

# STORMWATER OPERATIONS & MAINTENANCE PLAN

Nevada Department of Transportation

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## Acronyms

BMP	Best Management Practice
EAMS	Enterprise Asset Management System
IDDE	Illicit Discharge Detection and Elimination
MS4	Municipal Separate Storm Sewer System
NDEP	Nevada Division of Environmental Protection
NDOT	Nevada Department of Transportation
NPDES	National Pollutant Discharge Elimination System
NV	Nevada
SAM	Stormwater Asset Mapping
SWOMP	Stormwater Operations and Maintenance Plan
WOUS	Waters of the United States

## 1. Introduction

### 1.1. Background

The Nevada Department of Transportation (NDOT) operates under a municipal separate storm sewer system (MS4) discharge permit issued by the Nevada Division of Environmental Protection (NDEP). This permit requires policies and procedures for storm sewer system maintenance, public street maintenance in urbanized areas and highway maintenance activities related to stormwater. To meet these requirements, NDOT has developed the Stormwater Operations and Maintenance Plan (SWOMP). This SWOMP provides a basis for the inspection and maintenance of NDOT’s stormwater system, particularly those structures and conveyances associated with the MS4. These practices will help to define a level and extent of service for the inspection and maintenance of system components (assets) to achieve the ultimate goal of properly maintaining these stormwater assets to meet permit requirements and be protective of water quality. This SWOMP is designed to evaluate routine maintenance concerns and to provide guidelines and checklists for storm sewer system assets.

The storm sewer system is comprised of conveyance systems best management practices (BMPs) and stormwater assets that must be routinely inspected and maintained to ensure they continually function as designed. If proper maintenance is not provided, adverse environmental impacts such as the discharge of pollutants into ground and surface waters may occur. NDOT is responsible for implementing federal, state and local stormwater regulations that require them to reduce potential water quality impacts from daily activities including construction, maintenance and roadway activities. A new Stormwater Division was established in 2015 to help the Department improve compliance with requirements of the Clean Water Act, the U.S. Environmental Protection Agency and NDEP. The mission of NDOT’s Stormwater Division is to promote stormwater stewardship as an essential element of all operations. The vision for the Stormwater Division is to be a leader in stormwater management and preserve Nevada’s (NV) water quality for future generations.

This document will lay out general aspects of stormwater conveyance and treatment assets as follows:

- Chapter 2: Storm Sewer System
- Chapter 3: General Storm Sewer System Inspections and Maintenance
- Chapter 4: Reporting and Record Keeping
- Chapter 5: Storm Sewer System Assets

A three-tiered condition assessment of components will be applied to each asset that is evaluated during an inspection, where green, yellow and red correspond to good, fair or poor condition. The appendices contain additional reference information and pictures to aid the inspector in determining these conditions as follows:

- Appendix A: Maintenance Condition Assessment Criteria
- Appendix B: Inspection and Maintenance Guidelines
- Appendix C: Inspection and Maintenance Checklists

NDOT is currently developing a mobile application for completing the inspection sheets and tracking inspection and maintenance information.



**1.2. Purpose**

The purpose of the SWOMP is to provide direction on how NDOT and their representatives (i.e., contract personnel and other authorized entities) will conduct permanent BMP and storm sewer system inspections and maintenance to aid in the protection of NV waters. This document is focused on inspection procedures for the state highway system or other routes as designated by agreement. The primary focus is to define the inspection, operation and maintenance practices needed to assess the condition of stormwater assets, keep stormwater assets and their components functioning as intended, and identify potential pollutant discharges that would require further investigation.

Some of the practices in this SWOMP may be used elsewhere (i.e. a maintenance facility) whenever NDOT feels such application is appropriate. Use of this SWOMP is a standard of practice that is complementary to other standards of practice and documents within NDOT (Maintenance Manual, Manual of Instruction, Project Design Guidelines, Construction Site Best Management Practices Manual, Field Guide for the Detection and Elimination of Illicit Discharges, Maintenance Facility Stormwater Best Management Practices Manual, Facility Pollution Prevention Plan, Dry Weather Outfall Inspection Plan). The SWOMP does not address inspections on maintenance facilities, as they are addressed through NDOT’s Facility Pollution Prevention Plan (Major and Minor Maintenance Facilities) document and the Maintenance Facility Stormwater Best Management Practices Manual.

BMPs, as defined by NDOT’s MS4 permit incorporates “schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of Waters of the United States.” This SWOMP is based on balancing stormwater permit compliance, safety of the traveling public, legal obligations, environmental risk, financial prioritization and use of established NDOT maintenance policies and procedures. This plan may change as necessary due to modifications to one or more of these factors.

**1.3. Regulatory Background**

The procedures outlined in this document are to satisfy the relevant Permit Requirements from the Department’s 2010 NPDES MS4 Permit (NV0023329 - Permit) as follows:

- (Permit Condition III.I. – Discharges from New Development and Redevelopment). NDOT shall inventory, inspect, and maintain all post-construction stormwater pollution control BMPs.
- (Permit Condition III.Q.1.b.i.). NDOT shall inspect and record conditions of its storm sewer system including roadways used for stormwater conveyance, catch basins, storm drain inlets, open channels, washes, culverts, and retention basins to identify potential sources of pollutants and determine maintenance needs.
- (Permit Condition III.Q.1.b.ii)

NDOT shall maintain records of inspections and conditions found and shall present the number of inspections in each Annual Report.

**1.4. Priority**

The Department’s MS4 permit requires stormwater assets to be prioritized. At a minimum the Department shall identify high priority components of the storm sewer system. High priority components shall be inspected at least once per year or more frequently and cleaned in accordance with this operation and maintenance plan or a specific plan for that asset.

The Stormwater division will identify high priority components at locations where there is a greater risk for discharge of pollutants, based on such factors as the types of activities in the sub-watershed or proximity to impaired waters.

District personnel will identify high priority components based on safety, sediment, debris, and other pollutant accumulation, vegetation growth, and general site conditions or other factors that may have changed or been identified since the initial construction.

**1.5. Contact Information**

The information provided in this manual is intended to serve as a guideline to those individuals responsible for inspecting the stormwater system. If a particular situation should require deviation from the method, procedures and/or criteria presented in this manual or in the event there are signs of illicit discharges or illegal connections to the drainage system, contact the Stormwater Division at (775) 888-7771 for additional guidance.

**2. Storm Sewer System**

The Storm Sewer System refers to the structure or ‘assets’ that collect, convey and provide water quality treatment for rainwater or snow melt runoff from streets, roads, and highways. The system can include curbs, gutters, ditches, channels, storm drains, culverts, basins, or other post construction BMPs. NDOT has installed, operated, and maintained stormwater collection and conveyance systems to provide safe and effective drainage along its roads and highways. These same systems have the potential to transport roadway pollutants as runoff flows across pervious and impervious areas. These pollutants may discharge to streams, rivers, lakes and other water bodies. Routine inspection and maintenance is conducted to ensure that structures are functioning as designed and to prevent the potential discharge of pollutants to receiving waters. Maintenance indicators of potential problems include structural damage, erosion, corrosion, blockages, debris, siltation and undesirable vegetation. Inspections can identify required maintenance before problems occur and can also be used to identify potential illicit discharges. Inspections are intended to prevent any potential discharges of pollutants into waterways; pollutants typically include nutrients, sediment, trash, and other types of waste generated from the roadways.

**3. General Storm Sewer System Inspections and Maintenance**

**3.1. Inspections**

Stormwater assets must be routinely inspected and receive the routine maintenance necessary to ensure they continually function as designed. If any component of an asset is not functioning properly, the cause must be determined and the site be restored to working order as soon as practicable. The frequency at which stormwater assets should be inspected will depend on the age of the asset, the type, its location (near a water body, for example), and in some cases after a storm

event (post-storm). In many cases, inspections should occur in the spring prior to any runoff event to ensure the asset is in good functioning condition. In other cases, asset life spans can be up to 20 years with inspections recommended every 5 years. Table 1 includes recommended/typical inspection frequencies for the different asset types.

The following is a list of typical problems that may be encountered during an inspection of any stormwater asset. This type of information will be recorded on the inspection checklist:

**GENERAL SITE CONDITIONS:**

- Trash and debris
- Animal burrows
- Algae, stagnation and odors
- Vandalism
- Sediment accumulation
- Obstructions of the inlet or outlet devices by trash, debris, sediment and vegetative growth

**STRUCTURAL/MECHANICAL**

- Cracks and deterioration of inlets, outlets, pipes and catch basins
- Malfunctioning valves, sluice gates, locks and access hatches
- Slow draining infiltration devices
- Inadequate outlet protection
- Water seepage or ponding

**VEGETATION**

- Poor and distressed stands of grass
- Unwanted vegetative growth that impairs functionality
- Bare ground

**EARTHWORKS**

- Excessive erosion or sedimentation, particularly in emergency spillways, filter strips or forebays
- Cracks or settling in the embankment or berms
- Deterioration of downstream channels

**SPILLS/RELEASES**

- Hazardous spill
- Illicit discharge
- Illegal dumping

### 3.2. Maintenance

Maintenance describes work that is performed to maintain the condition of the transportation system or to respond to specific conditions or events that restore the highway system to a functional state of operation. It is performed to delay, prevent or correct deterioration and to maintain facilities as close to their original or reconstructed condition as practical. Maintenance also includes emergency repairs as a result of accidents, weather conditions or other unexpected damage to a roadway, structure or facility. Preventive maintenance measures include highway sweeping efforts to remove sediment and other pollutants from the roadways and drainage system, and trash and litter pick-up, with internal schedules for maintenance crews and as-needed situations. NDOT will continue to perform preventive maintenance measures to reduce sources of sediment and debris from entering stormwater systems. All routine maintenance and/or emergency repair needs found at the time of inspection should be identified and reported. Visual observations, maintenance performed, and any additional maintenance recommended at the time of the inspection must be documented. Routine maintenance is any procedure performed on a regular basis to maintain the proper working order of a stormwater asset. Tasks associated with routine maintenance include the following:

#### Vegetation Maintenance

- Vegetation helps control erosion, provide structural stability, promotes infiltration, and removes pollutants from stormwater runoff. It can also enhance the appearance of the BMPs and help them blend into the landscape. Periodic maintenance of vegetation is required to ensure that it remains healthy and established.

#### Trash and Debris Removal

- Trash and other debris can pollute surface waters and damage or constrict stormwater control devices. Trash should be removed on a routine basis as part of maintenance activities from outlet orifices, trash racks, basin and swale floors and side slopes, and other components, as well as from the area surrounding the BMP, to reduce the potential for clogging during storm events.

