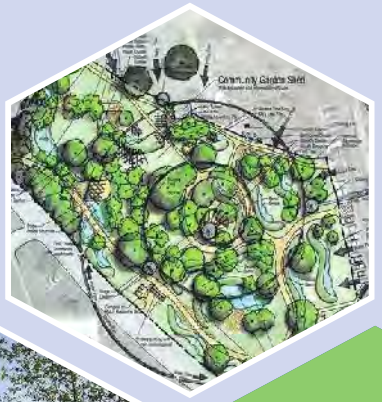
City of Birmingham, AL

Property Owner's Guide to BMP Maintenance



Version March 2019

Property Owner's Guide to BMP Maintenance

1.0 Best Management Practices (BMPs) = Regulated Storm Water Management Practices

BMPs can look like typical landscaping...

... but they are working to manage stormwater

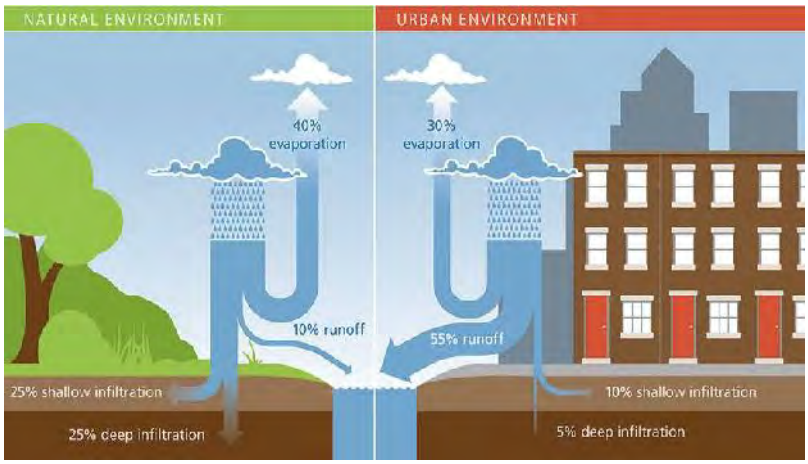
What Is Storm Water?

Storm water is created when rain falls into the ground and does not soak into the soil. The amount of storm water created depends on how quickly or intensely rain falls, how much water is already in the soil prior to rainfall, and the type of land cover in the area where the rain falls.

Land cover is a particularly significant factor in the amount of storm water that is generated by a rainfall event. Natural landscapes (a mix of trees, vegetation, and loose soil) are very good at managing storm water. Leaves slow down rain, loose soil allows rain to infiltrate into the ground, and plant roots take up the water for photosynthesis. These actions limit the amount of storm water that runs off an area. When land is developed and natural vegetation is replaced with impervious surfaces (buildings, parking lots, and other hard surfaces), storm water is generated much more quickly and in larger volumes than in natural landscapes. This is why many cities and towns experience more flooding and stream erosion as they grow. More buildings and roads always leads to more storm water.

Urban areas produce storm water more quickly and in larger volumes than most natural landscapes due to high amounts of impervious surfaces. As storm water discharges from rooftops and travels over driveways, parking lots, yards, and roads, it picks up pollutants. These pollutants can include sediment (soil), litter, pathogens from animal waste, pesticides and herbicides used on lawns and landscapes, oils and greases from cars and industries, dusts, and other substances.

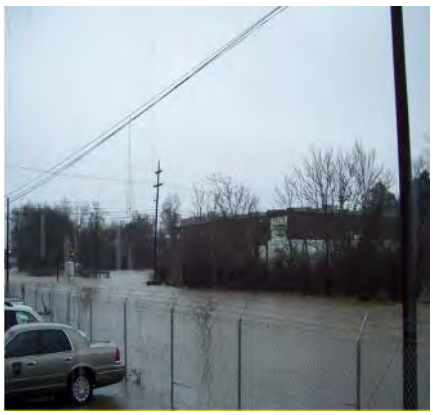
Storm water does not flow to water treatment plants. Instead, storm water and the pollutants it carries flow along roadways and through ditches and pipes to local streams, rivers, and lakes.



The high levels of impervious surface found in the urban environment have both increased the volume of storm water into the overall system and increased the pollutant load into local waterways.

The City of Birmingham, like most other cities, has experienced growth and a significant increase in impervious surface over time. More impervious surfaces mean more storm water. **These large quantities of storm water can have negative impacts associated with: flooding, erosion, and pollution.**

*Storm water can cause **flooding***	*Storm water can cause **erosion***	*Storm water can cause **pollution***



OWNER RESPONSIBILITIES

- **Protection of the BMP, related components, and access routes from a public roadway from development, encroachment, and damage**
- **Conduct and document inspections and maintenance**
- **Submit required information to the City**
- **Provide for the perpetual and proper operation of the BMP**

CITY RESPONSIBILITIES

- **Enforce the provisions for inspection and maintenance**

We are here to help! The City of Birmingham's Storm Water Management Department can answer questions about your BMP!

What are Storm Water BMPs?

BMPs are structural practices designed to store storm water permanently (retain) or temporarily (detain). As well, many BMPs are designed to treat polluted storm water. They retain, detain, and treat storm water to reduce flooding, erosion, and pollution problems commonly associated with the loss of natural landscape and increase of roads and buildings that result from land development. BMPs can be designed to hold runoff to allow it to soak into the ground to help replenish the groundwater. This can also prevent pollutants from being released to local waterbodies that serve as drinking water sources. When storm water cannot soak into the ground, BMPs are designed to store the water temporarily to allow pollutants to settle, filter, or otherwise be removed before the storm water is released. BMPs can also be designed to store water temporarily and release it slowly to prevent erosion and habitat loss in streams lower the potential for flooding.

Why do we have Storm Water BMPs?

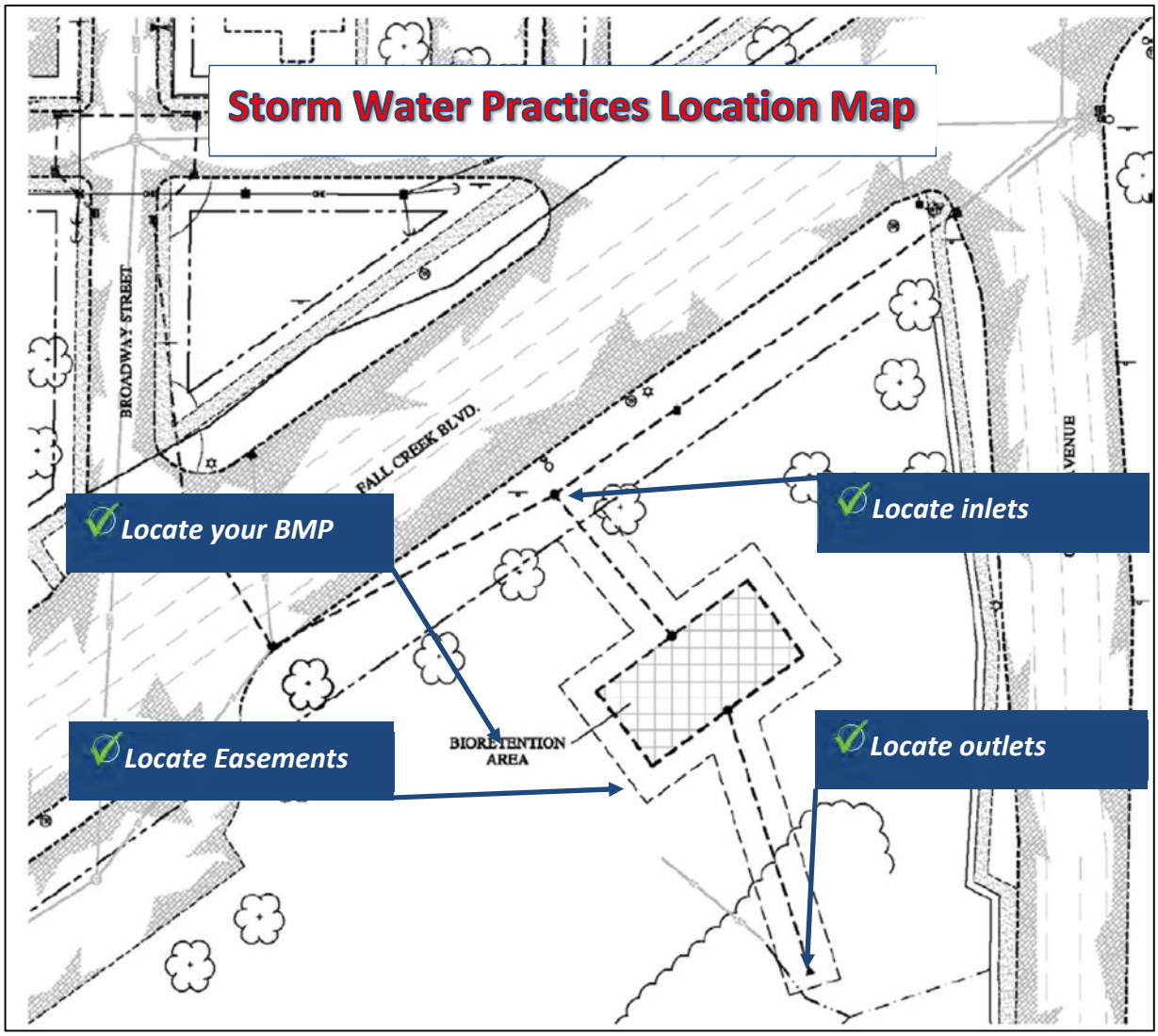
BMPs are used to control the increased storm water that is generated by buildings and pavement to prevent negative impacts, such as flooding, erosion, and pollution. Once a BMP fails, it cannot serve its intended function and will not prevent these problems.

It can be quite costly to repair a failing BMP. In contrast, when inspected and maintained correctly, BMPs should continue to function for many years with only minor cleaning and upkeep required.

How do I know if I have a Storm Water BMP on my property?

BMPs are designed and constructed in a wide variety of sizes, shapes, and structures. In some cases, BMPs can be easily spotted (e.g., a fenced detention pond or a large cistern). In other cases, they might be less recognizable because they are located underground or on a roof. Others might be mistaken for a part of the parking lot or the landscaping of a property. In fact, many BMPs serve dual purposes. Beyond storm water management, multi-functional BMPs can also provide aesthetic landscaping (e.g., bioretention areas, storm water islands), functional space (e.g., porous and modular porous pavement systems in a parking lot), or planned green space (e.g., reforested tree stands).

Consulting your property's Storm Water Practices Location Map (example shown on next page) will tell you if you have a BMP, where it is located on the property, its boundaries and/or easements, and what type of an BMP it is. Contact the City of Birmingham's Storm Water Management Department for information on the Maintenance Agreement if you are not sure if you have BMP on your property.



Once you have your Storm Water Practices Location Map, locate your specific BMPs. They may be called by other names, such as:

- **Rain Garden**
- **Swale**
- **Downspout Disconnection**
- **Green Roof**
- **Sheet Flow**
- **Reforestation**
- **Permeable Pavement**
- **Infiltration Trench**
- **Rain Barrel**
- **Pond**
- **Underground Detention**
- **Oil/Grit Separator**
- **Manufactured Treatment Device**

BMPs are regulated because they provide a storm water management function and are required by the City of Birmingham's Post Construction Storm Water Ordinance.

BMPs are a protected part of the property and cannot be removed.

The Post Construction Storm Water Ordinance requires the property owner to protect, inspect, and maintain the BMPs located on their property.

Property Owner's Guide to BMP Maintenance

2.0 Keeping Your Best Management Practice (BMP) Working Properly

What makes a functional BMP?

Generally speaking, storm water BMPs are used to reduce the negative impacts of the water that runs off of buildings, pavement, and other developed areas during and after a storm. Negative impacts include property flooding, ditch and stream erosion, and pollution. There are many types of BMPs, some that address all the impacts and some that address only one or two impacts. The impacts address depends on the design of the BMP.

- **RETENTION BMPs** – This type of BMP, usually called a retention pond or basin, prevents flooding, erosion, and pollution by capturing and storing storm water permanently and not allowing it to be released from the property.
- **DETENTION BMPs** – Detention BMPs prevent flooding and soil erosion by temporarily storing storm water then releasing it slowly and safely during and after the storm. Some detention BMPs are designed to detain the water for 24 to 48 hours to allow pollutants to settle to the bottom of the basin or filter through vegetation before the water is released. Detention ponds, extended detention ponds, and underground detention are all examples of detention BMPs.
- **GREEN INFRASTRUCTURE BMPs** – Green infrastructure BMPs are special type of BMP that primarily target pollutant removal. These BMPs try to mimic how a natural landscape full of leafy vegetation and loose soil would manage storm water. Most green infrastructure BMPs allow water to soak into the ground and filter through special soil to remove pollutants. Depending on the design and surrounding soil, the filtered water is either dispersed into the soil below the BMP or is intercepted by an underdrain and carried off the property. Many green infrastructure BMPs can be hard to see as many of them look like landscaped areas. Bioretention, urban bioretention, and infiltration trench, are all examples of green infrastructure BMPs. However, one type of green infrastructure BMP is easy to spot because it works differently. A cistern is a BMP that accepts the storm water generated on a rooftop and stores it temporarily to be used for another purpose, such as landscape water or toilet flushing.
- **MANUFACTURED BMPs** – Manufactured BMPs are designed to remove pollutants from storm water by filtering or mechanical means (e.g., baffling, centrifugal force) before the water is released. These BMPs are typically located underground, near or at a storm water inlet or manhole. In general, they require significantly more maintenance than other types of BMPs. Manufactured BMPs do not address flooding or erosion.

Why is proper BMP function important?

A properly functioning BMP provides for the prevention of flooding, erosion and pollution that can be caused by storm water. If a BMP is not functioning properly, homes and property can be damaged, streams and aquatic life can be threatened, and human health can be affected.

What is your role, as the property owner, in keeping your BMP working properly?

Regular inspection and maintenance to keep BMPs functioning as they were designed is critical. As the property owner, you are responsible for the protection, inspection, and maintenance of the BMP(s) that are located on your property. BMPs that are included in your property's Maintenance Agreement must be protected, inspected and maintained in accordance with the written standards and specifications in the Maintenance Agreement. Failure of an owner to protect, inspect, and maintain a BMP is a violation of the City of Birmingham's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, property liens, and/or requirement for corrective action.

Common Components of ALL BMPs

What common components?

There are a number of components that are common to all BMPs. These are shown in the examples below. Proper inspection and maintenance of these components will go a long way in making sure your BMP is operating and functioning the way it was designed. Each component must be working properly. Poor maintenance or damage to just one of these components could lead to failure of the BMP.

Regardless of the method of operation, all BMPs will include some variation of the following components that work together to manage storm water: 1. Inlet structure, 2. Pretreatment, 3. Main treatment, 4. Outlet structure, and 5. Emergency overflow**. These components are shown in Figures 1, 2 and 3**, which are general depictions of an extended detention basin, a bioretention area, and a manufactured treatment device. In addition, specific pictures and definitions are provided of each common component to demonstrate how each of these components has to be maintained in order for your BMP to work properly.

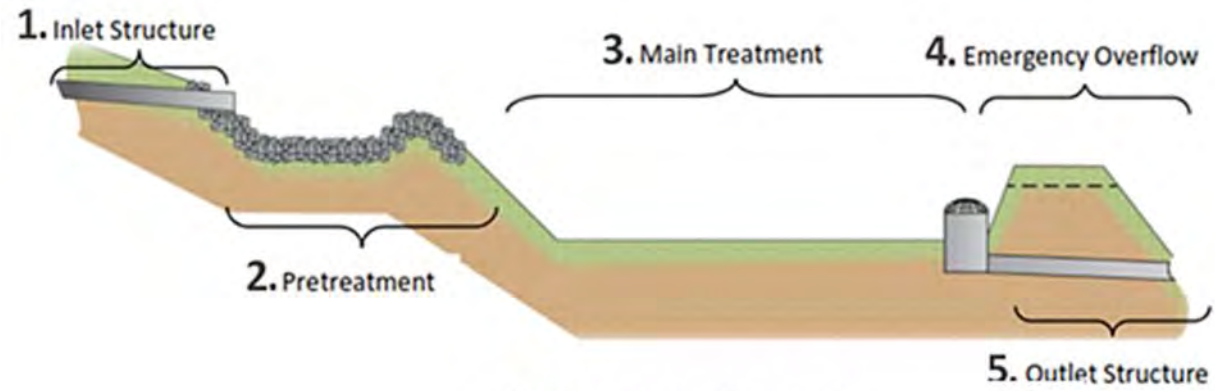


Figure 1: Detention Basin

Figure 2: Bioretention

Figure 3: Manufactured Treatment Device (MTD)

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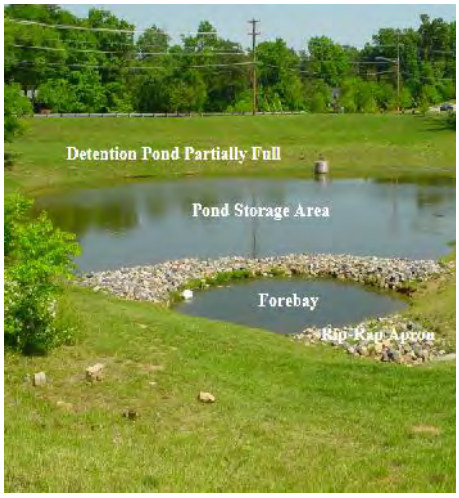
What do the Common Components of BMPs Look Like? Success? Failure?

Routine inspection of these common components is very important to keep the BMP working properly and to catch and repair minor issues before they become major problems. Major problems could result in costly repairs, property damage, and/or legal problems. For example, inspecting the inlet structure whenever landscape maintenance occurs allows you to clear debris that can block or divert storm water flow. Unmaintained, this issue can lead to flooding or erosion on your property, and the release of pollutants.

The pictures below provide examples of well-maintained, successful common components compared to failed components.

	WHAT DOES SUCCESS LOOK LIKE?	WHAT DOES FAILURE LOOK LIKE?
Inlet structures bring water into the BMP. They should be free of sediment, trash, and debris. Erosion, scour, and damage should be evaluated.		
Pretreatment is the first layer of protection for the main treatment area. Debris and coarse sediment are removed, which reduces clogging in the main treatment area. The pretreatment area can be cleaned more easily than the main treatment area. It should be free of sediment, trash, and debris. Erosion, scour, and damage should be evaluated.		

Main treatment is where storm water is collected so that water can be discharged at a controlled rate. These areas should be free from trash and overgrown vegetation and inspected for sediment and signs of erosion.

Emergency overflow is designed to keep the area surrounding the BMP from flooding in very large rain events. Similar to outlets, spillways need to be kept clear to prevent flooding. Erosion, scour, and damage should be evaluated.

Outlet structures allow treated water to exit the BMP.
If the outlet structure is clogged, flooding will occur within the BMP. Outlets should be free of sediment, trash, and debris. Erosion, scour, and damage should be evaluated.

BMP Success Factors

What are BMP success factors?

The City of Birmingham's Post Construction Storm Water Ordinance requires that the rate of storm water released from your property be reduced and that storm water be treated to remove pollutants. The BMPs on your property were installed to accomplish these goals. They were designed and constructed to manage the storm water from your property and reduce the risk of flooding, stream erosion, and pollution. Design reviews, construction inspections, and execution of a legally-binding Maintenance Agreement were required by the City of Birmingham when the BMP was constructed. These activities were performed to ensure that each BMP constructed was operating properly when construction ended and the property became occupied.

As the property owner, it is your responsibility to keep your BMP functioning as it was designed. This responsibility is highly dependent on meeting certain success factors. There are four critical success factors that will apply to BMPs. These are described below.

Success Factor 1: Vegetation

Vegetation should be healthy and maintained. Bare soil should not be visible in vegetated areas, nor should vegetation be overgrown.

Success Factor 2: Draindown

After rainfall, storm water should generally recede within 48 hours. There should not be regular, prolonged flooding. This can indicate a clog or other problem with filter media, underdrains, inlets, or outlets.

Success Factor 3: Protection

Pedestrian, vehicles, and heavy equipment can damage BMPs. There should not be signs of encroachment, such as compacted soil, pet waste, or crushed vegetation

Success Factor 4: Cleanliness

The area around a BMP needs to be kept clean to reduce the chance that objectionable materials enter the BMP. There should not be sediment, litter, or stored pollutants in the BMP or its drainage area.

The icons associated with each success factor (shown above) will be found throughout this document and in the Individual BMP Inspection and Maintenance Requirements found in Section 5. Keep these success factors in mind as you perform inspections and maintenance. Additionally, these success factors will play a role when it comes to inspecting and maintaining the common components of BMPs.

BMP owners will use these success factors to inspect their BMPs and determine the maintenance needed to keep them functioning as designed. Which success factors must be met depend on the type of BMP and its individual design. Not every BMP will need to meet all four of the success factors. The critical success factors applicable to each type of BMP are clearly provided in the Individual BMP Inspection and Maintenance Requirements found in Section 5.

The following pages provide you with examples of how success factors can influence a BMP's functionality. You will see how the success factors impact the functionality of a detention basin, bioretention area and a manufactured treatment device.

Can I remove a BMP on my property?

No, you cannot remove a BMP that is included in your property's Maintenance Agreement. The BMP is approved by the City as a regulated storm water management practice. Contact the City of Birmingham if you would like to discuss options for modifying a BMP.

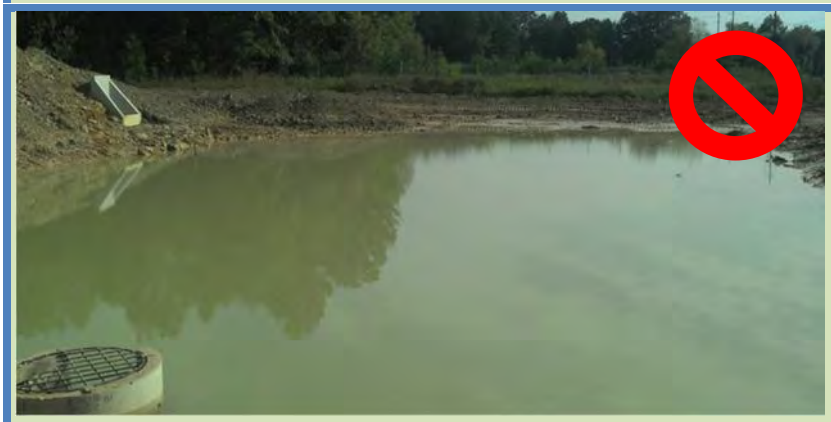
Detention Basin Success Factors

Success Factor 1: Vegetation
Vegetation is healthy and free from weeds.

Success Factor 2: Draindown
Water level is appropriate with inlet and outlet structures visible and clear from debris.

Success Factor 3: Protection
No signs of vehicle, equipment, or pedestrian damage.

Success Factor 4: Cleanliness
No signs of litter, erosion, pollution, or debris.



Success Factor 1: Vegetation
Vegetation in the main treatment area is not established. Requires planting and stabilization measures.

Success Factor 4: Cleanliness
Signs of litter, erosion, pollution, and debris in any of the common components. Requires trash removal and pick up.

Success Factor 1: Vegetation
Vegetation in the main treatment area is overgrown and requires removal.

Bioretention Success Factors

Success Factor 1: Vegetation
Vegetation is healthy and free from weeds

Success Factor 2: Draindown
BMP is not holding water long after rain event.

Success Factor 3: Protection
No signs of vehicle, equipment, or pedestrian damage.

Success Factor 4: Cleanliness
No signs of litter, erosion, pollution, or debris.

Success Factor 1: Vegetation
Vegetation is dead or unhealthy. Requires maintenance or replacement

Success Factor 2: Draindown
BMP is flooded more than 48 hours after an average rain event. Requires maintenance to unclog the outlet structure.

Manufactured Treatment Device Success Factors

Success Factor 2: Draindown

BMP is not holding water long after rain event.

Success Factor 3: Protection

No signs of vehicle, equipment, or pedestrian damage.

Success Factor 4: Cleanliness

No signs of litter, erosion, pollution, or debris in the main treatment area.

Success Factor 2: Drawdown

BMP is flooded more than 48 hours after an average rain event. Requires maintenance to unclog the inlet structure.

Success Factor 4: Cleanliness

Litter and possible pollution are visible in the main treatment area. BMP requires cleaning.

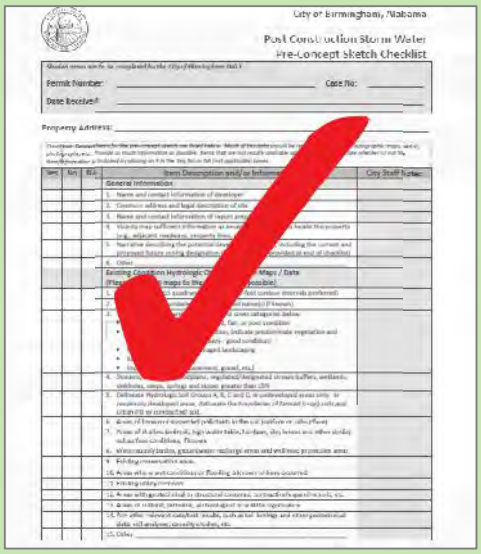
Property Owner's Guide to Maintenance

3.0 Inspection of Best Management Practices (BMPs)

Inspection keeps BMPs in good working order…

Urban Bioretention Area after a Rain

… and keeps you in compliance



Why Inspect BMPs?

Best Management Practices (BMPs) are used to control storm water from developed property. They prevent the flooding, erosion and pollution that can result from development. Unfortunately, BMPs can fail for many reasons such as: clogging with sediment or trash, unhealthy or dead vegetation, and damage to structures. **The key to the long-term success of a BMP is routine inspection and maintenance.**

You, the property owner, are responsible for the inspection of the BMPs that are located on your property. This requirement includes the BMP itself and the related components and access routes from a public roadway. Inspections are a requirement of the Post Construction Storm Water Ordinance and allow you to determine maintenance needs and prevent future problems with the BMP.

You are required to perform and document a BMP inspection at least annually and must submit the inspection checklist to the City of Birmingham each year. Beyond that, the City encourages property owners to perform undocumented inspections regularly, especially after major storm events.

The key to the long-term success of a BMP is routine inspection and maintenance.

How do I inspect my BMPs?

Specific inspection requirements are different for each BMP. The following pictures generally illustrate what to inspect at the common components for several types of BMPs. These pictures do not apply to all types of BMPs. Specific instructions on the inspection and maintenance of each specific type of BMP is provided in the Individual BMP Inspection and Maintenance Requirements provided in Section 5.

1. Inlet Structure: Check for Sediment Trash Clogging

High Amounts of Sediment. Remove so water can flow in easier.

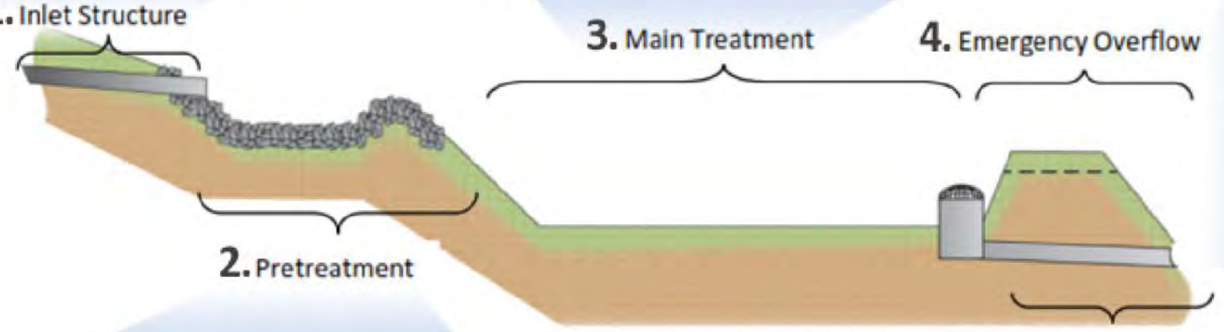
No sediment or trash

3. Main Treatment: Check for Trash, Debris, Weeds, Appropriate Vegetation, Standing Water

4. Emergency Overflow
5. Outlet Structure

Outlet structure is clearly clogged from trash and debris.

In some BMPs, the emergency overflow and outlet structure are the same thing. Check for clogging of structure debris and sediment buildup signs of ponded water.



2. Pretreatment: Check for Sediment Trash

Pretreatment area needs to be cleaned out

Inspect Common Components

Check for the following:

Sediment/debris in main treatment areas and at inlet and outlet structures

Success Factor: Cleanliness

Sediment has accumulated on this inlet grate and needs to be cleaned off.

Sediment has accumulated in the infiltration area and needs to be cleaned out. Clogged media may require replacement.

Erosion, settlement, or slope failures

Success Factor: Cleanliness

The slope of this berm has failed and eroded, requiring regrading and replanting.

The slope near the outlet has eroded and requires repair.

Clogging, as evidenced by frequent standing water for more than 2 or 3 days after storms

Success Factor: Draindown

The outlet has clogged, which has led to flooding of the BMP and nearby property.

The outlet screen was filled with debris. After removal and cleaning, water can flow again

Disturbance, encroachment or soil compaction

Success Factor: Protection

Heavy construction equipment has encroached on the BMP and needs to be kept out.

This pipe has been damaged and requires repair or replacement.

Damaged, unhealthy or sparse vegetation

Success Factor: Vegetation

Dead vegetation needs to be removed and replaced.

Overgrown, invasive vegetation requires removal.

Some BMPs are located underground, making inspection more difficult and, in some cases, hazardous. **DO NOT ENTER AN UNDERGROUND BMP WITHOUT PROPER TRAINING.** Generally, these underground systems can be inspected by individual who is certified in Occupational Safety and Health Administration (OSHA) confined space entry. Local civil engineering firms typically have knowledgeable and trained staff that can perform such inspections safely.

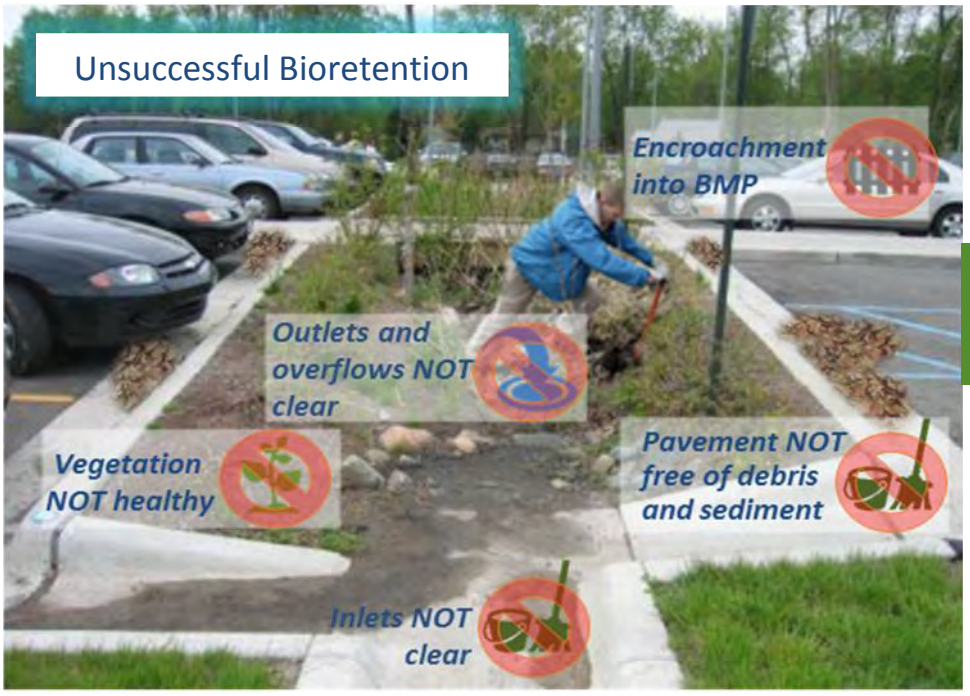
Regardless, should there be a situation where a safety concern arises, the inspection must not be performed until the safety concern is addressed. Once the concern is addressed, the inspection can continue. Review the helpful resources section, which provides contractors that may be able to assist with more specialized inspections.

Signs indicating a potential maintenance problem with the underground system include the following:

- **Ponding water or water remaining in the observation well for a long period of time**
- **Excessive sediment built up**
- **Damage to the structure through compaction or settling**

Observation wells in infiltration area

Well-maintained bioretention area within a pervious paver parking lot



Poorly-maintained bioretention area within an asphalt parking lot

Successful Dry Detention Basin

Unsuccessful Dry Detention Basin


Successful Pervious Pavement System
Pervious pavers are free from debris, sediment
Water is moving through the pavement. No ponding after a rain event.
No signs of vehicle, equipment, or pedestrian damage.


Signs of Damage to the pavement.
Water is NOT moving through the pavement. Ponding after a rain event.
Pervious pavers are NOT free from debris, sediment
Unsuccessful Pervious Pavement System

INSPECTION STEPS

1. **Review your record drawing. Know the locations of your BMPs and their inlets, outlets, easements, and access routes**
2. **Inspect all the BMPs on your property, including all components**
3. **Assess any drainage issues or debris on your property that might be a result of a failed BMP**
4. **Complete the City inspection checklist**
5. **Make a plan for addressing any maintenance items and note follow-up items on the checklist**
6. **Provide your inspection checklist to the City**
7. **Maintain copies of your inspection records**

How are Inspections Documented?

