City of Solon

Maintaining Your Storm Water Management System

A Guidebook for Property Owners in the City of Solon
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Your storm water management system is designed to reduce the impacts of pollutants and increased storm water on local streams caused by development. They are an essential part of the City of Solon’s efforts to regulate the flow of storm water and improve the quality of our streams, rivers and lakes; however storm water management systems will fail prematurely if not properly maintained. Once a system fails, it will no longer perform its intended function and it is often very expensive to restore to its constructed condition.

- What is a storm water management system and why are they important?
- Do you have a storm water management system on your property?
- Are there different types of systems?
- Are you responsible for your storm water management system?
- Maintenance? Why is it necessary?
- What maintenance tasks should be considered?

Whether you are an individual property owner, a homeowner’s association representative, or a residential/commercial property manager, this Guidebook will answer all of these questions and provide you with step-by-step instructions for maintenance activities. Routine maintenance will prolong the life of your storm water management system, improve its appearance, help to prevent flooding and property damage, enhance local streams and lakes and protect the environment. This Guidebook is not a set of rules and regulations on how to design or build a storm water management systems.
When land is altered to build homes and other developments, the natural system of trees and plants over relatively spongy soil is replaced with harder surfaces like sidewalks, streets, decks, roofs, driveways, and even lawns over compacted soils. As a result, less rainwater is soaked up and more rain water/storm water flows off the land at a faster rate. This can lead to stream bank erosion within the local streams and possible downstream flooding. As development occurs, storm water runoff contains higher levels of pollutants.

The increased concentrations of pollutants in storm water/drain water are called non-point source pollution. These pollutants include sediment, phosphorus and nitrogen from fertilizers, salts, and oil and grease from roads and parking surfaces, and bacteria from pet waste. These pollutants, which are a direct result of a variety of common outdoor human and animal activities in the neighborhood, degrade water quality and limit the habitat for wildlife in the stream. Every storm water management system located in the City of Solon plays an important role in improving and protecting water quality.

Your storm water management system (along with others in the area) help to slow the rate of runoff from the neighborhood/development and improve the quality of the storm water leaving the storm water management system. They are important in protecting public and private property, public health and safety, and water quality. The systems collect and trap sediment pollutants and other debris from storm water that would otherwise end up clogging our rivers and streams and degrading the environment for fish, birds, and other wildlife.
Do you have a storm water management system on your property?

If your development/property was built or has had an addition after the mid-1980’s you may have a storm water management system that manages water runoff. If you live in a residential community, your association bylaws or master deed may indicate the location of any management systems. In commercial applications the approved site plan should show where the management systems are located. If you are unsure, then contact the City of Solon Engineering Department.

Are there different types of storm water management systems?

Storm water management systems come in many different shapes, forms and sizes, from a simple swale to a complicated extended detention basin. Listed below are some of the common types of storm water management systems:

- Bio Retention Systems
- Permeable Pavement
- Manufactured Underground Detention and Infiltration
- Vegetated Swale
- Dry and Wet Storm Water Ponds (Detention – Retention Ponds)
- Infiltration Trench
- Constructed Wetlands
- Green Roofs

Are you responsible for storm water system management system maintenance?

We are all responsible for protecting water quality. However, if a system is located on your property, commercial or residential, most likely you are the responsible party. Systems on a common ground may be the responsibility of the homeowners association or some businesses and are subject to a maintenance agreement. It is important to check your maintenance agreement to identify your specific legal obligations. If you are not sure who is responsible for maintenance, contact the City of Solon Engineering Department.
Types of Storm Water Management Systems

A Detention Basin is a shallow bowl or depression in the land that is designed to temporarily hold a set amount of water and gradually allow the water to drain to another location. These basins are also called "Dry Ponds" and no permanent pool of water exists in them. The ponds are usually seeded with grass to absorb pollutants.

A Retention Basin, sometimes also referred to as a "Wet Pond", is an artificial lake with vegetation around the perimeter and includes a permanent pool of water in its design for the purpose of storing water and settling sediment and other pollutants from surface runoff.

Infiltration Trenches: are linear ditches that collect rain water from adjacent surfaces, and their highly permeable soils allow the water to quickly seep and absorb, providing ground water recharge.

A Green Roof is a roof that has vegetation growing over a water proof membrane. These roofs absorb water which equates to less water entering the storm sewer system and provide insulation and a wildlife habitat.