#### Mechanical/Structural Component Maintenance

- Mechanical and structural components need to be maintained regularly in accordance with manufacturer's or design recommendations to ensure that they remain functional at all times. Valves, sluice gates, pumps, filters, cartridges, fences, gates, trash racks, and access hatches or locks should be operated during each inspection to ensure that they function properly.

#### Sediment Removal

- The degree to which sediment accumulates will depend on the upstream sediment source, rainfall intensity, and the amount of runoff that the BMP receives. Sediment that has accumulated that is affecting the function of the stormwater control must be removed. In general, sediment should be removed when it exceeds 50% of storage capacity or the original design sediment storage depth. The sediment removed must be transferred to an appropriate facility for dewatering or disposal.

Mechanical/Structural Repair

- Mechanical and structural repairs to the BMP should be made promptly. Equipment, materials, and personnel should be readily available to perform repairs on short notice. Conditions that could lead to structural failure and may necessitate an emergency repair include cracks in concrete outlet structure; settling, scouring, cracking or furrowing on embankments; seepage around outflow pipes.

Erosion Repair

- Failure to maintain a vegetative or riprap cover could result in structural failure and sediment loss. Repair activities must be tailored to the specific site conditions, vegetation or cover type, and seasonal variations. Repairs may include the use of erosion control blankets, riprap matting, sodding, and/or seeding/mulching.

Undesirable Woody Vegetation

- Tree and shrub root systems can penetrate deep into a basin and clog an underdrain system. Decaying plant roots can create voids in dams or embankments when mature trees die or are cut. Remove undesirable woody vegetation when found and dispose of off-site. Any void created by removal activities must be completely filled and properly compacted. Reestablish desirable vegetation to stabilize the area and prevent erosion.

Animal Burrow Repair

- Voids created by animal burrows can weaken dams and embankments, and result in structural failure, and should be filled in as soon as possible. If burrowing problems persist, local wildlife officials should be consulted for information regarding preventive tactics or animal removal.

**4. Reporting and Record Keeping**

Each inspection must be documented by completing the inspection checklists provided in Appendix C and entering the information into the Department’s Stormwater Asset Mapping (SAM) database or another Enterprise Asset Management System (EAMS) when adopted by the Stormwater Division. Proper documentation and record keeping ensures that the department is adequately performing its inspection and maintenance responsibilities as required.

The checklists serve as documentation of field observations and also serve the purpose of triggering further action for cleaning, repair, and/or replacement of structures. Upon completion, they will be forwarded to the appropriate District maintenance manager for further review, as necessary. They also can serve as a repository of information for planning future maintenance related activities, identifying future budget needs, identifying pollutant hotspot areas, and helping the Department to meet its annual reporting requirement for the stormwater program.

The Inspection and Maintenance Checklist (Appendix C) is to be filled out at the time of the inspection, provided to the maintenance manager or designated District personnel upon completion, and entered into NDOT’s asset management system for tracking. The checklist may be completed using a mobile application to enter the data directly into the asset management system.

## 5. Storm Sewer System Assets

For purposes of this document, the storm sewer system is divided into the following categories:

- Drainage System (Hydraulic assets)
- Stormwater System (Post-construction BMPs and other water quality treatment assets)
- Stormwater Asset Inspections
- Slopes
- Outfall Inspections

### 5.1. Drainage System (Hydraulic Assets)

The drainage system consists of hydraulic assets that are designed, specified and/or reviewed by the NDOT Hydraulics Section. These include components of the collection and conveyance system designed to manage and safely direct stormwater runoff away from roadways and facilities. The inspection and maintenance of these assets as presented herein is intended to reduce the potential for assets to adversely affect water quality.

- Pipes and culverts are used to convey collected runoff to a treatment or dispersion area. They are systems designed to collect, convey and direct roadway runoff safely and effectively away from the roadway surface. Pipe segments usually consist of plastic, concrete or corrugated metal conduits; alternatives include box culverts and other shapes (square, oval).
- Drainage Inlets (may also be referred to as either drop inlets or catch basins) collect runoff. They should be maintained in a condition that allows the free flow of water into the conveyance system.
- Drainage Outlets include energy dissipaters, riprap aprons, basin outlets, storm drain outlets, and culvert outlets.
- Ditches, channels and swales are open, linear systems designed to safely and effectively collect, convey, and direct roadway runoff away from the road surface or away from a treatment structure. Sometimes these structures may be designed to provide infiltration or other water quality treatments.

The impairment of individual components of the drainage system can compromise the functionality of the larger system. Drainage systems are subject to functional impairment by a variety of conditions, including:

- Cracks and/or joint separation
- Corrosion
- Scour, undermining or erosion at the inlet or outlet
- Obstruction due to vegetation, debris, or other objects
- Capacity reduction due to excessive sediment accumulation
- Site specific conditions

In some cases, due to size, length, and/or condition of the structure, the inspector may not be able to perform the inspection. These cases should be noted and submitted for alternate inspection methods.



## 5.2. Stormwater System (Post-construction BMPs and other water quality treatment assets)

Post-construction BMPs and other water quality treatment assets are permanent structures used to capture and treat stormwater runoff pollutants through detention, infiltration, settling, media filtration, or biological processes. Each BMP system is composed of similar components (inlet/outlet structure, forebay, emergency spillway). The proper function of these individual components will ensure a properly functioning BMP. Inspections and routine maintenance will focus on these components. Table 1 includes a brief summary of storm sewer assets that will require inspections for which inspection checklists are included.

Typical types of post-construction BMPs include biofiltration (vegetated strips/swales), infiltration, detention, wet basins, hydrodynamic separators, and filtering systems. Appendix B contains inspection and maintenance guidelines and recommendations for each of the following assets that should be used as supplemental information with the inspection checklist.

**Biofiltration** – typically refers to filtration that passes through soil or plant based material. This can include swales or filter strips. Bioswales are vegetated channels designed to convey the design storm and treat water quality flow, while biofiltration strips are vegetated and treat stormwater as the water sheet flows across the strip.

**Infiltration** – refers to where percolation into the soil causes pollutants to be removed from surface water. Infiltration basins and trenches capture the water quality volume of design storms and infiltrate directly into the soil rather than discharging to surface waters.

**Detention** – in this practice, basins intercept runoff and detain the water quality volume long enough for pollutants to settle out before the runoff is discharged.

**Wet Basin** – wet basins are designed to remove pollutants from surface discharges by capturing and detaining the water quality volume to allow settling and biological uptake to occur.

**Treatment Vaults or Hydrodynamic Separators** – are continuous flow deflection devices that typically separate suspended sediments and pollutants out as a result of centrifugal action. Suspended sediment or pollutants are retained in the structure allowing treated water to flow out.

**Filtering Systems** – these are systems that include proprietary media filtration systems that filter out a variety of pollutants depending on the type of media is present. Large particles settle out and other pollutants are filtered out as they pass through the media present.

## 5.3. Stormwater Asset Inspections

This manual is intended to be a practical tool to aid in the inspection and maintenance of BMPs. Inspection guidance will be focused on condition of the asset or BMP through visual observations to evaluate how the asset is functioning relative to its intended design. Table 1 represents the maintenance criteria applicable to the different types of assets that will be inspected. A three-tier condition assessment method is used to rate the condition observed and maintenance priority for assets in the Department's inventory.

- Green: Good condition, no corrective action required.
- Yellow: Fair condition, but still functioning. Minor maintenance and/or follow-up inspection is recommended.
- Red: Poor condition. Needs maintenance, repair and/or replacement.

Appendix C contains Inspection and Maintenance Checklists for each type of asset. Copies of these sheets should be available to each inspector for use during inspections; one should be filled out for each asset at each visit. In addition, Appendix A contains examples of assets for reference; these include photos and descriptions of the assets in different levels of condition (green, yellow or red). These are intended to guide the inspector to choose the most representative level of each component of the BMP inspected. No photos were included for the yellow tier as this is more of a judgment call somewhere between the red and green categories.

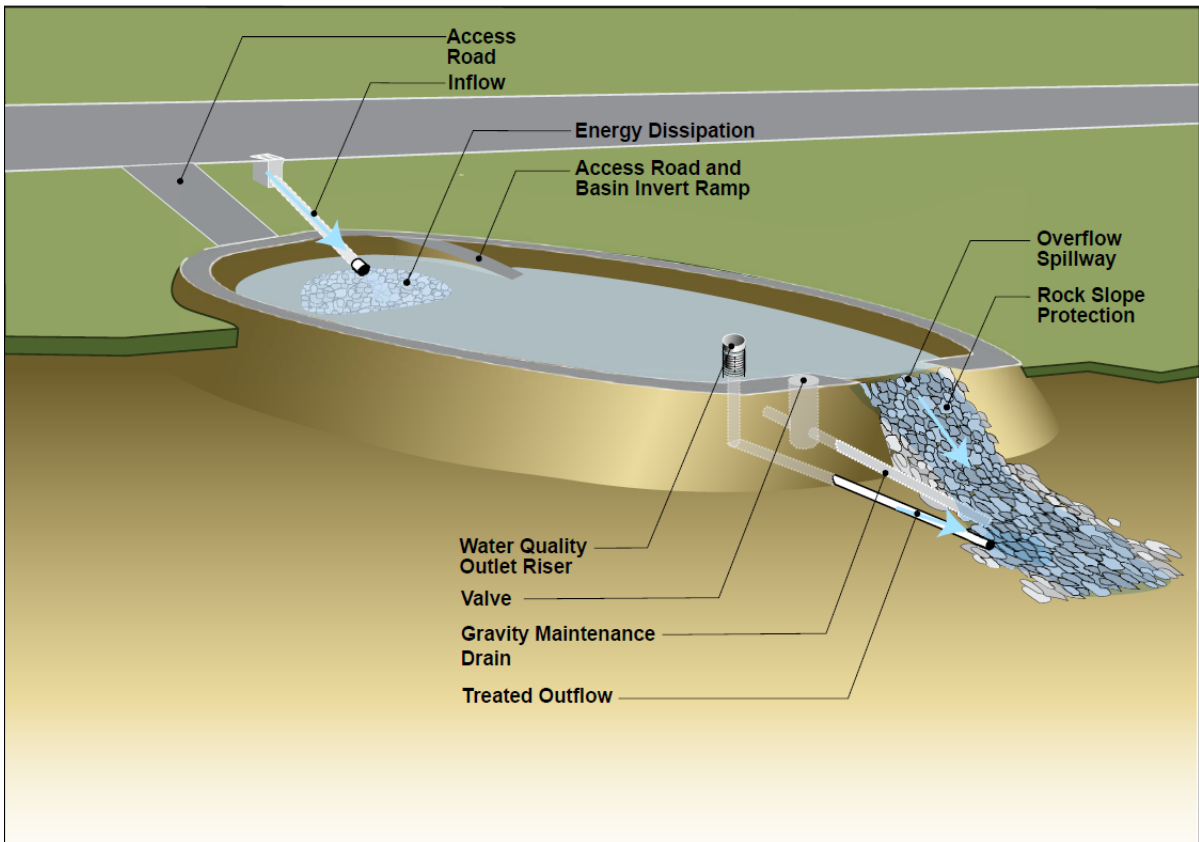
When maintenance, repair or replacement is found during an inspection that is beyond the scope of the inspection crew (yellow or red levels), it must be forwarded to maintenance or stormwater divisions for further action or direction. Follow-up inspection will be conducted. It is recommended that maintenance managers work closely with the stormwater division to ensure appropriate actions are taken to remain in compliance with NDOT’s MS4 permit.