Regular inspection of BMPs by the property owner is key to their long-term performance. Property owners are required to perform a BMP inspection at least annually and submit an inspection report to the City Storm Water Management Department by September 30th of each year. Beyond that, you are encouraged to perform less formal inspections at regular and appropriate frequencies. Individual BMP Inspection and Maintenance Requirements can be found in Section 5 of this document. Contact the City Storm Water Management Department if you need additional guidance.

The table below details suggested inspection frequencies and documentation policies.

Inspection Type	Inspection Guidance	Documentation Procedures
Routine Operational Inspections	) As often as necessary, such as after storm events or when landscaping activities are being performed at the property.	) No documentation required. Documentation of maintenance is required only when larger-scale maintenance is performed.
Detailed Visual Inspections	) At least annually.) Performed in accordance with the requirements in the Individual BMP Inspection and Maintenance Requirements associated with your BMP found in Section 5.) Performed by the owner (or person designated by the owner) who is familiar with the purpose and basic function of the BMP.	) The inspection and any resulting maintenance must be fully documented and submitted in accordance with this Manual.) Inspections must be completed and submitted by September 30th of each year.) Documentation must be maintained by the owner(s) for a minimum of 5 years and made available upon request from the local jurisdiction.

Detailed guidance on inspections and inspection frequency for specific BMPs is included in Section 5. In general, all inspections should check for evidence of the following:

- Accumulation of sediment or debris in infiltration areas and at inlet and outlet structures;
- Erosion, settlement, or slope failures;
- BMP clogging, as evidenced by long standing water after rain events;
- A lack of adequate protection as evidenced by signs of disturbance, encroachment or soil compaction; and
- Vegetation damage, poor vegetative health or inadequate vegetation coverage.

What Happens after the Inspection?

If your inspection identified maintenance issues, you need to address them. This may involve cleaning up debris or sediment manually or hiring someone to do a more extensive clean-out or repair. Refer to the next section of this document and your Inspection, Protection, and Maintenance agreement for more guidance. After receiving your checklist, the City will track your BMPs annual inspections but will likely not follow up with you regularly. If you have questions, it is your responsibility to contact a professional or ask the Storm Water Management Department for more information.

We are here to help! The City of Birmingham's Storm Water Management Department can answer questions about your BMP Inspections!

Property Owner's Guide to BMP Maintenance

4.0 Best Management Practice (BMP) Maintenance

Record drawings indicate the type, location, and constructed condition of the BMPs on your property.

The BMP maintenance agreement for the property lists requirements for your property.

Each BMP has a checklist, which can be found attached to this maintenance guide.

The City of Birmingham's Storm Water Management Department can answer questions about your BMP.

Preparing to Maintain Your BMP

The maintenance needs for BMPs can be difficult to assess, especially if you are new to BMP maintenance. Cost, safety, and effectiveness are key factors in determining who will carry out maintenance activities. Reviewing your property's record drawings and maintenance agreement will provide important information to get you started maintaining all the BMPs on your property. In addition, this maintenance guide includes a checklist for all the types of BMPs.

If you have difficulty finding information about your property or BMP, or if you have additional questions, contact The City of Birmingham's Storm Water Management Department.

Your property may only have one BMP, such as a detention pond, or you might have several BMPs on your property as depicated in the picture below.

Some properties have multiple BMPs, which all require maintenance. This building has cisterns, green roofs, porous pavers, and a small bioretention area.

All BMPs require maintenance, both routinely and in response to problems.

Routine Maintenance

If a BMP were an automobile, routine maintenance would equate to an oil change. Routine maintenance is defined as the typical clearing, cleaning, and light repair activities that are performed on a repetitive and frequent basis to sustain the on-going proper operational performance of the BMP.

While an inspection may identify the need for a particular routine maintenance activity, property owners should not always rely on inspections to identify maintenance needs. Instead, routine maintenance should be considered an ongoing activity performed on a regular basis. The activities performed may vary depending on the type of BMP, the season (e.g., leaf removal from BMP inlets may be a frequent activity in the fall), and the land use and condition of the area draining to the BMP (e.g., a fast food restaurant parking lot may require frequent trash removal).

Examples of routine maintenance include:

- Trash, debris, leaf litter, and minor sediment removal (sweeping, shoveling, vacuuming) within the BMP and in the area that drains to the BMP;
- Inlet and outlet cleaning;
- Mowing and pruning vegetation;
- Removal and replacement of dead or unhealthy vegetation;
- Erosion prevention and sediment control for bare soil or eroding surfaces; and
- Repair or replacement of BMP signage and other physical protection measures.

Litter pick-up is an example of routine maintenance.

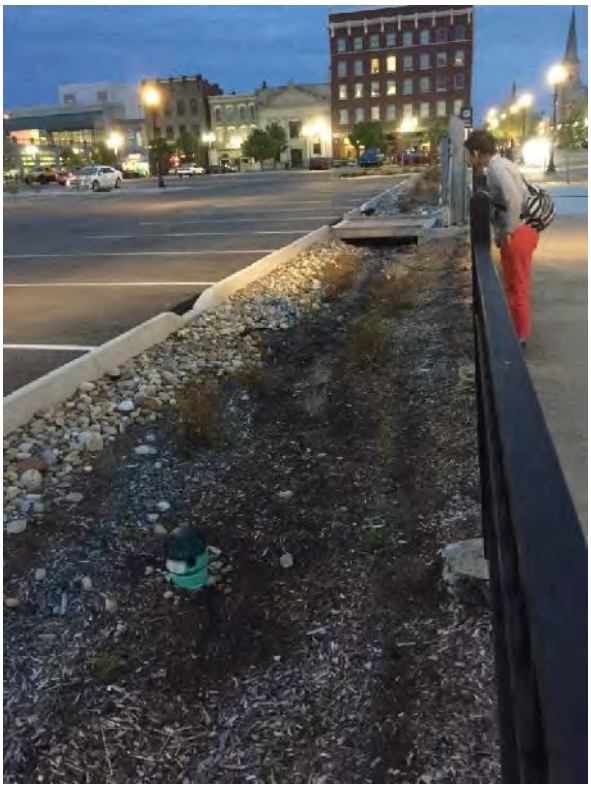
Routine maintenance can generally be done by the property owner. It is recommended that a professional landscaping company be hired for the more difficult routine maintenance. Trained professionals can also identify problems early on that might save you from costly repairs later.

Maintenance in Response to Problems

Problems with your BMP might be noticed during an inspection or as a result of an unexpected disturbance or encroachment, or by an uncontrollable event, such as an extreme flood event. In any case, problems with your BMP should be corrected as soon as possible. You may require the services of a licensed professional engineer, landscape architect, or soil scientist. Because it may be costly, creating a long-term fund for large maintenance items is highly recommended.

Examples of large maintenance tasks include:

- Repairs to structural components (e.g., curbing, outlets, underdrain, observation wells, etc.);
- Major sediment removal;
- Addressing areas where soil has been compacted by heavy equipment;
- Removal and replacement of BMP filters or filter media; and
- Large-scale removal and replacement of dead, damaged or unhealthy vegetation.



This bioretention area is being completely replanted as part of a large-scale maintenance effort.

Removal and Disposal of Soil Media, Sand, or Accumulated Sediment from BMPs

Many BMPs clean sediment out of storm water and will therefore accumulate sediment deposits over time. Sediment must be removed periodically so the BMP continues to work as designed. Some BMPs also use filters or a special media to remove pollutants from storm water. Media must be periodically replaced so that fresh media can continue to remove pollutants.

The bioretention area in this parking lot island has accumulated sediment which requires removal.

In most cases, filters, media, sand, soil, and sediment removed from a BMP can be disposed of properly as trash and accumulated sediment can even be used elsewhere on your property as fill dirt. However; in some cases, the disposal of these materials can be a concern because pollutants may be present. For example, a BMP that receives discharges from a commercial trucking fueling/parking area may have significant amounts of petroleum substances (e.g., gasoline, oils and greases) or metals within sand or other filter media. If the BMP receives runoff from a commercial or industrial setting, the sediment may be hazardous and will need to be tested. Before disposing of potentially contaminated or hazardous sediment or materials, the Alabama Department of Environmental Management (ADEM) Land Division should be contacted for guidance associated with the requirements for waste determination and disposal procedures. For more information, please call ADEM at 1-334-271-7700.

Vegetated BMPs

Vegetation and the soil supporting the vegetation are critical elements of some BMPs. In some vegetated BMPs, the primary stormwater management approach is to use the BMP's vegetation and soil to soak up storm water or send it down into groundwater. Soil has numerous open spaces that store and transmit water beneath the soil's surface and distribute the water downward. Strong and vigorous root growth from healthy plants are an important part of this process. For other BMPs, plants provide a stabilizing cover for soil, preventing it from washing away during a rainfall and creating pollution in the form of sediment. The success of vegetated BMPs as effective stormwater management elements is highly dependent on the health and adequate coverage of the plants within the BMP. As a result, inspection and maintenance activities will incorporate vegetation and soil considerations. Healthy, growing plants, and in some BMPs their relationship to healthy, loose soils, are essential components of vegetated BMPs. Properly planting and maintaining vegetation and protecting the soil are critical to ensuring that a vegetated BMP performs most effectively for many years.

Vegetated BMPs can look like mowed grass, such as this vegetated swale on the left, or like landscaping, such as this urban bioretention area on the right.

Non-Vegetated BMPs

Non-vegetated BMPs can range from cisterns that capture and re-use rainwater to underground detention areas under parking lots. Non-vegetated BMPs generally do not have specific requirements for vegetation health and coverage. As a result, they will typically not have significant soil or vegetation aspects to inspection and maintenance. Regardless of the design, non-vegetated BMPs have specific inspection and maintenance requirements that need to be met to ensure that they function as originally designed.

The pervious paver parking lot and cistern shown above are both examples of non-vegetated BMPs.

Use the Four Success Criteria to Guide Your Maintenance Efforts.

Success Criteria 1: Vegetation

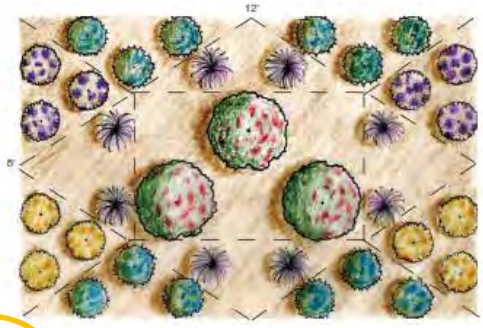
Look for bare soil: this could indicate dead vegetation.

Look for overgrown vegetation: This could indicate weeds or necessitate mowing or pruning.

Fertilizers and pesticides should be avoided within and near BMPs.

Vegetation may need watering to establish new plants or if weather is very dry.

If you have questions about what vegetation should be present, the BMP record drawing should show the planting plan, the type of plants, and the location of the plants.



Plant List

Plant Common Name	Spacing (ft)	Area (ft²)	ft²/plant	Quantity
crimsoneyed rose mallow	3	24	7.8	3
muhly grass	2	6	3.4	2
muhly grass	2	6	3.4	2
muhly grass	2	6	3.4	2
muhly grass	2	6	3.4	2
purple coneflower	1.5	6	2	3
purple coneflower	1.5	6	2	3
orange coneflower	1.5	6	2	3
orange coneflower	1.5	6	2	3
Stoke's aster	1.5	6	2	3
Stoke's aster	1.5	6	2	3
Stoke's aster	1.5	6	2	3
Stoke's aster	1.5	6	2	3

The planting or landscaping plan for your property will tell you where plants should be, their species, and spacing. This is helpful information if you need to replace plants.

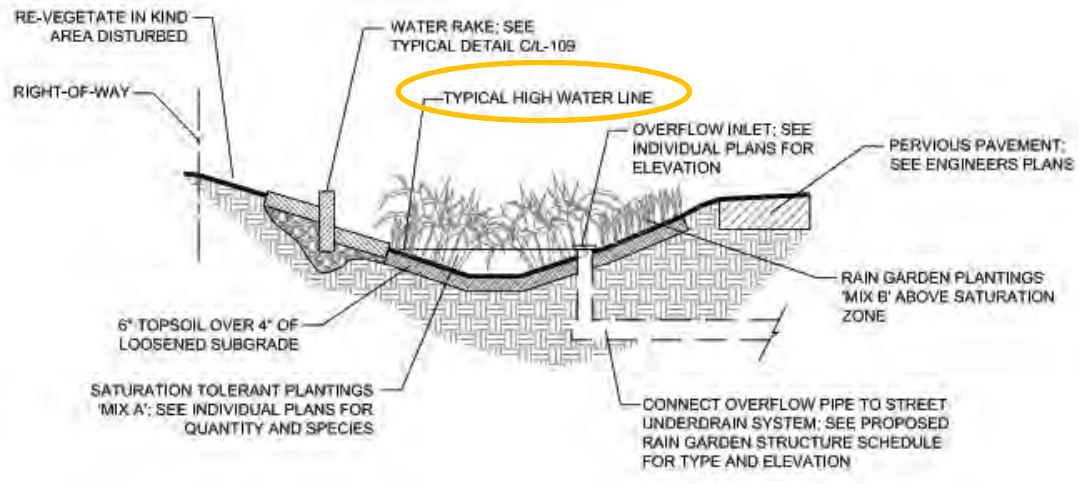
Success Criteria 2: Draindown

Look for ponded water: After a rainfall, storm water should generally recede within 48 hours.

Look for sediment and debris that may be causing clogging or high-water levels.

Check observation wells and cleanouts if you suspect problems with drainage are beneath the ground surface.

The BMP record drawing should show the normal pool, or water level, for your BMP.



Your record drawing should show the typical high-water line or mark for some BMPs. This will help determine if there is too much water ponding, which can indicate a clog within the BMP or its outlet.

Success Criteria 3: Protection

Look for signs of encroachment, such as compacted soil, pet waste or crushed vegetation.

Look for damage to signage, berms, and other barriers.

The BMP record drawing should show the types and locations of signs and barriers.

Your record drawing will show the types and locations of signage. It's important to maintain signage to keep vehicles, equipment, people, and/or chemicals from damaging your BMP.

Success Criteria 4: Cleanliness

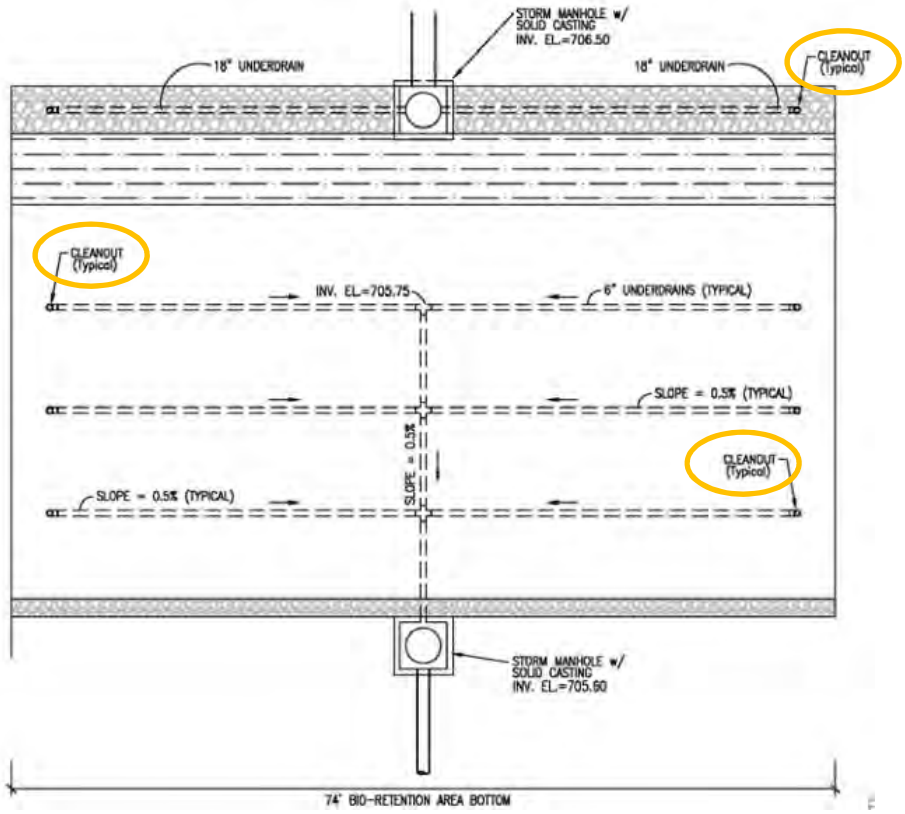
Look for sediment, which needs to be removed periodically and can also indicate erosion nearby.

Look for litter and leaf litter, which can cause clogging of structures and prevent proper draindown times. It needs to be removed.

Look for signs of pollutants, such as leaking vehicles/equipment or stockpiles of salt, soil, etc.

Check for visibly dirty water and oil sheens.

Check observation wells and cleanouts for signs of clogging.



Your record drawing will show the locations of cleanouts and observation wells. Make sure these are kept clear and monitor them for clogs and signs of pollution.

Common Maintenance Tasks

Common maintenance problems and solutions are shown below. For more information, refer to your Inspection, Protection, and Maintenance agreement or contact The City of Birmingham's Storm Water Management Department.

Grass has grown over this inlet and should be cut back to allow water to enter the inlet.

Debris and leaf litter are blocking this inlet. Remove this material to allow water to enter the inlet.

The erosion around this outlet has been stabilized with rock and erosion control blanket.

This outlet is clogged with sediment and overgrown vegetation. Sediment and vegetation should be removed to allow water to flow out of the inlet.

This pretreatment area has been mowed to an appropriate length, and litter has been removed to prevent clogging.

This pretreatment area is full of sediment. Sediment should be removed, and the property should be checked for the source of the sediment, such as an eroded area. Larger jobs may require a contractor and/or special equipment.

Water on this pervious pavement is not draining, which can indicate clogging. Some sediment and debris can be removed manually. Fine sediment that causes clogs at the surface or in the media below requires maintenance with a vacuum truck.

This infiltration area is full of sediment. Sediment should be removed, and the property should be checked for the source of the sediment, such as a nearby soil pile. Larger jobs may require a contractor and/or special equipment.

Look down observation wells to investigate clogs in underdrains. If a clog is found, underdrains may require special equipment or excavation to clean or repair.

This bioretention area was not draining 48 hours after a rain. The outlet should be cleaned out and inspected for signs of damage.

Vegetation has grown over this outlet, which blocks the flow of water. The plants should be trimmed back to allow water drain from the BMP.

This bioretention area has bare soil and dead plants. It will need to be replanted. The planting plan from the record drawing should be checked for the types of plants needed.

Algae needs to be controlled, so it does not take over storage areas and harm aquatic life. Check the function of fountains and aeration devices. Fertilizer use around the pond should be limited. Maintaining healthy native plants and limiting mowing around the pond can also help.

This detention pond is overgrown with cattails, which are invasive plants. Overgrown vegetation should be removed and replaced with the correct plantings. The planting plan will be shown on the record drawing. Larger jobs may require a contractor and/or special equipment.

Steep slopes need to be vegetated to prevent erosion of sediment. Hydroseeding sprays seed and a sticky mulch that adheres to soil. It can be an effective way to quickly prevent erosion and establish vegetation.

The slope around this detention pond has failed, allowing soil to enter the storage area and erosion to continue to occur. New vegetation needs to be established. Installation of additional soil, erosion control matting, or other measures is required.

Extensive erosion can be caused by spillways that are too steep. Check the record drawing for the correct slope. Regrading and slope protection with rock may be required.

The slope next to this spillway has failed, causing erosion. New vegetation needs to be established. Installation of additional soil, rock outlet protection, or other measures is required.

Stockpiles of soil will send sediment to your BMP, causing problems with clogging. Move stockpiles away from inlets and protect them with barriers, such as silt fencing.

Tire tracks and signs of encroachment can indicate problems, such as bare soil and BMP damage. Ensure vehicles, equipment, and pedestrians stay out of your BMP by maintaining signage, fencing, and other barriers. Repair damage and vegetate bare areas.

Pollutants may be visible at inlets and outlets or within your BMP. If oil or other hazardous materials are present, a specialized clean-up crew may be required.

Litter around your property can travel to your BMP and clog it. Conduct regular litter pick up and make sure adequate trash collection is conducted.

5.1 Bioretention Area Basics

What is Bioretention?

Bioretention areas are Best Management Practices (BMPs) that provide storm water quality protection by filtering pollutants from storm water. Bioretention areas are designed as shallow depressions in the landscape to allow them to capture storm water from the surrounding property. The storm water percolates into the bioretention area's soil. The typical bioretention area will manage about 1 inch of storm water and should drain completely in about 2 to 3 days after a storm. Bioretention areas that are designed and constructed in this manner will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

Benefits of Bioretention Areas

- Removes pollutants from storm water
- May reduce erosion in nearby streams
- May reduce nuisance flooding
- Builds habitat for birds and bees
- Creates aesthetic benefits

In the City of Birmingham, most bioretention areas will have five primary components (see the figure below):

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment** areas remove debris and coarse sediment to reduce clogging of the main treatment area
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.

What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your Bioretention BMP. There are a few key points to keep in mind:

- Bioretention areas included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your bioretention area is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your bioretention area and save on maintenance costs by protecting the vegetation and soil, keeping your property clean, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning bioretention area. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Bioretention Area Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.

Do

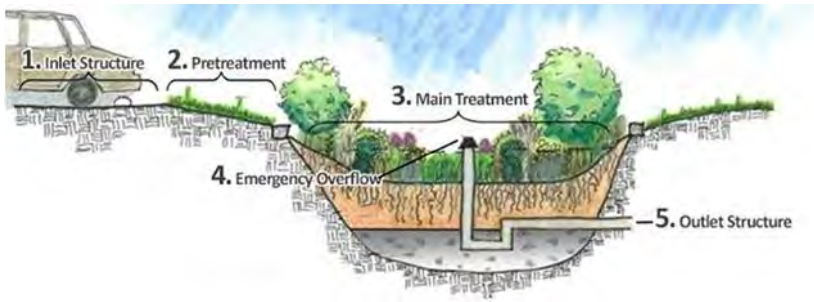
- ✓ Check the property frequently for bare soil, erosion, litter, plant health, and soil compaction.
- ✓ Remove weeds and invasive plants. Re-stock with healthy vegetation and ensure that basic requirements for plant health are met.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.

Don't

- X Don't use excessive amounts of salt and sand around the bioretention area in the winter.
- X Apply fertilizer, herbicides, or pesticides inside the planting area, and use these materials sparingly on your property. Contact a local nursery or landscape professional if your plants aren't thriving.
- X Don't allow heavy equipment in the bioretention areas, or use it as a storage area, even for landscape materials (leaves, snow, soil mulch, etc.)

Bioretention Area Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance. **The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.**



BMP Name(s)				Today's Date:
	Note: The bioretention area name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Bioretention Area 1" or "Bioretention Area A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Bioretention?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Bioretention?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes No

Reason for Follow Up?

Completed forms can be submitted by email: poststorm@birminghamal.gov

Storm Water Management ● Department of Planning, Engineering & Permits

710 North 20th Street ● Birmingham, Alabama 35203

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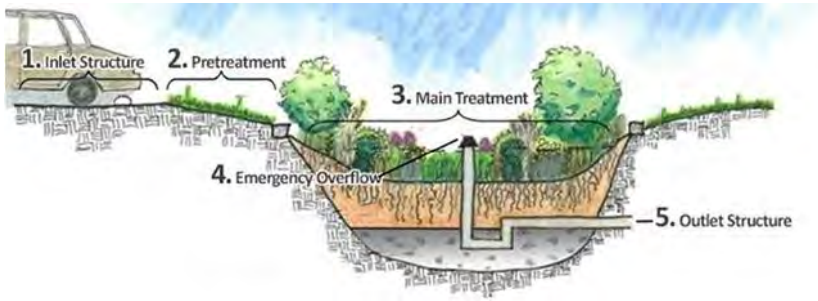

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet, Pretreatment, and Outlet Structures (Items 1, 2, and 5)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Are trash, sediment, debris, grass clippings, or other similar materials in the inlet or pretreatment structures?						
Guidance: Remove unwanted materials and correct any other problems that clog the mulch and soil or block the water flow into or out of the BMP. **Schedule:** Weekly						
2. Have curbs, gutters, grates, or other similar components been damaged or altered in any way that disrupts the flow of storm water into or out of the BMP?						
Guidance: Repair damage or alterations before the next storm, if possible. If components have been intentionally altered to resolve a drainage or flooding issue, consult the City of Birmingham for further guidance. Bioretention components cannot be altered without approval. **Schedule:** Weekly						
3. Is there unhealthy vegetation, exposed soil, or evidence of soil erosion in the pretreatment structure?						
Guidance: Healthy vegetation should cover pretreatment structures with no signs of erosion or bare soil. Replace any dead or unhealthy vegetation. Repair areas of erosion and re-seed or re-sod. Native species are preferred. **Schedule**: Weekly for vegetation and exposed soil. Monthly for evidence of soil erosion.						
4. Are trees, shrubs, or other woody vegetation present in the pretreatment structure?						
Guidance: Trees/shrubs can block water flow. If needed, remove woody vegetation and stabilize exposed soil with appropriate, non-woody vegetation. Native species are preferred. **Schedule:** Monthly						
5. Notice another problem? Describe in comments.						**Your Comments:**

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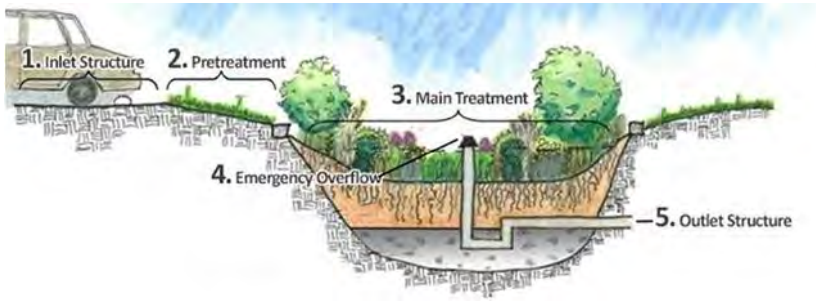

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Main Treatment Area (Component 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
6. Are trash, sediment, debris, leaves, grass clippings, or other similar materials present in the main treatment area?						
Guidance: Remove unwanted materials and correct any other problems that can cause clogging or otherwise prevent percolation of storm water into the soil. **Schedule:** Weekly						
7. Are there signs of human encroachment in the main treatment area unrelated to maintenance, such as compacted or displaced mulch, damaged plants, tire tracks, or other?						
Guidance: Repair or replace protection measures if damaged (e.g, fences, hedges, signs, etc.) Increase protection measures if this is a frequent problem. Rake and refresh mulch and soil layers to loosen compacted areas. If standing water has become a problem, see #4 below. **Schedule:** Monthly						
8. Is there evidence of soil erosion or are there patches of exposed soil?						
Guidance: Repair the erosion or bare soil areas with vegetation and/or mulch. Identify the cause of erosion and take steps to prevent future occurrences. **Schedule:** Monthly						
9. Are there signs of soil clogging or underdrain blockage? Signs include frequent standing water, hard-packed planting layer, etc.						
Guidance: If the underdrain is clogged, contact the City of Birmingham. If the soil is compacted, the entire planting layer may need repair to restore percolation. **Schedule:** Monthly						
10. Notice another problem? Describe in comments.						**Your Comments:**

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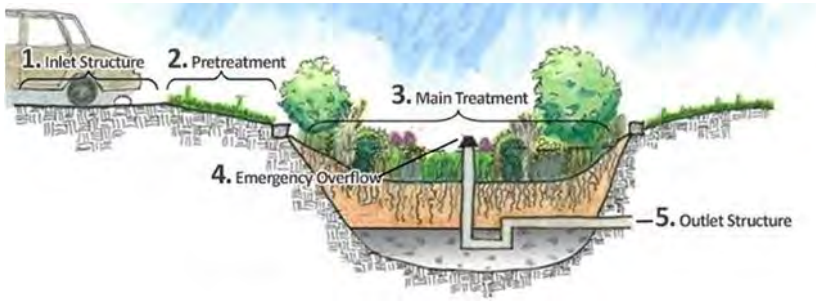

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Main Treatment Area Vegetation (Trees, Shrubs, Grasses; Component Item 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
11. Is vegetation overgrown and in need of weeding, pruning, or clipping?						
Guidance: Remove overgrown vegetation. Do not dispose of clippings and other waste in the bioretention area. **Schedule:** Seasonally						
12. Do plants or trees (not including weeds) cover less than 75% of the planting area?						
Guidance: Supplement vegetation as needed to achieve at least 75% planting area coverage. Native species are preferred. **Schedule:** Seasonally						
13. Are diseased, dying, or dead plants present? At least 85% of shrubs and grasses and 100% of trees must be healthy and growing.						
Guidance: Remove and replace unhealthy or dead vegetation. Native species are preferred. Determine and correct the cause of vegetation health problems. **Schedule:** Seasonally						
14. Notice another problem? Describe in comments.						**Your Comments:**

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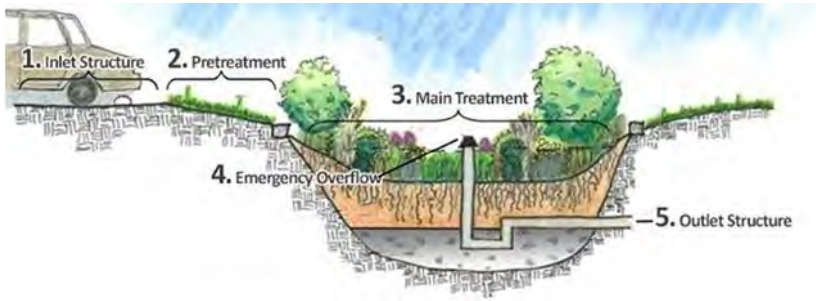

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to Bioretention Area						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
15. Are litter, trash, debris, sediment, grass clippings, or other materials present in the area?						
Guidance: Trash and other materials can wash into the bioretention area during a storm, potentially clogging the inflow or outflow areas, the planting area, and the underdrain. Remove undesirable materials and keep the property clean. **Schedule:** Weekly						
16. Are there stockpiles of soil, chemicals, equipment, or other materials that could be a source of pollutants washing into the bioretention area during a storm?						
Guidance: Stockpiled materials can contain pollutants that are harmful to plants or that can otherwise be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water runoff. **Schedule:** Weekly						
17. Are there areas of erosion or exposed soil/bare earth that could be a source of sediment washing into the bioretention area during a storm?						
Guidance: Too much sediment washing into a bioretention area can clog the planting area. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for those areas, cover them with mulch, wood chips, pavement, or another hard surface to prevent sediment erosion, **Schedule:** Weekly						
18. Do activities nearby that may cause unusual or substantial amounts of pollutants to be discharged to the bioretention area? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Prevent these activities from occurring or take steps to prevent the pollutants from reaching the bioretention area, such as washing cars in areas that drain to the wastewater system, conducting street or parking lot sweeping, installation of pet waste pickup stations, etc. **Schedule:** Weekly						
19. Notice another problem? Describe in comments.						**Your Comments:**

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Bioretention Area Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Bioretention Area Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.2 Urban Bioretention Area Basics

What is Urban Bioretention?

Benefits of Urban Bioretention Areas
- **Removes pollutants from storm water**
- **May reduce erosion in nearby streams**
- **May reduce nuisance flooding**
- **Builds habitat for birds and bees**
- **Creates aesthetic benefits**

Urban bioretention areas are Best Management Practices (BMPs) that provide storm water quality protection by filtering pollutants from storm water. Urban bioretention areas are designed as shallow depressions in the landscape to allow them to capture storm water from the surrounding property. Urban bioretention is similar to a traditional bioretention practice, except that the bioretention is fit into concrete-sided containers within urban landscapes, such as planter boxes or tree planters. The storm water percolates into the urban bioretention area's soil. The typical urban bioretention area will manage about 1-inch of storm water and should **drain completely in about 24 hours after a storm**. Urban bioretention areas that are designed and constructed in this manner will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

In the City of Birmingham, most urban bioretention areas will have five primary components (see the figure below):

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment** areas remove debris and coarse sediment to reduce clogging of the main treatment area
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
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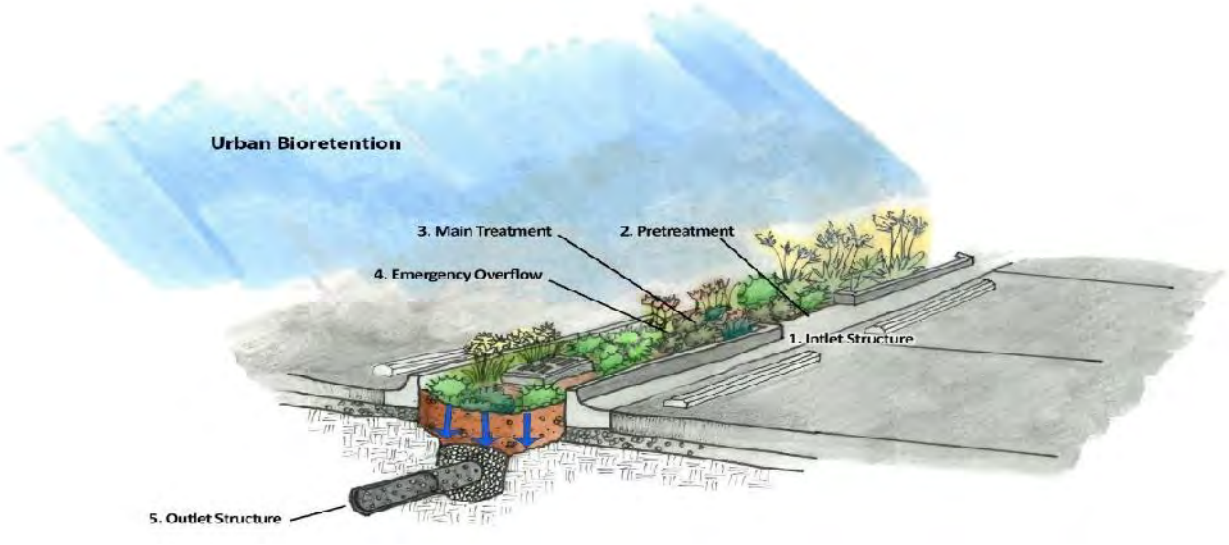


What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your urban bioretention BMP. There are a few key points to keep in mind:

- Urban bioretention areas included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your bioretention area is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your urban bioretention area and save on maintenance costs by protecting the vegetation and soil, keeping your property clean, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning urban bioretention area. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Urban Bioretention Area Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.