Constructed Wetlands are artificial wetlands created to use the natural functions of soil, vegetation and organisms to treat storm water. They act as a filter removing sediments and pollutants while sometimes also designed to temporarily hold storm water.
A **swale** is a low tract of land, especially one that is moist or marshy. The term can refer to a natural landscape feature or a human-created one. Artificial swales are often designed to manage water runoff, filter pollutants, and increase rainwater infiltration.

**Bio retention** is the process in which contaminants and sedimentation are removed from storm water runoff. Storm water is collected into the treatment area which consists of a grass buffer strip, sand bed, ponding area, organic layer or mulch layer, planting soil, and plants.

**Permeable paving** is a range of sustainable materials and techniques for **permeable pavements** with a base and subbase that allow the movement of storm water through the surface. In addition to reducing runoff, this effectively traps suspended solids and filters pollutants from the water.

**A underground detention** vault is an underground structure designed to manage excess storm water runoff on a developed site, often in an urban setting. This type of best management practice may be selected when there is insufficient space on the site to infiltrate the runoff or build a surface facility such as a detention basin or retention basin.

**A swale** is a low tract of land, especially one that is moist or marshy. The term can refer to a natural landscape feature or a human-created one. Artificial swales are often designed to manage water runoff, filter pollutants, and increase rainwater infiltration.
A consistent maintenance program is the best way to ensure that storm water management systems will continue to perform their water quality and flood control functions. The first step in a maintenance program is to obtain a copy of the storm water management system plan from our Engineering Department to determine how your system was designed to function. In general, a maintenance program should contain the following components as applicable:

- Regular visual inspections;
- Vegetation management;
- Embankment and outlet stabilization;
- Debris and litter control;
- Sediment and pollution removal.

The remaining sections of the Guidebook focus on describing the maintenance tasks required for proper function as well as frequency of various tasks. The following categories of maintenance tasks are further described in the Guidebook:

- Storm sewer system and structural components;
- Vegetation management;
- Property management activities that benefit your system.

It’s important to keep records of all inspections, maintenance activities, repairs and associated costs. A form has been provided at the back of this Guidebook for your use to assist in documentation (Storm Water Management System Inspection and Maintenance Form). Finally, if maintenance is required, you should consult with the Engineering Department to determine what, if any, permits are necessary.
The storm sewer system includes pipes, catch basins and the outlet structures that enter and exit the storm water management system. It is important to regularly inspect the structural elements (inlet/outlet pipes, headwall, channels, grates, etc.) of your storm water management system in order to ensure that water is flowing in and out of the system as originally designed. Debris and sediment commonly clog storm water management systems and reduce their overall effectiveness.

The following maintenance and inspection tasks should be included: (also see Storm Water System Inspection and Maintenance Form located at the end of this Guidebook).

1. **Inspect for clear vehicle and equipment** access into storm water management system and structural components including the outlet structure.

2. **Inspect the inlet pipes and outlet pipes for structural integrity. (Annually)** Check inlet or outlet pipes for structural integrity to ensure they aren’t crumbling or broken.

3. **Inspect riprap at the inlet/outlet pipes.** Replace when the riprap is clogged with sediment and debris.

4. **Conduct routine inspections** for trash sediment or other debris that may be blocking the inlet/outlet pipes or emergency spillway. (Monthly and after rain events). Remove all trash and debris from the system. An improperly maintained system can harbor a breeding area for mosquito’s and reduce the storage volume of the system.

5. **It’s important to clean out sediment** that might be restricting water flow. Remove accumulated sediment with a shovel and wheelbarrow if it is blocking water flow. Dispose of the sediment properly. Sometimes small amounts of removed sediment can be spread evenly on upland areas and seeded with natural vegetation.

6. **The city will Inspect and clean** the storm sewers and catch basins upstream from the storm water management system that are located in the City Right-Of-Way.

7. **Inspect the stone around the outlet structure.** If stone has accumulated sediment, vegetation and/or debris to an extent that water is not flowing through the stone or out of the system as originally designed, then the stone should be replaced.

8. **Inspect for excess sediment** accumulation in the system (annually).

