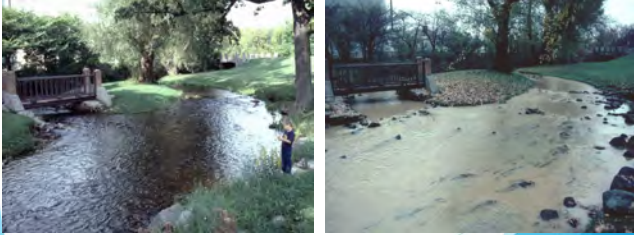
Surface Type	Runoff
Pavement	24 X
Grass	1 X

Watersheds and Development

- ▶ Water Quality
- ▶ Water flow
- ▶ Temperature
- ▶ Pollutants
- ▶ Erosion

Source: Maryland DNR

Example of stormwater runoff entering a stream



Stormwater Management

- ▶ So how do we increase infiltration and treatment of stormwater and still have development?

Stormwater is NOT treated before it enters streams and waterways

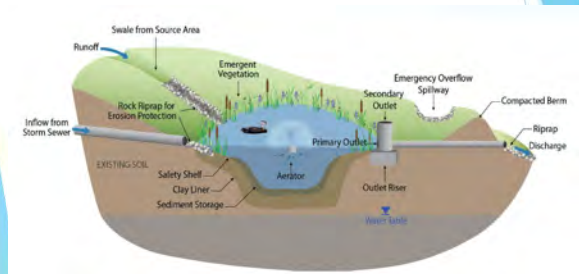
Source: West Whiteland Township, PA

Stormwater Management

- ▶ Types of stormwater practices can be built in developments to help treat stormwater runoff before they enter a waterbody
 - ▶ Stormwater Ponds
 - ▶ Infiltration Basins
 - ▶ Natural Kettles
- ▶ These are engineered to capture stormwater runoff and remove pollutants before the water reaches a waterbody

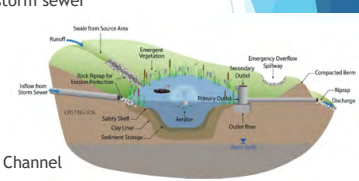


Stormwater Pond



Components of Stormwater Designs

- ▶ Inlet Swale or inflow pipe from storm sewer
- ▶ Berm
- ▶ Clay liner
- ▶ Forebay
- ▶ Safety Shelf
- ▶ Pond
- ▶ Emergency Spillway or Overflow Channel
- ▶ Outlet pipe
 - ▶ Outlet riser