While there are different types of stormwater assets that must be inspected, they are all made up of the same individual components, some of which are shown in Figure 1.

1. Inlet Drainage System
2. Forebay
3. Basin/Treatment Structure
4. Landscaping/Vegetation
5. Underdrain System (if present)
6. Outlet Control Structure
7. Outlet Drainage System

It is the operational condition of these components that will be visually inspected to determine condition of the asset and recorded on the inspection sheets.

Figure 1. Schematic containing typical components of a BMP that will be inspected.



**Table 1. Summary of storm sewer conveyance and treatment assets for inspection.**

No.	Name	Condition	Recommended Inspection Frequency	Description
<b>HYDRAULIC ASSETS</b>				
<b>1</b>	Pipes, Culverts, RCBs <i>S = Dia. or Width</i>			Underground pipes to provide hydraulic control of surface flows from collection to treatment
		$S \leq 18$ in.	No routine inspection required.	No routine inspection required. Inspect during regular maintenance activities.
	18 in. < $S \leq 48$ in.	Good / Fair	Every 10 years	Every 10 years or prior to routine roadway maintenance activities, whichever is less.
		Poor	At least every 5 years	At least every 5 years and with routine roadway maintenance activities.
	48 in. < $S \leq 120$ in.	Good / Fair	Every 5 years or	Every 5 years or prior to routine roadway maintenance activities, whichever is less.
		Poor	At least every 2 years	At least every 2 years and with routine roadway maintenance activities.
	$S > 120$ in.	Good / Fair	Every 2 years	Every 2 years
		Poor	At least every 2 years	At least every 2 years and with routine roadway maintenance activities.
<b>2</b>	Drainage Inlets / Trench Drains			Structure that includes a drainage inlet and usually a sediment trap to store surface flows allowing sediment to accumulate
		Good / Fair	Every 5 years	Every 5 years or prior to routine roadway maintenance activities, whichever is less
		Poor	Annually	
<b>3</b>	Manholes, Junction Boxes		No routine inspection required.	Inspect during regular maintenance activities.
<b>4</b>	Ditches, channels, swales, energy dissipaters		No routine inspection required.	Inspect during regular maintenance activities. Conveyance method used to reduce erosion, promote infiltration of runoff and settling of materials

\* More frequent inspections may be required based on location, condition, pollutant potential, or other factors.

**Table 1 (continued)**

No.	Name	Condition	Recommended Inspection Frequency	Description
<b>STORMWATER TREATMENT ASSETS/BMPs</b>				
5	Outfalls		Annually (High Priority)  At least every 3 years (Low Priority)	Outfalls are locations where a pipe outlet meets criteria contained in the Departments Dry Weather Outfall Inspection plan. The frequency of inspection of the Outfall of a pipe may differ from the required inspection frequency of the pipe itself.
6	Bioretention Basin / Bed Filter		Annually	Basin or filter control structure and underdrain to collect treated water for transport to a discharge point
7	Dry Basin / Detention basin		Annually	Basin with outlet overflow to provide for storage and controlled sedimentation.
8	Gross Solids Removal Device (GSRD)		Annually	Flow-through device that removes trash, debris and coarse sediment in the water by capturing it in a tubular entrapment device.
8	Infiltration basin		Annually	Basin used primarily for infiltration
9	Infiltration trench		Annually	Infiltration system to temporarily store surface flows and divert underground by infiltration
10	Spreading Structure / Level Spreader		Annually	Structure that redistributes concentrated stormwater flow into sheet flow
11	Permeable pavement		Annually (during wet weather)	An alternative to conventional asphalt and concrete in highly urbanized settings with low traffic speeds and volumes.
12	Sand filter		Semi-annually	Structure that uses sand to remove sediment and pollutants from stormwater runoff through filtration.
13	Sediment Trap / Traction Sand Trap		Annually	Particle capture device connected to collection and conveyance system
14	Wetland		Annually	Permanent pond that removes sediments and pollutants from stormwater runoff through physical, chemical and biological processes.
15	Hydrodynamic Separator		Annually	Vault structure with various configurations to separate sediments from stormwater flows
16	Tree box filter		Annually	Designed to mimic natural systems such as bioretention areas by incorporating plants, soil and microbes
17	Vegetated swale		Annually	Vegetated channels that convey stormwater runoff as well as remove sediments and pollutants by filtration through grass and infiltration through soil.
18	Wet basin		Annually	Permanent pond that removes sediments and pollutants from stormwater runoff through settling and biological processes.

\* More frequent inspections may be required based on location, condition, pollutant potential, or other factors.

#### 5.4. Slopes

The construction of roadways and the establishment of cut and fill slopes has the potential to cause significant erosion and sedimentation if they are not constructed properly or if environmental factors increase the probability for slopes to fail. Slopes that are steeper than 3:1 are more prone to erosion. Slopes link directly to drainage infrastructure. Gravity impacts materials on the slopes depending on the slope angle, water presence, climate and length of the slope. A slope inspection sheet (appendix C) has been developed to evaluate slopes especially where evidence of erosion is occurring or prone to occur. An active inspection program that evaluates slopes with increased risk of failure (slopes steeper than 3:1) can help to establish erosion abatement projects and prioritization of capital spending. This type of approach can proactively help to minimize sediment from entering the Department’s MS4 system. It is important to inspect slopes to ensure excessive sediment or erosion does not affect safety to the traveling public, employees; as well as compliance with the NPDES Permit and reducing sediment load and reducing costs for maintenance of drainage systems.

#### 5.5. Outfall Inspections

Given the arid climate conditions in NV, storm sewer system assets typically exhibit flow only after precipitation events. During dry weather periods, it is anticipated that minimal flow, if any, from stormwater outfalls will be observed. NDOT’s MS4 permit requires NDOT to conduct outfall inspections as part of the Illicit Discharge Detection and Elimination Program. Therefore, dry weather inspections are intended to characterize any flow observed during a dry weather period and identify potential sources of an illicit discharge.

Pursuant to this requirement, NDOT has developed its Dry Weather Outfall Inspection Plan to prevent, identify and eliminate illicit discharges. Outfall inspections generally consist of visual observations to assess the condition of the outfall structure, associated conveyance, and the condition of the immediate surrounding area.

For the purpose of this Plan, NDOT will conduct routine dry weather inspections for “Outfalls” that meet all of the following criteria:

1. Located within the current Nevada Division of Environmental Protection designated MS4 urban boundaries; and
2. Discharges from a single pipe with an inside diameter of 36 or more inches or, if not a circular pipe, a conveyance with a drainage area of more than 50 acres; or
3. Discharges with a contributing industrial land use from a single pipe with an inside diameter of 12 or more inches or, if not a circular pipe, a conveyance associated with the drainage area of more than two acres; and
4. Located at the most downstream point in the right-of-way where it discharges to a Waters of the United States (WOUS).

An “Outfall” for the purposes of this plan does not include:

1. Cross-drain structures or culverts installed under a road that functions primarily to maintain the natural flow of surface waters and drainage;
2. Bridges as defined by 23 CFR 650.3;
3. Discharges from NDOT right-of-way that leave the right-of-way before entering a WOUS;



4. Discharges from NDOT's storm sewer system to another storm sewer system component such as, but not limited to, a pipe, catch basin, manhole, ditch, channel, culvert or conduit;
5. Discharges from diffuse sources or sources other than discernable, confined and discrete conveyance of NDOT's storm sewer system; and
6. Discharges from pavement subsurface drainage features such as, but not limited to, pipe underdrains, prefabricated edge drains, and aggregate drains.

In this plan NDOT has identified high and low priority outfalls. The district stormwater engineering staff, maintenance staff, or other district designated staff conduct dry weather field screening for these high and low priority outfalls during their routine maintenance inspections. Outfalls identified as high priority will be inspected at least once per year, and low priority outfalls will be inspected at least once every three years. It is important to utilize resources effectively and to target field inspection activities in high priority areas that encompass the most common sources of illicit discharges. A GIS layer in the NDOT SAM has been developed to identify NDOT outfalls and the associated prioritization.

The Inspection Form associated with routine outfall inspections is attached in Appendix C.





# APPENDIX A

## Maintenance Condition Assessment Criteria





- Basins
- Ditches, Channels and Swales
- Drainage Inlet System
- Drainage Outlet System
- Forebay
- Gross Solids Removal Devices (GSRD)
- Outlet Control Structure
- Pipes and Culverts
- Slopes 3:1 or Steeper



## Basins

NDOT uses four types of basins including infiltration, dry, bioretention, and wet. An infiltration basin is a shallow impoundment that uses the natural filtering ability of the soil to remove pollutants in stormwater runoff. A dry basin is a constructed basin with riser outlets that reduces peak stormwater flows, promotes the settling of suspended pollutants, and minimizes erosive velocities downstream of the outlet structure. Outflow occurs at the top of the water column and/or through drain holes at discrete depths. A bioretention basin is a type of filtration basin with landscaped shrubs and other various plants, filter media, and a mulch cover to enhance pollutant removal. A wet basin is a constructed basin that maintains a permanent pool of water, reduces peak stormwater flows, promotes the settling of suspended solids and biological uptake of pollutants, and reduces erosive velocities downstream of the outlet control structure.