9. **Certain systems will require weekly mowing of grass and vegetation** to keep your system clean and clear. Less frequent mowing requires collection of large amounts of brush which could cause blockages.
Property management refers to specific activities that you as a property owner or maintenance personnel can do to enhance the storm water management system and minimize long-term maintenance. A number of these activities are described as follow:

1. **Do not use pesticides, herbicides, or fertilizers in your system.** These products can leach and pollute our streams and rivers. In addition, these chemicals are harmful to wildlife, including frogs, toads, fish, dragonflies, etc.

2. **Do not place yard waste such as leaves, grass clippings or brush** in or around the storm water management system or in the storm drains located in the streets, parking lots or back yards. These materials release excess nutrients as they decompose and will lead to more algae growth in ponds, basins, etc. This can also lead to the potential of blockages in the system.

3. **Do not dump any materials in the storm sewer system.** Improperly disposed of materials will pollute the downstream creeks, ponds and rivers.

4. **If you must use fertilizers, only use low-phosphorus, slow-release varieties.** Keep fertilizers as directed on the lawn and not on paved areas. Sweep all excess material from sidewalks and paved areas.

5. **Pick up and dispose of pet waste with your weekly garbage.**

6. **Provide educational updates to the property owners, workers, landscapers, etc.** Discuss your maintenance plan at regular meetings with everyone that might be involved in the maintenance of your storm water management system on your property.
AN ORDINANCE AMENDING SECTION 1261.02 AND 1289.02 OF THE PLANNING AND ZONING CODE TO ESTABLISH RESPONSIBILITY FOR THE MAINTENANCE OF ALL STORM WATER MANAGEMENT INFRASTRUCTURE, PROVIDING FOR AN ENFORCEMENT PROCEDURE AND ADDING APPLICABLE DEFINITIONS

WHEREAS, it is necessary to establish regulations for the maintenance of all storm water management infrastructure; and

WHEREAS, it is necessary to provide a procedure for enforcement of such regulations.

NOW, THEREFORE, BE IT ORDAINED by the Council of the City of Solon, State of Ohio:

SECTION 1. That Section 1261.02 (Definitions) of the Planning and Zoning Code is hereby amended to add the following definitions:

“STORM WATER MANAGEMENT SYSTEM” All aspects of the system designed to effectively regulate and control storm water runoff emanating from one property or development to another, and which includes but is not limited to retention basins, detention basins, open waterways, and drainage easement areas.

“DETENTION BASIN” A flow control structure that is used to contain storm water for a limited period of time, and provides protection for areas below it by containing storm water. The water is discharged from the basin until the basin is empty.

“RETENTION BASIN” A flow control structure that is used to contain storm water for a limited period of time, and provides protection for areas below it by containing storm water. Some water remains in the basin area.

“STORM WATER” Water that originates during precipitation events, snowmelt, or other runoff sources.

“STORM SEWER” A series of buried pipes, manholes, catch basins, or culvert pipes that are designed to drain excess rain and groundwater from paved streets, parking lots, sidewalks, and roofs, and convey to a drainage way.

“STORM WATER RUNOFF” Water from rain, snowmelt, or other sources, that flows over the land surface.

“DRAINAGE WAY” Use of the land to collect and transport storm water runoff in a swale, ditch, channel, or stream.
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"DRAINAGE WAY” Use of the land to collect and transport storm water runoff in a swale, ditch, channel, or stream.

SECTION 2. That Section 1289.02 (Prohibited Uses and Property Conditions) of the Planning and Zoning Code is hereby amended to add the following:

8. MAINTENANCE OF STORM WATER MANAGEMENT SYSTEMS

A. MAINTENANCE REQUIRED - The Homeowners Association for each residential development and/or the owner of each lot or parcel within the residential development, as well as the owner(s) of any non-residential development, shall be responsible for maintaining in good working order the Storm Water Management System that has been provided to control the storm water runoff generated by such development. However, the City of Solon shall be responsible for maintaining any Storm Water Management System that is located on City owned property.

Minimum required maintenance of detention and/or retention basins shall include but not be limited to the control of vegetation within basin areas so as to not exceed a height of ten (10) inches unless otherwise explicitly approved by the City Planning Commission and/or City Council as part of a professional landscape plan. In addition, detention and/or retention basins shall not be permitted to accumulate with silt, soil, branches, trees, vegetation, debris, or any other obstructions, or to become damaged or compromised in any way so as to prevent the detention and/or retention basin from effectively operating in the manner in which it was designed and intended as determined by the City Engineer.