Components

- ▶ Inlet Swale




Components

- ▶ Forebay
- ▶ Safety Shelf
- ▶ Berm



Components

- ▶ Inlet and Outlet Structures



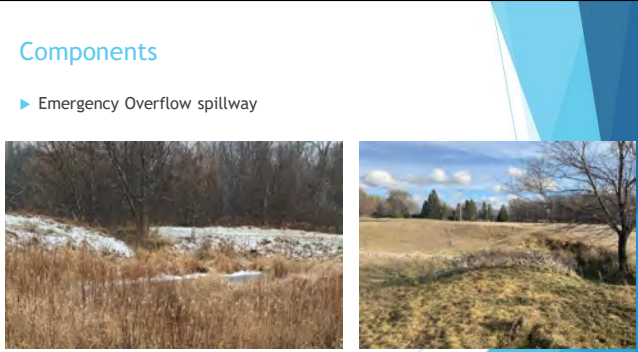
Components

- ▶ Outlet riprap swale



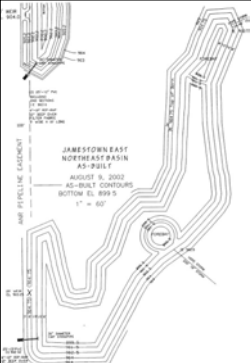
Components

- ▶ Emergency Overflow spillway



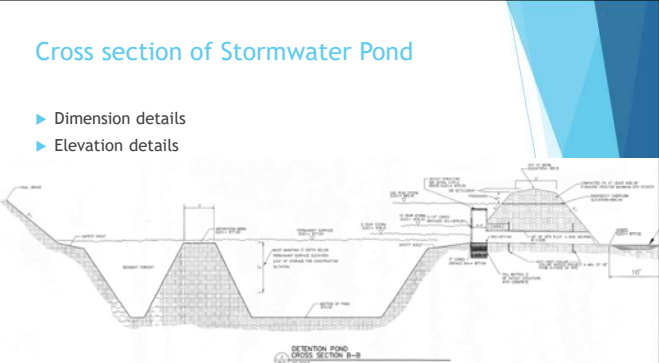
Design of Stormwater Pond

- ▶ Should list elevations of berm, water level, and bottom of pond.
- ▶ Should list component locations.

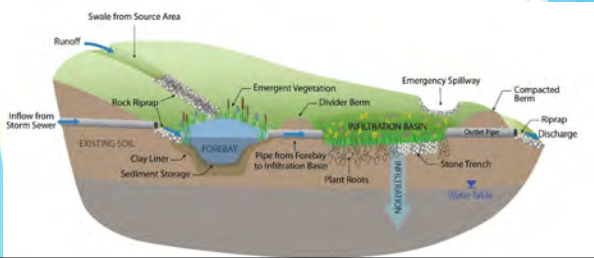


Cross section of Stormwater Pond

- ▶ Dimension details
- ▶ Elevation details



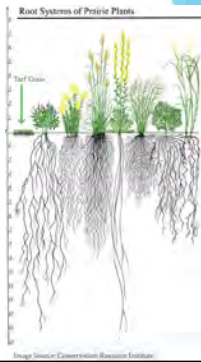
Infiltration Basin



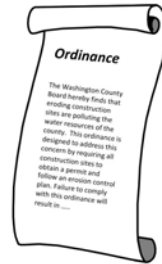
Dry Infiltration basin



Stormwater Management - Vegetation



Local Ordinance 1997



- ▶ Construction Site Erosion Control
- ▶ Stormwater Management
- ▶ Erosion Control Stormwater Management (ECSM)

Ordinance Implementation

- ▶ Town enforces town ordinance
- ▶ County enforces town ordinance (agreement)
- ▶ County enforces County ordinance in town
 - ▶ If your project lies within any City, Village or the following three Townships: Jackson, Kewaskum, Wayne; Erosion Control & Stormwater Management is administered through their permitting offices and ordinances

Ordinance Intergovernmental Agreement

- ▶ Database
- ▶ Inspections
- ▶ Notification
- ▶ Enforcement
- ▶ Disclaimer

Maintenance Agreements

- ▶ Each pond or basin built after 1998, should have a maintenance agreement
- ▶ It should list:
 - ▶ Who is responsible for maintenance
 - ▶ Administering authority and access for inspection
- ▶ Maintenance is not your town's or village/cities responsibility/cost



ECSM Ordinance Language - Requires a Maintenance Agreement

- ▶ The agreement shall:
 1. Identify land ownership where the stormwater practice is located;
 2. Identify type(s) of practices and describes its purpose and design;
 3. A description of long-term maintenance needs;
 4. Granting of easement/access sizeable for construction equipment;
 5. Identification of entity responsible for long-term maintenance;
 6. Authorization of access for inspections;
 7. Authorize the town/county to carry out maintenance activities if not completed;
 8. Realize that local government can levy charges for maintenance services;
 9. Language confirming the agreement is binding.

Example Maintenance Agreement

Section 1: Purpose and Scope
This agreement shall be entered into by and between the undersigned parties for the purpose of maintaining the stormwater management facilities on the site located at the address and parcel ID number as shown on the attached site plan. The agreement shall include the following terms:

Section 2: Parties
Owner/Developer: Name of Owner/Developer (as defined in the governing ordinance).
Operator: Name of Operator (as defined in the governing ordinance).

Section 3: Maintenance Requirements
The Operator shall be responsible for the maintenance of the stormwater management facilities on the site in accordance with the standards and procedures set forth in this agreement. An annual inspection of the stormwater management facilities shall be conducted by the Operator and a report shall be submitted to the Owner/Developer within the specified time period. The cost of all maintenance charges, of any kind, shall be the responsibility of the Operator.