	Maintenance Index	
Routine Activity	1. Slopes and Bed Stability	2. Vegetation Management
Maintenance Index	Slopes and bed are stable, and functioning properly and per their design requirements.	Vegetation is in good condition and at a reasonable height.
<b>Level 1 (Good)</b>	 <p>Infiltration basin bed is stabilized with vegetation, and side slopes are stabilized with riprap. All components are in good condition.</p>	 <p>Vegetation is less than five inches high, and in good condition (varies depending on the season).</p>
<b>Level 2 (Fair)</b>	Fair conditions exist, but the basin is still functioning effectively. Minor maintenance should be requested and/or a follow up inspection is recommended.	
<b>Level 3 (Poor)</b>	 <p>Basin is not draining due to sediment and debris clogging the outlet. Basin bed is clogged with fine sediment.</p>	 <p>Wet basin with too much vegetation, very little exposed water.</p>



Maintenance Index		
Routine Activity	3. Sediment Management	4. Trash Management
<b>Maintenance Index</b>	Slopes or riprap are stabilized and functioning properly with no signs of erosion.	Trash is not present in or around the basin or outlet.
<b>Level 1 (Good)</b>		
	Riprap/slopes are in good condition, and the side slopes are stabilized to prevent erosion.	No trash has accumulated in the basin or at the outlet.
<b>Level 2 (Fair)</b>	Fair conditions exist, but the basin is still functioning effectively. Minor maintenance should be requested and/or a follow up inspection is recommended.	
<b>Level 3 (Poor)</b>		
	Erosion is occurring on side slopes due to unhealthy vegetation or improper stabilization.	Basin has significant sediment accumulation, trash and debris present. Removal of accumulated materials is an immediate concern.

	<b>Maintenance Index</b>	
<b>Routine Activity</b>	<b>5. Underdrain System</b>	
<b>Maintenance Index</b>	Underdrain system is draining the basin efficiently per its design requirements.	
<b>Level 1 (Good)</b>	Underdrain appears to be functioning properly with no standing water and healthy vegetation.	
<b>Level 2 (Fair)</b>	Fair conditions exist, but the basin is still functioning effectively. Minor maintenance should be requested and/or a follow up inspection is recommended.	
<b>Level 3 (Poor)</b>	Basin is not draining because the underdrain is clogged.	







## Ditches, Channels, and Swales

Ditches, channels, and swales are open, linear systems designed to safely and effectively collect, convey, and direct roadway runoff away from the road surface.

	Maintenance Index	
Routine Activity	1. Debris Management	2. Slope Stability
Maintenance Index	Ditches, channels, or swales are free of any debris that could prevent it from operating normally.	Evidence of erosion on side slopes or sediment accumulation in the ditches, channels, or swales.
Level 1 (Good)		
	Ditches, channels, or swales are clear of any debris.	Slopes of the ditches, channels, and swales are stable and no signs of erosion or sediment accumulation exists.
Level 2 (Fair)	Fair conditions exist, but the ditches, channels, or swales are still draining and functioning. Minor maintenance should be requested and/or a follow up inspection is recommended.	
Level 3 (Poor)		
	Debris is visible within the ditches, channels, or swales.	Erosion is occurring along the side slopes of ditches, channels, or swales.











		<b>Maintenance Index</b>	
<b>Maintenance Index</b>	Vegetation is growing where appropriate.	No sediment is accumulating in the ditches, channels, or swales.	
<b>Level 1 (Good)</b>			
	Vegetation is growing where appropriate (i.e., vegetated swale), and is less than five inches high.	No sediment exists in the ditches, channels, or swales.	
<b>Level 2 (Fair)</b>	Fair conditions exist, but the ditches, channels, or swales are still draining and functioning. Minor maintenance should be requested and/or a follow up inspection is recommended.		
<b>Level 3 (Poor)</b>			
	Vegetation is either growing inappropriately, or brown and dead, or weeds are accumulating.	Sediment has accumulated in the base of rock-lined ditches, channels, or swales.	



## Drainage Inlet System

A drainage inlet is a catch basin, sediment trap or other inlet used to capture sediment, debris and pollutants from the roadways. Drainage inlets include drop inlets, grates, sediment traps.





	Maintenance Index	
Routine Activity	1. Debris Accumulation	2. Erosion
Maintenance Index	Sediment or debris has accumulated in the device.	Erosion is leading to obstruction of the inlet.
Level 1 (Good)		
	No sediment or debris has accumulated, and it still functions properly.	Erosion is present but inlet is protected.
Level 2 (Fair)	Less than 20% of the inlet has accumulated sediment, and it still functions properly.	
Level 3 (Poor)		
	The channel has accumulated 30% or more of its capacity in sediment.	Sediment has accumulated in the outlet structure and slopes of the outlet system are eroding.

	Maintenance Index	
Routine Activity	3. Trash and Debris	4. General Maintenance Inspection
Maintenance Index	Trash and debris are present in the channel.	Inlet is clear of sediment and debris; no damage to structures.
Level 1 (Good)	 <p>No woody vegetation is visible in the outlet channel or outlet.</p>	 <p>Inlet is clear of sediment, and there is sufficient structural integrity around the inlet.</p>
	<p>Between three and eight pieces of trash exist or debris is present nearby.</p>	<p>Two components are damaged or in need of repair: there is evidence of vandalism.</p>
Level 2 (Fair)	 <p>Debris has almost entirely covered inlet structure.</p>	 <p>More than two components are damaged or in need of repair.</p>
Level 3 (Poor)		







## Drainage Outlet System

A drainage outlet system is used to convey runoff away from a treatment structure or through the conveyance system.



	Maintenance Index	
Routine Activity	1. Debris Management	2. Slope Stability
Maintenance Index	Outlet is free of any debris that could prevent it from operating normally.	Evidence of erosion on side slopes or sediment accumulation in the outlet channel.
Level 1 (Good)		
	Outlet channel is clear of debris, sediment, and woody vegetation, and draining properly.	Slopes of outlet system are stable and no signs of erosion or sediment accumulation exists.
Level 2 (Fair)	Fair conditions exist, but the drainage outlet system is still draining and functioning. Minor maintenance should be requested and/or a follow up inspection is recommended.	
Level 3 (Poor)		
	Debris, litter, sediment, and vegetation have accumulated in the outlet channel and will obstruct the flow.	Sediment has accumulated in the outlet structure and slopes of the outlet system are eroding.



	<b>Maintenance Index</b>	
<b>Routine Activity</b>	<b>3. Vegetation Management</b>	<b>4. Sediment Management</b>
<b>Maintenance Index</b>	Woody vegetation is not growing in the outlet or the outlet channel.	No sediment is accumulating in the outlet or the outlet channel.
<b>Level 1 (Good)</b>		
	No woody vegetation is visible in the outlet channel or outlet.	Outlet and outlet channel are clear of sediment, and slopes are stable with a sufficient amount of riprap.
<b>Level 2 (Fair)</b>	Fair conditions exist, but the drainage outlet system is still draining and functioning. Minor maintenance should be requested and/or a follow up inspection is recommended.	
<b>Level 3 (Poor)</b>		
	Woody vegetation is growing in the outlet channel or outlet.	Sediment has accumulated significantly in outflow channels, reducing the capacity of the outflow infiltration area.

## Forebay





The forebay is a settling area that may be installed upstream of a basin or inlet to allow large particles to settle before the surface water enters the drainage system.




	Maintenance Index
Routine Activity	Debris and Sediment Management
Maintenance Index	Forebay is free of any debris, trash or sediment that could prevent it from operating normally.
<b>Level 1 (Good)</b>	 <p>No sediment, trash or debris is present. Adjacent slopes are stabilized to prevent erosion.</p>
<b>Level 2 (Fair)</b>	Some sediment or trash is visible, but the forebay is still functioning.
<b>Level 3 (Poor)</b>	 <p>Sediment, trash, or debris are clogging the forebay so that it may not function properly during a rain event.</p>



## Gross Solids Removal Devices

A Gross Solids Removal Device (GSRD) is a flow-through device that removes trash, debris and coarse sediment in the water by capturing it in a tubular entrapment device.



	Maintenance Index	
Routine Activity	1. Structural Components	2. Trash and Debris
Maintenance Index	Inlet structures, outlet structures, or other features hindered by debris or damaged.	Trash or debris has filled up the GSRD.
Level 1 (Good)		
	Structural components are working properly and no debris is hindering any components.	No trash or debris exists in the GSRD.
Level 2 (Fair)	GSRD is partially filled with trash and debris, but it is still functioning.	
Level 3 (Poor)		
	Structural components are broken and/or the device's components are hindered by debris.	Trash or debris has collected in the GSRD and it is approaching full capacity.

Maintenance Index		
Routine Activity	3. Standing Water	4. Screen Functionality
Maintenance Index	Standing water exists in the device for more than 72 hours after any storm.	Screen is clogged, damaged, loose, or does not open or close properly.
Level 1 (Good)		
	No standing water exists up to more than 96 hours after a rain event.	Screens are clean, in good condition, and open/close properly.
Level 2 (Fair)	GSRD is partially filled with trash and debris, but it is still functioning.	
Level 3 (Poor)		
	Standing water exists 96 hours after a rain event.	Screens are clogged with debris, and do not open or close properly.







## Outlet Control Structure

An outlet control structure is used to convey runoff away from a treatment structure or through the conveyance system.





	Maintenance Index
Routine Activity	Debris and Vegetation Management
Maintenance Index	Outlet control structure is free of any vegetation or debris that could prevent it from operating normally.
<b>Level 1 (Good)</b>	 <p>Outlet control structure is unobstructed, free of trash and debris.</p>
<b>Level 2 (Fair)</b>	Fair conditions exist, but the outlet control structures are still draining and functioning. Minor maintenance should be requested and/or a follow up inspection is recommended.
<b>Level 3 (Poor)</b>	 <p>Basin outlet control structure is obstructed with vegetation and debris. The surrounding area should be cleared of these potential obstructions.</p>

## Pipes and Culverts

Pipes and culverts are structures that convey water under roadways, railways, or embankments.

	Maintenance Index	
Routine Activity	1. Structural Durability	2. Asphalt and Concrete Integrity
Maintenance Index	Pipes/culverts are functioning properly and structurally secure per their design requirements.	Asphalt and concrete structures are structurally sound and effective.
Level 1 (Good)		
	Pipe/culvert is functioning properly and is in good condition.	Pavement and concrete structures above and around the pipe/culvert are functioning properly and do not show any signs of weakening (cracks, crumbling, etc.).
Level 2 (Fair)	Fair conditions exist, but the pipe/culvert is still functioning effectively. Minor maintenance should be requested and/or a follow up inspection is recommended.	
Level 3 (Poor)		
	Pipe/culvert is crushed, corroded, damaged, or in a poor condition, and not functioning properly.	Asphalt or concrete is broken and ineffective.