Do

- ✓ Check the property frequently for bare soil, erosion, litter, plant health, and soil compaction.
- ✓ Remove weeds and invasive plants. Re-stock with healthy vegetation and ensure that basic requirements for plant health are met.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.

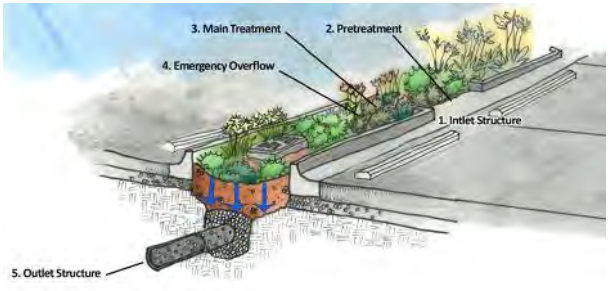
Don't

- X Don't use excessive amounts of salt and sand around the urban bioretention area in the winter.
- X Apply fertilizer, herbicides, or pesticides inside the planting area, and use these materials sparingly on your property. Contact a local nursery or landscape professional if your plants aren't thriving.
- X Don't allow heavy equipment in the urban bioretention areas, or use it as a storage area, even for landscape materials (e.g., leaves, snow, soil mulch, etc.

Urban Bioretention Area Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.



BMP Name(s)				Today's Date:
	Note: The urban bioretention area name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Urban Bioretention Area 1" or "Urban Bioretention Area A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Urban Bioretention?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Urban Bioretention?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes No

Reason for Follow Up?

Completed forms can be submitted by email: poststorm@birminghamal.gov

Storm Water Management ● Department of Planning, Engineering & Permits

710 North 20th Street ● Birmingham, Alabama 35203

Urban Bioretention Area Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Pretreatment and Main Treatment (Components 2 and 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Is the BMP difficult to access for inspection and maintenance?						
Guidance: Any obstacles blocking access to or maintenance of the urban bioretention area should be removed. Put a note in this form if access is blocked by a permanent fixture (e.g. fence) that is not easily removed. **Schedule:** Monthly						
2. Is the area around the BMP damaged in any way? Look for cracks, breaks, depressions, upheaval, spalling, etc.						
Guidance: Cracks, breaks, depressions, upheaval and spalling of the curbing, pavement or sides of the urban bioretention area can be a sign of structural or seepage problems. Planter box damage can result in storm water bypassing or inundation of the planting area, erosion, loss of plant material, mulch or soil media, and a loss of structural integrity. Determine the cause and repair. Consider adding or changing protection measures to prevent future damage. (Note that upheaval can be caused by tree roots within the planter, which could require repair of both the structure and the planting bed.) **Schedule:** Monthly						
3. Are trash, sediment, debris, grass clippings or other materials present in the urban bioretention area?						
Guidance: Remove unwanted materials and correct any problems that can cause clogging or otherwise prevent infiltration of storm water into the soil. **Schedule:** Weekly						
4. Is the mulch thinning or decaying?						
Guidance: Maintain 2 to 4 inches of loosely packed high-quality mulch. Loosen compacted or decaying mulch with a rake before applying new mulch. **Schedule:** Seasonally						
5. Are there signs of human or pet encroachment in the planting area, unrelated to maintenance, such as compacted or displaced mulch, damaged plants, tire tracks, pet waste, or other?						
Guidance: Repair or replace protection measures if damaged (e.g., fences, shrubs/hedges, signs, etc.). Increase protection measures if this is a frequent problem. Rake and refresh mulch and top soil to loosen lightly compacted areas. If standing water has become a problem, see #7 below. (A sign specifically addressing pet waste can reduce dog waste. Also consider installation of a pet waste station (sign, pet waste bag dispenser & trash can) if the urban bioretention is in an area where dog walking is popular.) **Schedule:** Monthly						
6. Is there soil erosion or are there patches of bare soil?						
Guidance: Repair the erosion or bare soil areas with vegetation or mulch. Identify the cause of erosion and take steps to prevent future occurrences. **Schedule:** Monthly						

Urban Bioretention Area Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
7. Are there signs of soil clogging or underdrain blockage? Signs can include frequent standing water than does not drain within 24 hours or hard-packed soil.						
Guidance: Check the underdrain for clogging. Loosen and refresh mulch and topsoil if needed. If the soil is compacted, it may need to be restored with replacement or amendment. **Schedule:** Monthly						
8. Is the underdrain clogged (check observation wells if present)?						
Guidance: The underdrain must not be blocked or clogged for the BMP to function properly. If the problem cannot be resolved by accessing the blockage through the underdrain pipe, then the planting area will likely need to be removed and then restored after fixing the underdrain. In this case, consult a civil engineer or landscape architect to ensure that the underdrain and planting area are restored . **Schedule:** Monthly						
9. Is vegetation overgrown and in need of weeding, pruning or clipping?						
Guidance: Remove overgrown vegetation. Do not dispose of clippings and other landscape debris in the urban bioretention area. **Schedule:** Seasonally						
10. Do plants and trees (not including weeds) cover less than 75% of the planting area (check NA for tree boxes)?						
Guidance: Supplement vegetation as needed to achieve at least 75% coverage of the planting area. Native species are preferred. See the Additional Resources section of this Manual for more information on vegetation selection and maintenance. (Note: This requirement is not applicable to tree boxes (i.e., urban bioretention that are specifically designed and constructed for the growth of one or more trees only). **Schedule:** Seasonally						
11. Are diseased, dying, or dead plants present? (Note that at least 85% of shrubs and grasses and 100% of trees must be healthy and growing as expected.)						
Guidance: Remove and replace unhealthy or dead vegetation. Native species are preferred. Determine and correct the cause of unhealthy vegetation. **Schedule:** Seasonally						
12. Notice another problem? Describe in comments.						**Your Comments:**

Completed forms can be submitted by email: poststorm@birminghamal.gov
Storm Water Management ● Department of Planning, Engineering & Permits
710 North 20th Street ● Birmingham, Alabama 35203

Urban Bioretention Area Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to Bioretention Area						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
13. Is there litter, grass clippings, trash, debris or other materials that could be washed, blown or dumped in the urban bioretention area?						
Guidance: Trash and other materials can be carried into the BMP, potentially clogging the inflow and outflow structures, the planting area and underdrain. Remove undesirable materials and keep the property clean. **Schedule:** Weekly						
14. Are there stockpiles of soils, chemicals, equipment, or other materials that could be a source of pollutants entering the BMP during a storm?						
Guidance: Stockpiled materials can contain pollutants that are harmful or that can be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule:** Weekly						
15. Are there areas of erosion or exposed soil/bare earth that could be a source of soil washing into the BMP during a rainfall?						
Guidance: Too much soil washing into a bioretention area can clog the planting area. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for these areas, cover them with mulch, wood chips, pavement or another measure to prevent erosion. **Schedule:** Monthly						
16. Do activities occur in the area that may cause unusual or substantial amounts of pollutants to be discharged? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Prevent these activities from occurring or take steps to prevent the pollutants from reaching the bioretention area, such as washing cars in areas that drain to the wastewater system, street or parking lot sweeping, pet waste pickup stations, etc. **Schedule:** Weekly						
17. Notice another problem? Describe in comments.						**Your Comments:**

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710 North 20th Street ● Birmingham, Alabama 35203

Urban Bioretention Area Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet Structure, Outlet Structure, and Emergency Overflow (Components 1, 4, and 5)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
18. Are trash, sediment, debris, grass clippings or other materials that can obstruct storm water flow present in the inlet or outlet structures?						
Guidance: Remove unwanted materials and correct any other problems that block the water flow into or out of the urban bioretention area. **Schedule:** Monthly						
19. Have curbs, gutters, grates, or similar components been damaged or altered in any way that disrupts the flow of storm water into or out of the BMP?						
Guidance: Repair damage or alterations before the next rainfall if possible. If components have been intentionally altered to resolve a drainage or flooding issue, consult the City of Birmingham for further guidance. BMP components cannot be altered without approval. **Schedule:** Monthly						
20. Is there visual evidence of pollutants at the inlet or outlet structures (e.g., oil, odd discoloration, stains, etc.)?						
Guidance: Visually check the inlet and outlet structure location(s) and look for discoloration or staining or significant stands of unhealthy vegetation. If you can determine the cause, do so and eliminate it. **Schedule:** Weekly						
21. Notice another problem? Describe in comments.						**Your Comments:**

Urban Bioretention Area Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Urban Bioretention Area Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.3 Dry Water Quality Swale and Enhanced Swale Basics

What are Dry Water Quality Swales and Enhanced Swales?

Benefits of Dry Water Quality Swales and Enhanced Swales

- Allows water to travel away from a site while removing pollutants
- May reduce erosion in nearby streams
- May reduce nuisance flooding

Dry water quality swales and enhanced swales are Best Management Practices (BMPs) that provide storm water quality protection by filtering pollutants from storm water. These BMPs are designed as vegetated channels that treat storm water within small areas formed by check dams, or other means, within the swale. The storm water percolates into the soil. The typical dry water quality swale or enhanced **swale will** manage about 1 inch of storm water and should drain completely in **about 24 hours after a storm**. Dry water quality swales and enhanced swales that are designed and constructed in this manner will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

In the City of Birmingham, most dry water quality swales and enhanced swales will have five primary components (see the figure below):

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment** areas remove debris and coarse sediment to reduce clogging of the main treatment area
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.

What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your dry water quality swale or enhanced swale BMP. There are a few key points to keep in mind:

- Dry water quality swales or enhanced swales included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your dry water quality swale or enhanced swale is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your dry water quality swale or enhanced swale and save on maintenance costs by protecting the vegetation and soil, keeping your property clean, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning swale area. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Dry Water Quality Swale or Enhanced Swale Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.

Do

- ✓ Check the property frequently for bare soil, erosion, litter, plant health, and soil compaction.
- ✓ Remove weeds and invasive plants. Re-stock with healthy vegetation and ensure that basic requirements for plant health are met.
- ✓ Inform contractors working on the property of the BMP location to prevent accidental damage.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.

Don't

- X Don't use excessive amounts of salt and sand around the dry water quality swale or enhanced swale in the winter.
- X Don't apply fertilizer, herbicides, or pesticides in the channel, and use these materials sparingly on your property. Contact a local nursery or landscape professional if your plants aren't thriving.
- X Don't allow heavy equipment in the dry water quality swale or enhanced swale or use it as a storage area, even for landscape materials (i.e. leaves, snow, soil, mulch).

Dry Water Quality Swale/Enhanced Swale Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

BMP Name(s)				Today's Date:
	Note: The dry water quality swale/enhanced swale name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Dry Water Quality Swale 1" or "Dry Water Quality Swale A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Swale?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Swale?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number		Has the City Entered and Approved this Inspection?	Yes / No
Name of Staff Approving This Inspection Report:		Date of Inspection Approval:	
Is a Follow Up Inspection by Staff Required? Circle One:	Yes / No		
Reason for Follow Up?			

Completed forms can be submitted by email: poststorm@birminghamal.gov

Storm Water Management ● Department of Planning, Engineering & Permits
710 North 20th Street ● Birmingham, Alabama 35203

Dry Water Quality Swale/Enhanced Swale Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Pretreatment and Main Treatment (Components 2 and 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Is the swale hard to access for inspection and maintenance?						
Guidance: Any obstacles blocking access and/or maintenance should be removed. If access is blocked by a permanent fixture (e.g. fence), note this on inspection form. **Schedule:** Monthly						
2. Is the swale holding water for longer than 24 hours after a storm?						
Guidance: Water should drain out of the swale in 24 hours after any rain event. If it stays in the swale longer, grass could be killed, or wetland plants could begin to grow. Check for and remove any blockages from the swale. If no blockages are found and standing water is a prevalent occurrence in the swale during otherwise dry periods, more extensive maintenance, such as regrading or repair of the underdrain, may be required. **Schedule:** Monthly						
3. Are there bare or eroding areas in the swale or pretreatment area?						
Guidance: The swale and pretreatment area should have a thick stand of grass. Bare areas and areas of erosion should be repaired and covered with sufficient vegetation or material to slow the water and prevent erosion. **Schedule**: Monthly						
4. Notice another problem? Describe in comments.						**Your Comments:**

Dry Water Quality Swale/Enhanced Swale Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet Structure, Outlet Structure, and Emergency Overflow (Components 1, 4, and 5)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
5. Does the inlet structure have evidence of erosion, bare spots or scour?						
Guidance: Inlet structures should have dense healthy vegetation or a rock, concrete, asphalt, or paver lining to prevent erosion. Bare soil or signs of erosion should NOT be present. Repair eroded areas and cover bare soil immediately with the appropriate vegetation or material cover. **Schedule:** Monthly						
6. Do the inlet or outlet structures or emergency overflow contain trash, sediment, debris, grass clippings or other materials that can obstruct storm water flow?						
Guidance: Remove unwanted materials and correct any other problems that block the water flow into or out of the swale or damage the grass. **Schedule:** Monthly						
7. Is there evidence of erosion or scour at the outlet structure or emergency overflow?						
Guidance: Outlet structures and emergency overflows should not have any signs of erosion and should be covered with sufficient grass or material to slow the water and prevent erosion. If signs of erosion are visible, install a rock lining that extends at least 5' beyond the area of erosion. Consult an experienced professional if you have questions on the size and type of rock. **Schedule:** Monthly						
8. Is there visual evidence of pollutants at the outlet structure (e.g. oil, odd discoloration, stains, etc.)?						
Guidance: Visually check the swale and outlet structure location. Look for discolored or stained grass or significant stands of unhealthy vegetation. Also look for stains at the outlet structure. If a persistent or frequent discoloration occurs, this could be a sign that pollutants have been introduced into the swale. **Schedule:** Monthly						

Dry Water Quality Swale/Enhanced Swale Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Pretreatment and Main Treatment (Components 2 and 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
9. Is the grass overgrown or in need of cutting?						
Guidance: Mow grass to 4-6 inches in height and remove the clippings. Do not dispose of clippings or other waste in the grass swale. **Schedule:** Monthly						
10. Is the grass healthy, and does it cover 100% of the grass swale?						
Guidance: The grass swale should have a healthy, thick cover of grass on the sides and in the bottom of the swale. Consider aerating and over-seeding in the fall to ensure vegetation health. **Schedule:** Seasonally						
8. Are there signs of underdrain blockage? Signs include frequent standing water, hard-packed soil, etc.						
Guidance: If the underdrain is clogged, contact the City of Birmingham. If the soil is compacted, the entire planting layer may need repair to restore percolation. **Schedule:** Monthly						
9. Notice another problem? (describe in comments)						**Your Comments:**

Dry Water Quality Swale/Enhanced Swale Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to Dry Water Quality Swale or Enhanced Swale						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
10. Is there litter, grass clippings, trash, debris or other materials that could enter the dry water quality swale/enhanced swale via storm water or wind?						
Guidance: Trash and other materials can be carried into the swale, causing blockages. Remove undesirable materials and keep the property clean. **Schedule:** Monthly						
11. Are there stockpiles of soil, chemicals, equipment or other materials that could be a source of pollutants washing into the dry water quality swale/enhanced swale during a storm?						
Guidance: Stockpiled materials can contain pollutants that are harmful or that can be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule:** Monthly						
12. Are there areas of erosion or exposed soil/bare earth that could be a source of sediment washing into the swale during a storm?						
Guidance: Too much sediment washing into a swale can reduce the water storage and conveyance in the swale. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for these areas, cover them with mulch, wood chips, pavement or another hard surface to prevent sediment erosion. **Schedule:** Weekly						
13. Do activities occur in the area that may cause unusual or substantial amounts of pollutants to be discharged to the swale? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Implement policies to prevent these activities from occurring or take steps to prevent the pollutants from reaching the swale, such as washing cars in areas that drain to the wastewater system, street or parking lot sweeping, pet waste pickup stations, etc. **Schedule:** Monthly						
14. Notice another problem? Describe in comments.						**Your Comments:**

Dry Water Quality Swale/Enhanced Swale Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Dry Water Quality Swale/Enhanced Swale Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.4 Downspout Disconnection Basics

What is Downspout Disconnection?

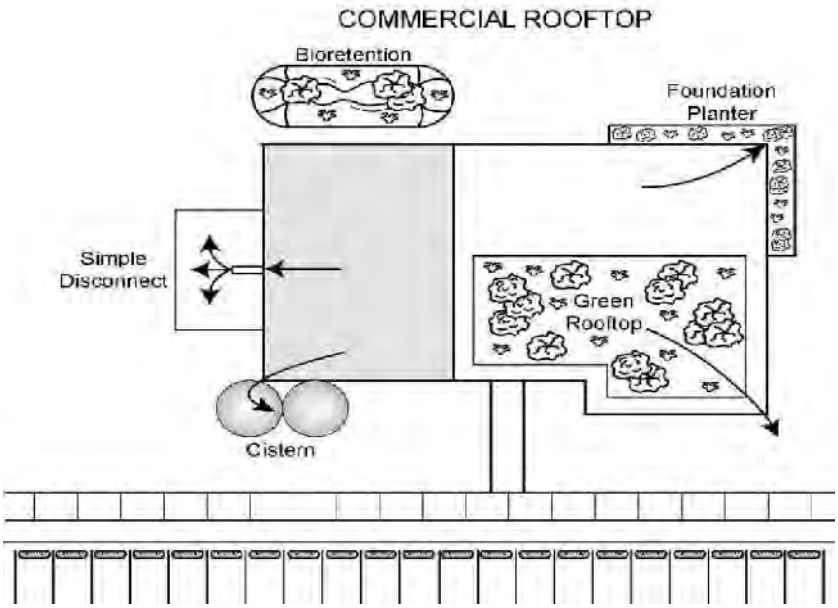
Downspout disconnection is a Best Management Practice (BMP) that manages storm water from impervious surfaces (i.e., rooftops or paved areas such as roads, sidewalks and driveways) by directing it to a vegetated area or to another BMP, thus disconnecting the impervious surface from rooftop or parking lot. This allows the storm water to soak into the ground, be used by plants, or be managed by other means, thus reducing the amount of storm water runoff from the property. The typical downspout disconnection will manage about 1-inch of storm water and should drain completely in about 24 hours after a storm.

Benefits of Downspout Disconnection

- Slows and spreads out storm water from impervious surfaces
- Reduces storm water runoff
- Promotes vegetated areas, which may be attractive landscaping
- Creates aesthetic benefits

Downspout disconnections may send storm water to another BMP, such as a bioretention area or cistern, or simply allow storm water to soak into the ground (see the figure below, (Source: VADCR 2011)).

Only downspout disconnections included on your property's Maintenance Agreement are covered by this Manual.

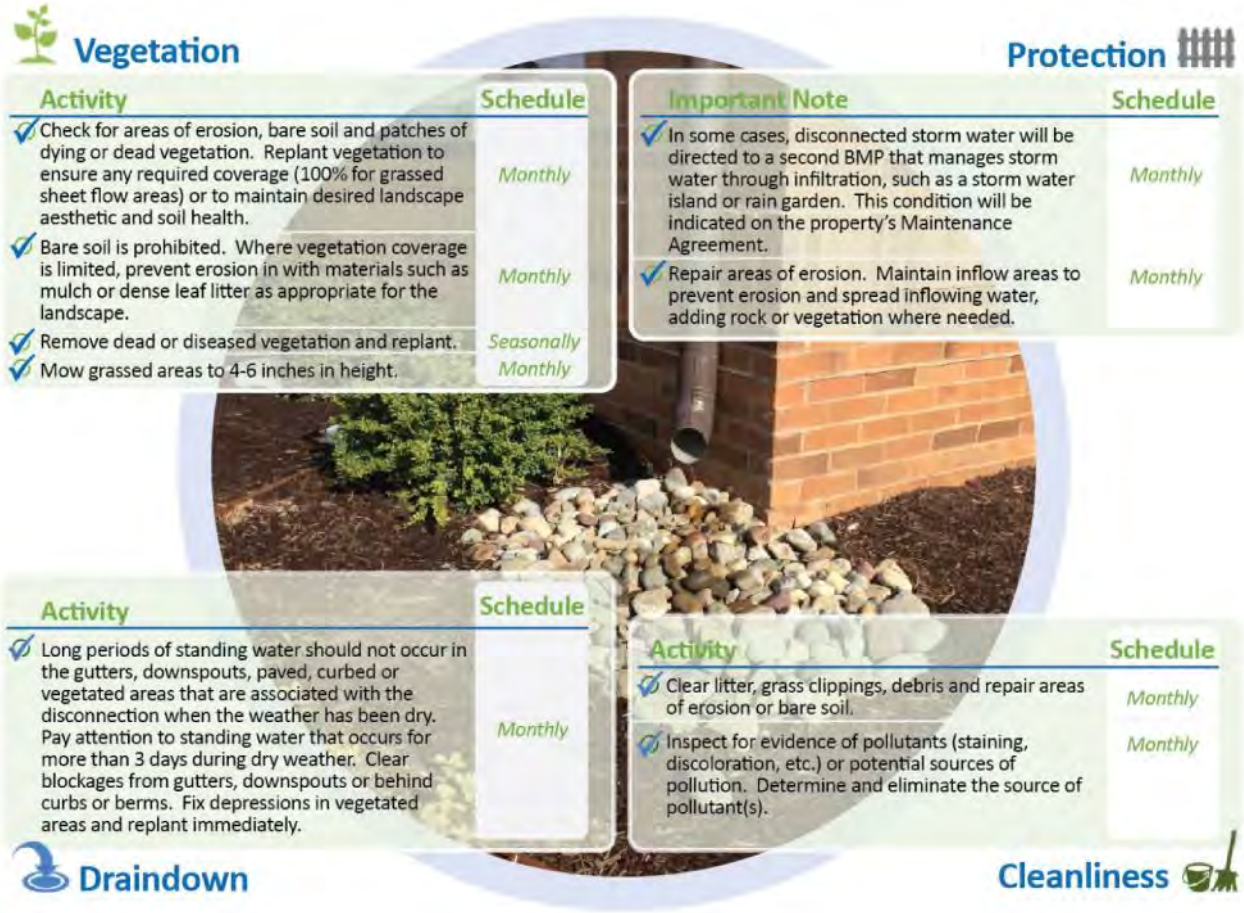


What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your downspout disconnection BMP. There are a few key points to keep in mind:

- Downspout disconnections included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a contractor or landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your downspout disconnection is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your downspout disconnection and save on maintenance costs by protecting the vegetation and soil, keeping your property clean, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning downspout disconnection. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Downspout Disconnection Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.



Do

- ✓ Ensure storm water draining from rooftops and paved areas does not cause erosion in the vegetated areas of the BMP. Reseed any areas of bare soil immediately
- ✓ Remove debris, sand, and dirt that is deposited behind berms and on paved areas to ensure that storm water will slow and spread before entering grassed areas.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.

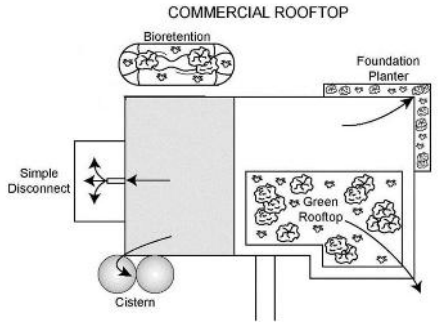
Don't

- X Don't use excessive amounts of salt and sand around the downspout disconnection area in the winter.
- X Don't apply fertilizer, herbicides, or pesticides inside vegetated areas used as part of the disconnection.
- X Don't allow heavy equipment in the vegetated areas of the downspout disconnections, or use it as a storage area, even for landscape materials (e.g., leaves, snow, soil mulch, etc.

Downspout Disconnection Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.



BMP Name(s)				Today's Date:
	Note: The downspout disconnection name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Downspout Disconnection 1" or "Downspout Disconnection A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Disconnection?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Disconnection?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes No

Reason for Follow Up?

Completed forms can be submitted by email: poststorm@birminghamal.gov

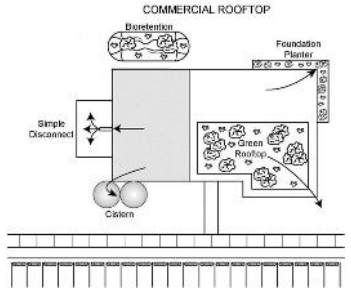
Storm Water Management ● Department of Planning, Engineering & Permits

710 North 20th Street ● Birmingham, Alabama 35203

Downspout Disconnection Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

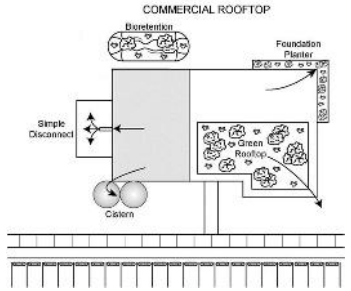


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Pretreatment and Main Treatment (Components 2 and 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Is the BMP difficult to access for inspection and maintenance?						
Guidance: Any obstacles blocking access and/or maintenance should be removed. If access is blocked by a permanent fixture (e.g. fence), contact your local jurisdiction. **Schedule:** Monthly						
2. Are there patches of bare soil or signs of erosion in or near the BMP?						
Guidance: The area must have a healthy stand of grass, shrubs or trees. Repair areas of erosion with vegetation and other materials. Grassed areas must maintain a 100% cover with thick, healthy grass or other groundcover. Other areas must be protected against erosion with materials such as mulch, leaf litter, etc. to prevent erosion. **Schedule:** Monthly						
3. Is anything being stored near the downspout disconnection area, such as trash, cars, or other unnatural materials?						
Guidance: Nothing should be stored in the downspout disconnection area. All materials, equipment, cars, lumber, etc. must be removed, as they are prohibited in the BMP. **Schedule**: Monthly.						
4. Is there visual evidence of dirt, vegetation clippings, oil or other pollutants?						
Guidance: Visually check the area for discolored grass or surfaces. Also look for deposits of soil. Remove pollutants from the BMP and try to determine their source. Repair any damaged vegetation. **Schedule:** Monthly						
5. Are there litter, grass clippings, trash, debris, or other materials that could be swept into the area by water or wind?						
Guidance: Trash and other materials swept into the BMP can block the flow into or out of the area and/or damage vegetation. Remove undesirable materials and keep the property clean. **Schedule:** Monthly						
6. Are there stockpiles of soil, chemicals, equipment, or other materials nearby that could be a source of pollutants?						
Guidance: Stockpiled materials can contain pollutants that are harmful or that can be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule:** Monthly						

Downspout Disconnection Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.



Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
7. Are there areas of erosion or exposed soil/bare earth nearby that could be a source of sediment?						
Guidance: Too much sediment washing onto the BMP can block the flow of runoff and/or damage the grass. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for these areas, cover them with mulch, wood chips, pavement or another hard surface to prevent sediment erosion. **Schedule:** Monthly						
8. Do activities occur in the area that may cause pollutants to be discharged to the area? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Prevent these activities from occurring or take steps to prevent the pollutants from reaching the area, such as washing cars in areas that drain to the wastewater system, street or parking lot sweeping, pet waste pickup stations, etc. **Schedule:** Monthly						
9. Notice another problem? Describe in comments.						**Your Comments:**

Downspout Disconnection Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Downspout Disconnection Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.5 Grass Channel and Open Channel Basics

What are Grassed Channels and Open Channels?

Grass channels and open channels are vegetated Best Management Practices (BMPs) designed to slow and filter storm water, typically before treatment by another BMP. The vegetation covering the side slopes and bottom of the channel reduce the flow of storm water and provide a filtration surface. In steeper areas, some grass channels have stone or concrete "dams" across the width to help slow the water, prevent erosion, and allow some of it to soak into the ground. During large storms, grass channels and open channels can direct extra runoff to other BMPs or to the storm drain system. The typical grass channel or open channel is design to manage site runoff that is directed to it and should drain completely in about 2-3 days after a storm. Grass channels and open channels that are designed and constructed in this manner will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

Benefits of Grass Channels and Open Channels

- Removes pollutants from storm water
- May reduce erosion in nearby streams
- May reduce nuisance flooding
- Reduces the need for additional pavement in the form of curbs and gutters

In the City of Birmingham, most grass channels and open channels will have five primary components (see the figure below):

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment** areas remove debris and coarse sediment to reduce clogging of the main treatment area
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.

What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your grass channel or open channel BMP. There are a few key points to keep in mind:

- Grass channel or open channel BMPs included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a contractor or landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.

- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your grass channel or open channel is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your grass channel or open channel and save on maintenance costs by protecting the vegetation and soil, keeping your property clean, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning grass channel. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Grass Channel/Open Channel Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.

Do

- ✓ Inspect the grass channel to make sure that water is draining and there is no erosion.
- ✓ Reseed any bare areas and water during initial grass establishment period.
- ✓ Adjust mower height to avoid scalping the edges of the site slopes.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.

Don't

- ✗ Don't use excessive amounts of salt and sand around the grass channel or open channel in the winter.
- ✗ Don't apply fertilizer, herbicides, or pesticides inside the grass channel or open channel. Refer to maintenance recommendations in this Manual or contact a local nursery or landscape professional if the grass is not thriving.
- ✗ Don't allow heavy equipment in the grass channel or open channel, or use it as a storage area, even for landscape materials (i.e. leaves, snow, soil mulch)
- ✗ Don't mow grass immediately after a rain event. This could damage the grass channel or open channel.

Grass Channel/Open Channel Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

BMP Name(s)				Today's Date:
	Note: The grass channel/open channel name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Grass Channel 1" or "Grass Channel A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Grass/Open Channel?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Grass/Open Channel?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number		Has the City Entered and Approved this Inspection?	Yes / No
Name of Staff Approving This Inspection Report:		Date of Inspection Approval:	
Is a Follow Up Inspection by Staff Required? Circle One:	Yes / No		
Reason for Follow Up?			

Completed forms can be submitted by email: poststorm@birminghamal.gov
Storm Water Management ● Department of Planning, Engineering & Permits
710 North 20th Street ● Birmingham, Alabama 35203

Grass Channel/Open Channel Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Pretreatment and Main Treatment (Components 2 and 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Is the channel hard to access for inspection and maintenance?						
Guidance: Any obstacles blocking access and/or maintenance should be removed. If access is blocked by a permanent fixture (e.g. fence), note this on inspection form. **Schedule:** Monthly						
2. Is the channel holding water for longer than 2 days after a storm?						
Guidance: Water should drain out of the channel in 2 days after any rain event. If it stays in the channel longer, grass could be killed, or wetland plants could begin to grow. Check for and remove any blockages from the channel. If no blockages are found and standing water is a prevalent occurrence in the channel during otherwise dry periods, more extensive maintenance, such as regrading, may be required. **Schedule:** Monthly						
3. Are there bare or eroding areas in the channel or pretreatment area?						
Guidance: The channel and pretreatment area should have a thick stand of grass. Bare areas and areas of erosion should be repaired and covered with sufficient vegetation or material to slow the water and prevent erosion. **Schedule**: Monthly						
4. Notice another problem? Describe in comments.						**Your Comments:**

Grass Channel/Open Channel Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet Structure, Outlet Structure, and Emergency Overflow (Components 1, 4, and 5)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
5. Does the inlet structure have evidence of erosion, bare spots or scour?						
Guidance: Inlet structures should have dense healthy vegetation or a rock, concrete, asphalt, or paver lining to prevent erosion. Bare soil or signs of erosion should NOT be present. Repair eroded areas and cover bare soil immediately with the appropriate vegetation or material cover. **Schedule:** Monthly						
6. Do the inlet or outlet structures or emergency overflow contain trash, sediment, debris, grass clippings or other materials that can obstruct storm water flow?						
Guidance: Remove unwanted materials and correct any other problems that block the water flow into or out of the channel or damage the grass. **Schedule:** Monthly						
7. Is there evidence of erosion or scour at the outlet structure or emergency overflow?						
Guidance: Outlet structures and emergency overflows should not have any signs of erosion and should be covered with sufficient grass or material to slow the water and prevent erosion. If signs of erosion are visible, install a rock lining that extends at least 5' beyond the area of erosion. Consult an experienced professional if you have questions on the size and type of rock. **Schedule:** Monthly						
8. Is there visual evidence of pollutants at the outlet structure (oil, odd discoloration, stains, etc.)?						
Guidance: Visually check the channel and outlet structure location. Look for discolored or stained grass or significant stands of unhealthy vegetation. Also look for stains at the outlet structure. If a persistent or frequent discoloration occurs, this could be a sign that pollutants have been introduced into the channel. **Schedule:** Monthly						

Grass Channel/Open Channel Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Pretreatment and Main Treatment (Components 2 and 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
9. Is the grass overgrown or in need of cutting?						
Guidance: Mow grass to 4-6 inches in height and remove the clippings. Do not dispose of clippings or other waste in the grass channel. **Schedule:** Monthly						
10. Is the grass healthy, and does it cover 100% of the grass channel?						
Guidance: The grass channel should have a healthy, thick cover of grass on the sides and in the bottom of the channel. Consider aerating and over-seeding in the fall to ensure vegetation health. **Schedule:** Seasonally						
11. Notice another problem? (describe in comments)						**Your Comments:**

Grass Channel/Open Channel Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to Grassed Channel or Open Channel						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
12. Is there litter, grass clippings, trash, debris or other materials that could enter the grass channel/open channel via storm water or wind?						
Guidance: Trash and other materials can be carried into the channel, causing blockages. Remove undesirable materials and keep the property clean. **Schedule:** Monthly						
13. Are there stockpiles of soil, chemicals, equipment or other materials that could be a source of pollutants washing into the grass channel/open channel during a storm?						
Guidance: Stockpiled materials can contain pollutants that are harmful or that can be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule:** Monthly						
14. Are there areas of erosion or exposed soil/bare earth that could be a source of sediment washing into the channel during a storm?						
Guidance: Too much sediment washing into a channel can reduce the water storage and conveyance in the channel. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for these areas, cover them with mulch, wood chips, pavement or another hard surface to prevent sediment erosion. **Schedule:** Weekly						
15. Do activities occur in the area that may cause unusual or substantial amounts of pollutants to be discharged to the channel? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Implement policies to prevent these activities from occurring or take steps to prevent the pollutants from reaching the channel, such as washing cars in areas that drain to the wastewater system, street or parking lot sweeping, pet waste pickup stations, etc. **Schedule:** Monthly						
16. Notice another problem? Describe in comments.						**Your Comments:**

Completed forms can be submitted by email: poststorm@birminghamal.gov
Storm Water Management ● Department of Planning, Engineering & Permits
710 North 20th Street ● Birmingham, Alabama 35203

Grass Channel/Open Channel Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Grass Channel/Open Channel Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.6 Sheet Flow Basics

What is Sheet Flow?