Section 4: Easement
The Operator shall have an easement over the site for the purpose of conducting maintenance activities. The easement shall include the right of access to the stormwater management facilities and the right to enter the site for the purpose of conducting maintenance activities.

Section 5: Termination
This agreement shall terminate upon the sale of the site to a third party. Upon termination, the Operator shall be responsible for the maintenance of the stormwater management facilities on the site until the assignment of all interest.

Example Maintenance Agreement

Section 6: Identification of Parties
The Operator shall be responsible for the maintenance of the stormwater management facilities on the site in accordance with the standards and procedures set forth in this agreement. An individual easement of interest shall be assigned to each property owner of the site, upon the sale of said property from the Owner/Developer. The Operator shall be responsible for the maintenance of the stormwater management facilities on the site until the assignment of all interest.

Section 7: Easement
The Operator shall have an easement over the site for the purpose of conducting maintenance activities. The easement shall include the right of access to the stormwater management facilities and the right to enter the site for the purpose of conducting maintenance activities.

Exhibit B of Maintenance Agreement

Section 8: Maintenance Procedures
The Operator shall be responsible for the maintenance of the stormwater management facilities on the site in accordance with the standards and procedures set forth in this agreement. An annual inspection of the stormwater management facilities shall be conducted by the Operator and a report shall be submitted to the Owner/Developer within the specified time period. The cost of all maintenance charges, of any kind, shall be the responsibility of the Operator.

Section 9: Easement
The Operator shall have an easement over the site for the purpose of conducting maintenance activities. The easement shall include the right of access to the stormwater management facilities and the right to enter the site for the purpose of conducting maintenance activities.

Section 10: Termination
This agreement shall terminate upon the sale of the site to a third party. Upon termination, the Operator shall be responsible for the maintenance of the stormwater management facilities on the site until the assignment of all interest.

Stormwater Practice Maintenance

- ▶ Overtime, these ponds and basin can lose functionality if not maintained
 - ▶ Ponds and forebays can fill up with sediment
 - ▶ Outlet structures can become clogged and not function
 - ▶ The clay liner can crack
 - ▶ Inlet channel can become eroded
 - ▶ Trees can grow on berms
 - ▶ Weedy vegetation present
- ▶ Maintenance will keep the basin functioning properly



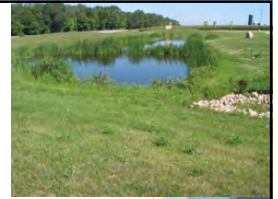
General Inspection Findings

- ▶ Large trees
- ▶ Rusted outlet structure
- ▶ Litter and/or yard debris
- ▶ Wet basins that are dry
- ▶ Sediment/vegetation-organic accumulation
- ▶ Component not functioning - outflow rusted or basket missing to keep outlet from getting clogged



General Inspections

- ▶ What to look for when conducting a stormwater practice inspection:
 - ▶ Erosion
 - ▶ Functioning components
 - ▶ Sediment Deposits
 - ▶ Dumping of trash or lawn litter
 - ▶ Animal Burrows
 - ▶ Water Quality
 - ▶ Water Level
 - ▶ Trees and vegetation



Inlet Swale / Open Channel

- ▶ Should have uniform grass cover



Yard Debris

- ▶ No yard debris should be dumped near Stormwater practices or waterbodies



Outlet Structures

- ▶ Rusted or cover/basket missing



Trees

- ▶ Trees growing on berm, the waters edge, or in outlet structures



Wet basin now dry

- ▶ Clay liner damaged
- ▶ Water budget
 - ▶ Was designed for more stormwater than what is occurring
 - ▶ Weather
- ▶ Turned into an infiltration basin



Erosion

- ▶ Rip-rap in inlet swale eroding



Wildlife Damage

- ▶ Muskrats
- ▶ Invasive Species



RED SWAMP CRAYFISH
Procambarus clarkii

Identification:
Red swamp crayfish are dark red to black with yellow bright red spots covering the body and legs and a black stripe around the eye on the side of the abdomen. They may vary in length between 1 to 3 inches. Occasionally a genetic mutation may have the body and/or legs blue.