Maintenance Index		
Routine Activity	3. Sediment Management	4. Trash Management
Maintenance Index	Slopes upstream and in or around the pipe/culvert are stabilized so that no sediment accumulates in the pipe/culvert.	Trash is not present in or around the pipe/culvert.
Level 1 (Good)		
	No sediment or signs of erosion are visible in or around the pipe/culvert.	No trash is clogging the pipe/culvert.
Level 2 (Fair)	Fair conditions exist, but the pipe/culvert is still functioning effectively. Minor maintenance should be requested and/or a follow up inspection is recommended.	
Level 3 (Poor)		
	Erosion is occurring around the pipe/culvert preventing it from flowing and resulting in sediment transport downstream during rain events.	Trash is obstructing the pipe/culvert.







## Slopes 3:1 or Steeper

Slopes that are 3:1 or steeper are more susceptible to significant erosion control issues.

	Maintenance Index	
Routine Activity	1. Gullies and Rills	2. Sediment Discharge
Maintenance Index	Gullies (deep channels of erosion) and rills (shallower channels of erosion) exist on the slopes.	Sediment has collected at the toe of the slope or downstream of the slope.
Level 1 (Good)		
	No gullies and rills are present. Slopes are stabilized and no visible signs of erosion exist.	No sediment discharge exists at the toe of the slope.
Level 2 (Fair)	Some erosion is visible, but the existing vegetation and/or any installed slope stability BMPs are functioning.	
Level 3 (Poor)		
	Gullies and rills have formed on the slope, and sediment has collected at the toe of the slope.	Sediment is accumulating at the toe of the slope and/or downstream of the slope in channels and storm drain systems.



Maintenance Index		
Routine Activity	3. Sloughing	4. Slope Stabilization
Maintenance Index	Sloughing occurs when large areas of the slope collapse.	Vegetation is effectively growing on the slope and preventing erosion from occurring.
Level 1 (Good)		
	No sloughing exists on the slope.	Vegetation is growing or stabilization BMPs (e.g., tackifier, erosion control blanket, etc.) are effectively preventing erosion from occurring.
Level 2 (Fair)	Some erosion is visible, but the existing vegetation and/or any installed slope stability BMPs are functioning.	
Level 3 (Poor)		
	Sloughing is occurring on the slope.	Slope is sparsely vegetated or stabilization BMPs (e.g., tackifier, erosion control blanket, etc.) are ineffective and erosion is causing sediment to collect at the toe of the slope or downstream.

# APPENDIX B

## Inspection and Maintenance Guidelines

- Bed Filter/Bioretention Basin
- Conveyance Piping
- Ditches, Channels and Swales
- Drainage Inlet
- Drainage Outlet
- Dry Basin
- Infiltration Basin
- Infiltration Trench
- Level Spreader/Spreading Structure
- Permeable Pavement
- Riprap Slope Stabilization
- Sand Filter
- Sediment Trap/Traction Sand Trap
- Stormwater Ponds and Wetlands
- Treatment Vault
- Tree Box Filter
- Vegetated Swale
- Wet Basin

## BED FILTER/BIORETENTION BASIN

A **BIORETENTION BASIN** is a type of filtration basin with landscaped shrubs and other various plants, filter media, and a mulch cover to enhance pollutant removal.



### Purpose and Description

- Bioretention basins are designed to temporarily capture stormwater runoff, filter and retain pollutants, and reduce peak flows.
- Inflow to the bioretention basin is filtered through engineered media or amended soil. The filtered water exits through an underdrain system at the bottom of the filter media.
- Specially selected plants enhance the pollutant removal capabilities of the basin.

### Inspection Frequency

- Inspect annually for structural issues, materials issues, and sediment accumulation.

COMPONENT	INSPECTION	MAINTENANCE
<b>Inlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Runoff should be allowed to flow freely into the structure.</li> <li>▪ Inspect ditches, pipes, and catch basins for trash, sediment and debris</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> <li>▪ Inspect ditches for signs of erosion and undesirable vegetation (woody plants).</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove and properly dispose of debris, unwanted vegetation and major sediment accumulations.</li> <li>▪ Repair eroded areas and damaged pipes.</li> </ul>
<b>Forebay</b>	<ul style="list-style-type: none"> <li>▪ Inspect for trash, debris and undesirable vegetation</li> <li>▪ Structurally sound</li> <li>▪ Does not contain excessive amount of accumulated sediment</li> <li>▪ Inspect the embankment for structural integrity and signs of erosion</li> <li>▪ Ensure minimal plant growth</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris and undesirable vegetation and properly dispose of off-site</li> <li>▪ Remove sediment from forebay when it exceeds 50% of forebay storage capacity</li> <li>▪ Correct any structural problems</li> <li>▪ Replace erosion protection (riprap) as needed</li> </ul>
<b>Basin</b>	<ul style="list-style-type: none"> <li>▪ Inspect the basin for structural integrity, noting any signs of erosion or animal activity</li> <li>▪ Inspect the embankment for setting, scouring, cracking, sloughing and furrowing, and for invasive trees and shrubs.</li> <li>▪ Inspect the downstream toe of the embankment for seepage.</li> <li>▪ Inspect for bare soils, sediment deposition, trash, debris and unwanted vegetation.</li> <li>▪ No standing water 3 days (72 hours) after storm event</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment when it is clogging the filter media or has reached a depth of 3 inches</li> <li>▪ Remove trash, debris and undesirable vegetation</li> <li>▪ Stabilize any eroding surfaces in or around the basin</li> <li>▪ Flush the underdrain system if it is not draining properly</li> </ul>
<b>Landscaping</b>	<ul style="list-style-type: none"> <li>▪ Note any undesirable vegetation</li> <li>▪ Note any areas of exposed soil</li> <li>▪ Note that surrounding area is stabilized with vegetation or grass</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove any undesirable vegetation</li> <li>▪ Cover any areas of bare soil with at least 3 inches of mulch</li> </ul>
<b>Underdrain System</b>	<ul style="list-style-type: none"> <li>▪ Inspect cleanouts to ensure their caps are in place and undamaged</li> <li>▪ Inspect cleanouts by observing inside for standing water or sediment</li> </ul>	<ul style="list-style-type: none"> <li>▪ Use a high-pressure hose to flush out underdrain system</li> <li>▪ Replace cleanout caps that are missing, cracked or damaged.</li> <li>▪ Do not drive heavy equipment into the basin.</li> </ul>
<b>Outlet Control Structure</b>	<ul style="list-style-type: none"> <li>▪ Inspect for signs of damage such as cracks, holes or leaks</li> <li>▪ Ensure trash rack or grate is structurally sound</li> </ul>	<ul style="list-style-type: none"> <li>▪ Repair any damaged areas and remove sediment and debris</li> <li>▪ Replace metal components if necessary</li> </ul>
<b>Outlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Inspect pipes and drainage structures for cracks or leaks.</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> <li>▪ Inspect ditches for signs of erosion or undesirable vegetation.</li> <li>▪ Verify that outlet protection materials (riprap) are present and adequate</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair eroded areas and damaged pipes.</li> <li>▪ Replace outlet protection materials (riprap) as necessary.</li> </ul>
<b>Emergency Spillway</b>	<ul style="list-style-type: none"> <li>▪ Inspect that it is free of trash and debris.</li> <li>▪ Inspect concrete to verify that it is in good condition or that adequate riprap is present.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair concrete or replace riprap, areas of erosion.</li> </ul>
<b>Inspection and Maintenance Summary</b>		
<ul style="list-style-type: none"> <li>▪ Observations made must be documented on the Checklist</li> <li>▪ If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.</li> <li>▪ A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.</li> </ul>		



## CONVEYANCE PIPING

*Pipes and culverts* are used to convey collected runoff to a treatment structure, dispersion area, or discharge point.

### Purpose and Description

- The conduit system is comprised of different pipes, lengths, material types, shapes, and sizes of storm drain conveyance which are connected by appurtenant structures such as manholes, junction boxes, or other miscellaneous structures.
- Conveyance pipes do not remove stormwater pollutants, but rather transport pollutants to stormwater treatment structures.
- Used to convey water under a roadway, railway, or embankment



### Inspection Frequency

Barrel Size	Inspection Frequency
New Installation (< 1ft)	Annually for 2 years
<= 1 ft	No routine inspection; inspect during roadway maintenance activities
1 ft to 4 ft	Every 5 years and with routine roadway maintenance activities
4 ft to 10 ft	Every 2 years and with routine roadway maintenance activities
> 10 ft	Every 2 years and with routine roadway maintenance activities



COMPONENT	INSPECTION	MAINTENANCE
<b>Approach Roadway</b>	<ul style="list-style-type: none"> <li>▪ Distress indicators such as cracking, humps or sags in pavement</li> <li>▪ Guardrail is aligned and plumb</li> <li>▪ Check for displacement of posts due to settlement or sliding of the shoulder</li> </ul>	<ul style="list-style-type: none"> <li>▪ Possible maintenance or replacement due to backfill loss</li> </ul>
<b>Embankment</b>	<ul style="list-style-type: none"> <li>▪ Erosion such as sloughing, rillying, gullyng</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove, replace or retrofit embankment to ensure stability</li> </ul>
<b>Channel</b>	<ul style="list-style-type: none"> <li>▪ Look for alignment changes that may direct flow to wingwall instead of pipe</li> <li>▪ Bank erosion/scour, channel protection</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove blockages that impede or redirect flow path away from pipe or culvert</li> </ul>
<b>Barrel</b>	<ul style="list-style-type: none"> <li>▪ Inspect the surface over the pipe for settlement or lost cover</li> <li>▪ Look for obstructions due to excessive vegetation, such as trees or other woody vegetation</li> <li>▪ Pipe structure for collapse or deformation</li> <li>▪ Corrosion of metal pipes, especially at the invert</li> <li>▪ Deposition of sediment or other debris</li> </ul>	<ul style="list-style-type: none"> <li>▪ Typical maintenance of conveyance pipes includes removal of sediment, debris and trash by hand or using a vector truck.</li> <li>▪ Call for maintenance if indications of potential collapse</li> <li>▪ Remove accumulated sediment or debris within pipe</li> <li>▪ Remove and replace the pipe if corrosion indicates potential failure</li> </ul>