Open drainage ways, or any portion thereof, located on any lot or parcel shall be maintained free from accumulations of silt, soil, branches, trees, vegetation, debris, or any other obstructions which impede the natural flow and/or course of the open waterway as determined by the City Engineer.

B. ABATEMENT OF VIOLATIONS - If the Homeowners Association for the residential development and/or the individual lot or parcel owners within the residential development, or the owner(s) of any non-residential development, after being given notice to comply with the requirements of this section, fail, neglect, or refuse, within thirty (30) days to comply with said order by the City, the City may take such action required by such order, either by force account or by contract, or the City Prosecutor or Director of Law may institute legal proceedings to compel compliance with the order. The City Engineer is authorized to grant an extension of the thirty (30) day compliance period if in his/her professional judgment additional time is reasonably required to correct the violation in question.

C. COLLECTION OF COSTS - Any cost or expense incurred by the City pursuant to achieving compliance with the requirements of this Section, shall be reimbursed to the City by the Homeowners Association and/or the individual lot or parcel owners within the residential development, or the
owner(s) of any non-residential development, including an additional twenty five percent (25%) of either the contractors price or the City’s remedial expenses to cover the City’s administrative cost of maintaining the Storm Water Management System. If not so paid by the Homeowners Association and/or the individual lot or parcel owners within the residential development, or the owner(s) of any non-residential development, within thirty (30) days after billing, such expense or cost may be recovered by an action at law against such responsible parties, and to the extent permitted by law, by Ordinance of Council, and be certified to the County Auditor and placed proportionately on the tax duplicates of any lot(s) and/or parcel(s) owned by the Homeowners Association for the residential development and/or on each individual lot or parcel owned within the residential development, or on the lot(s) and/or parcel(s) owned within any non-residential development, for collection and shall become a lien on such lot(s) or parcel(s).

SECTION 3. That all other ordinances and resolutions inconsistent herewith be, and the same hereby are, repealed.

SECTION 4. This Ordinance shall take effect and be in force from and after the earliest period allowed by law.

Passed: June 18, 2007
## Storm Water Management System Inspection & Maintenance Form

**Date:** _____________________________  
**Subdivision:** _____________________________  
**Location/Address:** _____________________________  
**Type:** Wet _____     Dry_____     Underground_____  

**Name:** ___________________________________  
(Company name if applicable)  
**Address:** ___________________________________  
**Phone #** _______________  
**Email:** _________________________

### Checklist
- Is the basin being mowed on a regular basis?  
- Is there sediment accumulated in the stream channel?  
- Are the inlet and outlet pipes, headwall and stream channel free of debris and obstructions?  
- Was any erosion noted during inspection?  
- Are there any additional maintenance or repair needs?

### Task | Maintenance Required | Date of Annual Inspection:
---|---|---
**Inspect inlet pipes and outlet pipes for structural integrity.** | Check pipes for structural integrity to ensure they aren’t crumbling or broken. | Annual
**Conduct routine inspections.** | Check for trash, sediment or other debris that may be blocking the inlet or outlet pipes or emergency spillway. Remove all trash and debris from the system. | Monthly and after rain events
**Inspect the stone around the channel and outlet.** | If stone has accumulated sediment, vegetation and/or debris to an extent that water is not flowing through the stone or out of the system as originally designed, then the stone should be replaced. | Monthly and after rain events
**Inspect riprap at inlet pipes.** | Replace when the riprap is clogged with sediment and debris. | Annually
**Inspect concrete trough for settlement, heaving or erosion.** | | Annually
**Inspect for excess sediment accumulation in the pond or basin bottom.** | Remove accumulated sediment if it is blocking water flow. Dispose of the sediment properly. | Annually
**Mow grass and vegetation and weed whip where necessary.** | To keep your system clean and clear.  
Less frequent mowing requires collection of large amounts of brush which could cause blockages. | Weekly during growing season
**Inspect for clear vehicle and equipment access to outlet structure.** | Access into storm water management system and in particular the outlet structure. | Annually

### Notes:

This form and any pictures should be completed by **JULY 1st.** Please return this information to the City of Solon, Engineering Department, 34200 Bainbridge Road, Solon OH  44139 or by email to Marci Rizzo at mrizzo@solonohio.org.
Storm Water Management System Inspection & Maintenance Form

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