Reproduction:
A reproducing population of red swamp crayfish was reported in a wetland in Washington County in 2008. Since this discovery, the species has now been documented in Mississippi. The red swamp crayfish is making along the Gulf Coast from the Florida Panhandle and ranges westward to southern Texas along the Mississippi River drainage basin. This species is the most widely introduced crayfish in the world and is currently found in many southern coastal habitats and inland sites. Red swamp crayfish are harmful organisms in the United States. Control plans and clean-up the soil integrity of wildlife and natural habitats. Biological control, mechanical control, and the species is not an established pest.

Rearing and Ecology:
Red swamp crayfish prefer marshes, swamps, ponds and slow moving streams and streams, but have also become established in lakes. They are well adapted to areas with large water level fluctuations. In their native range, red swamp crayfish feed on algae and the eggs of many fish and insects. The female carries the soft abdomen and the eggs. The number of eggs varies with the size of the female, with larger females laying as many as 500 eggs at a time. They are tolerant of fluctuating water levels and can survive long dry spells by retreating to burrows or standing water to prevent water evaporation. Red swamp crayfish are omnivorous, feeding on aquatic plants, insects, small fish and mollusks, and other living things. They have been found to reduce amphibian populations in Louisiana and South America through predation and competition for habitat. Additionally, they are the dominant crayfish species in larger stream channels and streams they affect river the aquatic biotic system.



Typical Landowner Maintenance Activities for basins and ponds

- ▶ Remove debris or sediment near inlet swale or near overflow spillway - keep water flowing properly
- ▶ Repair any erosion on embankment or inlet swale
 - ▶ Replace rip-rap if needed
- ▶ Remove small trees and weeds by either carefully spot-applying herbicide, cutting, or pulling.
- ▶ Remove excessive dead plant material in early spring.

Typical Landowner Maintenance Activities for basins and ponds

- ▶ Remove any debris clogging the inlet and outlet structures
- ▶ Repair basket/catchment that keeps outlet from getting clogged
- ▶ Replant native species and herbicide invasive weeds
- ▶ Visually check the sediment depth in ponds



Outlet structure filled with dirt

Removed dirt so it drains properly

Typical Landowner Maintenance Activities for natural kettles and drainage channels

- ▶ Natural Kettles
 - ▶ Remove any yard waste or debris
 - ▶ Monitor; water should be infiltrating in the kettle
 - ▶ Contact us if water starts backing up and infiltration stops
- ▶ Drainage Channels
 - ▶ Mow 3x per year, keep vegetated, and clear of debris

Take Action - Next Steps for Landowners

- ▶ Look for your maintenance deed to find out responsibility
- ▶ Get together with your neighbors and discuss maintenance responsibility
- ▶ Inspect your stormwater practice
- ▶ Call us (Washington County) or town and staff will meet you to go over specific practices of your development
- ▶ Create a list of possible maintenance that needs to be done
 - ▶ Decide if you can safely do the maintenance yourself or need to enlist a professional



Maintenance Guidelines

- ▶ Safety first - do what you feel is safe and within your capabilities
 - ▶ For example, using a chainsaw and herbicide
 - ▶ If a tree has fallen into pond or basin, think if some of it can be removed in the winter after it freezes
- ▶ Report issues and follow-up from us or community
- ▶ Think what should be done by a professional



Take Action - Next Steps for Landowners

- ▶ Stormwater Practice Maintenance Day - April 22nd
- ▶ Get together with neighbors in the morning or afternoon to do some maintenance
- ▶ Not a one-and-done event
 - ▶ Take on projects as a work-in-progress.
- ▶ County Staff will be around that day to answer questions
- ▶ Pro-active maintenance will reduce costs in the long run



Image Credit: Saint Francis University

Share success!

- ▶ Share photos via facebook event or email
- ▶ Report any issues or larger maintenance needs
- ▶ Plan for a maintenance budget



Questions?

- ▶ Contact information:
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 - ▶ Paul.sebo@washcowisconsin.gov



- ▶ Recording will be posted at:
 - ▶ https://www.washcowisconsin.gov/departments/natural_resources/land_resources