	<ul style="list-style-type: none"> <li>▪ Vertical misalignments (sag, pooled water)</li> <li>▪ Sheared joints</li> <li>▪ Barrel cracking, spalling, deterioration</li> <li>▪ Scaling, abrasion or other surface damage</li> <li>▪ Corrosion, wear</li> <li>▪ Deposition of sediment and other debris. The inspector should estimate the severity of the sediment or siltation by percent, in 25% increments (i.e., 0%, 25%, 50% full).</li> </ul>	<ul style="list-style-type: none"> <li>▪ Maintenance crews most often should be prepared to remove sediment/debris accumulation and/or reform a pipe that was crushed during winter snow removal.</li> <li>▪ Extensive repair issues would include providing riprap to stabilize a surrounding slope or new piping to replace a malfunctioning a pipe.</li> </ul>
<b>Concrete Footing and Invert Slab</b>	<ul style="list-style-type: none"> <li>▪ Inspect for differential settlement</li> <li>▪ Inspect for scour, concrete deterioration</li> </ul>	<ul style="list-style-type: none"> <li>▪ Replace or retrofit</li> </ul>
<b>COMPONENT</b>	<b>INSPECTION</b>	<b>MAINTENANCE</b>
<b>Inlet/Outlet End Treatments</b>	<ul style="list-style-type: none"> <li>▪ Issues with aprons and flumes</li> <li>▪ Extent of debris accumulation</li> <li>▪ Issues with weep holes</li> <li>▪ Inspect the structural condition of the outlet and inlet ends of the pipe system, including headwalls and aprons for cracks, separated or collapsed end conditions</li> <li>▪ Inspect for scouring or undermining, evidence of animal burrowing at inlets or outlets</li> <li>▪ Projecting ends</li> <li>▪ Changes to prefabricated end treatments</li> <li>▪ Issues with headwalls/spandrel walls/wingwalls</li> </ul>	<ul style="list-style-type: none"> <li>▪ Replace or retrofit when functionality is lost</li> <li>▪ Repair eroded areas and damaged pipes</li> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Replace outlet protection materials (riprap, flared end section) as necessary</li> </ul>
<b>Inspection and Maintenance Summary</b>		
<ul style="list-style-type: none"> <li>▪ Observations made must be documented on the Checklist</li> <li>▪ If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.</li> <li>▪ A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.</li> </ul>		

## DITCHES, CHANNELS AND SWALES

**DITCHES, CHANNELS AND SWALES** are open, linear systems designed to safely and effectively collect, convey, and direct roadway runoff away from the road surface.



### Purpose and Description

- May be concrete lined, articulated block, natural or grass channels
- May provide filtering and/or detention to provide water quality treatment

### Inspection Frequency

- Annual inspections to document sediment accumulation, unstable channel banks producing sediment runoff, excessive vegetation blocking stormwater flow, lack of vegetated slope protection, and vector damage.



COMPONENT	INSPECTION	MAINTENANCE
<b>Inlet and Outlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Runoff should be allowed to flow freely into the structure.</li> <li>▪ Inspect for trash, sediment and debris</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove and properly dispose of debris, unwanted vegetation and major sediment accumulations.</li> <li>▪ Repair eroded areas and damaged pipes.</li> </ul>
<b>Ditch/Swale</b>	<ul style="list-style-type: none"> <li>▪ Inspect for settlement or sinks along the surface</li> <li>▪ Inspect for erosion of the ditch itself or from surrounding area</li> <li>▪ Inspect for accumulation of sediment or debris</li> <li>▪ Inspect for animal burrows, obstructions due to undesirable vegetation</li> <li>▪ Inspect for integrity of riprap or other material lining the channel</li> </ul>	<ul style="list-style-type: none"> <li>▪ Settlement should be corrected and repairs of broken or eroded surfaces should be made with appropriate materials</li> <li>▪ Remove obstructing materials to maintain the flow of water</li> <li>▪ Remove any trash or debris</li> <li>▪ Remove any significant buildup of sediment</li> </ul>
<b>Outlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Inspect the inside of structures or pipes to verify that they are free of sediment and debris</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair eroded areas and damaged pipes</li> <li>▪ Replace outlet protection materials (riprap) as necessary</li> </ul>
<b>Inspection and Maintenance Summary</b>		
<ul style="list-style-type: none"> <li>▪ Observations made must be documented on the Checklist</li> <li>▪ If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.</li> <li>▪ A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.</li> </ul>		

## DRAINAGE INLET (MANHOLE, JUNCTION BOX, CATCH BASIN, DROP INLET, SLOTTED DRAIN, TRENCH DRAIN)

A **DRAINAGE INLET** is a catch basin, sediment trap or other inlet used to capture sediment, debris and pollutants from the roadways.



### Purpose and Description

- Inlets are junction and connection points for the linear system and are designed to safely and effectively collect, convey and direct roadway runoff away from the road surface.

### Inspection Frequency

- Annual inspections should be conducted to assess amount of sediment or debris accumulated to ensure more frequent maintenance is not needed.
- Post-storm inspections should be made to ensure sediment capacity has not been exceeded



COMPONENT	INSPECTION	MAINTENANCE
<b>Grate, Cover</b>	<ul style="list-style-type: none"> <li>▪ Inspect for sediment, debris or trash collected around the inlet structure</li> <li>▪ Annual inspections should be made to ensure the manhole cover can be removed, that it is structurally sound</li> </ul>	<ul style="list-style-type: none"> <li>▪ A shovel may be used to remove sediment from the surrounding grate that may obstruct flow.</li> <li>▪ Remove any accumulated trash or debris</li> <li>▪ Maintenance crews should be prepared to identify erosion, remove accumulated sediment, and repair damaged covers or inlets.</li> <li>▪ The area surrounding the manhole should be observed for signs of weakness in the pavement or surrounding area.</li> </ul>
<b>Collection Sump</b>	<ul style="list-style-type: none"> <li>▪ Sediment accumulation should not exceed 60% of the sump</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove accumulated sediment with a vactor truck when 60% of sump is filled</li> </ul>
<b>Inlet and Outlet Pipes</b>	<ul style="list-style-type: none"> <li>▪ Inlet and outlet pipes within the sump should be free of obstructions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Material within inlet or outlet pipes may indicate blockage within the pipe that may require additional maintenance</li> </ul>

### Inspection and Maintenance Summary

- Observations made must be documented on the Checklist
- If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.
- A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.



## DRAINAGE OUTLET

A **DRAINAGE OUTLET**, basin outlet, conveyance piping outlet, or culvert outlet is used to convey runoff away from a treatment structure or through the conveyance system.



### Purpose and Description

- Storm system drainage outlets, whether open channels or pipe systems, are critical locations of conveyance obstruction, structural damage, and erosion potential.

### Inspection Frequency

- Annual inspections should be made to ensure the structure does not have the potential to compromise a stormwater system by obstructing conveyance, structurally failing, or enhancing erosion.
- Annual inspections should be made to ensure that there is no scour at the outlets or structural damage to the outlet itself.



COMPONENT	INSPECTION	MAINTENANCE
<b>Outlet Structure</b>	<ul style="list-style-type: none"> <li>Inspect for erosion around the structure, scour and conduit failure</li> <li>Inspect for sediment, debris, vegetation or trash collected around the structure that may impede flow</li> <li>Inspect for structural integrity of the outlet</li> <li>Inspect that riprap or energy dissipation device is structurally sound</li> </ul>	<ul style="list-style-type: none"> <li>Repair or replace riprap if damaged</li> <li>Remove trash, sediment and debris</li> </ul>



*These photos indicate outlets for which maintenance is required.*

### Inspection and Maintenance Summary

- Observations made must be documented on the Checklist
- If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.
- A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.

## DRY BASIN

A **DRY BASIN** is a constructed basin with a riser outlet that reduces peak stormwater flows, promotes the settling of suspended pollutants, and minimizes erosive velocities downstream of the outlet structure. Outflow occurs at the top of the water column and/or through drain holes at discrete depths.



### Purpose and Description

- Dry detention basins are designed to temporarily capture stormwater runoff and reduce flow velocity.
- Inflow is detained and released slowly from a primary outlet control structure over a period of 48 – 72 hours.
- Dry detention basins are designed with a drawdown component that keeps the basin dry between storm events.



### Inspection Frequency

- Inspect annually for structural issues, materials issues, sediment accumulation and service performance

COMPONENT	INSPECTION	MAINTENANCE
<b>Inlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Runoff should be allowed to flow freely into the structure</li> <li>▪ Inspect ditches, pipes, and catch basins for trash, sediment and debris</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> <li>▪ Inspect ditches for signs of erosion and undesirable vegetation (woody plants)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove and properly dispose of debris, unwanted vegetation and major sediment accumulations.</li> <li>▪ Repair eroded areas and damaged pipes.</li> </ul>
<b>Forebay</b>	<ul style="list-style-type: none"> <li>▪ Inspect for trash, debris and undesirable vegetation</li> <li>▪ Structurally sound</li> <li>▪ Does not contain excessive amount of accumulated sediment</li> <li>▪ Inspect the embankment for structural integrity and signs of erosion</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris and undesirable vegetation and properly dispose of off-site</li> <li>▪ Remove sediment from forebay when it exceeds 50% of forebay storage capacity</li> <li>▪ Correct any structural problems</li> <li>▪ Replace erosion protection (riprap) as needed</li> </ul>
<b>Basin</b>	<ul style="list-style-type: none"> <li>▪ The floor, interior and side slopes should be stabilized with vegetation</li> <li>▪ Inspect the basin for structural integrity, noting any signs of erosion or animal activity</li> <li>▪ Inspect the embankment for setting, scouring, cracking, sloughing and furrowing, and for invasive trees and shrubs</li> <li>▪ Inspect the downstream toe of the embankment for seepage</li> <li>▪ Inspect for bare soils, sediment deposition, trash, debris and unwanted vegetation</li> <li>▪ No standing water after 3 days</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment if it occupies more than 25% of the original storage capacity</li> <li>▪ Remove trash, debris and undesirable vegetation.</li> <li>▪ Stabilize any eroding surfaces in or around the basin</li> </ul>
<b>Outlet Control Structure</b>	<ul style="list-style-type: none"> <li>▪ Inspect for signs of damage such as cracks, holes or leaks</li> <li>▪ Ensure that water can flow freely</li> <li>▪ Ensure trash rack or grate is structurally sound</li> </ul>	<ul style="list-style-type: none"> <li>▪ Repair any damaged areas and remove sediment and debris</li> <li>▪ Replace metal components if necessary</li> </ul>
<b>Outlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Inspect pipes and drainage structures for cracks or leaks.</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> <li>▪ Inspect ditches for signs of erosion or undesirable vegetation</li> <li>▪ Verify that outlet protection materials (riprap) are present and adequate</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair eroded areas and damaged pipes.</li> <li>▪ Replace outlet protection materials (riprap) as necessary</li> </ul>

COMPONENT	INSPECTION	MAINTENANCE
<b>Emergency Spillway</b>	<ul style="list-style-type: none"> <li>▪ Inspect that it is free of trash and debris</li> <li>▪ Inspect concrete to verify that it is in good condition or that adequate riprap is present</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair concrete or replace riprap, areas of erosion</li> </ul>
<b>Inspection and Maintenance Summary</b> <ul style="list-style-type: none"> <li>▪ Observations made must be documented on the Checklist</li> <li>▪ If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.</li> <li>▪ A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.</li> </ul>		



## INFILTRATION BASIN

An **INFILTRATION BASIN** is a shallow impoundment that uses the natural filtering ability of the soil to remove pollutants in stormwater runoff.