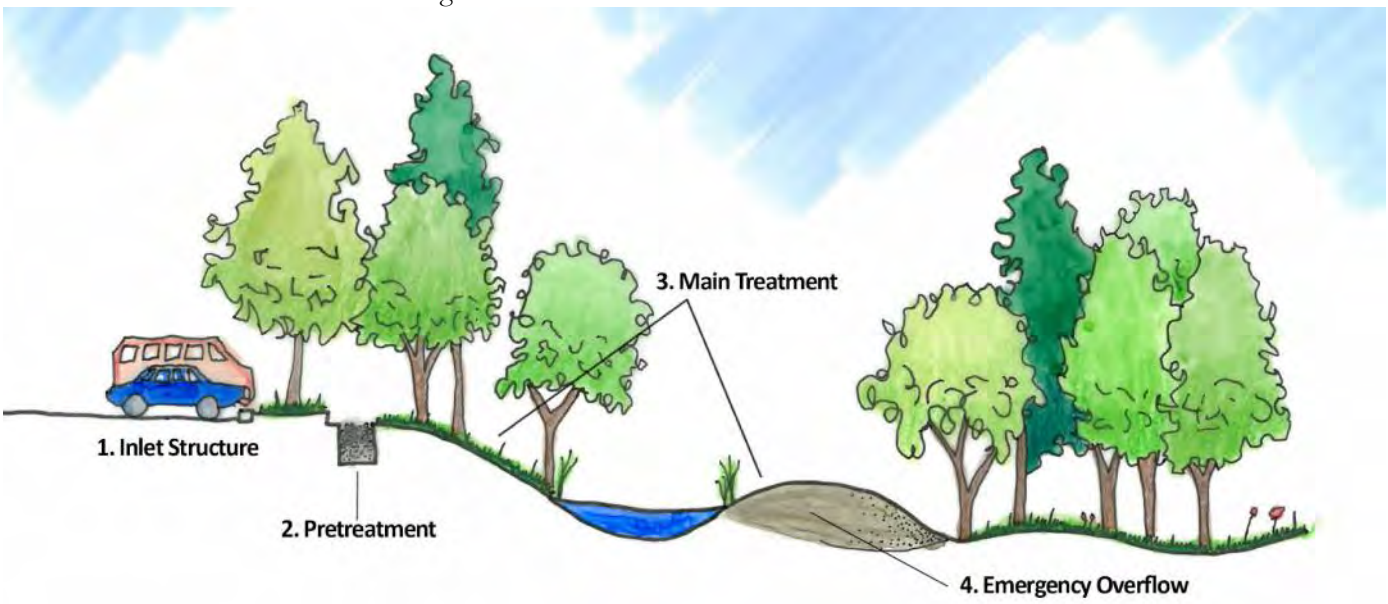
Benefits of Sheet Flow

- **Removes pollutants from storm water**
- **Promotes open space in developed areas**

Sheet flow is a vegetated Best Management Practices (BMPs) designed to slow and filter storm water, typically before treatment by another BMP. Impervious areas are disconnected and runoff is routed over a level spreader to sheet flow over adjacent vegetated areas. This slows runoff velocities, promotes infiltration, and allows sediment and attached pollutants to settle and/or be filtered by the vegetation. The typical sheet flow is design to manage site runoff that is directed to it and should drain completely in about 2-3 days after a storm. Sheet flow areas that are designed and constructed in this manner will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

In the City of Birmingham, most sheet flow BMPs will have five primary components (see the figure below):

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment** areas remove debris and coarse sediment to reduce clogging of the main treatment area
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.

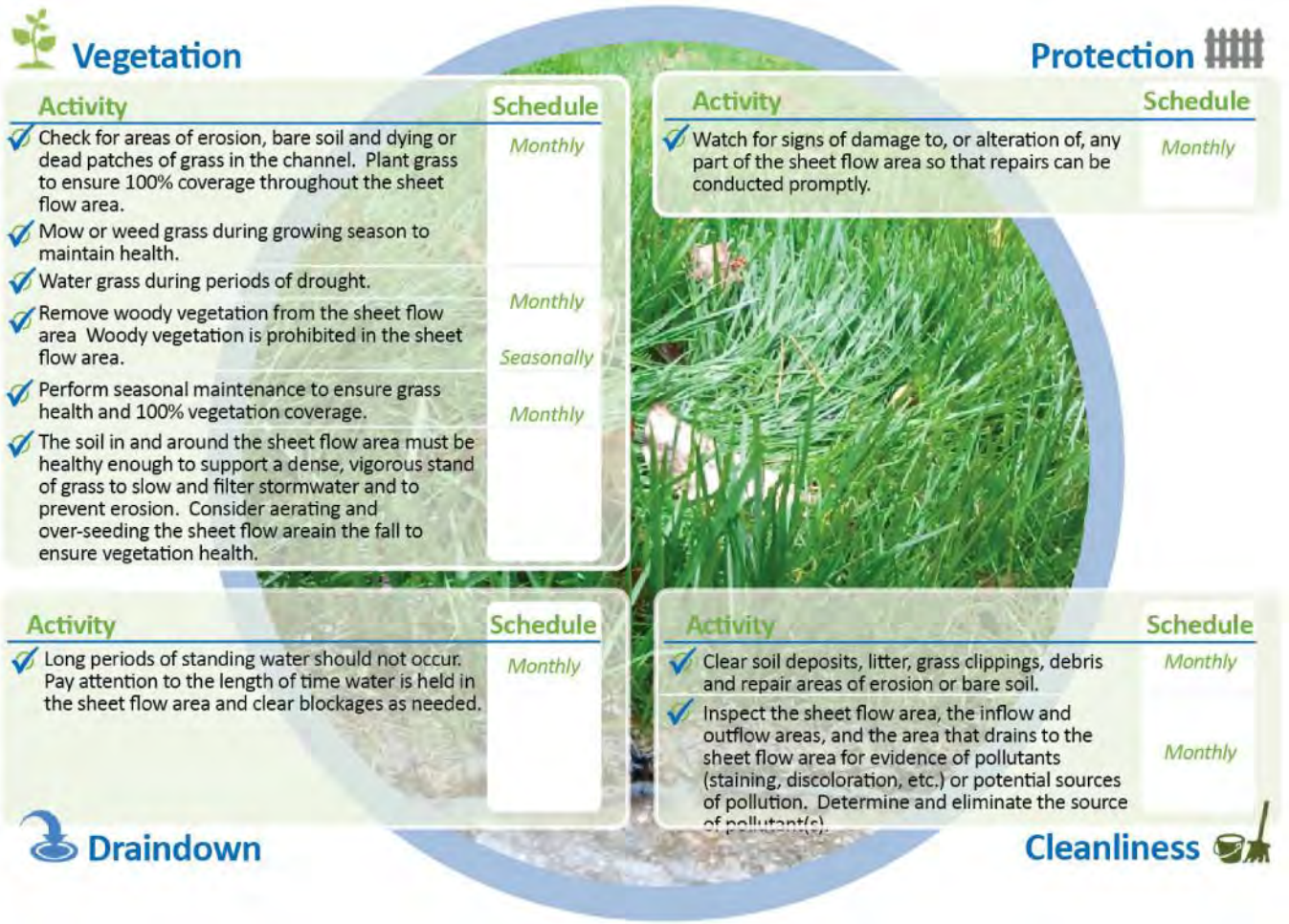


What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your sheet flow BMP. There are a few key points to keep in mind:

- Sheet flow BMPs included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a contractor or landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your sheet flow BMP is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your sheet flow BMP and save on maintenance costs by protecting the vegetation and soil, keeping your property clean, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning sheet flow BMP. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Sheet Flow Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.



Do

- ✓ Inspect the sheet flow area to make sure that water is draining and there is no erosion.
- ✓ Reseed any bare areas and water during initial grass establishment period.
- ✓ Adjust mower height to avoid scalping the edges of the site slopes or berms.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.

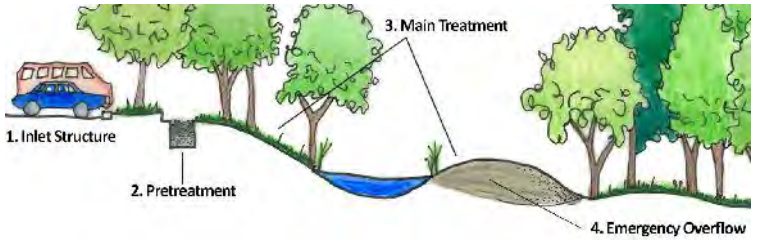
Don't

- ✗ Don't use excessive amounts of salt and sand around the sheet flow BMP in the winter.
- ✗ Don't apply fertilizer, herbicides, or pesticides to the sheet flow area. Refer to maintenance recommendations in this Manual or contact a local nursery or landscape professional if the grass is not thriving.
- ✗ Don't allow heavy equipment in the sheet flow area, or use it as a storage area, even for landscape materials (i.e. leaves, snow, soil mulch)
- ✗ Don't mow grass immediately after a rain event. This could damage the sheet flow area.

Sheet Flow Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.



BMP Name(s)				Today's Date:
	Note: The sheet flow area name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Sheet Flow Area 1" or "Sheet Flow Area A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Sheet Flow area?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Sheet Flow area?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes No

Reason for Follow Up?

Completed forms can be submitted by email: poststorm@birminghamal.gov

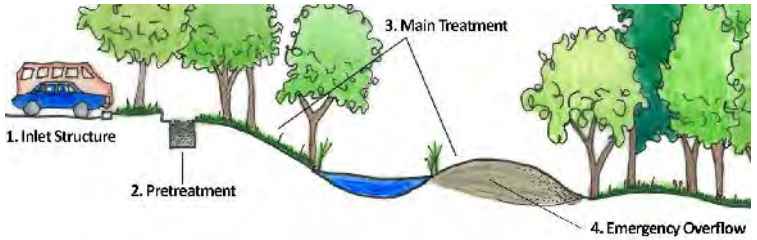
Storm Water Management ● Department of Planning, Engineering & Permits

710 North 20th Street ● Birmingham, Alabama 35203

Sheet Flow Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.



Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Pretreatment and Main Treatment (Components 2 and 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Is the sheet flow area hard to access for inspection and maintenance?						
Guidance: Any obstacles blocking access and/or maintenance should be removed. If access is blocked by a permanent fixture (e.g. fence), note this on inspection form. **Schedule:** Monthly						
2. Is the sheet flow area holding water for longer than 1 days after a storm?						
Guidance: Water should drain out of the sheet flow area in 1 days after any rain event. If it stays in the sheet flow area longer, grass could be killed, or wetland plants could begin to grow. Check for and remove any blockages from the sheet flow area. If no blockages are found and standing water is a prevalent occurrence in the sheet flow area during otherwise dry periods, more extensive maintenance, such as regrading, may be required. **Schedule:** Monthly						
3. Are there bare or eroding areas in the sheet flow area or pretreatment area?						
Guidance: The sheet flow area and pretreatment area should have a thick stand of grass. Bare areas and areas of erosion should be repaired and covered with sufficient vegetation or material to slow the water and prevent erosion. **Schedule**: Monthly						
4. Does the level spreader have evidence of erosion, scour, or damage?						
Guidance: Repair eroded areas and damaged components as soon as possible. A qualified professional may be needed for some repairs. **Schedule:** Annually						
5. Notice another problem? Describe in comments.						**Your Comments:**

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Storm Water Management ● Department of Planning, Engineering & Permits
710 North 20th Street ● Birmingham, Alabama 35203

Sheet Flow Inspection Form

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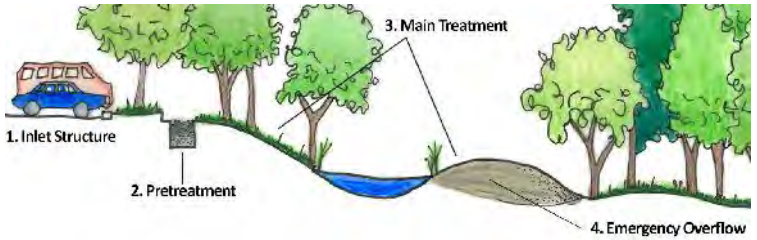
The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

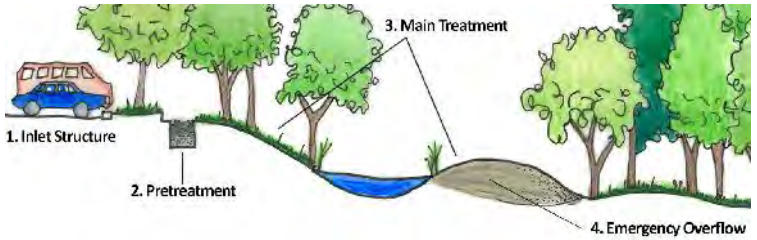


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Pretreatment and Main Treatment (Components 2 and 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
6. Is the grass overgrown or in need of cutting?						
Guidance: Mow grass to 4-6 inches in height and remove the clippings. Do not dispose of clippings or other waste in the grass sheet flow area. **Schedule:** Monthly						
7. Is the grass healthy, and does it cover 100% of the sheet flow area?						
Guidance: The grass sheet flow area should have a healthy, thick cover of grass on the sides and in the bottom of the sheet flow area. Consider aerating and over-seeding in the fall to ensure vegetation health. Woody vegetation is not allowed in the sheet flow area and should be removed. **Schedule:** Seasonally						
8. Notice another problem? (describe in comments)						**Your Comments:**

Sheet Flow Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.



Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to Sheet Flow area						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
9. Is there litter, grass clippings, trash, debris or other material that could enter the sheet flow area via storm water or wind?						
Guidance: Trash and other materials can be carried into the sheet flow area, causing blockages. Remove undesirable materials and keep the property clean. **Schedule:** Monthly						
10. Are there stockpiles of soil, chemicals, equipment or other materials that could be a source of pollutants washing into the sheet flow area during a storm?						
Guidance: Stockpiled materials can contain pollutants that are harmful or that can be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule:** Monthly						
11. Are there areas of erosion or exposed soil/bare earth that could be a source of sediment washing into the sheet flow area during a storm?						
Guidance: Too much sediment washing into a sheet flow area can reduce the water storage and conveyance in the sheet flow area. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for these areas, cover them with mulch, wood chips, pavement or another hard surface to prevent sediment erosion. **Schedule:** Monthly						
12. Do activities occur in the area that may cause unusual or substantial amounts of pollutants to be discharged to the sheet flow area? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Implement policies to prevent these activities from occurring or take steps to prevent the pollutants from reaching the sheet flow area, such as washing cars in areas that drain to the wastewater system, street or parking lot sweeping, pet waste pickup stations, etc. **Schedule:** Monthly						
13. Notice another problem? Describe in comments.						**Your Comments:**

Completed forms can be submitted by email: poststorm@birminghamal.gov
Storm Water Management ● Department of Planning, Engineering & Permits
710 North 20th Street ● Birmingham, Alabama 35203

Sheet flow Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Sheet flow Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.7 Reforestation Basics

What is Reforestation?

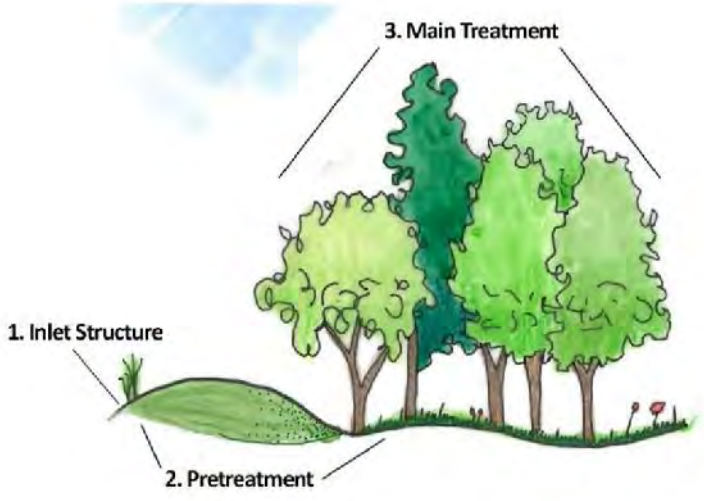
Benefits of Reforestation

- **Removes pollutants from storm water**
- **Reduces storm water runoff**
- **Provides shade, cooling, and energy savings**
- **Promotes open space in developed areas**

Reforestation is a vegetated Best Management Practice (BMPs) and refers to the planting of trees, shrubs and other native vegetation in previously disturbed vegetated areas to restore them to their undisturbed (predeveloped) conditions. Restoring sites that have been disturbed by clearing, grading and other land disturbing activities improves their ability to intercept rainfall, increases evaporation and plant uptake of water, slows and filters storm water, and helps improve soil drainage. This can lead to reduced storm water rates, volumes and pollutant loads. The typical reforestation area is design to reduce the impervious area on a site. Reforestation areas that are designed and constructed in this manner will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

In the City of Birmingham, most reforestation BMPs will have three primary components (see the figure below). Unlike most BMPs, reforestation areas do not tend to have emergency overflows or outlet structures unless they are associated with another BMP, ditch, or waterway.

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment** areas remove debris and coarse sediment to reduce clogging of the main treatment area
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** (not present) allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** (not present) allows treated water to exit the BMP.



What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your reforestation BMP. There are a few key points to keep in mind:

- Reforestation BMPs included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a contractor or landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your reforestation BMP is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your reforestation BMP and save on maintenance costs by protecting the vegetation and soil, keeping your property clean, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning reforestation BMP. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Reforestation Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.

Do

- ✓ Ensure that the reforestation area is protected to remain undisturbed and natural.
- ✓ Remove trash and debris that accumulates in, or can be blown or washed into, the reforestation area.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Address erosion and unhealthy vegetation as problems are noticed.

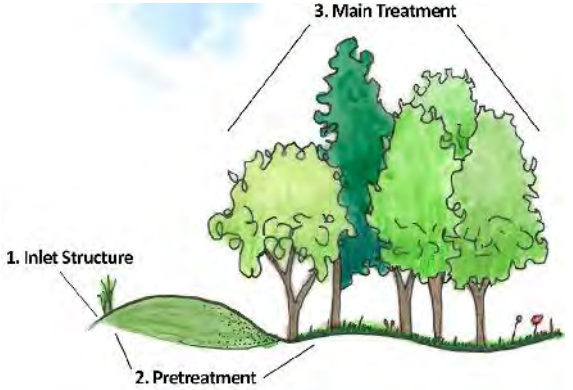
Don't

- X Don't use excessive amounts of salt and sand around the reforestation BMP in the winter. Limit application of fertilizers, herbicides, or pesticides in the reforestation area and use these materials sparingly on the property. Refer to maintenance recommendations in this Manual or contact a local nursery or landscape professional if the trees and other vegetation is not thriving.
- X Don't allow heavy equipment in the reforestation area, or use it as a storage area, even for landscape materials (i.e. leaves, snow, soil mulch).

Reforestation Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.



BMP Name(s)				Today's Date:
	Note: The reforestation area name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Reforestation Area 1" or "Reforestation Area A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Reforestation area?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Reforestation area?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes No

Reason for Follow Up?

Completed forms can be submitted by email: poststorm@birminghamal.gov

Storm Water Management ● Department of Planning, Engineering & Permits

710 North 20th Street ● Birmingham, Alabama 35203

Reforestation Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

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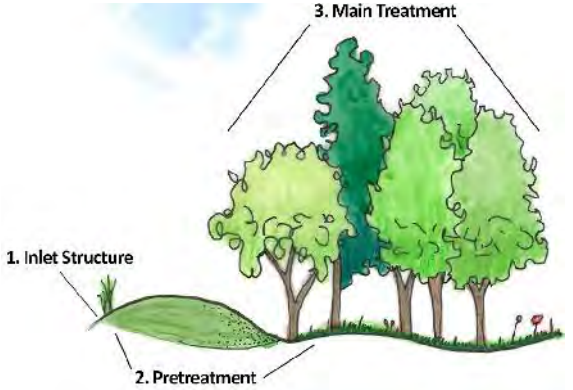

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Pretreatment and Main Treatment (Components 2 and 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Is the reforestation area hard to access for inspection and maintenance?						
Guidance: Any obstacles blocking access and/or maintenance should be removed. If access is blocked by a permanent fixture (e.g. fence), note this on inspection form. **Schedule:** Monthly						
2. Are there areas of bare or compacted soil?						
Guidance: The tree canopy should cover 75% of the reforestation area. Native understory species and seasonal leaf fall may provide sufficient ground cover. Mulch can also be applied to provide cover. Compacted soil may require replacement. **Schedule:** Monthly						
3. Are there dead or dying trees or patches of dead understory plants?						
Guidance: The tree canopy should cover 75% of the reforestation area. Determine the cause of dead or dying trees and correct it or hire an experienced professional. Replanting may be required to meet the 75% cover requirement. **Schedule**: Seasonally						
4. Are there invasive plants such as English ivy or kudzu present?						
Guidance: Remove invasive plants to promote the growth of trees and native vegetation. A qualified professional may be needed for large scale removal. **Schedule:** Seasonally						
5. Notice another problem? Describe in comments.						**Your Comments:**

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710 North 20th Street ● Birmingham, Alabama 35203

Reforestation Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

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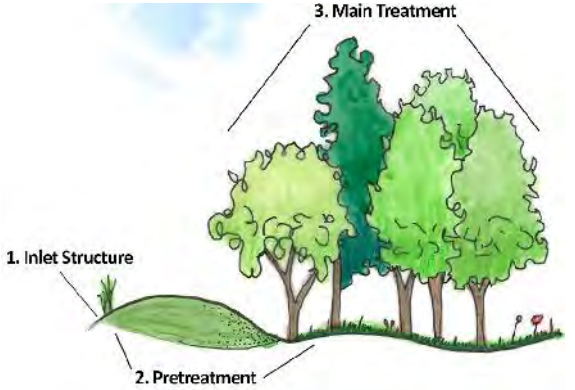


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to Reforestation area						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
6. Is there litter, grass clippings, trash, debris or other materials that could enter the reforestation area via storm water or wind?						
Guidance: Trash and other materials can be carried into the reforestation area, reducing the storm water benefits of a reforestation area. Remove undesirable materials and keep the property clean. **Schedule:** Monthly						
7. Are there stockpiles of soil, chemicals, equipment or other materials that could be a source of pollutants washing into the reforestation area during a storm?						
Guidance: Stockpiled materials can contain pollutants that are harmful or that can be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule:** Monthly						
8. Are there areas of erosion or exposed soil/bare earth that could be a source of sediment washing into the reforestation area during a storm?						
Guidance: Too much sediment washing into a reforestation area can reduce storm water benefits of the reforestation area. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for these areas, cover them with mulch, wood chips, pavement or another hard surface to prevent sediment erosion. **Schedule:** Monthly						
9. Do activities occur in the area that may cause unusual or substantial amounts of pollutants to be discharged to the reforestation area? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Implement policies to prevent these activities from occurring or take steps to prevent the pollutants from reaching the reforestation area, such as washing cars in areas that drain to the wastewater system, street or parking lot sweeping, pet waste pickup stations, etc. **Schedule:** Monthly						
10. Notice another problem? Describe in comments.						**Your Comments:**

Reforestation Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Reforestation Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.8 Green Roof Basics

What is a Green Roof?

Benefits of Green Roofs

- **Reduces the volume of storm water that runs off a roof**
- **Provides building insulation and energy savings**
- **Increases aesthetic value**

Green roofs are Best Management Practices (BMPs) that that typically contain a layered system of roofing, which is designed to support plant growth and retain water for plant uptake while preventing damage to the roof deck. The roofs are designed so that water drains vertically through the soil media and then horizontally along a waterproofing layer towards the outlet. The typical green roof will manage about 1-inch of storm water and should drain completely in about 2 to 3 days after a storm. Green roofs that are designed and constructed in this manner will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

In the City of Birmingham, most green roofs will have three primary components (see the figure below). Unlike most BMPs, green roofs will receive storm water as direct precipitation and therefore usually lack inlet structures and pretreatment areas.

1. **Inlet structures (not present)** bring water into the BMP.
2. **Pretreatment areas (not present)** remove debris and coarse sediment to reduce clogging of the main treatment area.
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.

What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your green roof BMP. There are a few key points to keep in mind:

- Green Roofs included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a contractor or landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your green roof area is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your green roof and save on maintenance costs by protecting the health of the vegetation, maintaining healthy and stable soil media, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning green roof. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Green Roof Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.

Vegetation

Activity	Schedule
✓ Check vegetation for signs of stress or disease (yellowing vegetation, wilting, damaged leaves, etc.).	Monthly
✓ Replace dead or dying vegetation so that the planting area is at least 75% covered with vegetation.	Seasonally
✓ Remove undesirable weeds or invasive plants.	Seasonally
✓ Check that the planting soil or growing medium has a sufficient depth. Over time, soil can be lost through erosion by wind and water. The original growing medium depth should be maintained to support the vegetation.	Annually
✓ Test soil/growing medium for nutrients and apply when and if needed. Do not apply fertilizers and soil amendments without a soil test.	Annually
✓ Unless the green roof includes trees, remove deep rooted vegetation, as the root system can damage the waterproof membrane.	Semi-Annually

Protection

Activity	Schedule
✓ Check for signs of encroachment. Maintain and repair measures that prevent encroachment, such as strategic placement of landscaping, signs, and limitations on roof access	Monthly

Draindown

Activity	Schedule
✓ Visually inspect roof drains, scuppers and gutters to ensure they are draining. Check for signs of outflow during dry periods. If flow is present, check for blockages at drain inlets or in the roof drain or downspout pipe systems.	Monthly
✓ Check the waterproof membrane for evidence of leaking, cracks of other deterioration. Contact a roofing specialist familiar with green roofs to determine the best repair.	Twice per year
✓ Look for damage or deterioration to other structural components, such as flow diverters, gutters and roof drains.	Twice per year

Cleanliness

Activity	Schedule
✓ Remove litter, vegetation clippings, trash and other debris or materials from planting areas and roof drains/scuppers.	Semi-Annually
✓ Note signs of pollution, such as oil sheens, staining or discoloration on the green roof. Look for pollutant sources and eliminate them.	Semi-Annually

Do

- ✓ Check the waterproof membrane for evidence of leaks or deterioration.
- ✓ Remove weeds and invasive plants. Re-stock with healthy vegetation and ensure that basic requirements for plant health are met.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.
- ✓ Prevent damage to the green roof by informing landscapers, contractors, and others that may be managing the buildings or landscape on the property of the location and purpose of the BMP.

Don't

- X Don't use regular garden soil to replace the engineered soil or media. Regular soil is heavy and can damage the structural integrity of your green roof.
- X Don't neglect the maintenance needs of your green roof. Consider hiring an experienced professional if needed.
- X Don't apply herbicides or weed killer without first consulting a horticulturalist experienced with green roofs.

Green Roof Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

BMP Name(s)				Today's Date:
	Note: The green roof name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Green Roof 1" or "Green Roof A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Green Roof?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Green Roof?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes / No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes / No

Reason for Follow Up?

Completed forms can be submitted by email: poststorm@birminghamal.gov

Storm Water Management ● Department of Planning, Engineering & Permits
710 North 20th Street ● Birmingham, Alabama 35203

Green Roof Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet Structures, Outlet Structures, and Emergency Overflows (Components 4 and 5)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Are trash, sediment, debris, grass clippings or other materials that can obstruct storm water flow present near inlet structures outlet structures or emergency overflows?						
Guidance: Remove unwanted materials and correct any other problems that block the water flow. Standing water should not be observed in the planting area for more than 2 days. **Schedule:** Monthly						
2. Is water flowing from the outlet when it is not expected?						
Guidance: The green roof is designed to drain within 2 days after a rainfall. This may take longer during especially wet periods. In addition, if the irrigation system doesn't adjust to overly wet conditions, ponding may be exacerbated. During dry periods, an outlet that is discharging water or water ponding in the planting area may indicate a clog or blockage. Determine the cause and correct it. If the cause cannot be determined, call a civil engineer or irrigation specialist for assistance. **Schedule**: Weekly						
3. Notice another problem? Describe in comments.						**Your Comments:**

Green Roof Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Main Treatment (Component 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
4. Is the soil media compacted or does the soil media have less than the proper depth?						
Guidance: Visually check the condition and depth of the soil media. Replace with the appropriate soil media to maintain the depth required by the design. Soil loss is expected over time, through wind and water erosion. Foot traffic in the planting area can cause compaction of the soil. Loosen soils when replanting and put protection measures in place to prevent future foot traffic impacts. **Schedule**: Twice per year						
5. Are main components such as irrigation system, downspouts and inlets, gutters, scuppers and their associated mechanical components hard to access for operation, inspection and maintenance?						
Guidance: Any obstacles blocking access to, or maintenance of, these components should be removed. Put a note in this form if access is blocked by a permanent fixture (e.g. fence) that is not easily removed. **Schedule:** Monthly						
6. Is the vegetation unhealthy and/or and covering less than 75% of the planting area?						
Guidance: Soil and plants work together to take up water and nutrients. Healthy plants have the proper coloring in leaves and often have vigorous growth. Yellowing leaves, spots on leaves and wilted or stunted vegetation is often a sign of a problem. Obvious issues include a lack of water, wrong plant for the location (soil moisture, sun exposure, temperature). If vegetation does not look healthy and water management isn't the issue, take a soil test and apply fertilizers and lime based upon the recommendations of the soil test. Do not apply nutrients without first doing a soil test, as over fertilizing can cause storm water pollution. Address the issue or replace the plant – with feedback from a nursery – so that the plants cover at least 75% of the planting area. **Schedule:** Monthly						
7. Are there weeds growing in the planting area?						
Guidance: Remove any weeds found in the green roof area and dispose of them. Weeds can out-compete other desirable plants by competing for water, nutrients and sun. Remove weeds before they go to seed to prevent additional spreading. **Schedule:** Monthly						

Green Roof Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
8. Are there dead or dying plants in the planting area?						
Guidance: Remove dead, diseased or dying plants and replace them with appropriate plants. Consult a nursery to find the best plants for the soil moisture, sun exposure, and heat expected on the roof. **Schedule:** Monthly						
9. Is there evidence of water leaks under or around the structure of the green roof?						
Guidance: Under the plants and soil is a waterproof membrane designed to keep water from seeping into other components of the roof structure. If this happens, water damage to the roofing structure can occur. Look for water spots, wetness on structural components outside of or under the green roof, and overly dry soils under normal rainfall conditions. If a leak is suspected, contact a qualified roofing company to perform an assessment. It may be that the waterproof membrane has been damaged and must be replaced. **Schedule:** Twice per year						
10. Notice another problem? Describe in comments.						**Your Comments:**

Green Roof Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Green Roof Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.9 Permeable Pavement Basics

What is Permeable Pavement?

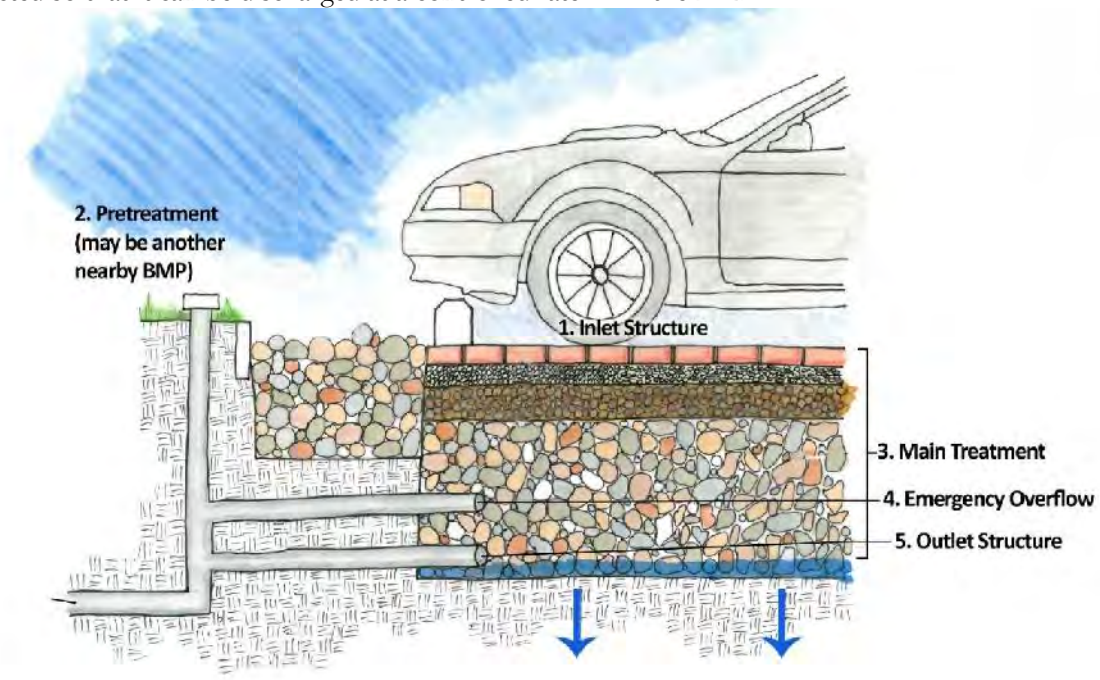
Permeable pavement is a general term for Best Management Practices (BMP) that allow storm water to filter through voids (holes) in a pavement surface where it can then infiltrate (soak) into the underlying soil. There are four major categories of permeable pavement 1) pervious concrete; 2) modular block systems; 3) grass pavers; and 4) gravel pavers. Whatever type of permeable pavement you have on your property, it will be readily identifiable on your property's Maintenance Agreement. Typically, permeable pavement will manage about 1 inch of storm water and should be dry on the pavement surface about 2 hours after a storm.

Benefits of Permeable Pavement

- **Reduces the volume of storm water that runs off a property**
- **Removes pollutants**
- **Increases aesthetic value of paved areas**

In the City of Birmingham, most permeable pavement will have five primary components (see the figure below):

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment areas** remove debris and coarse sediment to reduce clogging of the main treatment area.
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.



What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your permeable pavement. There are a few key points to keep in mind:

- Permeable pavement included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a contractor or landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your permeable pavement is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your permeable pavement and save on maintenance costs by keeping your property clean, preventing erosion on your property, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning permeable pavement. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Permeable Pavement Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.

Do

- ✓ Inspect the BMP after storms to make sure storm water properly drains through the material.
- ✓ Remove sediment that could wash into the BMP by using a leaf blower (for gravel or grass areas) or a vacuum sweeper (for concrete or asphalt areas) and properly disposing of sediment.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.
- ✓ Prevent damage to the permeable pavement by informing landscapers, contractors, and others that may be managing the buildings or landscape on the property of the location and purpose of the BMP.

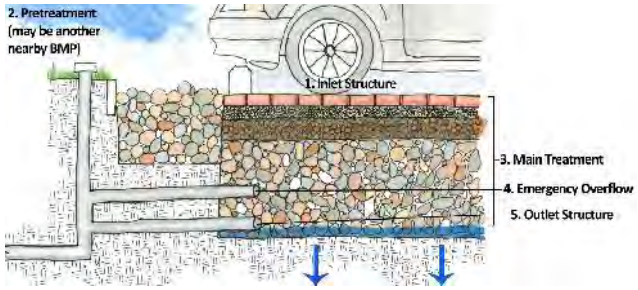
Don't

- X Don't stockpile mulch, sand, salt, soil or yard waste on the permeable pavement.
- X Don't neglect the maintenance needs of your permeable pavement. Consider hiring an experienced professional if needed.
- X Don't apply sand or salt for snow removal on permeable pavement or pile snow that contains sand or salt on your permeable pavement.
- X Don't apply sealants over permeable pavement or repave the area with materials that do not let water pass through.

Permeable Pavement Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.



BMP Name(s)				Today's Date:
	Note: The permeable pavement area name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Permeable Pavement Area 1" or "Permeable Pavement Area A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Permeable Pavement?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Permeable Pavement?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes No

Reason for Follow Up?

Completed forms can be submitted by email: poststorm@birminghamal.gov

Storm Water Management ● Department of Planning, Engineering & Permits

710 North 20th Street ● Birmingham, Alabama 35203

Permeable Pavement Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

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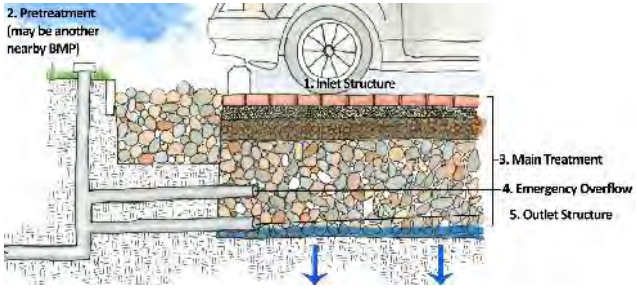
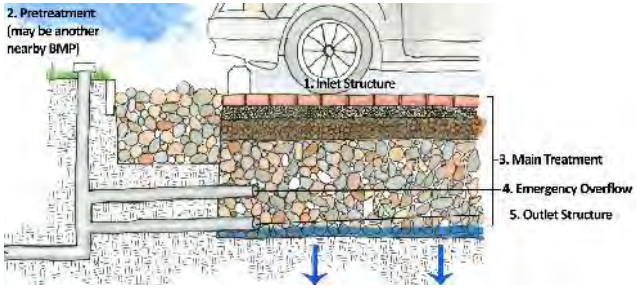


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Main Treatment (Component 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Is the BMP difficult to access for inspection and maintenance?						
Guidance: Any obstacles blocking access to or maintenance of the permeable pavement should be removed. Put a note in this form if access is blocked by a permanent fixture (e.g. fence) that is not easily removed. **Schedule:** Monthly						
2. Are trash, sediment, debris, grass clippings, or other materials that can obstruct storm water flow on or adjacent to the pavement surface?						
Guidance: Remove unwanted materials and correct any other problems that block the water flow. **Schedule:** Monthly						
3. Do activities occur in the area that may cause unusual or substantial amounts of pollutants (especially oil and grease) to be discharged through the pavement?						
Guidance: Activities in the drainage area should minimize oil, grease, and sediment from reaching the draining surface. **Schedule:** Weekly						
4. Is there evidence of deterioration or cracking of the pavement? Is there any damage or erosion to the inlets or outlets?						
Guidance: There should be no signs of cracking or erosion. If these are found, repair or replace any damaged material. **Schedule**: Monthly						
5. Is water storm water bypassing the permeable surface?						
Guidance: Storm water should be drained into surface generally 1-2 hours of a storm and should not be flowing off of the surface into adjacent areas. **Schedule:** Monthly						

Permeable Pavement Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.



Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
6. Is there any visual evidence of long-term ponding or standing water (e.g., stains, odors, etc)?						
Guidance: Remove unwanted materials and correct any other problems that can cause clogging or otherwise prevent percolation of storm water into the permeable pavement. **Schedule:** Monthly						
7. Does the area surrounding the practice contain exposed soil or bare earth?						
Guidance: The area surrounding the permeable pavement should be maintained (e.g., grass mowed regularly, no exposed soil near the draining surface, **Schedule:** Weekly						
8. Are any clean-out caps missing?						
Guidance: Visually inspect for missing or damage components and repair or replace as needed. **Schedule:** Monthly						
9. Has the underdrain system been flushed properly, displaying no clogging?						
Guidance: The draining system should be flushed annually (or sooner if needed) and no clogs should be present in the draining system. **Schedule:** Annually						
10. Notice another problem? Describe in comments.						**Your Comments:**

Completed forms can be submitted by email: poststorm@birminghamal.gov
Storm Water Management ● Department of Planning, Engineering & Permits
710 North 20th Street ● Birmingham, Alabama 35203

Permeable Pavement Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Permeable Pavement Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.10 Infiltration Trench Basics

What is an Infiltration Trench?

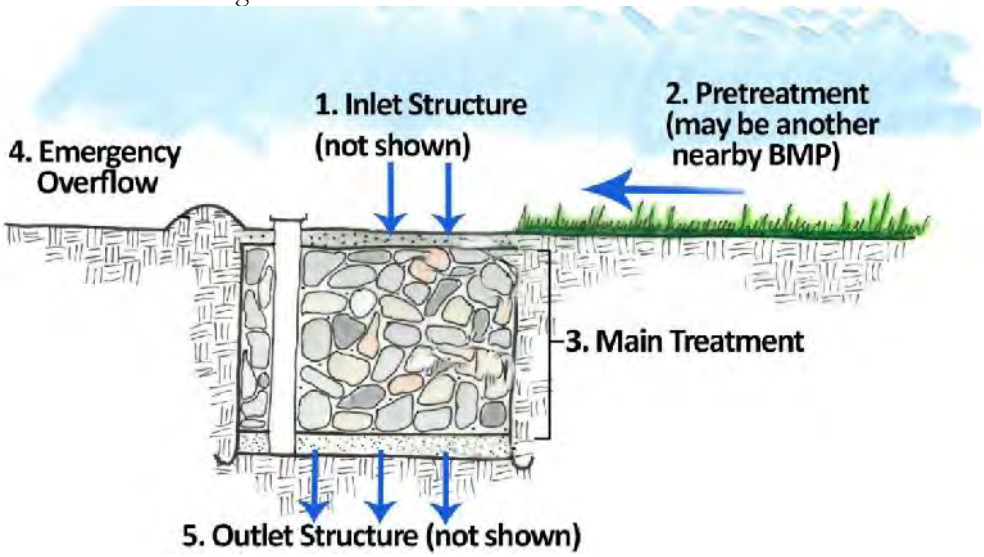
Benefits of Infiltration Trenches

- **Reduces the volume of storm water that runs off a property**
- **Typically take up less space than some other BMPs and fit well on small sites**

Infiltration trenches are Best Management Practices (BMP) that that capture and infiltrate storm water into the surrounding soils from the bottom and sides of an excavated, stone filled trench. Storm water is captured and directed through layers of stone that filter out pollutants and return clean water back to the local stream or into the storm drainage system. Some infiltration trenches are also covered with permeable topsoil and planted with grass in a landscaped area. Typically, infiltration trenches will manage about 1 inch of storm water and should drain completely about 24 to 48 hours after a storm. Infiltration trenches that are designed and constructed in this manner will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

In the City of Birmingham, most infiltration trenches will often have three primary components (see the figure below). Some infiltration trenches, like the one shown below, may receive storm water as sheet flow and infiltrate directly to groundwater and therefore may lack inlet structures and outlet structures.

1. **Inlet structures** (not shown) bring water into the BMP.
2. **Pretreatment areas** remove debris and coarse sediment to reduce clogging of the main treatment area.
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** (not shown) allows treated water to exit the BMP.



What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your infiltration trench. There are a few key points to keep in mind:

- Infiltration trenches included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a contractor or landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your infiltration trench is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your infiltration trench and save on maintenance costs by keeping your property clean, preventing erosion on your property, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning infiltration trench. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Infiltration Trench Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.

Vegetation

Activity	Schedule
Check for stressed, dying or dead grass and for areas of bare soil and erosion in the filter strip. If the infiltration trench itself is grassed, do the same, taking care to avoid compaction of the topsoil on the surface of the trench.	Monthly
Mow grass to an approximate 4-inch grass height. Dispose of grass clippings.	Monthly
Perform seasonal grass maintenance to ensure 100% grass coverage of dense healthy grass in the filter strip at all times.	Monthly
Clear weeds, tree sprouts and invasive vegetation.	Seasonally

Protection

Activity	Schedule
Clear weeds, tree sprouts and invasive vegetation.	Monthly
Inspect for signs of disturbance or compaction of the trench's stone surface layer. Remove and refresh the top layer if needed.	Monthly
Inspect protective measures. Repair fencing, curbing, grates, signage and other measures quickly to prevent future BMP damage.	Monthly

Draindown

Activity	Schedule
Take notice if water regularly ponds in the infiltration trench for more than 24 to 48 hours after a rainfall.	Monthly
Clear litter, debris and sediment from inlets and overflow areas to prevent blockage and allow proper drainage.	Weekly
Inspect underdrain observation wells for sediment buildup or stagnant water. Remove blockages.	Monthly
Inspect for signs of disturbance or compaction of the trench surface. Remove and refresh the top layer if needed.	Monthly

Cleanliness

Activity	Schedule
Clear litter, grass clippings, debris and repair areas of erosion or bare soil in the area draining to the infiltration trench.	Monthly
Clear pet waste. If frequent and excessive pet waste is a problem, consider adding signage to alert pet owners.	Monthly
Inspect for sources of pollutants (e.g., stored chemicals, materials stockpiles). Cover or remove built up sediment and dispose of properly.	Monthly
If the trench is not grassed, clear litter, grass clippings, debris from the stone surface layer. Dispose of material away from the trench.	Monthly

Do

- ✓ Pick up trash, debris, and leaves in the area draining to your infiltration trench. Keep the area above the infiltration trench itself clean.
- ✓ Prevent damage to the infiltration trench by informing landscapers, contractors, and others that may be managing the buildings or landscape on the property of the location and purpose of the BMP.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.

Don't

- ✗ Don't stockpile mulch, sand, salt, soil or yard waste on your property unless they are in covered containment areas and will not drain to the infiltration trench.
- ✗ Don't neglect the maintenance needs of your permeable pavement. Consider hiring an experienced professional if needed.
- ✗ Don't allow weeds or woody plants to grow on the surface layer of the infiltration trench.
- ✗ Don't allow sediment to accumulate on the surface layer of the infiltration trench.

Infiltration Trench Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

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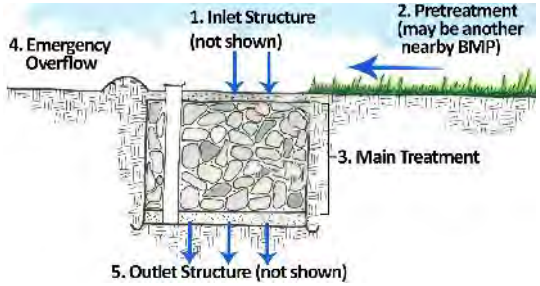

BMP Name(s)				Today's Date:
	Note: The infiltration trench area name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Infiltration Trench 1" or "Infiltration Trench A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Infiltration trench?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Infiltration trench?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes No

Reason for Follow Up?

Completed forms can be submitted by email: poststorm@birminghamal.gov

Storm Water Management ● Department of Planning, Engineering & Permits

710 North 20th Street ● Birmingham, Alabama 35203

Infiltration Trench Inspection Form

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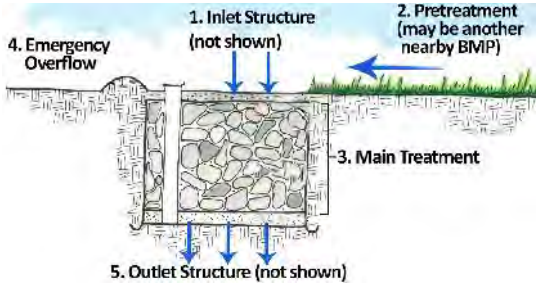

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Main Treatment (Component 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Do grassed areas (the trench surface, if grassed, and filter strip) have areas of bare soil or erosion? Is the grass thin, stressed, diseased or dead?						
Guidance: The filter strip and trench (if grassed) must be 100% vegetated with a dense stand of healthy grass. Areas of bare soil and erosion are prohibited. Repair erosion and revegetate bare soil as soon as they are noticed. Determine the cause for thinning, unhealthy or dead grass, correct and re-sod or overseed. **Schedule:** Monthly						
2. Is the grass in need of maintenance?						
Guidance: Watering and mowing are essential to maintain a healthy stand of grass. Provide water during prolonged dry periods and mow grass periodically to a height of 4 inches. If the top layer of the trench is pea gravel, REMOVE GRASS CLIPPINGS AS THESE CAN CLOG THE TRENCH. Aerate and over seed as needed. Avoid the use of herbicides to control weeds and use fertilizer sparingly and only when intense rains will not wash fertilizers into the trench before they can soak into the soil. **Schedule:** Monthly						
3. Are trash, sediment, debris, grass clippings or other materials that can obstruct storm water flow into, or clog, the infiltration trench present?						
Guidance: Remove unwanted materials and correct any other problems that block the water flow and infiltration in the trench. Replace top layer (pea gravel or grass) and top surface filter fabric when clogged. **Schedule:** Weekly						
4. Is the infiltration trench difficult to access for inspection & maintenance?						
Guidance: Any obstacles blocking access to or maintenance of the infiltration trench should be removed. Put a note in this form if access is blocked by a permanent fixture (e.g. fence) that is not easily removed. **Schedule**: Monthly						

Infiltration Trench Inspection Form

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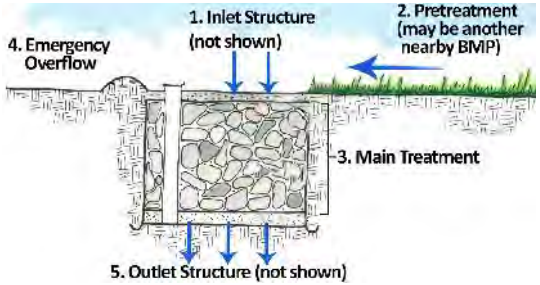

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
5. Are there signs of human or pet encroachment in the filter strip or the trench, such as compacted or displaced rocks, tire tracks, pet waste, or other?						
Guidance: Repair or replace protection measures if damaged (e.g., fences, shrubs/hedges, signs, etc.). Increase protection measures if this is a frequent problem. Repair damage to the filter strip by reestablishing grass. Repair damage to the trench by replacing pea gravel or topsoil /grass and filter fabric (when clogged). (A sign specifically addressing pet waste can reduce dog waste. Also consider installation of a pet waste station (sign, pet waste bag dispenser & trash can) if the infiltration trench is in an area where dog walking is popular.) **Schedule:** Monthly						
6. Is there any visual evidence of long-term ponding or standing water (stains, odors, etc.)?						
Guidance: Ponded water inside the trench (as visible from the observation well or on the surface) longer than 24 to 48 hours (during normal rainfall conditions) or several days after a rainfall (during wet conditions or very heavy rainfall) is an indication that the trench is clogged. **Schedule:** Monthly						
7. Notice another problem? Describe in comments.						**Your Comments:**

Infiltration Trench Inspection Form

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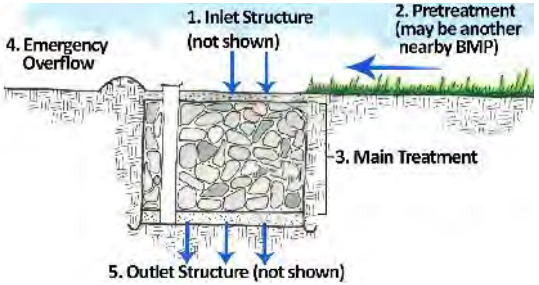

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet, Pretreatment, and Outlet Structures (Items 1, 2, and 5)						**Success Factors: Vegetation, Protection, Draindown and Cleanliness**
8. Have the inlet structures been damaged or altered in any way that disrupts the flow of storm water into the infiltration trench?						
Guidance: Repair damage or alterations before the next rainfall if possible. If components have been intentionally altered to resolve a drainage or flooding issue, consult the City of Birmingham for further guidance. BMP components cannot be altered without approval. **Schedule**: Monthly						
9. Is there visual evidence of pollutants at the inflow on the surface of the infiltration trench (e.g., oil, odd discoloration, stains, odors, etc.)?						
Guidance: If signs of pollution are present, attempt to determine the cause and eliminate it. If a persistent or frequent pollution issue occurs, contact the local jurisdiction. This could be a sign that pollutants are routinely being introduced into the trench. **Schedule**: Monthly						
10. Is the underdrain clogged or blocked?						
Guidance: The underdrain can be checked by looking into the observation well(s) following 3 days of dry weather. If water is present, then the underdrain could be clogged. If the seasonal conditions have been overly wet, check again each day for several more days and document the result. Use the same method to check again after several more rain events. The underdrain must not be blocked or clogged for the storm water island to function properly. If the problem cannot be resolved by accessing the blockage through the underdrain pipe, then both the trench's surface layer and subbase may need to be removed to fix the underdrain, and then restored. In this case, consult a civil engineer or landscape architect to ensure that the underdrain and trench are restored in keeping with local jurisdiction requirements.						
11. Notice another problem? Describe in comments.						**Your Comments:**

Infiltration Trench Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

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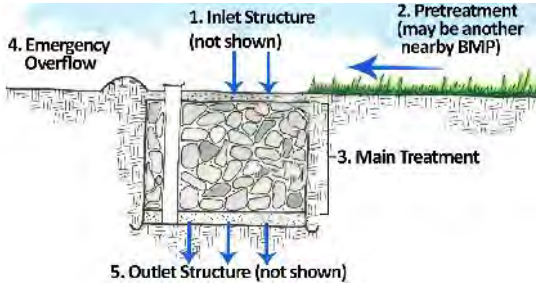


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to Infiltration Trench						**Success Factors: Vegetation, Protection, Draindown and Cleanliness**
12. Is there litter, grass clippings, trash, debris or other materials that could be washed, blown or dumped in the infiltration trench?						
Guidance: Trash and other materials can be carried into, and potentially clog, the infiltration trench. Remove undesirable materials and keep the property clean.						
13. Are there stockpiles of soil, chemicals, equipment or other materials that could be a source of pollutants entering the infiltration trench during a storm?						
Guidance: Stockpiled materials can contain pollutants that are harmful or that can be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule**: Monthly						
14. Are there areas of erosion or exposed soil/bare earth that could be a source of soil washing into the infiltration trench during a rainfall?						
Guidance: Too much sediment washing into an infiltration trench can clog the pea gravel/top soil layer and the filter fabric. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for these areas, cover them with mulch, wood chips, pavement or another hard surface to prevent erosion. Repair sediment damage to the trench by replacing pea gravel or topsoil and top surface filter fabric (when clogged). **Schedule**: Monthly						
15. Do activities occur in the area that may cause unusual or substantial amounts of pollutants to be discharged to the infiltration trench? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Prevent these activities from occurring or take steps to prevent the pollutants from reaching the infiltration trench, such as washing cars in areas that drain to the wastewater system, street or parking lot sweeping, pet waste pickup stations, etc. **Schedule**: Monthly						
15. Notice another problem? Describe in comments.						**Your Comments:**

Infiltration Trench Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Infiltration Trench Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.11 Cistern Basics

What is a Cistern?

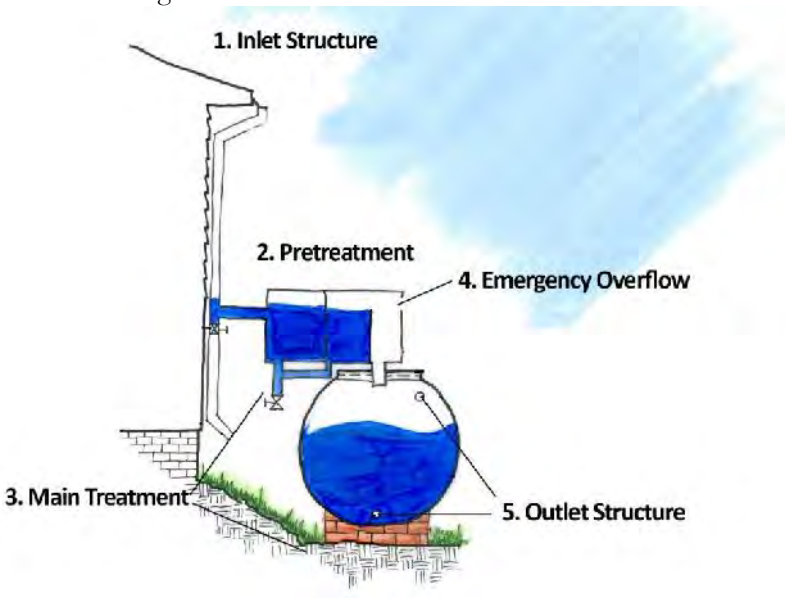
Benefits of Cisterns

- **Water source for non-potable use (irrigation, toilet flushing, etc.)**
- **Reduces storm water runoff from site**
- **Reduces pollutants in storm water**

Cisterns are Best Management Practices (BMPs) that catch and divert rain that falls onto rooftops for temporary storage and future use on the property. Rainwater that falls on a rooftop is collected and conveyed into a tank located above or below ground. The water can then be used for non-potable water uses at a home or business. Non-potable uses of cistern water can include water for toilets and urinals inside buildings, landscape irrigation, exterior washing (i.e. car washes, building facades, sidewalks), supply for chilled water cooling towers, and for laundry. Cisterns are commonly paired with vegetated BMPs like bioretention areas, grass channels, enhanced swales and pervious pavement. Depending on the size of the cistern, it will manage about 1-inch of storm water, or more, before filling. Once filled, the water in the cistern should be used or drained; otherwise it is designed to overflow. Cisterns that are designed and constructed in this manner will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

In the City of Birmingham, most cisterns will have five primary components (see the figure below):

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment** areas remove debris and coarse sediment to reduce clogging of the main treatment area.
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.



What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your cistern. There are a few key points to keep in mind:

- Cisterns are included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a contractor or landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your cistern is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your cistern and save on maintenance costs by protecting the vegetation and soil, keeping your property clean, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning cistern. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Cistern Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.

Do

- ✓ Check the tank and all connections between gutters, downspouts, and cistern for structural integrity and sealing. Have cracks or leaks repaired.
- ✓ Prevent damage to the cistern by informing landscapers, contractors, and others that may be managing the buildings or landscape on the property of the location and purpose of the BMP.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.

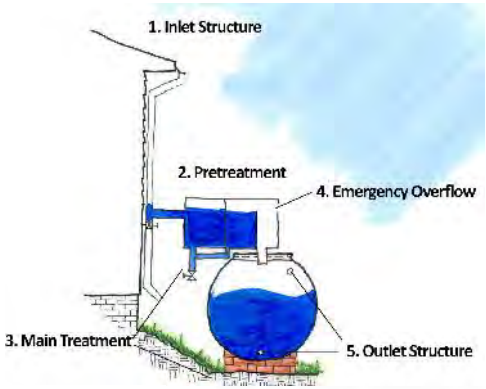
Don't

- X Don't allow the water in your cistern to be used for drinking or personal grooming of humans or pets. Cistern water should only be used for non-potable water purposes.
- X Don't leave your cistern full of water. Your Maintenance Agreement contains requirements for using the water and/or draining your cistern during dry weather so that storm water can continue to be captured in the cistern.
- X Don't store chemicals, metal, or other materials on the roof as these can pollute the water that enters the cistern.
- X Don't climb into the cistern unless you are properly trained to do so. If inspection or maintenance requires entry into the cistern, contact a professional that has training for confined space entry.

Cistern Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.



BMP Name(s)				Today's Date:
	Note: The cistern name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Cistern 1" or "Cistern A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Cistern?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Cistern?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes No

Reason for Follow Up?

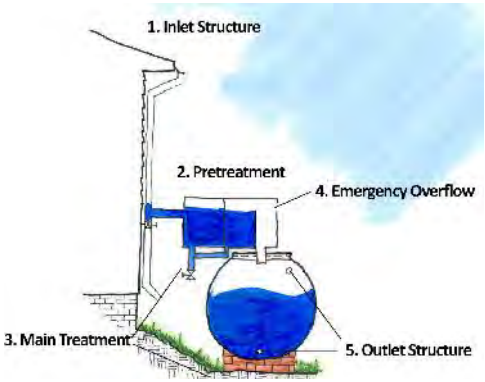
Completed forms can be submitted by email: poststorm@birminghamal.gov

Storm Water Management ● Department of Planning, Engineering & Permits
710 North 20th Street ● Birmingham, Alabama 35203

Cistern Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

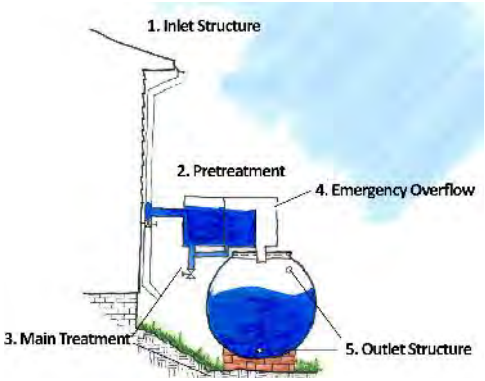


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet Structure, Outlet Structure, and Emergency Overflow (Components 1, 4, and 5)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Are the downspouts and gutter free of leaves, sediment, and other obstructions?						
Guidance: Check and clean gutters, downspouts, and the inlet regularly when significant leaf litter and debris is expected (spring, fall, and winter) **Schedule:** Seasonally						
2.Are the downspouts and gutters correctly attached to the building and the tank? Are they water tight and operating properly?						
Guidance: The gutters must be positioned to capture roof drainage, and must be securely attached to downspouts, which in turn must be securely attached to the tank. Replace or repair damaged components. **Schedule:** Seasonally						
3. Is water flowing out of the overflow pipe in small storms when the previous rain event was 4 or more days before?						
Guidance: Check the entire system for clogging and damage. Make sure the pump is working properly and is pumping water at the right rate and right time. **Schedule:** Monthly						

Cistern Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

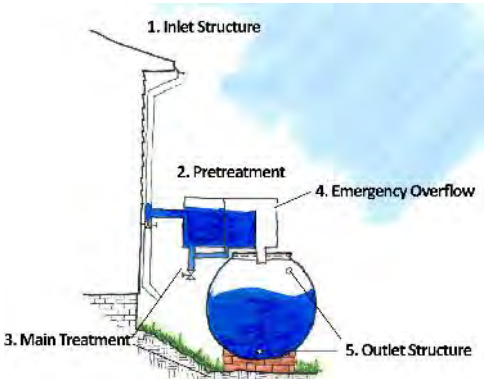


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Pretreatment and Main Treatment (Components 2 and 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
4. Does the pretreatment device need to be cleaned?						
Guidance: Guidance: If the pretreatment device (such as a screen) gets clogged, storm water may bypass the cistern. Proper function of the cistern requires frequent inspection and cleaning of the pretreatment device. Also, a functioning pretreatment device keeps the debris and sediment from entering the tank and reduces the need for tank maintenance. **Schedule:** Seasonally						
5. Does the pretreatment device appear to be working properly?						
Guidance: Look for evidence of bypassing, erosion, leaks or cracks. Repair or replace the pretreatment device to allow storm water to filter through pretreatment before discharging into the tank. **Schedule:** Monthly						
6. Are there visible sediment deposits or other debris in the tank, taking up 5% or more of the storage space?						
Guidance: Sediment will likely enter the tank, even with a properly functioning pretreatment device. Remove sediment and debris from the tank when deposits take up 5% or more of the tank volume. **Schedule:** Seasonally						
7. Does the tank show signs of breakdown such as cracks, leaks, warps, or other damage?						
Guidance: Some damage can be repaired before the tank is no longer usable. Catch small repairs early. Patch holes and/or paint the tank with appropriate paint to keep sunlight from breaking the tank down. Protect the tank from access by people or animals. **Schedule:** Seasonally						

Cistern Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.



Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
8. Are there nuisance issues such as odors, algae, or mosquitoes in the tank?						
Guidance: Add bleach at Â¼ cup per 1000 gallons of water. Then be sure the tank fully fills back up before using the water for irrigation or other non-potable uses. Otherwise, the bleach could damage vegetation, decking or other materials. Adjust draw down times to reduce the number of days water sits in the tank if algae and odors are problematic. **Schedule:** Seasonally						
9. Are pipes, hoses, valves, spigots, and pumps working properly?						
Guidance: Check all fittings and the pump to ensure they are working. Be sure all fittings are connected well. Replace cracked or broken pipes and malfunctioning spigots. Pull the pump at least once a year for maintenance, such as checking the motor, flushing the pump, checking the fittings and housing, etc. **Schedule:** Seasonally						
10. Are tank operation personnel properly trained in manual tank operation?						
Guidance: Make sure that all persons who are responsible for operation of the cistern understand its function, its dewatering schedule, and how to drain the tank manually. Persons who are new to the operation of the cistern should be trained before they are expected to operate the cistern. **Schedule:** Annually						
11. Notice another problem? Describe in comments.						**Your Comments:**

Cistern Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Cistern Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.12 Dry Detention Pond and Dry Extended Detention Pond Basics

What are Dry Detention Ponds and Dry Extended Detention Ponds?

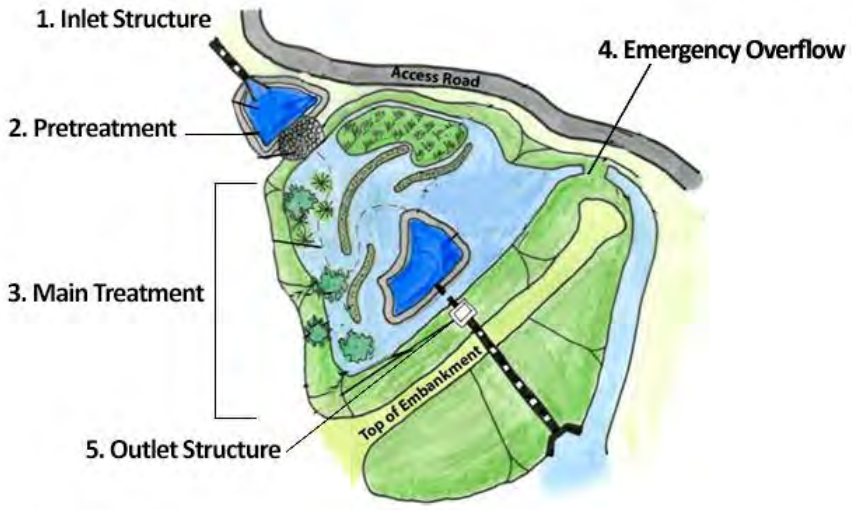
Dry detention ponds and dry extended detention ponds are Best Management Practices (BMPs) that store storm water in basins designed to remove pollutants and provide flood control. The typical dry detention pond or dry extended detention pond will manage about 1-inch of storm water. A dry extended detention pond should drain completely in about 24 to 48 hours after a storm while a dry detention pond is designed to drain in a shorter amount of time. Dry detention ponds or dry extended detention ponds that are designed and constructed in this manner will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

Benefits of Dry Detention Ponds and Dry Extended Detention Ponds

- **Remove pollutants from storm water**
- **Reduce flooding**
- **Multi-use ponds may provide multiple purposes on a site, such are space for recreation**
- **Create aesthetic benefits**

In the City of Birmingham, most dry detention pond and dry extended detention pond will have five primary components (see the figure below):

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment** areas remove debris and coarse sediment to reduce clogging of the main treatment area
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.