### Purpose and Description

- Temporarily capture stormwater runoff, allowing it to soak into soils
- Reduce peak flows and recharge groundwater
- Removal of fine sediment and associated pollutants

### Inspection Frequency

- Inspect annually for structural issues, materials issues, sediment accumulation and service performance



COMPONENT	INSPECTION	MAINTENANCE
<b>Inlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Runoff should be allowed to flow freely into the structure</li> <li>▪ Inspect ditches, pipes, and catch basins for trash, sediment and debris</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> <li>▪ Inspect ditches for signs of erosion and undesirable vegetation (woody plants)</li> <li>▪ Ensure no bare soil in area draining to basin</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove and properly dispose of debris, unwanted vegetation and major sediment accumulations.</li> <li>▪ Repair eroded areas and damaged pipes.</li> </ul>
<b>Forebay</b>	<ul style="list-style-type: none"> <li>▪ Inspect for trash, debris and undesirable vegetation.</li> <li>▪ Structurally sound</li> <li>▪ Does not contain excessive amount of accumulated sediment</li> <li>▪ Inspect the embankment for structural integrity and signs of erosion</li> <li>▪ Ensure minimal plant growth</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris and undesirable vegetation and properly dispose of off-site</li> <li>▪ Remove sediment from forebay when it exceeds 50% of forebay storage capacity</li> <li>▪ Correct any structural problems</li> <li>▪ Replace erosion protection (riprap) as needed</li> </ul>
<b>Basin</b>	<ul style="list-style-type: none"> <li>▪ Inspect that the interior and exterior side slopes are stabilized with vegetation.</li> <li>▪ Inspect the sides of the basin for structural integrity, noting any signs of burrowing animals, erosion, inadequate vegetation cover, or undesirable vegetation</li> <li>▪ Inspect the embankment for settling, scouring, cracking, sloughing, and furrowing, and for invasive plants</li> <li>▪ Inspect the downstream toe for seepage</li> <li>▪ Inspect for trash and debris</li> <li>▪ Ensure no standing water or evidence of wetland vegetation (cattails)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove undesirable vegetation by hand if possible.</li> <li>▪ If erosion has occurred, reestablish grass, wetland vegetation or riprap as appropriate</li> <li>▪ Remove sediment if it is clogging the infiltration abilities (taking 3 to 4 days to drain)</li> <li>▪ Repair animal burrows</li> <li>▪ Heavy equipment should not be used in the basin</li> </ul>
<b>Outlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Inspect the inside of structures or pipes to verify that they are free of sediment and debris</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> <li>▪ Inspect ditches for signs of erosion or undesirable vegetation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair eroded areas and damaged pipes</li> <li>▪ Replace outlet protection materials (riprap) as necessary</li> </ul>

COMPONENT	INSPECTION	MAINTENANCE
<b>Emergency Spillway</b>	<ul style="list-style-type: none"> <li>▪ Inspect that it is free of trash and debris.</li> <li>▪ Inspect concrete to verify that it is in good condition or that adequate riprap is present.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair concrete or replace riprap, areas of erosion.</li> </ul>
<p><b>Inspection and Maintenance Summary</b></p> <ul style="list-style-type: none"> <li>▪ Observations made must be documented on the Checklist</li> <li>▪ If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.</li> <li>▪ A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.</li> </ul>		

## INFILTRATION TRENCH

An **INFILTRATION TRENCH** is a treatment device designed to remove pollutants from the runoff by infiltrating into the soil.



### Purpose and Description

- Temporarily capture stormwater runoff, allowing it to soak into soils
- Reduce peak flows and recharge groundwater
- Removal of fine sediment and associated pollutants

### Inspection Frequency

- Inspect annually for structural issues, materials issues, sediment accumulation and service performance



COMPONENT	INSPECTION	MAINTENANCE
<b>Inlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Inspect for trash, debris and sediment</li> <li>▪ Inspect areas for signs of erosion</li> <li>▪ Inspect piping for damage or plugging</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove trash and vegetative debris or sediment that has the potential to inhibit flow into the device</li> <li>▪ Repair eroded areas by resodding. Restore riprap (if present)</li> <li>▪ Check the upstream areas for bank stability and evidence of piping or scour holes</li> <li>▪ Repair or replace damaged piping</li> </ul>
<b>Forebay</b>	<ul style="list-style-type: none"> <li>▪ Inspect amount of sediment accumulation</li> <li>▪ Inspect for presence of undesirable vegetation</li> <li>▪ Inspect condition of erosion protection materials</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris and undesirable vegetation and properly dispose of off-site</li> <li>▪ Remove sediment from forebay when it exceeds 50% of forebay storage capacity</li> <li>▪ Replace erosion protection materials</li> </ul>
<b>Infiltration Trench</b>	<ul style="list-style-type: none"> <li>▪ Inspect for water ponding on surface 72 hours or more after a storm event</li> <li>▪ Inspect vegetation growing on the surface of the trench</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove and replace the topsoil or first layer of stone if ponding occurs for longer than 72 hours</li> <li>▪ Inspect observation wells to determine water levels</li> <li>▪ Remove undesirable vegetation that threatens the integrity of the trench</li> </ul>
<b>Outlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Inspect the inside of structures or pipes to verify that they are free of sediment and debris</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> <li>▪ Inspect ditches for signs of erosion or undesirable vegetation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair eroded areas and damaged pipes.</li> <li>▪ Replace outlet protection materials (riprap) as necessary</li> </ul>
<b>Emergency Spillway</b>	<ul style="list-style-type: none"> <li>▪ Inspect that it is free of trash and debris.</li> <li>▪ Inspect concrete to verify that it is in good condition or that adequate riprap is present.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair concrete or replace riprap, areas of erosion.</li> </ul>
<b>Inspection and Maintenance Summary</b>		
<ul style="list-style-type: none"> <li>▪ Observations made must be documented on the Checklist</li> <li>▪ If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.</li> <li>▪ A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.</li> </ul>		



## LEVEL SPREADER/SPREADING STRUCTURE

A **LEVEL SPREADER** is a structural stormwater control that redistributes concentrated stormwater flow into sheet flow.

### Purpose and Description

- A level spreader provides a nonerosive outlet for concentrated runoff by diffusing the water uniformly across a stable slope.
- A level spreader consists of a trough with a level, nonerosive lip.



### Inspection Frequency

- Inspect annually for structural issues, materials issues, sediment accumulation and service performance.

COMPONENT	INSPECTION	MAINTENANCE
<b>Inlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Runoff should be allowed to flow freely into the structure</li> <li>▪ Inspect ditches, pipes, and catch basins for trash, sediment and debris</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> <li>▪ Inspect ditches for signs of erosion and undesirable vegetation (woody plants)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove and properly dispose of debris, unwanted vegetation and major sediment accumulations</li> <li>▪ Repair eroded areas and damaged pipes</li> </ul>
<b>Level Spreader trough and lip</b>	<ul style="list-style-type: none"> <li>▪ Inspect that trough is level and remains free of sediment and debris</li> <li>▪ Inspect the lip for erosion, undesirable vegetation, other impairments that could render it uneven or ineffective</li> <li>▪ Verify that the area immediately downstream of the lip is free of woody vegetation</li> <li>▪ Ensure drawdown structure (if present) is not clogged with sediment or debris</li> </ul>	<ul style="list-style-type: none"> <li>▪ Repair any areas of the trough that are damaged or eroded.</li> <li>▪ If there is erosion, build a berm that is higher than the lip and stabilize with vegetation</li> <li>▪ Sediment should be removed before it interferes with the spreader's ability to distribute flow evenly</li> <li>▪ Repair the lip if it has become cracked or damaged.</li> <li>▪ Remove any vegetation growing over the lip or any woody vegetation that could channelize flow</li> <li>▪ Remove any sediment and debris from the drawdown system if clogged</li> </ul>
<b>Filter Strip and Buffer</b>	<ul style="list-style-type: none"> <li>▪ Inspect for signs of erosion and channelization</li> <li>▪ Ensure filter strip is vegetated with a uniform, dense cover</li> <li>▪ Verify that sediment has not accumulated to the degree that vegetation is dying</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove trash and undesirable vegetation</li> <li>▪ Remove debris that could cause channelization</li> <li>▪ Repair areas affected by erosion or channelization</li> <li>▪ If excessive sediment has accumulated, remove the sediment and reestablish vegetation and regrade if necessary</li> </ul>
<b>Inspection and Maintenance Summary</b>		
<ul style="list-style-type: none"> <li>▪ Observations made must be documented on the Checklist</li> <li>▪ If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.</li> <li>▪ A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.</li> </ul>		

## PERMEABLE PAVEMENT

**PERMEABLE PAVEMENT** is an alternative to conventional concrete and asphalt paving materials that allows for infiltration of stormwater into a storage area, with void spaces that provide temporary detention. Routine preventative cleaning is more effective than corrective cleaning.



### Purpose and Description

- Permeable pavement promotes the infiltration of stormwater into void spaces that filters pollutants, decreases runoff rate, and reduces pollutant loads.
- Visual inspections are an integral part of system maintenance. This includes monitoring pavement to ensure water drainage, debris accumulation, and surface deterioration.

### Inspection Frequency

- Semi-annually to make sure structural integrity is maintained and surface is not damaged

COMPONENT	INSPECTION	MAINTENANCE
<p><b>Permeable Pavement</b></p>	<ul style="list-style-type: none"> <li>▪ Check for standing water on the surface of the pavement after a precipitation event. If standing water remains within 30 minutes after rainfall had ended, cleaning of porous pavement is recommended.</li> <li>▪ Check for debris accumulating on pavement, especially debris buildup in winter</li> </ul>	<ul style="list-style-type: none"> <li>▪ Vacuum sweeper shall be used regularly to remove sediment and organic debris on the pavement surface. The sweeper may be fitted with water jets.</li> <li>▪ Power washing can be an effective tool for cleaning clogged areas. This should occur at mid pressure typically less than 500 psi and at an angle of 30 degrees or less.</li> <li>▪ Vacuuming adjacent non porous asphalt can be effective at minimizing run-on.</li> <li>▪ Stockpiled snow areas on porous pavements will require additional maintenance and vacuuming.</li> <li>▪ For loose debris, a power/leaf blower or gutter broom can be used to remove leaves and trash.</li> </ul>

### Inspection and Maintenance Summary

- Observations made must be documented on the Checklist
- If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.
- A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.