What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your dry detention pond or dry extended detention pond BMP. There are a few key points to keep in mind:

- Dry detention ponds or dry extended detention ponds included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your dry detention pond or dry extended detention pond is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your dry detention pond or dry extended detention pond and save on maintenance costs by protecting the vegetation and soil, keeping your property clean, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning dry detention pond or dry extended detention pond. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Dry or Dry Extended Detention Pond Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.

Do

- ✓ Mow surrounding grass to a height of 3-4 inches and remove trash and debris regularly.
- ✓ Keep your property clean and protect the detention basin to prevent pollutants (trash, pet waste, pesticides, oils, etc.) from washing or being dumped in to the basin.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.
- ✓ Inform contractors working on the property of the location of the basin to prevent accidental damage.

Don't

- X Don't use excessive amounts of salt and sand around the detention basin in the winter.
- X Don't apply fertilizer, herbicides, or pesticides inside the detention basin, and use these materials sparingly on your property. Contact a local nursery or landscape professional if the plants in or near your BMP aren't thriving.
- X Don't allow heavy equipment in the detention basin, or use it as a storage area, even for landscape materials (e.g., leaves, snow, soil mulch, etc.

Dry Detention Pond and Dry Extended Detention Pond Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

BMP Name(s)				Today's Date:
	Note: The dry detention pond name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Dry Detention Pond 1" or "Dry Detention Pond A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Dry Detention Pond?	Name (Owner, Tenant, Property Manager or Landscape Company):		Contact Name (If Different):	
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Dry Detention Pond	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes No

Reason for Follow Up?

Completed forms can be submitted by email: poststorm@birminghamal.gov

Storm Water Management ● Department of Planning, Engineering & Permits

710 North 20th Street ● Birmingham, Alabama 35203

Dry Detention Pond and Dry Extended Detention Pond Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Main Treatment Area (Component 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Is it difficult to access the dry detention pond for inspection and maintenance?						
Guidance: Any obstacles blocking access and/or maintenance should be removed. If access is blocked by a permanent fixture (i.e. fence), contact the City of Birmingham. **Schedule:** Monthly						
2. Is the top of the berm unlevel or uneven? Or are there cracks or animal burrows?						
Guidance: Potholes, depressions, animal burrows and significant cracks on the top or sides of the berm can be a sign that the berm has structural or seepage problems, especially if these grow in size or depth. Keep a log of these issues during each inspection by measuring and writing down the length, width and depth of the problem on the inspection form. Note the location of each issue on the inspection figure. For animal burrows, call animal control for removal and fill the holes with clay soil. Call your local jurisdiction if these problems appear to be getting worse. Schedule: Monthly						
3. Is grass dying, diseased, or unhealthy on the front, back, or top of the berm?						
Guidance: The berm should have a healthy, thick stand of grass or other ground cover on all sides and on the front of the berm down to the water, on the top of the berm and on the backside of the berm down to the bottom. Patches of bare soil should not be present. Ground cover vegetation should be chosen and maintained to not only achieve the desired landscape aesthetic, but also to maintain structural integrity, discourage animal burrowing, allow for adequate inspection of the berm and require only intermittent mowing to maintain its health. If vegetation appears unhealthy or thin, determine the cause of the issue take corrective action. More frequent watering, or fertilizer, seed or sod may be needed to establish fuller, healthier coverage. **Schedule**: Seasonally.						
4. Are trees present on the berm of the pond?						
Guidance: Trees and other wood vegetation are prohibited as these can reduce the structural integrity of the berm, or significantly damage the berm if they fall. This damage can be severe enough to cause the berm to break. Trees and woody vegetation can also interfere with the ability to fully inspect the berm surfaces. Remove small trees and their stumps from the berm, backfill the stump areas with clay soil and cover with thick grass or other vegetative ground cover.						

Dry Detention Pond and Dry Extended Detention Pond Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
5. Is the dry detention pond holding water during dry weather?						
Guidance: The dry detention pond should generally follow what would be expected under the seasonal or current climatic conditions (slower to drain during wet weather and very dry during a drought). All of the water should drain out of the dry detention pond 24-48 hours after most rain events. If the water level rises and doesn't lower in this time period, the outlet structure may be blocked. If there is no water after a large rainfall, the water could be leaking through the berm. Contact an experienced professional if the water level is frequently too low or too high and stays that way for a prolonged period of time. **Schedule:** Monthly						
6. Are there visible areas of bare soil or growing deposits or soil in or around the water quality basin?						
Guidance: Bare or eroding areas should be vegetated or lined with rock or other material. Visible deposits of soil should be removed, as these deposits can decrease the amount of water storage provided by the dry detention pond. **Schedule:** Annually						
7. Are cattails or other invasive plants growing in the detention pond?						
Guidance: Cattails and other invasive plants have the potential to completely take over the detention pond area. The detention basin area should be checked for dirt buildup and may need to be dredged. Also check the outflow for flow when there has been no rain, which could indicate a leak in the outflow system. **Schedule:** Seasonally						
9. Notice another problem? Describe in comments.						**Your Comments:**

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Storm Water Management ● Department of Planning, Engineering & Permits
710 North 20th Street ● Birmingham, Alabama 35203

Dry Detention Pond and Dry Extended Detention Pond Inspection Form

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Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet, Pretreatment, and Outlet Structures (Items 1, 2, and 5)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
10. Do the areas where storm water enters the dry detention pond have unhealthy vegetation, sparse rock, broken concrete, or other damaged materials?						
Guidance: Inlet structures should have dense, healthy vegetation or a rock, concrete, asphalt, or paver lining to prevent erosion. Bare soil or signs of erosion should NOT be present. Repair eroded areas and cover bare soil immediately with the appropriate vegetation or material cover. **Schedule:** Monthly						
11. Are trash, sediment, debris, grass clippings, or other materials that can obstruct storm water flow present in the inlet or outlet structures or in their vicinity?						
Guidance: Remove unwanted materials and correct any other problems that block the water flow in or out of the dry detention pond. **Schedule:** Monthly						
12. Is there bare soil or evidence of erosion or scour at the outlet structure?						
Guidance: Outlet structures should not have any signs of erosion and should be covered with sufficient vegetation or material to slow the water and prevent erosion. Typically, this is a rock lining, but can be concrete, asphalt, pavers or even dense vegetation. If signs of erosion are visible at the outlet, install a rock lining that extends at least 10' beyond the area of erosion. Contact you're a qualified professional if you have questions on the size and type of rock. **Schedule:** Seasonally						
13. Is there visual evidence of pollutants at the outlet structure (oil, odd colorations, stains, etc.)?						
Guidance: Visually check the outlet structure location(s) and look for discolored or stained grass or rocks or significant stands of unhealthy vegetation. This could be a sign that the detention basis is not operating properly or that pollutants have been introduced into the pond. If you suspect a pollutant source, contact the City of Birmingham. **Schedule:** Monthly						
14. Notice another problem? Describe in comments.						**Your Comments:**

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Storm Water Management ● Department of Planning, Engineering & Permits
710 North 20th Street ● Birmingham, Alabama 35203

Dry Detention Pond and Dry Extended Detention Pond Inspection Form

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Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to Dry Detention Pond						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
15. Are litter, trash, debris, sediment, grass clippings, or other materials present in the area?						
Guidance: Trash and other materials can wash into the dry detention pond during a storm and can block the inlet and outlet structures and fill up the pond storage area. Remove undesirable materials and keep the property clean. **Schedule:** Monthly						
16. Are there stockpiles of soil, chemicals, equipment, or other materials that could be a source of pollutants washing into the dry detention pond during a storm?						
Guidance: Stockpiled materials can contain pollutants that are harmful to plants or that can otherwise be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water runoff. **Schedule:** Monthly						
17. Are there areas of erosion or exposed soil/bare earth that could be a source of sediment washing into the dry detention pond during a storm?						
Guidance: Too much sediment washing into a dry detention pond can reduce the pond storage and water depth. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for those areas, cover them with mulch, wood chips, pavement, or another hard surface to prevent sediment erosion. **Schedule:** Monthly						
18. Do activities nearby that may cause unusual or substantial amounts of pollutants to be discharged to the bioretention area? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Prevent these activities from occurring or take steps to prevent the pollutants from reaching the bioretention area, such as washing cars in areas that drain to the wastewater system, conducting street or parking lot sweeping, installation of pet waste pickup stations, etc. **Schedule:** Weekly						
19. Notice another problem? Describe in comments.						**Your Comments:**

Dry Detention Pond and Dry Extended Detention Pond Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Dry Detention Pond and Dry Extended Detention Pond Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.13 Extended Detention Pond and Storm Water Wet Pond Basics

What are Extended Detention Ponds and Storm Water Wet Ponds?

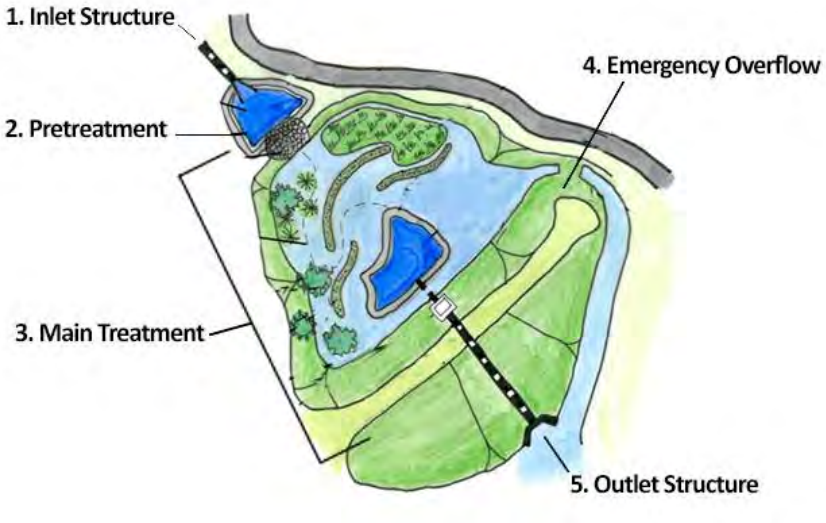
Extended detention ponds and storm water wet ponds are Best Management Practices (BMPs) that store storm water in basins designed to remove pollutants and provide flood control. Pollutants are removed from storm water though the settling of sediments and plant uptake of nutrients. Extended detention ponds and storm water wet ponds maintain a permanent pool (or micropool) of water. A typical extended detention pond or storm water wet pond will manage about 1-inch of storm water. An extended detention pond detains flows for 24 to 48 hours while a storm water wet pond detains flows for a much shorter period of time. Extended detention ponds or storm water wet ponds that are designed and constructed in this manner will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

Benefits of Extended Detention Ponds and Storm Water Wet Ponds

- **Remove pollutants from storm water**
- **Can be an amenity within a development**
- **Can provide wildlife habitat**

In the City of Birmingham, most extended detention ponds and storm water wet ponds will have five primary components (see the figure below):

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment** areas remove debris and coarse sediment to reduce clogging of the main treatment area
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.



What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your extended detention pond or storm water wet pond BMP. There are a few key points to keep in mind:

- Extended detention ponds or storm water wet ponds included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your extended detention pond or storm water wet pond is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your extended detention pond or storm water wet pond and save on maintenance costs by protecting the vegetation and soil, keeping your property clean, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning extended detention pond. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Extended Detention Pond or Storm Water Wet Pond Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.

Do

- ✓ Mow surrounding grass to a height of 3-4 inches and remove trash and debris regularly.
- ✓ Keep your property clean and protect the detention basin to prevent pollutants (trash, pet waste, pesticides, oils, etc.) from washing or being dumped in to the basin.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.
- ✓ Inform contractors working on the property of the location of the basin to prevent accidental damage.

Don't

- X Don't use excessive amounts of salt and sand around the detention basin in the winter.
- X Don't apply fertilizer, herbicides, or pesticides inside the detention basin, and use these materials sparingly on your property. Contact a local nursery or landscape professional if the plants in or near your BMP aren't thriving.
- X Don't allow heavy equipment in the detention basin, or use it as a storage area, even for landscape materials (e.g., leaves, snow, soil mulch, etc.

Extended Detention Pond and Storm Water Wet Pond Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

BMP Name(s)				Today's Date:
	Note: The extended detention pond or storm water wet pond name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Extended Detention Pond 1" or "Extended Detention Pond A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the pond?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the pond?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number		Has the City Entered and Approved this Inspection?	Yes / No
Name of Staff Approving This Inspection Report:		Date of Inspection Approval:	
Is a Follow Up Inspection by Staff Required? Circle One:	Yes / No		
Reason for Follow Up?			

Completed forms can be submitted by email: poststorm@birminghamal.gov
Storm Water Management ● Department of Planning, Engineering & Permits
710 North 20th Street ● Birmingham, Alabama 35203

Extended Detention Pond and Storm Water Wet Pond Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Main Treatment Area (Component 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Is it difficult to access the extended detention pond (or storm water wet pond) for inspection and maintenance?						
Guidance: Any obstacles blocking access and/or maintenance should be removed. If access is blocked by a permanent fixture (i.e. fence), contact the City of Birmingham. **Schedule:** Monthly						
2. Is the top of the berm unlevel or uneven? Or are there cracks or animal burrows?						
Guidance: Potholes, depressions, animal burrows and significant cracks on the top or sides of the berm can be a sign that the berm has structural or seepage problems, especially if these grow in size or depth. Keep a log of these issues during each inspection by measuring and writing down the length, width and depth of the problem on the inspection form. Note the location of each issue on the inspection figure. For animal burrows, call animal control for removal and fill the holes with clay soil. Call your local jurisdiction if these problems appear to be getting worse. **Schedule:** Monthly						
3. Is grass dying, diseased, or unhealthy on the front, back, or top of the berm?						
Guidance: The berm should have a healthy, thick stand of grass or other ground cover on all sides and on the front of the berm down to the water, on the top of the berm and on the backside of the berm down to the bottom. Patches of bare soil should not be present. Ground cover vegetation should be chosen and maintained to not only achieve the desired landscape aesthetic, but also to maintain structural integrity, discourage animal burrowing, allow for adequate inspection of the berm and require only intermittent mowing to maintain its health. If vegetation appears unhealthy or thin, determine the cause of the issue take corrective action. More frequent watering, or fertilizer, seed or sod may be needed to establish fuller, healthier coverage. **Schedule**: Seasonally.						
4. Are trees present on the berm of the pond?						
Guidance: Trees and other wood vegetation are prohibited as these can reduce the structural integrity of the berm, or significantly damage the berm if they fall. This damage can be severe enough to cause the berm to break. Trees and woody vegetation can also interfere with the ability to fully inspect the berm surfaces. Remove small trees and their stumps from the berm, backfill the stump areas with clay soil and cover with thick grass or other vegetative ground cover.						

Extended Detention Pond and Storm Water Wet Pond Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
5. Is the water level in the extended detention pond or storm water wet pond high during dry weather?						
Guidance: The extended detention pond or storm water wet pond should generally follow what would be expected under the seasonal or current climatic conditions (slower to drain during wet weather and very dry during a drought). Water should drain out and the pond should be at its normal water elevation 24-48 hours after most rain events. If the water level rises and doesn't lower in this time period, the outlet structure may be blocked. If there is no water after a large rainfall, the water could be leaking through the berm. Contact an experienced professional if the water level is frequently too low or too high and stays that way for a prolonged period of time. **Schedule:** Monthly						
6. Are there visible areas of bare soil or growing deposits or soil in or around the pond?						
Guidance: Bare or eroding areas should be vegetated or lined with rock or other material. Visible deposits of soil should be removed, as these deposits can decrease the amount of water storage provided by the dry extended detention pond. **Schedule:** Annually						
7. Are cattails or other invasive plants growing in the pond?						
Guidance: The depth of the water in the water quality pond should be too deep for cattails and other invasive plants to grow. Growth of invasives around the edge of the pond may be normal. However, if they extend beyond the edge, it can mean that the correct water depth is not being maintained. The water quality pond area should be checked for dirt buildup and may need to be dredged. Also check the outflow for flow when there has been no rain, which could indicate a leak in the outflow system. **Schedule:** Seasonally						
8. Is the pond water discolored? Does it have a foul smell or bubbles? Are there signs of a fish kill?						
Guidance: The pond water can naturally be tea colored or can have a reddish tint or blue-green tint. However, other discoloration, a lot of foam or bubbles, fish kills, or a foul odor could mean that pollutants have been poured into the pond or were carried by storm water into the pond. Visually check the area surrounding the water quality pond to see if there are indicators of spills or high levels of pollutants coming to the pond, such as stains on grass or paved surfaces, burnt-looking or dead vegetation or fish. If found, eliminate the cause of the problem. Call your local jurisdiction if the problem cannot be eliminated or is persistent and the source of the problem cannot be determined. . **Schedule:** Monthly						

Extended Detention Pond and Storm Water Wet Pond Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet, Pretreatment, and Outlet Structures (Items 1, 2, and 5)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
9. Do areas where storm water enters extended detention pond or storm water wet pond have unhealthy vegetation, sparse rock, broken concrete, or other damaged materials?						
Guidance: Inlet structures should have dense, healthy vegetation or a rock, concrete, asphalt, or paver lining to prevent erosion. Bare soil or signs of erosion should NOT be present. Repair eroded areas and cover bare soil immediately with the appropriate vegetation or material cover. **Schedule:** Monthly						
10. Are trash, sediment, debris, grass clippings, or other materials that can obstruct storm water flow present in the inlet or outlet structures or in their vicinity?						
Guidance: Remove unwanted materials and correct any other problems that block the water flow in or out of the dry extended detention pond. **Schedule:** Monthly						
11. Is there bare soil or evidence of erosion or scour at the outlet structure?						
Guidance: Outlet structures should not have any signs of erosion and should be covered with sufficient vegetation or material to slow the water and prevent erosion. Typically, this is a rock lining, but can be concrete, asphalt, pavers or even dense vegetation. If signs of erosion are visible at the outlet, install a rock lining that extends at least 10' beyond the area of erosion. Contact you're a qualified professional if you have questions on the size and type of rock. **Schedule:** Seasonally						
12. Is there visual evidence of pollutants at the outlet structure (oil, odd colorations, stains, etc.)?						
Guidance: Visually check the outlet structure location(s) and look for discolored or stained grass or rocks or significant stands of unhealthy vegetation. This could be a sign that the detention basis is not operating properly or that pollutants have been introduced into the pond. If you suspect a pollutant source, contact the City of Birmingham. **Schedule:** Monthly						
13. Notice another problem? Describe in comments.						**Your Comments:**

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Extended Detention Pond and Storm Water Wet Pond Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to Dry Extended detention pond						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
14. Are litter, trash, debris, sediment, grass clippings, or other materials present in the area?						
Guidance: Trash and other materials can wash into the dry extended detention pond or storm water wet pond during a storm, and can block the inlet and outlet structures and fill up the pond storage area. Remove undesirable materials and keep the property clean. **Schedule:** Monthly						
15. Are there stockpiles of soil, chemicals, equipment, or other materials that could be a source of pollutants washing into the pond during a storm?						
Guidance: Stockpiled materials can contain pollutants that are harmful to plants or that can otherwise be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water runoff. **Schedule:** Monthly						
16. Are there areas of erosion or exposed soil/bare earth that could be a source of sediment washing into the dry extended detention pond during a storm?						
Guidance: Too much sediment washing into an extended detention pond or storm water wet pond can reduce the pond storage and water depth. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for those areas, cover them with mulch, wood chips, pavement, or another hard surface to prevent sediment erosion. **Schedule:** Monthly						
17. Do activities nearby that may cause unusual or substantial amounts of pollutants to be discharged to the bioretention area? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Prevent these activities from occurring or take steps to prevent the pollutants from reaching the bioretention area, such as washing cars in areas that drain to the wastewater system, conducting street or parking lot sweeping, installation of pet waste pickup stations, etc. **Schedule:** Weekly						
18. Notice another problem? Describe in comments.						**Your Comments:**

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Extended Detention Pond and Storm Water Wet Pond Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Extended Detention Pond and Storm Water Wet Pond Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.14 Storm Water Wetland and Gravel Wetland Basics

What are Storm Water Wetlands and Gravel Wetlands?

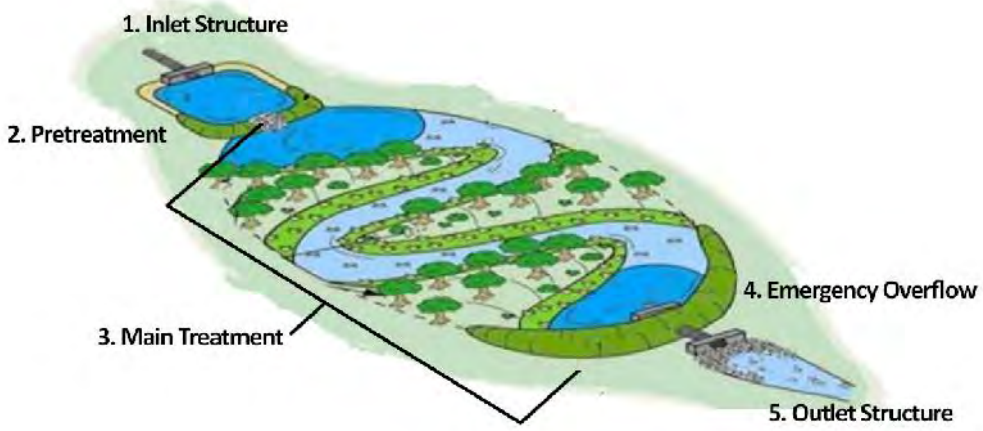
Benefits of Storm Water Wetlands and Gravel Wetlands

- **Removes pollutants, especially nutrients, from storm water**
- **Provides natural wildlife habitat**

Storm water wetlands or gravel wetlands are Best Management Practices (BMPs) that consist of a combination of shallow marsh areas, open water, and semi-wet areas above the permanent water surface. As storm water runoff flows through a wetland, it is treated, primarily through settling of sediments and plant uptake of nutrients. A submerged gravel wetland has one or more treatment cells that are filled with crushed rock or gravel and is designed to allow storm water to flow subsurface through the root zone of the constructed wetland. The typical storm water wetland or gravel wetland will manage about 1 inch of storm water and should drain back to its normal pool level in about 24 hours after a storm. Storm water wetlands and gravel wetlands that are designed and constructed in this manner will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

In the City of Birmingham, most storm water wetlands and gravel wetlands will have five primary components (see the figure blow):

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment** areas remove debris and coarse sediment to reduce clogging of the main treatment area
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.

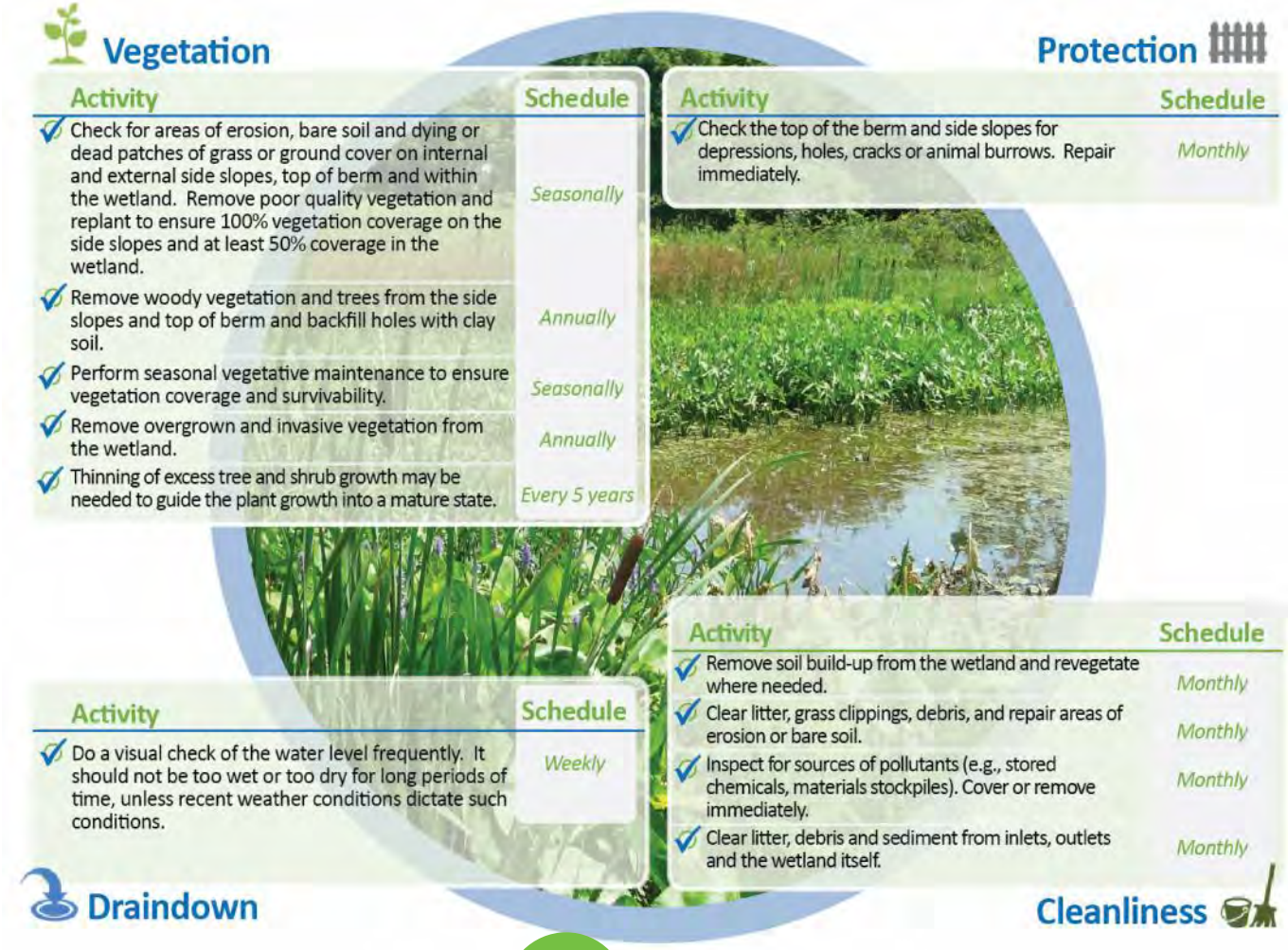


What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your storm water wetland or gravel wetland BMP. There are a few key points to keep in mind:

- Storm water wetlands and gravel wetlands included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your storm water wetland or gravel wetland is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your storm water wetland or gravel wetland and save on maintenance costs by protecting the vegetation and soil, keeping your property clean, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning storm water wetland or gravel wetland. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Storm Water Wetland/Gravel Wetland Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.



Do

- ✓ Remove trash, debris, and sediment that is deposited in the wetland to ensure that storm water will slow down and spread out before entering grassed areas.
- ✓ Prevent damage to the BMP by informing landscapers, contractors, and others that may be managing the buildings or landscape on the property of the location and purpose of the BMP.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.

Don't

- ✗ Don't use excessive amounts of salt and sand in the area draining to the storm water wetland or gravel wetland in the winter.
- ✗ Don't apply fertilizers, herbicides, or pesticides inside the planting area, and use these materials sparingly on your property. Contact a local nursery or landscape professional if your plants aren't thriving.
- ✗ Don't use or store anything in the storm water wetland or gravel wetland.

Storm Water Wetland/Gravel Wetland Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.

BMP Name(s)				Today's Date:
	Note: The storm water wetland or gravel name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Storm Water Wetland 1" or "Storm Water Wetland A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Storm Water Wetland?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Storm Water Wetland?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number		Has the City Entered and Approved this Inspection?	Yes / No
Name of Staff Approving This Inspection Report:		Date of Inspection Approval:	
Is a Follow Up Inspection by Staff Required? Circle One:	Yes / No		
Reason for Follow Up?			

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Storm Water Wetland/Gravel Wetland Inspection Form

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Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet Structure, Outlet Structure, and Emergency Overflow (Components 1, 4, and 5)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Are the inlets, outlets, treatment cells, valves, and other mechanical/structural components difficult to access for operation, inspection, and maintenance?						
Guidance: Any obstacles blocking access to, or maintenance of, these components should be removed. Put a note in this form if access is blocked by a permanent fixture (e.g. fence) that is not easily removed. **Schedule:** Monthly						
2. Are trash, sediment, debris, grass clippings, or other materials that can obstruct storm water flow present in the inlet or outlet areas?						
Guidance: Remove unwanted materials and correct any other problems that block the water flow into or out of the submerged gravel wetland. **Schedule:** Monthly						
3. Is water flowing from the outlet when it is not expected?						
Guidance: Storm water wetlands and gravel wetlands are designed to hold water. However, when it rains, some water will flow through the BMP and out the outlet. If water is still noted flowing from the outlet 24 hours after a rainfall, note that in the inspection report and look for the cause. In especially wet periods, the outlet may continue to flow for longer. During dry periods, an outlet that is discharging water or water that is backed up at the inlet may be an indication of a clog or blockage, or even cracked or damaged structural components, like pipes or concrete components. Determine the cause and correct it. If the cause cannot be determined, you might require the services of a civil engineer. **Schedule**: Weekly						

Storm Water Wetland/Gravel Wetland Inspection Form

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Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
4. Is there bare soil or evidence of erosion or scour at the inlet or outlet?						
Guidance: Outlets and the areas below them should not have any signs of erosion and should be covered with sufficient vegetation, pavement or other material to slow the water and prevent erosion. Typically, this is a rock lining, but can be concrete, asphalt, pavers or even dense vegetation. If signs of erosion are visible at the outlet, install a rock lining that extends at least 10' beyond the area of erosion. Consult an experienced professional if you have questions on the size and type of rock. **Schedule:** Seasonally						
5. Is there evidence of erosion, bare soil, broken pipes, or broken concrete at the inlets?						
Guidance: Where inlet areas collect storm water from pervious or impervious surfaces, these areas should have dense healthy vegetation or a rock, concrete, asphalt, or paver lining to prevent erosion. Bare soil or signs of erosion should NOT be present. Repair eroded areas and cover bare soil immediately with the appropriate vegetation or material cover. **Schedule:** Monthly						
6. Is there visual evidence of pollutants at the inlets, outlets, or on the surface of the BMP (oil, odd discoloration, stains, etc.)?						
Guidance: Visually inspect all areas of the BMP for evidence of sheens, staining or discoloration. If found, inspect areas drainage to the submerged gravel wetland and remove potential pollutant sources. Many pollutants can negatively impact the vegetation growing in the treatment cell(s). **Schedule:** Monthly						
7. Notice another problem? Describe in comments.						**Your Comments:**

Storm Water Wetland/Gravel Wetland Inspection Form

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The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Main Treatment (Component 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
8. Is the BMP draining slowly or not at all? Is it clogged?						
Guidance: Visually check the water level. Water should be present but should not permanently inundate the vegetation. Check for signs of debris, soil, sludge and other materials that can cause clogs or cause odors. In a gravel wetland, f the gravel is clogged and not draining, remove gravel down to the point where debris and soil is not noted in the gravel and then replace with the samed sized clean (washed) gravel. In a storm water wetland, contact an experienced professional. Replant any unhealthy or dying vegetation. **Schedule:** Weekly						
9. Does the wetland vegetation appear yellow, diseased, or to be dying?						
Guidance: Wetland vegetation must cover at least 75% of the treatment cell(s). If the vegetation is not healthy, appears to be dying or diseased, it should be removed and replaced to maintain a density of 75% coverage of the treatment cell(s). Do not apply fertilizer or pesticides to the vegetation, as these materials could cause an imbalance in the wetland water. **Schedule:** Seasonally						
10. Is the wetland vegetation overgrown in the treatment cells? Is woody vegetation present in the treatment cells?						
Guidance: Under the right conditions, wetland vegetation will quickly overgrow in an area. If the treatment cell(s) has 100% coverage of the surface with wetland vegetation, remove the overgrowth so that the surface coverage density is 75%. Also, no trees or deep-rooted woody vegetation should be growing in the treatment cells, as deep-rooted plants can harm the liner. Any plant material pruned or cut should be removed from the wetland and disposed of offsite. **Schedule:** Annually						
11. Notice another problem? Describe in comments.						**Your Comments:**

Storm Water Wetland/Gravel Wetland Inspection Form

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Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to Storm Water Wetland or Gravel Wetland (Component 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
12. Are there animal burrows, trees, or woody vegetation growing immediately adjacent to the submerged gravel wetland? Are there pavement or soil cracks, holes, or depressions immediately adjacent to the BMP?						
Guidance: The area around submerged gravel wetland should be paved, vegetated (with grass or other non-woody vegetation), or both. Cracks, depressions, and holes in or adjacent to BMP can indicate a subsurface issue with the treatment cell or piping system. Measure and log the length, width and depth of each of these problem on the inspection form and note the location of each issue. Check the treatment cell(s) and piping system for signs of structural damage if you can do so safely. Call a civil engineer for assistance if these problems appear to be getting worse. **Schedule:** Monthly						
13. Are there litter, grass clippings, trash, debris or other materials that could enter the submerged gravel wetland?						
Guidance: Trash and other materials can be carried into the BMP and block the inlets, outlets or treatment cells. Remove undesirable materials and keep the property clean. **Schedule:** Monthly						
14. Are there areas of erosion or exposed soil/bare earth that could be a source of sediment washing into the BMP during a storm?						
Guidance: Too much sediment washing into the treatment cells of a submerged gravel wetland can clog the gravel very quickly. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for these areas, cover them with mulch, wood chips, pavement or another hard surface to prevent sediment erosion. **Schedule:** Seasonally						
15. Do activities occur in the area that may cause unusual or substantial amounts of pollutants to be discharged to the gravel wetland? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Prevent these activities from occurring or take steps to prevent the pollutants from reaching the BMP, such as washing cars in areas that drain to the wastewater system, street or parking lot sweeping, pet waste pickup stations, etc. **Schedule:** Monthly						
16. Notice another problem? Describe in comments.						**Your Comments:**

Storm Water Wetland/Gravel Wetland Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Storm Water Wetland/Gravel Wetland Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.15 Underground Detention Basics

What is Underground Detention?

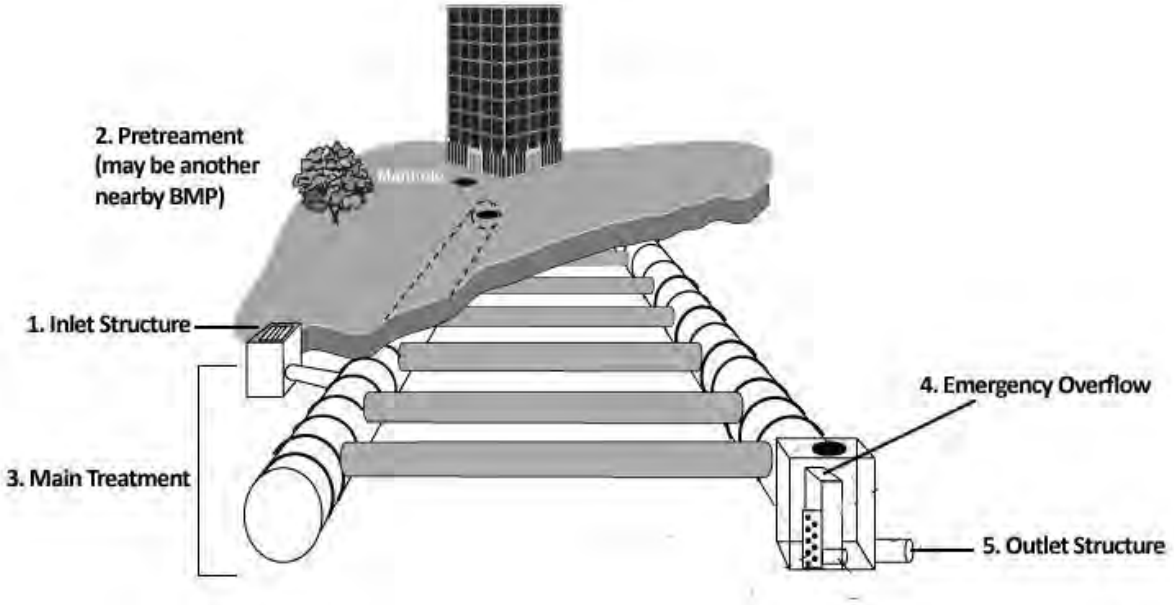
Underground detention is a Best Management Practices (BMP) that uses underground pipes or vaults to manage storm water and prevent flooding through detention or extended detention. Storm water is stored underground and slowly released. Underground detention BMPs are commonly located under parking lots or under grassed areas in parks and common spaces. The typical underground detention will manage about 1 inch of storm water and should drain completely in about 1 day after a storm. Underground detention that is designed and constructed in this manner will be readily identifiable on your property's Maintenance Agreement.

Benefits of Underground Detention

- **Can be used on sites where land is limited**
- **Can be connected to a pollutant removing BMP, such as a Manufactured Treatment Device**

In the City of Birmingham, most underground detention will have five primary components (see the figure below):

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment areas** (not shown) remove debris and coarse sediment to reduce clogging of the main treatment area.
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.



What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your underground detention. There are a few key points to keep in mind:

- Underground detention included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a contractor or landscape company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your underground detention is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

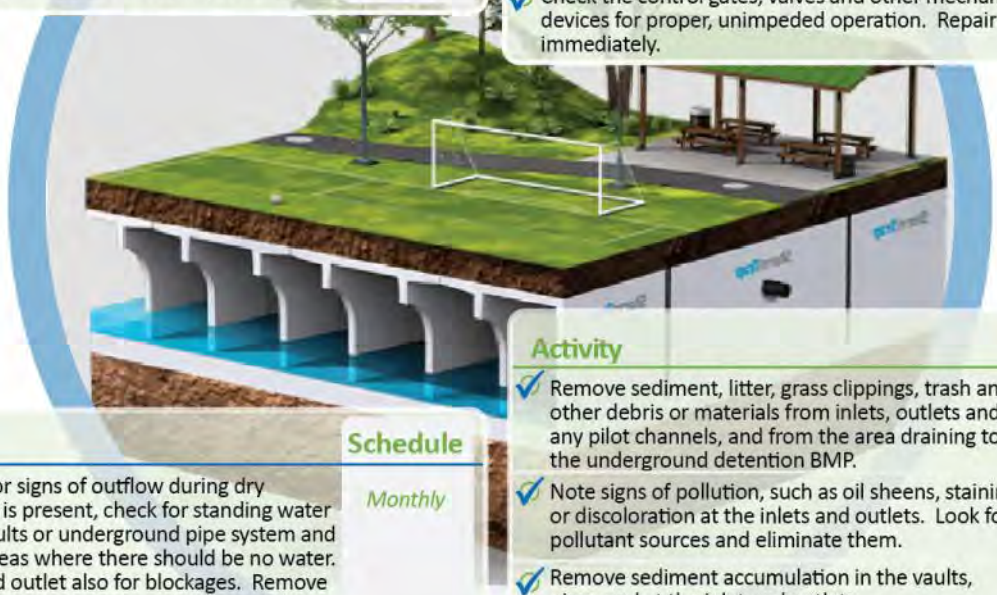
You can prolong the life of your underground detention and save on maintenance costs by keeping your property clean, preventing erosion on your property, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning underground detention. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Underground Detention Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.

Vegetation

Activity	Schedule
For underground detention beneath pavement, maintain vegetation in the surrounding area to prevent eroded sediment from entering the BMP.	Monthly
For underground detention beneath grassed area or vegetated areas, maintain vegetation and monitor for and remove woody vegetation, which can crack underground detention components.	Monthly

Protection

Activity	Schedule
Remove burrowing animals and trees/deep-rooted woody vegetation that have established on top of the underground detention vault and other components.	Monthly
Check visible parts of the underground detention for soil settlement, cracks, leaks and damage. Repair structural damage immediately.	Semi-annually
Check the control gates, valves and other mechanical devices for proper, unimpeded operation. Repair immediately.	Annually



Draindown

Activity	Schedule
Check outlets for signs of outflow during dry periods. If flow is present, check for standing water in the inlets, vaults or underground pipe system and in associated areas where there should be no water. Check inlets and outlet also for blockages. Remove any blockages and repair damaged components.	Monthly

Cleanliness

Activity	Schedule
Remove sediment, litter, grass clippings, trash and other debris or materials from inlets, outlets and any pilot channels, and from the area draining to the underground detention BMP.	Monthly
Note signs of pollution, such as oil sheens, staining or discoloration at the inlets and outlets. Look for pollutant sources and eliminate them.	Monthly
Remove sediment accumulation in the vaults, pipes and at the inlet and outlets.	Monthly

Do

- ✓ Pick up trash, debris and leaves around your property and around the inlets to your underground detention structure.
- ✓ Prevent damage to the BMP by informing landscapers, contractors, and others that may be managing the buildings or landscape on the property of the location and purpose of the BMP.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.

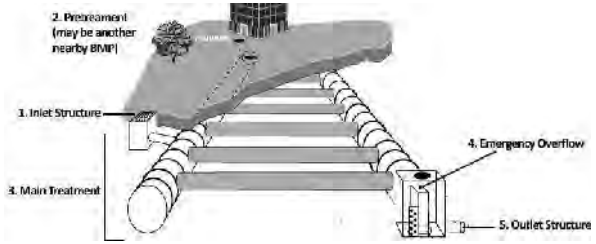
Don't

- X Don't allow anyone to enter the underground detention unless they have confined space training and certification.
- X Don't neglect the maintenance needs of your underground detention. Consider hiring an experienced professional if needed.
- X Don't stockpile sand, salt, chemicals, or materials on your property unless they are in covered containment areas.
- X Don't wash your vehicles or mechanical equipment on areas that drain to the underground detention.

Underground Detention Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.



BMP Name(s)				Today's Date:
	Note: The underground detention name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Underground Detention 1" or "Underground Detention A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Underground Detention?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Underground Detention?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes No

Reason for Follow Up?

Completed forms can be submitted by email: poststorm@birminghamal.gov

Storm Water Management ● Department of Planning, Engineering & Permits

710 North 20th Street ● Birmingham, Alabama 35203

Underground Detention Inspection Form

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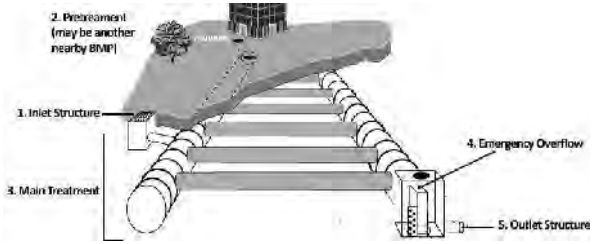
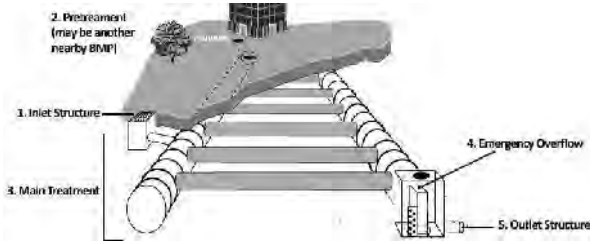


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet Structure, Outlet Structure, and Emergency Overflow (Components 1, 4, and 5)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Are the inlets, outlets, gates, valves, and other mechanical components difficult to access for operation, inspection, and maintenance?						
Guidance: Any obstacles blocking access to, or maintenance of, these components should be removed. Put a note in this form if access is blocked by a permanent fixture (e.g. fence) that is not easily removed. **Schedule:** Monthly						
2. Are trash, sediment, debris, grass clippings, or other materials that can obstruct storm water flow present in the inlet or outlet?						
Guidance: Remove unwanted materials and correct any other problems that block the water flow into or out of the area. **Schedule:** Monthly						
3. Is water flowing from the outlet when it is not expected?						
Guidance: Under normal rainfall conditions, the underground detention BMP is designed to drain 1 day after a rainfall. This may take longer during especially wet periods. During dry periods, an outlet that is discharging water or standing water in BMP components may indicate a clog or blockage, or even a cracked vault or pipe that is allowing landscape water or ground water to enter the system. Determine the cause and correct it. If the cause cannot be determined, call a civil engineer or the vendor of the underground detention system for assistance. **Schedule**: Monthly						
4. Is the outlet NOT flowing after a significant rain event? Or is water backing up into other parts of the storm water system?						
Guidance: Some flow should be visible at the structure outlet after most large storm events. If no flow is observed, the outlet may be clogged. If the clog is visible and accessible, remove it. If not, you may need the help of a qualified professional. **Schedule:** Monthly						

Underground Detention Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

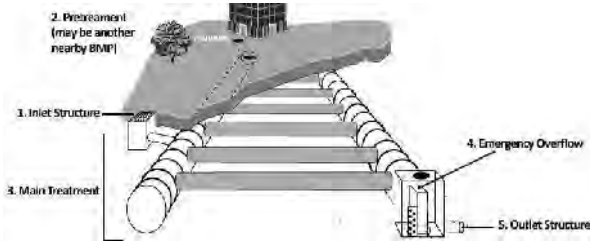


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
5. Is there bare soil or evidence of erosion or scour at the outlets?						
Guidance: Outlets and the areas below them should not have any signs of erosion, and should be covered with sufficient vegetation, pavement or other material to slow the water and prevent erosion. Typically, this is a rock lining, but can be concrete, asphalt, pavers or even dense vegetation. If signs of erosion are visible at the outlet, install a rock lining that extends at least 10' beyond the area of erosion. Contact a qualified professional if you have questions on the size and type of rock. **Schedule:** Monthly						
6. Do the inlets have unhealthy vegetation, sparse rock, broken concrete/pavement, or other damaged material?						
Guidance: Inflow areas should have dense healthy vegetation or a rock, concrete, asphalt, or paver lining to prevent erosion. Bare soil or signs of erosion should NOT be present. Repair eroded areas and cover bare soil immediately with the appropriate vegetation or material cover. **Schedule:** Monthly						
7. Is there visual evidence of pollutants at the inlets or outlets (e.g., oil, odd discoloration, stains, etc.)?						
Guidance: Visually check inlets and outlets for discolored or stained grass, pavement or rocks, or significant stands of unhealthy vegetation. If a persistent or frequent discoloration occurs, contact your local jurisdiction. This could be a sign that the underground detention BMP is not operating properly or that pollutants have been introduced into it. **Schedule:** Monthly						
8. Notice another problem? Describe in comments.						**Your Comments:**

Underground Detention Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.



Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Pretreatment and Main Treatment (Components 2 and 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
9. Are there cracks, holes, depressions, animal burrows, trees, or woody vegetation on top of the vault, on the pavement, or on the pipe system?						
Guidance: The area above the storage components (vault or pipe systems) should be paved, vegetated (with grass or other non-woody vegetation), or both. Animal burrows, trees and woody vegetation should be removed as soon as they are noticed. Cracks, depressions, and holes can indicate a structural problem with the storage components. Measure and log the length, width and depth of each of these problem on the inspection form and note the location of each issue on the inspection figure. Check the vault and piping system for signs of structural damage if you can do so safely. For animal burrows, call animal control for removal. Call a civil engineer or the vendor of the underground detention BMP for assistance if these problems appear to be getting worse. **Schedule:** Semi-annually						
10. Notice another problem? Describe in comments.						**Your Comments:**

Underground Detention Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

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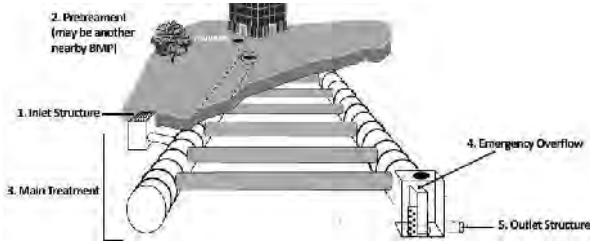


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to the Underground Detention						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
11. Are there litter, grass clippings, trash, debris, or other materials that could enter the underground detention BMP?						
Guidance: Trash and other materials can be carried into the BMP and block the inlets or outlets and fill up the detention storage area. Remove undesirable materials and keep the property clean. **Schedule:** Monthly						
12. Are there stockpiles of soil, chemicals, equipment, or other materials that could be a source of pollutants washing into the BMP during a storm?						
Guidance: Stockpiled materials can contain pollutants that are harmful or that can be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule:** Monthly						
13. Are there areas of erosion or exposed soil/bare earth that could be a source of sediment washing into the BMP during a storm?						
Guidance: Too much sediment washing into an underground detention BMP can reduce the water storage. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for these areas, cover them with mulch, wood chips, pavement or another hard surface to prevent sediment erosion. **Schedule:** Seasonally						
14. Do activities occur in the area that may cause unusual or substantial amounts of pollutants to be discharged to the underground detention BMP? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Prevent these activities from occurring or take steps to prevent the pollutants from reaching the BMP, such as washing cars in areas that drain to the wastewater system, street or parking lot sweeping, pet waste pickup stations, etc. **Schedule:** Monthly						
15. Notice another problem? Describe in comments.						**Your Comments:**

Underground Detention Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Underground Detention Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.16 Sand Filter Basics

What is a Sand Filter?

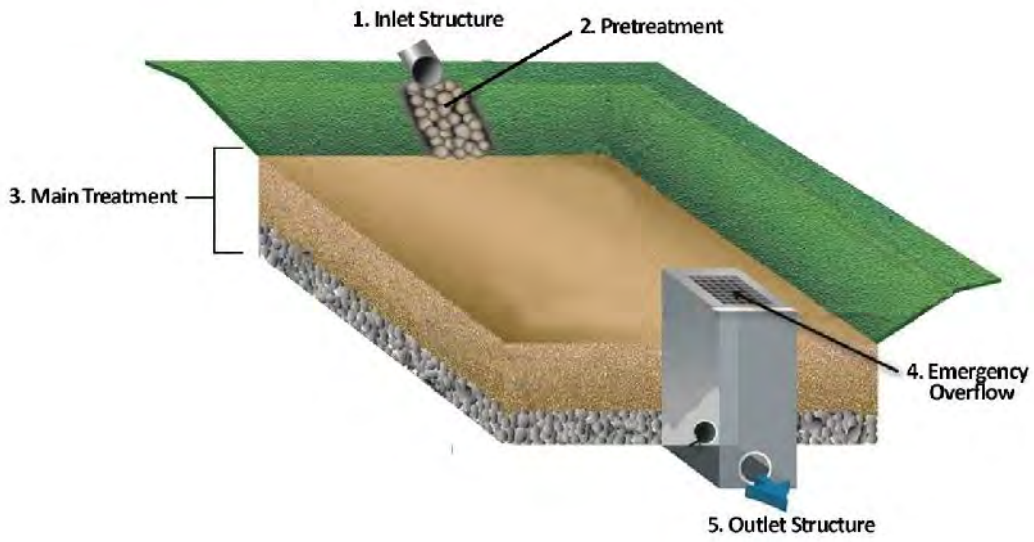
Benefits of Sand Filters

- **High pollutant removal capability**
- **Allow some storm water to soak into soil thereby reducing runoff from the site**

Sand filters are Best Management Practices (BMPs) that remove pollutants from storm water by filtering the storm water through a sand bed. Sand filters generally include a forebay as a pretreatment area discharge some runoff through an underdrain collection system. There are two general types of sand filters: 1) Surface sand filters are open at the surface and are located within earthen, concrete, or block structures. Large storms are able to bypass a surface sand filter. 2) Perimeter sand filters are enclosed in a vault along the edge of an impervious area such as a parking lot and runoff flows into a perimeter sand filter through inlet grates. Typically, sand filters will manage about 1-inch of storm water and should drain within about 1 to 2 days following a storm event. Sand filters that manage storm water on your site will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

In the City of Birmingham, most sand filters will often have five primary components (see the figure below).

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment areas** remove debris and coarse sediment to reduce clogging of the main treatment area.
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.



What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your sand filter. There are a few key points to keep in mind:

- Sand filters included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a contractor or a maintenance company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your sand filter is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your sand filter and save on maintenance costs by keeping your property clean, preventing erosion on your property, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning sand filter. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Sand Filter Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.

Do

- ✓ Check the sand filter after storms to make sure storm water property drains through the sand filter.
- ✓ Check the sand for signs of clogging, which could indicate it needs to be replaced or that the liner beneath is clogged and requires replacement.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.
- ✓ Remove leaves and debris from surfaces
- ✓ Prevent damage to the sand filter by informing landscapers, contractors, and others who may be managing the buildings or landscape on the property of the location and purpose of the sand filter.

Don't

- ✗ Don't stockpile mulch, sand, salt, soil or yard waste in the area draining to the sand filter.
- ✗ Don't neglect the maintenance needs of your sand filter. Consider hiring an experienced professional if needed.
- ✗ Don't pile snow that contains salt in the area draining to your sand filter.
- ✗ Don't replace vehicle fluids or wash your car in the area draining to the sand filter.

Sand Filter Inspection Form

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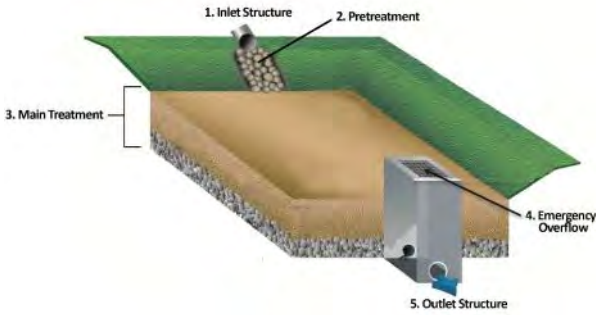

BMP Name(s)				Today's Date:
	Note: The sand filter name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Sand Filter 1" or "Sand Filter A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Sand Filter?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Sand Filter?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes No

Reason for Follow Up?

Completed forms can be submitted by email: poststorm@birminghamal.gov

Storm Water Management ● Department of Planning, Engineering & Permits

710 North 20th Street ● Birmingham, Alabama 35203

Sand Filter Inspection Form

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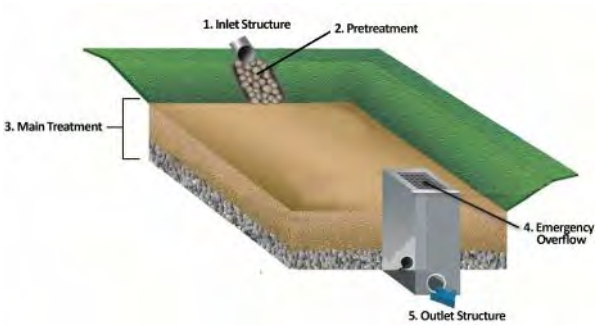

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet Structure, Outlet Structure, and Emergency Overflow (Components 1, 4, and 5)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Are the inlets, outlets, grates, chambers, or mechanical components difficult to access?						
Guidance: Any obstacles blocking access to, or maintenance of, these components should be removed. Put a note in this form if access is blocked by a permanent fixture (e.g. fence) that is not easily removed. **Schedule:** Monthly						
2.Are trash, sediment, debris, grass clippings, or other materials that can obstruct storm water flow present in the inlet or outlet areas?						
Guidance: Remove unwanted materials and correct any other problems that block the water flow into or out of the sand filter. **Schedule:** Monthly						
3. Is water flowing from the outlet when it is not expected?						
Guidance: While surface and perimeter sand filters have chambers that hold water permanently, other chambers and the surface sand filter are designed to drain within 1 to 2 days after a rainfall. This may take longer during especially wet periods. During dry periods, an outlet that is discharging water or water backed into the sand filter inlet may indicate a clog or blockage, or even a cracked vault or pipe that is allowing landscape water or ground water to enter the vault. Determine the cause and correct it. If the cause cannot be determined, call a civil engineer or the vendor of the sand filter system for assistance. **Schedule**: Monthly						
4. Is there bare soil or evidence of erosion or scour at the outlets?						
Guidance: Outlets and the areas below them should not have any signs of erosion, and should be covered with sufficient vegetation, pavement or other material to slow the water and prevent erosion. Typically, this is a rock lining, but can be concrete, asphalt, pavers or even dense vegetation. If signs of erosion are visible at the outlet, install a rock lining that extends at least 10 feet beyond the area of erosion. **Schedule:** Monthly						

Sand Filter Inspection Form

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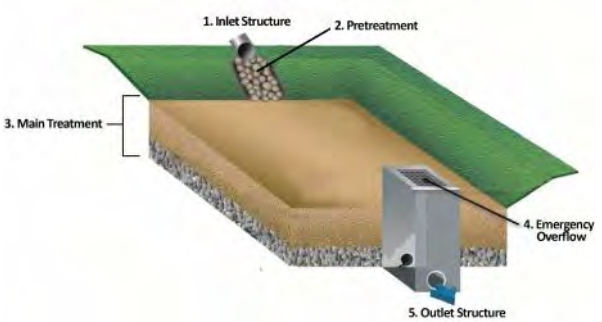

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
5. Is there evidence of erosion, bare soil, broken pipes or broken concrete at the inlets?						
Guidance: Most sand filters are directly connected to the storm water system through storm water pipes. Where inlet areas collect storm water from pervious or impervious surfaces, these areas should have dense healthy vegetation or a rock, concrete, asphalt, or paver lining to prevent erosion. Bare soil or signs of erosion should NOT be present. Repair eroded areas and cover bare soil immediately with the appropriate vegetation or material cover. **Schedule:** Monthly						
6. Is there visual evidence of pollutants at the inlets, outlets, or on the surface of the sand filter media (oil, odd discoloration, stains, etc.)?						
Guidance: Stockpiled materials can contain pollutants that are harmful or that can be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule:** Monthly						

Sand Filter Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

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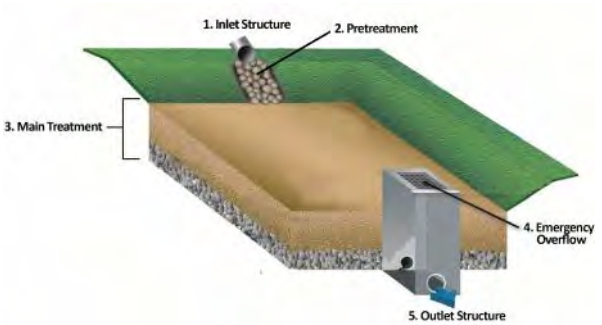

Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Pretreatment and Main Treatment (Components 2 and 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
7. Is the sand filter media draining slowly or not at all? Is it clogged or "crusted over"?						
Guidance: Visually check the filter for standing water, debris, sludge or other material on the surface of the sand filter media. This material can cause the sand filter to not function properly. Rake the sand filter and remove the debris and the top 2-4 inches of sand media. Replace the sand media with the type of sand recommended by the manufacturer. If the sand filter media still does not drain properly, contact a professional engineer or the sand filter manufacturer. **Schedule:** Monthly						
8. Are there animal burrows, trees, or woody vegetation on top of the vault or pipe system or in the filter media? Are there pavement or soil cracks, holes or depressions in or around the vault?						
Guidance: The area around sand filters should be paved, vegetated, or both. Grass, trees and other vegetation should be removed from surface sand filters. Cracks, depressions, and holes in/adjacent to sand filters can indicate structural problems. Measure and log the length, width and depth of each of these problems on the inspection form and note the location of each issue. Check the vault and piping system for signs of structural damage if you can do so safely. Call a civil engineer or the vendor for assistance if these problems appear to be getting worse. **Schedule:** Seasonally						
9. Notice another problem? Describe in comments.						**Your Comments:**

Sand Filter Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

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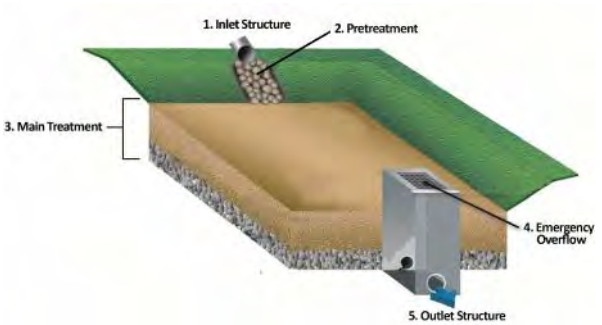


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to Sand Filter						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
10. Are there litter, grass clippings, trash, debris, or other materials that could enter the sand filter BMP?						
Guidance: Trash and other materials can be carried into the BMP and block the inlets, outlets or sand filter media, and fill up the chambers. Remove undesirable materials and keep the property clean. **Schedule:** Weekly						
11. Are there stockpiles of soil, chemicals, equipment or other materials that could be a source of pollutants washing into the BMP during a storm?						
Guidance: Stockpiled materials can contain pollutants that are harmful to plants or that can otherwise be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule:** Monthly						
12. Are there areas of erosion or exposed soil/bare earth that could be a source of sediment washing into the BMP during a storm?						
Guidance: Too much sediment washing into a sand filter can clog the sand filter media very quickly or fill in the settling chamber. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for these areas, cover them with mulch, wood chips, pavement or another hard surface to prevent sediment erosion. **Schedule:** Monthly y						
13. Do activities occur in the area that may cause unusual or substantial amounts of pollutants to be discharged to the sand filter? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Prevent these activities from occurring or take steps to prevent the pollutants from reaching the BMP, such as washing cars in areas that drain to the wastewater system, street or parking lot sweeping, pet waste pickup stations, etc. **Schedule:** Monthly						
14. Notice another problem? Describe in comments.						**Your Comments:**

Sand Filter Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Sand Filter Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.17 Gravity (oil-grit) Separator Basics

What is a Gravity (oil-grit) Separator?

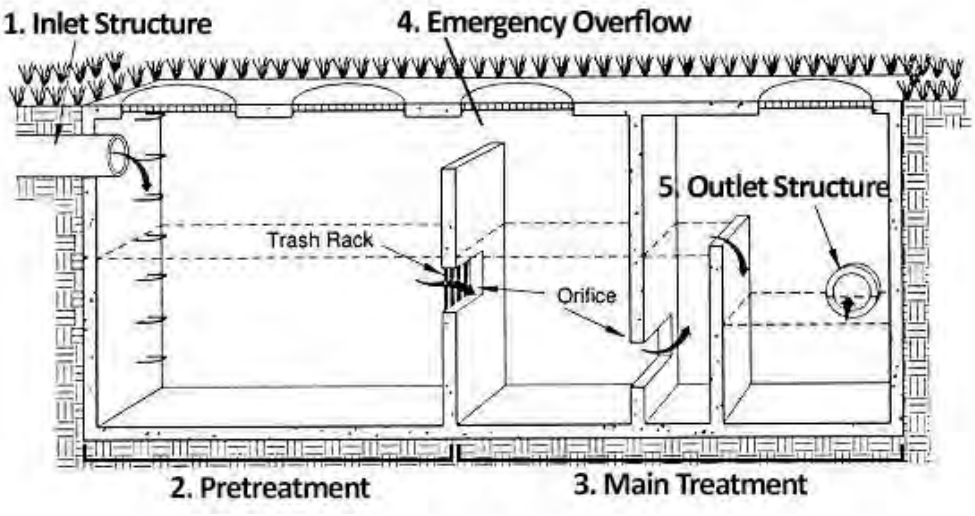
Gravity separators, also called oil-grit separators, are Best Management Practices (BMPs) that remove suspended solids (such as sediment), oil, grease, debris, and floatables (such as trash) from storm water through settling, hydrodynamic separation, and trapping of pollutants. Hydrodynamic separation uses the motion of water to separate pollutants from storm water. The specifics of your gravity separator should be obtained from the manufacturer. Typically, gravity separators will manage about 1 inch of storm water. They are usually designed so that large storms will bypass them and therefore should drain quickly following a storm event. Gravity separators that manage storm water on your site will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

Benefits of Gravity Separators

- **Removal of oil and sediment, which are common pollutants on some sites**
- **Typically take up less space than some other BMPs and fit well on small sites**

In the City of Birmingham, most gravity separators will often have five primary components (see the figure below). Most of these components will be stored underground or contained within a vault, requiring access via a manhole, observation well, or inlet/outlet structure. Because there are a wide range of gravity separators, inspection and maintenance will require the use of an owner's manual and specific information from the manufacturer.

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment areas** remove debris and coarse sediment to reduce clogging of the main treatment area.
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.

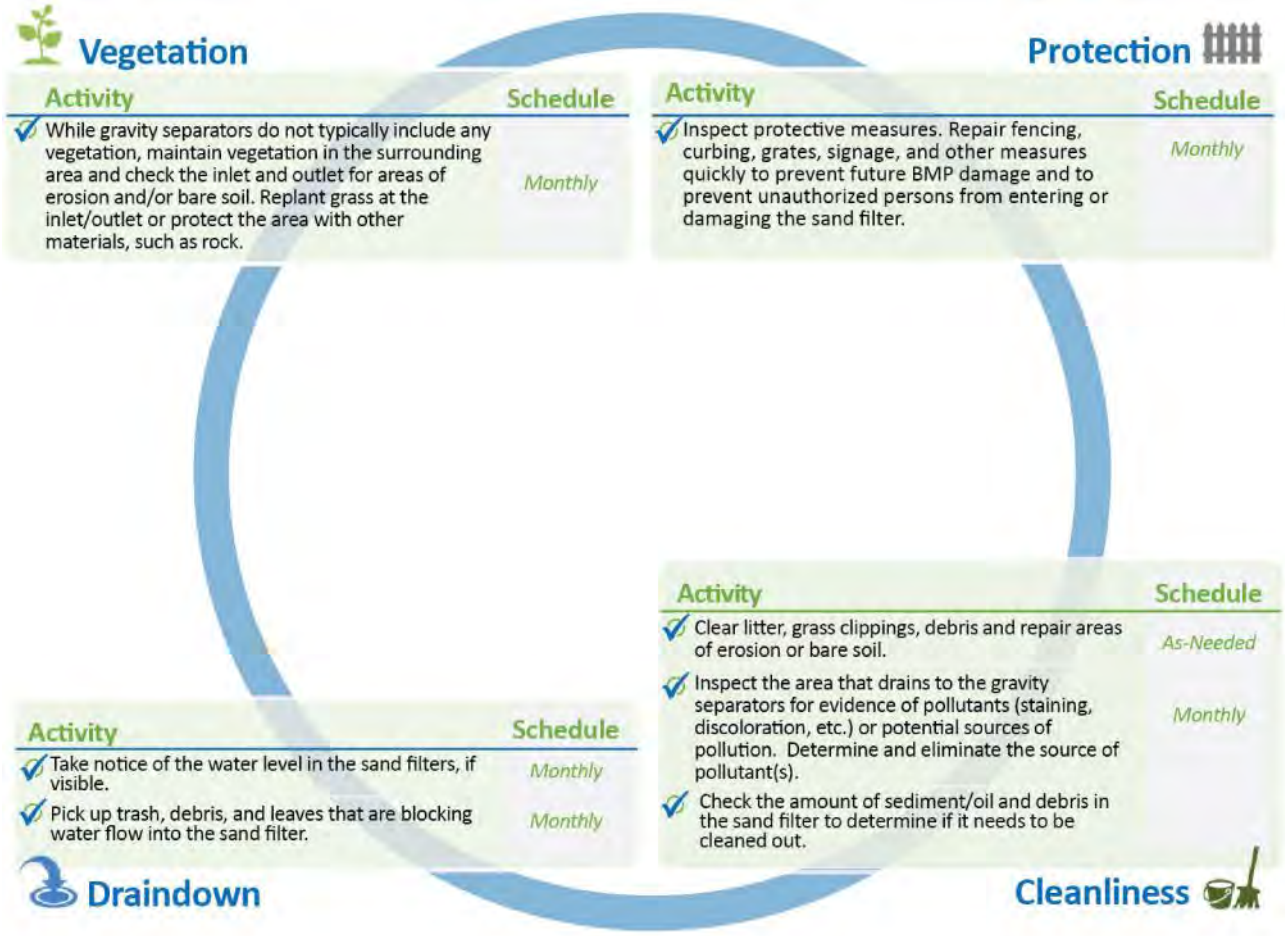


What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your gravity separator. There are a few key points to keep in mind:

- Gravity separators included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a contractor or a maintenance company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your gravity separator is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your gravity separator and save on maintenance costs by keeping your property clean, preventing erosion on your property, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning gravity (oil-grit) separator. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the Gravity Separator Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.



Do

- ✓ Check the gravity separator after storms to make sure storm water property drains through the gravity separator.
- ✓ Mark your gravity separator inlets and outlets to prevent accidental damage to the gravity separator that could result from impact with heavy equipment or vehicles.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.
- ✓ Remove leaves and debris from surfaces.
- ✓ Prevent damage to the gravity separator by informing landscapers, contractors, and others who may be managing the buildings or landscape on the property of the location and purpose of the gravity separator.

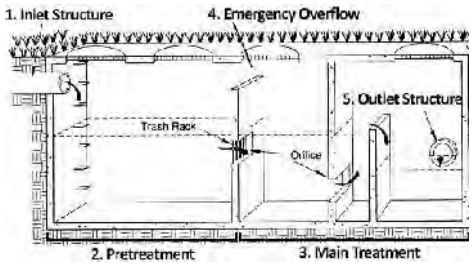
Don't

- X Don't stockpile mulch, sand, salt, soil or yard waste in the area draining to the gravity separator.
- X Don't neglect the maintenance needs of your gravity separator. Consider hiring an experienced professional if needed.
- X Don't pile snow that contains sand or salt in the area draining to your gravity separator.
- X Don't replace vehicle fluids or wash your car in the area draining to the gravity separator.
- X Don't enter the gravity separator for inspection or maintenance unless you are a professional with confined entry certifications.

Gravity (oil-grit) Separator Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.



BMP Name(s)				Today's Date:
	Note: The gravity separator name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "Gravity Separator 1" or "Gravity Separator A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the Gravity Separator?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the Gravity Separator?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes No

Reason for Follow Up?

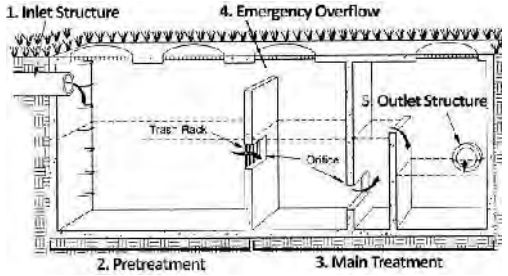
Completed forms can be submitted by email: poststorm@birminghamal.gov

Storm Water Management ● Department of Planning, Engineering & Permits
710 North 20th Street ● Birmingham, Alabama 35203

Gravity (oil-grit) Separator Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

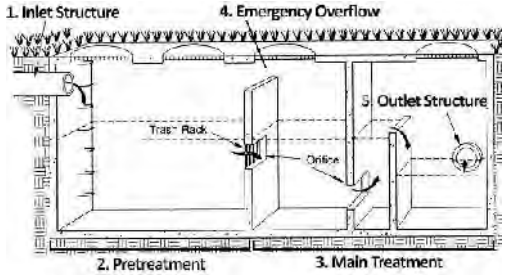


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet Structure, Outlet Structure, and Emergency Overflow (Components 1, 4, and 5)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
1. Are the inlets, outlets, grates, chambers, or mechanical components difficult to access?						
Guidance: Any obstacles blocking access to, or maintenance of, these components should be removed. Put a note in this form if access is blocked by a permanent fixture (e.g. fence) that is not easily removed. Don't enter the gravity separator for inspection or maintenance unless you are a professional with confined entry certifications. **Schedule:** Monthly						
2.Are trash, sediment, debris, grass clippings, or other materials that can obstruct storm water flow present in the inlet or outlet areas?						
Guidance: Remove unwanted materials and correct any other problems that block the water flow into or out of the gravity separator. **Schedule:** Monthly						
3. Is water flowing from the outlet when it is not expected?						
Guidance: While gravity separators have chambers that hold water permanently, other chambers are designed to drain quickly after a rainfall. This may take longer during especially wet periods. During dry periods, an outlet that is discharging water or water backed into the gravity separator inlet may indicate a clog or blockage, or even a cracked vault or pipe that is allowing landscape water or ground water to enter the vault. Determine the cause and correct it. If the cause cannot be determined, call a civil engineer or the vendor of the gravity separator system for assistance. **Schedule**: Monthly						
4. Is there bare soil or evidence of erosion or scour at the outlets?						
Guidance: Outlets and the areas below them should not have any signs of erosion, and should be covered with sufficient vegetation, pavement or other material to slow the water and prevent erosion. Typically, this is a rock lining, but can be concrete, asphalt, pavers or even dense vegetation. If signs of erosion are visible at the outlet, install a rock lining that extends at least 10 feet beyond the area of erosion. **Schedule:** Monthly						

Gravity (oil-grit) Separator Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

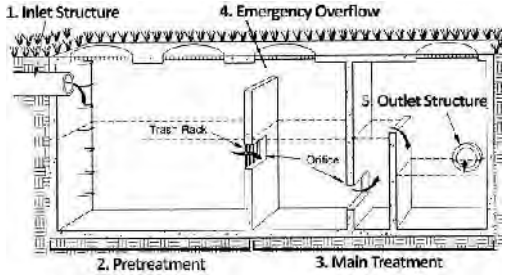


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
5. Is there evidence of erosion, bare soil, broken pipes or broken concrete at the inlets?						
Guidance: Most gravity separators are directly connected to the storm water system through storm water pipes. Where inlet areas collect storm water from pervious or impervious surfaces, these areas should have dense healthy vegetation or a rock, concrete, asphalt, or paver lining to prevent erosion. Bare soil or signs of erosion should NOT be present. Repair eroded areas and cover bare soil immediately with the appropriate vegetation or material cover. **Schedule:** Monthly						
6. Is there visual evidence of pollutants at the inlets, outlets, or on the surface of the gravity separator media (e.g., oil, odd discoloration, stains, etc.)?						
Guidance: Stockpiled materials can contain pollutants that are harmful or that can be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule:** Monthly						
7. Notice another problem? Describe in comments.						**Your Comments:**
Pretreatment and Main Treatment (Components 2 and 3)						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
8. Is the gravity separator draining slowly or not at all? Is there a clogged component?						
Guidance: Visually check any components to see if they are clogged with debris, sludge, or other material. This material can cause the gravity separator to not function properly. Follow the manufacturer's recommendations for cleaning and replacing components. If the BMP still does not drain property, contact the manufacturer or another qualified professional. **Schedule:** Monthly						
9. Notice another problem? Describe in comments.						**Your Comments:**

Gravity (oil-grit) Separator Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.



Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to Gravity Separator						**Success Factors: Vegetation, Protection, Draindown, and Cleanliness**
10. Are there litter, grass clippings, trash, debris, or other materials that could enter the gravity separator BMP?						
Guidance: Trash and other materials can be carried into the BMP and block the inlets, outlets or gravity separator media, and fill up the chambers. Remove undesirable materials and keep the property clean. **Schedule:** Weekly						
11. Are there stockpiles of soil, chemicals, equipment or other materials that could be a source of pollutants washing into the BMP during a storm?						
Guidance: Stockpiled materials can contain pollutants that are harmful to plants or that can otherwise be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule:** Monthly						
12. Are there areas of erosion or exposed soil/bare earth that could be a source of sediment washing into the BMP during a storm?						
Guidance: Too much sediment washing into a gravity separator can quickly fill in the settling chamber. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for these areas, cover them with mulch, wood chips, pavement or another hard surface to prevent sediment erosion. **Schedule:** Monthly						
13. Do activities occur in the area that may cause unusual or substantial amounts of pollutants to be discharged to the gravity separator? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Prevent these activities from occurring or take steps to prevent the pollutants from reaching the BMP, such as washing cars in areas that drain to the wastewater system, street or parking lot sweeping, pet waste pickup stations, etc. **Schedule:** Monthly						
14. Notice another problem? Describe in comments.						**Your Comments:**

Gravity (oil-grit) Separator Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

Gravity (oil-grit) Separator Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

5.18 Manufactured Treatment Device Basics

What is a Manufactured Treatment Device (MTD)?

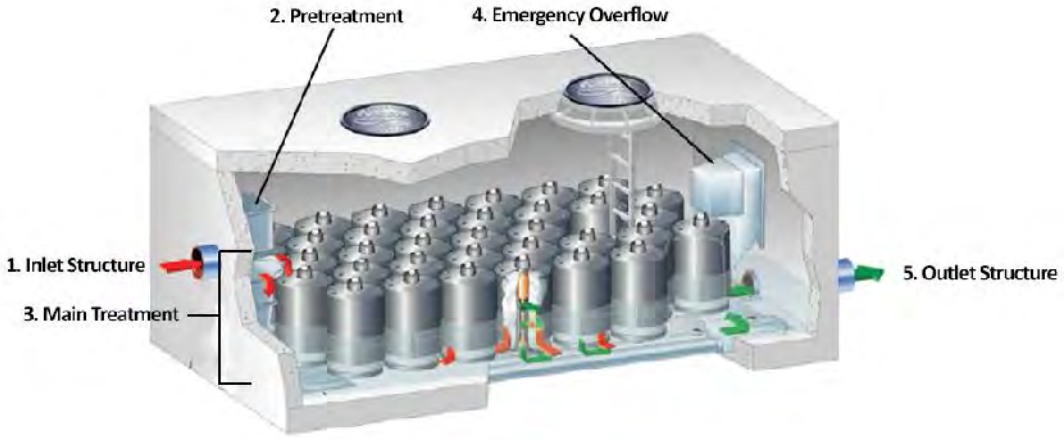
MTDs are Best Management Practices (BMPs) that remove pollutants from storm water by filtration and/or settling. There are some MTDs that include underground storage or cisterns and provide detention, but usually MTDs only provide pollutant removal. There are two general types of MTDs: 1) hydrodynamic separators generally control pollution using the movement of water to settle pollutants out of storm water. 2) Filtration systems typically use a filtering system to remove specific pollutants and the filtering media or cartridge is based on the targeted pollutant at a site. MTDs also include catch basin media inserts, chemical treatment systems, package treatment plans, and prefabricated detention structures. The specifics of your MTD should be obtained from the manufacturer. Typically, MTDs will manage about 1 inch of storm water. They are usually designed so that large storms will bypass them and therefore should drain quickly following a storm event. MTDs that manage storm water on your site will be located within drainage easements and will be readily identifiable on your property's Maintenance Agreement.

Benefits of MTDs

- **Removal of specific pollutants**
- **Typically take up less space than some other BMPs and fit well on small sites**

In the City of Birmingham, most MTDs will often have five primary components (see the figure below). Most of these components will be stored underground or contained within a vault, requiring access via a manhole, observation well, or inlet/outlet structure. Because there are a wide range of MTDs, inspection and maintenance will require the use of an owner's manual and specific information from the manufacturer.

1. **Inlet structures** bring water into the BMP.
2. **Pretreatment areas** remove debris and coarse sediment to reduce clogging of the main treatment area.
3. The **main treatment** area is where storm water is collected so that it can be discharged at a controlled rate.
4. **Emergency overflows** allow water to escape the BMP during large rain events without flooding the surrounding area.
5. The **outlet structure** allows treated water to exit the BMP.

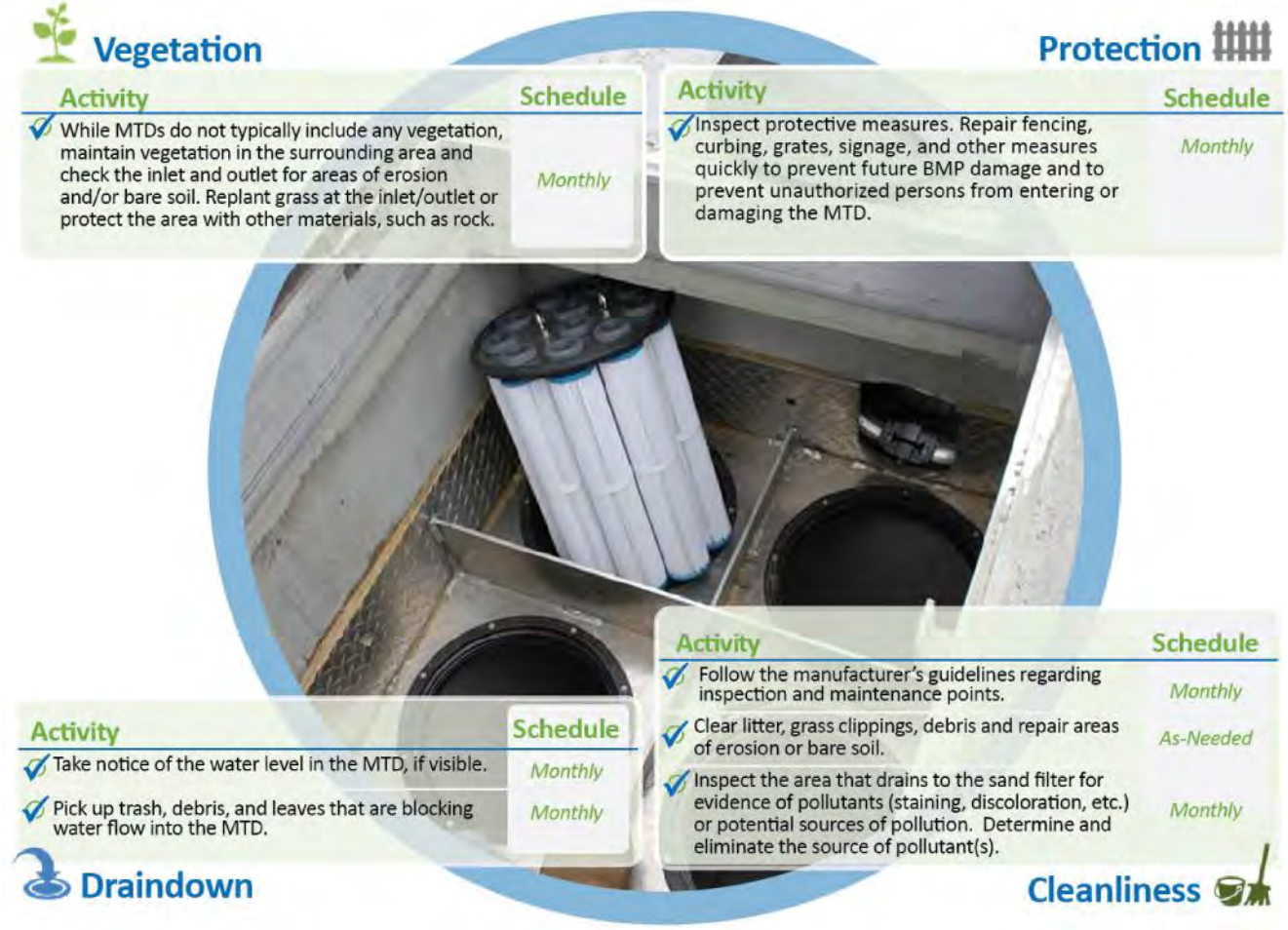


What are my responsibilities?

Continuous protection, regular inspection and consistent maintenance are critical to the operation of your MTD. There are a few key points to keep in mind:

- MTDs included in your Maintenance Agreement must be inspected and maintained by you, the property owner. The Maintenance Agreement is tied to the property, and the requirements for inspection and maintenance are supported by the City's Post Construction Storm Water Ordinance.
- You may choose to allow others, such as a contractor or a maintenance company, to carry out inspection and maintenance activities. However, you are ultimately responsible for inspection and maintenance.
- The City of Birmingham monitors your inspection and maintenance activities by examining your inspection reports and performing City-led inspections, which can occur at any time. Failure to inspect and maintain your MTD is a violation of the City's Post Construction Storm Water Ordinance and can result in enforcement actions such as fines, penalties, and requirement for corrective actions.

You can prolong the life of your MTD and save on maintenance costs by keeping your property clean, preventing erosion on your property, and performing routine inspection and maintenance. The graphic below provides information on the four success factors needed to ensure that you have an attractive and functioning MTD. Note that a **DOCUMENTED INSPECTION MUST BE PERFORMED ANNUALLY, NO LATER THAN 10-01**, using the MTD Inspection Form included with this guidance sheet and available on the storm water page of the City's website. The Inspection Form and any other documentation of inspection and maintenance must be retained by the Owner for at least three (3) years. The City can request this information at any time, and may require Form to be submitted to the City after it is completed.



Do

- ✓ Check the MTD after storms to make sure storm water property drains through the MTD.
- ✓ Mark your MTD inlets and outlets to prevent accidental damage to the MTD that could result from impact with heavy equipment or vehicles.
- ✓ Perform informal inspections and routine maintenance on a regular basis. Make repairs as soon as problems are noticed.
- ✓ Remove leaves and debris from surfaces
- ✓ Prevent damage to the MTD by informing landscapers, contractors, and others who may be managing the buildings or landscape on the property of the location and purpose of the MTD.

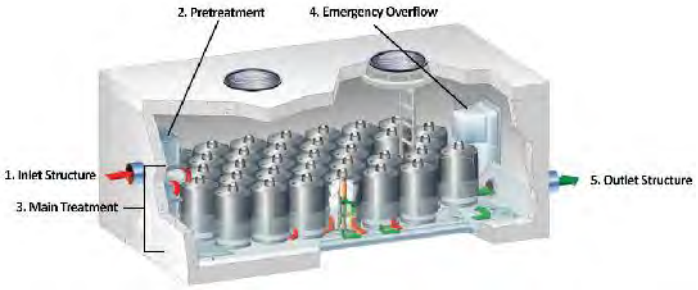
Don't

- X Don't stockpile mulch, sand, salt, soil or yard waste in the area draining to the MTD.
- X Don't neglect the maintenance needs of your MTD. Consider hiring an experienced professional if needed.
- X Don't pile snow that contains sand or salt in the area draining to your MTD.
- X Don't replace vehicle fluids or wash your car in the area draining to the MTD.
- X Don't enter the MTD for inspection or maintenance unless you are a professional with confined entry certifications.

Manufactured Treatment Device (MTD) Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form is a certification that you have met these requirements.



BMP Name(s)				Today's Date:
	Note: The MTD name will be shown on the Storm Water Practices Location Map which is attached to the property's Maintenance Agreement. A typical name would be "MTD 1" or "MTD A". If this inspection form is being submitted for multiple BMPs of the same type, please list all applicable names.			Date of Last Inspection:
Property Info	Street Address:	City:	State:	Zip:
Who is Inspecting the MTD?	Name (Owner, Tenant, Property Manager or Landscape Company):			Contact Name (If Different):
	Street Address (If conducted by a company, use company address):	City:	State:	Zip:
	Phone #:	Email:		
Who Owns the MTD?	Name (Person(s) or Company):	Contact Name (If Different):		
	Street Address:	City:	State:	Zip:
	Phone #:	Email:		

This Section is for City of Birmingham Use Only

Identification Number

Has the City Entered and Approved this Inspection? Yes No

Name of Staff Approving This Inspection Report:

Date of Inspection Approval:

Is a Follow Up Inspection by Staff Required? Circle One: Yes No

Reason for Follow Up?

Completed forms can be submitted by email: poststorm@birminghamal.gov

Storm Water Management ● Department of Planning, Engineering & Permits

710 North 20th Street ● Birmingham, Alabama 35203

Manufactured Treatment Device (MTD) Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

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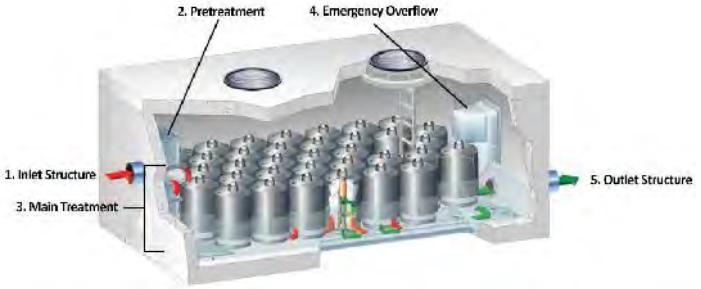
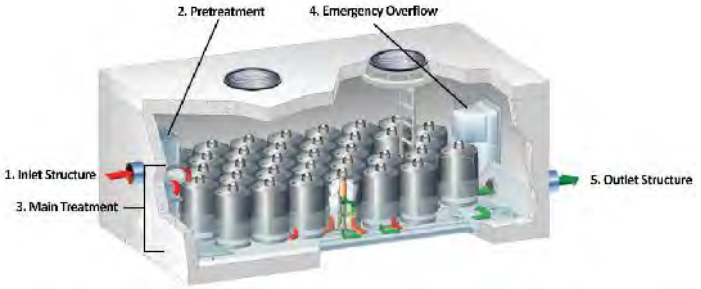


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Inlet Structure, Outlet Structure, and Emergency Overflow (Components 1, 4, and 5)						
1. Are the inlets, outlets, grates, chambers, or mechanical components difficult to access?						
Guidance: Any obstacles blocking access to, or maintenance of, these components should be removed. Put a note in this form if access is blocked by a permanent fixture (e.g. fence) that is not easily removed. Don't enter the MTD for inspection or maintenance unless you are a professional with confined entry certifications. **Schedule:** Monthly						
2. Are trash, sediment, debris, grass clippings, or other materials that can obstruct storm water flow present in the inlet or outlet areas?						
Guidance: Remove unwanted materials and correct any other problems that block the water flow into or out of the MTD. **Schedule:** Monthly						
3. Is water flowing from the outlet when it is not expected?						
Guidance: While surface and perimeter MTDs have chambers that hold water permanently, other chambers and the surface MTD are designed to drain within 1 to 2 days after a rainfall. This may take longer during especially wet periods. During dry periods, an outlet that is discharging water or water backed into the MTD inlet may indicate a clog or blockage, or even a cracked vault or pipe that is allowing landscape water or ground water to enter the vault. Determine the cause and correct it. If the cause cannot be determined, call a civil engineer or the vendor of the MTD system for assistance. **Schedule**: Monthly						
4. Is there bare soil or evidence of erosion or scour at the outlets?						
Guidance: Outlets and the areas below them should not have any signs of erosion, and should be covered with sufficient vegetation, pavement or other material to slow the water and prevent erosion. Typically, this is a rock lining, but can be concrete, asphalt, pavers or even dense vegetation. If signs of erosion are visible at the outlet, install a rock lining that extends at least 10 feet beyond the area of erosion. **Schedule:** Monthly						

Manufactured Treatment Device (MTD) Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.

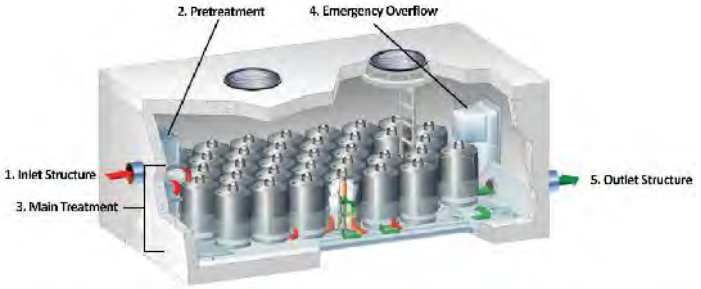


Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
5. Is there evidence of erosion, bare soil, broken pipes or broken concrete at the inlets?						
Guidance: Most MTDs are directly connected to the storm water system through storm water pipes. Where inlet areas collect storm water from pervious or impervious surfaces, these areas should have dense healthy vegetation or a rock, concrete, asphalt, or paver lining to prevent erosion. Bare soil or signs of erosion should NOT be present. Repair eroded areas and cover bare soil immediately with the appropriate vegetation or material cover. **Schedule:** Monthly						
6. Is there visual evidence of pollutants at the inlets, outlets, or on the surface of the MTD media (e.g., oil, odd discoloration, stains, etc.)?						
Guidance: Stockpiled materials can contain pollutants that are harmful or that can be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule:** Monthly						
Pretreatment and Main Treatment (Components 2 and 3)						
7. Is the MTD media draining slowly or not at all? Is there a clogged filter or other component?						
Guidance: Visually check any filters and other components to check if they are clogged with debris, sludge or other material. This material can cause the MTD to not function properly. Follow the manufacturer's recommendations for cleaning and replacing filters or other components. If the MTD still does not drain properly, contact the manufacturer or another qualified professional. **Schedule:** Monthly						
9. Notice another problem? Describe in comments.						**Your Comments:**

Manufactured Treatment Device (MTD) Inspection Form

All items listed must be inspected unless Not Applicable (NA). Answering "Yes" indicates a need for maintenance. Please include an approximate repair date for items that require maintenance.

The maintenance and inspection frequency shall be done in accordance with the Property Owner's Manual. This checklist details these frequency periods, and submittal of the annual form and answering "Yes" to the schedule is a certification that you have met these requirements.



Inspection Question	Answer			Schedule		Describe Problem(s) and Solution(s)
	Y	N	NA	Y	N	
Property Draining to MTD						
10. Are there litter, grass clippings, trash, debris, or other materials that could enter the MTD BMP?						
Guidance: Trash and other materials can be carried into BMP and block the inlets, outlets or MTD media, and fill up the chambers. Remove undesirable materials and keep the property clean. **Schedule:** Weekly						
11. Are there stockpiles of soil, chemicals, equipment or other materials that could be a source of pollutants washing into the BMP during a storm?						
Guidance: Stockpiled materials can contain pollutants that are harmful to plants or that can otherwise be hazardous. Remove or cover undesirable materials, fully preventing their exposure to rainfall or storm water. **Schedule:** Monthly						
12. Are there areas of erosion or exposed soil/bare earth that could be a source of sediment washing into the BMP during a storm?						
Guidance: Too much sediment washing into a MTD can clog the MTD media very quickly or fill in the settling chamber. Repair and revegetate all areas of erosion or exposed soil. If vegetation is not intended for these areas, cover them with mulch, wood chips, pavement or another hard surface to prevent sediment erosion. **Schedule:** Monthly y						
13. Do activities occur in the area that may cause unusual or substantial amounts of pollutants to be discharged to the MTD? Activities include car or equipment washing, pet walking, construction vehicle traffic, etc.						
Guidance: Prevent these activities from occurring or take steps to prevent the pollutants from reaching the BMP, such as washing cars in areas that drain to the wastewater system, street or parking lot sweeping, pet waste pickup stations, etc. **Schedule:** Monthly						
14. Notice another problem? Describe in comments.						**Your Comments:**

MTD Inspection Form

Use this page for any notes, comments, or questions generated by your inspection. If you are using this page to continue your notes from a previous section, please include the section name and section number. You may also use this page to address issues not covered on the inspection form.

MTD Inspection Form

Provide a photograph(s) of your BMP to document the annual compliance inspection.

Photograph Description:	**Photograph Description:**
Date Photograph Taken:	**Date Photograph Taken:**

Property Owner's Guide to BMP Maintenance

6.0 Helpful Resources

NEED HELP WITH YOUR BMP?

- **More technical questions may require the assistance of a professional engineer or landscape architect.**
- **Landscape firms can help you maintain your BMP's soil and vegetation.**
- **Master Gardeners are volunteers with valuable plant knowledge.**
- **Native Plant Nurseries can provide plants and information on keeping them healthy.**
- **Additional, online resources are also included in this section.**
- **The City of Birmingham's Storm Water Management Department can answer administrative questions about your BMP or refer you to additional resources.**

Getting Additional Help with BMPs

Whether you are an individual residential property owner, a homeowners' association representative, a non-residential property owner, a property manager, or part of a landscape or property maintenance staff, this Manual is intended to provide guidance for the protection, inspection, maintenance, and planning needed to keep your BMP functioning properly.

Sometimes, BMPs will require maintenance that requires more technical or specialized expertise. This Section is designed to guide you to additional resources.

Engineers and Landscape Architects

BMPs are used to meet flooding, erosion, and pollution control requirements. Engineers and landscape architects are specially trained to conduct the calculations required to meet these requirements and design BMPs accordingly. In the City of Birmingham, the City of Birmingham Storm Water Design Manual is used and includes all the requirements for designing and installing a BMP. If your BMP is experiencing problems despite regular maintenance and upkeep, or if it is damaged and its components need repairs, then it may be time to obtain the services of a technical specialist.

The following websites may provide additional information on finding an engineer or landscape architect:

Alabama Chapter of the American Society of Landscape Architects: http://www.alabamaasla.com/

Alabama Society of Professional Engineers: http://myaspe.com/#/home

Landscape Firms

Vegetated areas may require the use of a professional landscape firm to maintain healthy vegetation, manage weeds, replant problem areas, and maintain optimal soil and drainage conditions. Before hiring a landscape firm or having one work on your property, discuss with them they will be working with a BMP designed to manage storm water runoff. They need to be aware that maintenance of your BMP is required by local ordinance and that special care will be needed to protect the BMP components. Communicate the following to any landscape firms working on your property:

- Higher mowing heights and less frequent mowing may be required than conventional landscaping.
- Use of fertilizers, herbicides, and pesticides may be more limited than conventional landscaping.
- Heavy equipment should be avoided in vegetated areas and areas where infiltration occurs.
- The BMP area should be kept clear of grass clippings, leaf piles, and other plant trimmings.
- Also inform landscape firms of any other requirements of your maintenance agreement or planting plan.

Master Gardeners

Master Gardeners are gardeners that have been specially trained and sponsored by the Alabama Cooperative Extension System. Master Gardeners volunteer their expertise and services to the community, providing reliable, gardening information and education opportunities. Both the State of Alabama and Jefferson County have Master Gardener groups that may have resources and gardeners available to answer questions and help with the vegetation, soil, and media in your BMP. They can be reached through the following websites:

Jefferson County Master Gardeners: https://jeffcomg.org/

Alabama Master Gardeners Association: http://alabamamg.org/

Native Plant Nurseries

Even with careful management, vegetated BMPs will need additional planting to replace dead or unhealthy plants. Plants in a BMP serve very specific purposes, and the BMP may not function well if the wrong plants are used. If you are not sure what plants were planted in your BMP, your record drawing should have the original planting plan. Due to their deep roots and ability to withstand local conditions, native plants are most often used in BMPs. All commercial nurseries will not have the specific plants you need. Native plant nurseries will have the inventory and the expertise you need to maintain your vegetation. If you choose to contact a nursery, make sure they are familiar with your type of BMP by sharing the pertinent section of this Manual and the Record Drawings of your BMP.

City Storm Water Department

The Storm Water Management Department maintains the City of Birmingham Storm Water Design Manual, which is a technical manual used by engineers and planners to design BMPs for a development site. Most of the information included is more applicable to selecting or designing a BMP; however, some background information and technical drawings may be useful to a BMP owner. It is available here:

https://www.birminghamal.gov/storm-water-management/post-construction/

The City of Birmingham's Storm Water Management Department may be able to provide record drawings and administrative assistance for inspection of your BMP. The Storm Water Management Department can be reached at: Storm Water Management Department, Department of Planning, Engineering & Permits, 710 North 20th Street, Birmingham AL 35203, or by phone at 205-254-7771.

Additional Online Resources

All across the country, cities and private landowners are working to reduce negative impacts of storm water through the use of BMPs. Below are some recommended websites that may be able to provide additional information on BMPs. As you conduct your own research, keep in mind that some BMPs and recommendations you find may not be applicable to local conditions or your specific BMP.

Alabama A&M and Auburn University Extension Water Resources Web Site

http://www.aces.edu/natural-resources/water-resources/

Alabama Department of Environmental Management Water Programs

http://www.adem.state.al.us/programs/water/default.cnt

Alabama Low Impact Development Handbook

http://adem.alabama.gov/programs/water/waterforms/LIDHandbook.pdf

Alabama Soil & Water Conservation Committee Erosion and Sediment Control Resources

https://alconservationdistricts.gov/resources/erosion-and-sediment-control/

Alabama Wildflower Society

http://www.alwildflowers.org/

Environmental Protection Agency Stormwater Pollution Website

https://www.epa.gov/npdes/npdes-stormwater-program

Georgia Stormwater Management Manual

https://atlantaregional.org/natural-resources/water/georgia-stormwater-management-manual/