## RIPRAP SLOPE STABILIZATION

**RIPRAP SLOPE STABILIZATION** is a layer of large stones used to protect soil from erosion in areas of concentrated runoff.

### Purpose and Description

- Can also be used on slopes that are unstable because of seepage problems.
- Use riprap to stabilize cut-and-fill slopes, channel side slopes and bottoms, streambanks and bottoms, streambanks and grades.



- Riprap is commonly used to stabilize over-steepened slopes. Riprap can also be used to protect culvert inlets and outlets, stream banks, drainage channels (as a lining), or other areas subject to erosion by stormwater runoff.

### Inspection Frequency

- Annual inspections should be made to ensure riprap is stable and no erosion is occurring around the structure.



COMPONENT	INSPECTION	MAINTENANCE
<b>Riprap Structure</b>	<ul style="list-style-type: none"> <li>▪ Inspect for trash and unwanted debris</li> <li>▪ Inspect for soil erosion and accumulation, especially at the top and bottom of the slope</li> <li>▪ Inspect for invasive weeds</li> <li>▪ Inspect for animal burrows</li> <li>▪ Inspect for dislodged or unstable rock which could pose safety hazards</li> <li>▪ Inspect site for unusual or unsafe conditions (snowplow damage, structural damage, dumping)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove trash and unwanted debris from the area</li> <li>▪ Remove accumulated sediment with shovel, backhoe or vactor truck; Stabilize eroded and undercut areas</li> <li>▪ Remove invasive weeds annually</li> <li>▪ Backfill burrows if they are causing erosion or compromising structural integrity; fill void spaces with smaller rock if necessary</li> <li>▪ Repair dislodged or unstable rock</li> </ul>

### Inspection and Maintenance Summary

- Observations made must be documented on the Checklist
- If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.
- A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.

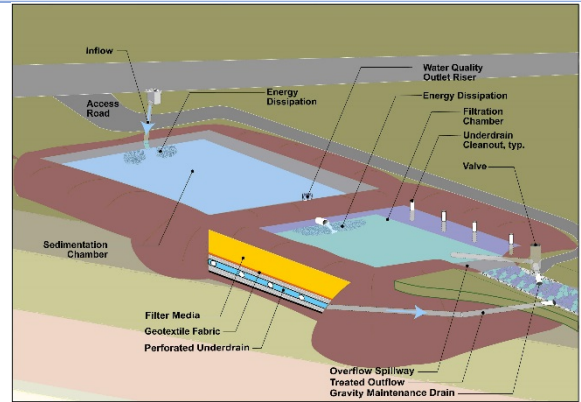


## SAND FILTER

**SAND FILTERS** (also referred to as filtration basins) are multi-chambered structures that treat stormwater by filtration through a sand media and include an underdrain collection system.

### Purpose and Description

- The filtered runoff is typically collected and returned to the conveyance system, although it can also drain into the surrounding soil in areas with porous soil.
- Sand filters are designed to completely drain the specified water quality volume within 48 hours and reaerate between rainfall events.



### Inspection Frequency

- Sand filters must be inspected semi-annually to ensure that they operate in good working condition and in accordance with the approved design and specifications. Items in need of repair must be immediately addressed.

COMPONENT	INSPECTION	MAINTENANCE
<b>Inlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Inspect for trash, debris and sediment</li> <li>▪ Inspect areas for signs of erosion</li> <li>▪ Inspect inlet and outlet pipes and inlets for damage or plugging</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove trash and vegetative debris or sediment that has the potential to inhibit flow into the sand filter</li> <li>▪ Repair eroded areas by revegetating</li> <li>▪ Identify and control the source of erosion damage if soil is evident</li> <li>▪ Repair or replace damaged grates and/or piping</li> <li>▪ If plugged, remove material and identify and mitigate the source of sediment or debris</li> </ul>
<b>Forebay</b>	<ul style="list-style-type: none"> <li>▪ Inspect for sediment accumulation in forebay</li> <li>▪ Inspect for undesirable vegetation</li> <li>▪ Inspect status of erosion protection materials</li> <li>▪ Inspect the perforated standpipe</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment in forebay when sediment depth is greater than 6 inches</li> <li>▪ Remove vegetation that threatens the function or integrity or cause structural deterioration, or make removal of sediment from the forebay difficult</li> <li>▪ Replace erosion protection materials as necessary</li> <li>▪ Remove sediment or debris from trash rack; remove overgrown vegetation if it has the potential to restrict flow</li> </ul>
<b>Filter Bed</b>	<ul style="list-style-type: none"> <li>▪ Inspect area for trash or debris</li> <li>▪ Inspect areas for unhealthy grass cover, bare areas, or dying grass</li> <li>▪ Inspect areas for presence of erosion or formation of gullies in the filter bed</li> <li>▪ Inspect surface type filter bed area for undesirable vegetation</li> <li>▪ Inspect surface filter beds for water ponding more than 72 hours after a storm event</li> <li>▪ Inspect filter for sediment accumulation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove and properly dispose of trash and debris</li> <li>▪ Monitor overall vegetative cover and maintain at 70% cover</li> <li>▪ If erosion has occurred, reestablish vegetation</li> <li>▪ If channelization has occurred, reestablish the proper grade of the basin bottom</li> <li>▪ Remove woody vegetation that can cause flow to channelize</li> <li>▪ If ponding water, check outlet structure for clogging</li> <li>▪ Remove the sediment if it is clogging the filter or has reached a depth of 3 inches</li> <li>▪ The top 2-5 inches of media are typically removed and replaced every 3-5 years</li> </ul>
<b>Outlet Control Structure</b>	<ul style="list-style-type: none"> <li>▪ Inspect water around outlet control structure</li> <li>▪ Inspect trash rack for trash, debris, damage or corrosion</li> <li>▪ Ensure movable components are operable (sluice gates, valves)</li> </ul>	<ul style="list-style-type: none"> <li>▪ If the outlet appears to be clogged or blocked, remove material causing the blockage. Inspect for leaks that may allow untreated runoff to bypass the sand media</li> <li>▪ Remove trash and debris from trash rack. Ensure it is not corroding or damaged</li> <li>▪ Remove sediment or debris within or near the moveable component</li> </ul>

COMPONENT	INSPECTION	MAINTENANCE
<b>Emergency Spillway</b>	<ul style="list-style-type: none"> <li>▪ Inspect that it is free of trash and debris.</li> <li>▪ Inspect concrete to verify that it is in good condition or that adequate riprap is present</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair concrete or replace riprap, areas of erosion</li> </ul>
<p><b>Inspection and Maintenance Summary</b></p> <ul style="list-style-type: none"> <li>▪ Observations made must be documented on the Checklist</li> <li>▪ If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.</li> <li>▪ A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.</li> </ul>		

## SEDIMENT TRAP/TRACTION SAND TRAP

A **SEDIMENT TRAP** is a particle capture device (catch basin, drop inlet) whose below-ground portion has been modified to capture and retain traction sand.



### Purpose and Description

- Placed in stormwater flow path to capture sediment, debris, coarse particles and associated pollutants in a deep sump
- Used where sand or abrasives are applied
- Located in road shoulder stormwater flow paths

### Inspection Frequency

- Annual inspections unless required by an environmental permit



COMPONENT	INSPECTION	MAINTENANCE
<b>Grate/Inlet</b>	<ul style="list-style-type: none"> <li>▪ Inspect for obstructions due to debris or other objects</li> <li>▪ Capacity reduction due to excessive sediment accumulation</li> <li>▪ Damage from equipment or vehicles</li> </ul>	<ul style="list-style-type: none"> <li>▪ Estimate the depth of sediment based on available capacity; remove when &gt;50%</li> <li>▪ Remove sediment or debris from blocking inlet to allow free flow into the device</li> <li>▪ Repair inlet grate as needed based on severity of damage</li> </ul>
<b>Outlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Inspect the inside of structures or pipes to verify that they are free of sediment and debris</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair eroded areas and damaged pipes</li> </ul>

### Inspection and Maintenance Summary

- Observations made must be documented on the Checklist
- If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.
- A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.



## STORMWATER PONDS AND WETLANDS

A **STORMWATER WETLAND** is an engineered marsh or swamp with dense wetland vegetation designed to remove stormwater pollutants primarily through biological processes.



### Purpose and Description

- Stormwater wetlands, as opposed to naturally occurring wetlands, have distinct inlet and outlet structures.
- Vegetation grows throughout the wetland.
- Pools of standing water are usually present, although some wetlands are designed to treat runoff below ground.

### Inspection Frequency

- Annually inspections should evaluate health of wetland vegetation and presence of water.

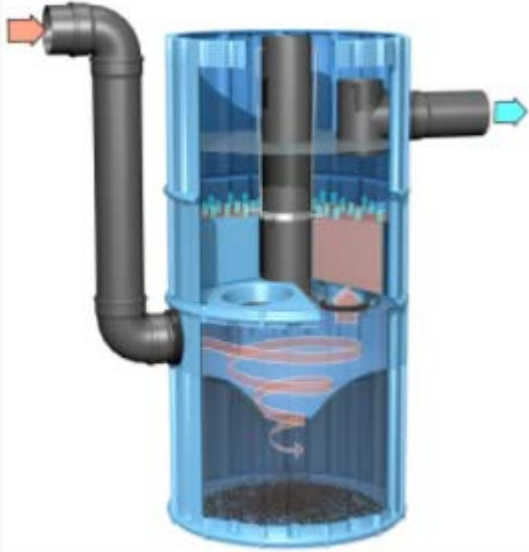
COMPONENT	INSPECTION	MAINTENANCE
<b>Inlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Runoff should be allowed to flow freely into the structure</li> <li>▪ Inspect ditches, pipes, and catch basins for trash, sediment and debris</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> <li>▪ Inspect ditches for signs of erosion and undesirable vegetation (woody plants)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove and properly dispose of debris, unwanted vegetation and major sediment accumulations</li> <li>▪ Repair eroded areas and damaged pipes</li> </ul>
<b>Forebay</b>	<ul style="list-style-type: none"> <li>▪ Inspect for trash, debris and undesirable vegetation.</li> <li>▪ Does not contain excessive amount of accumulated sediment</li> <li>▪ Inspect the embankment for structural integrity and signs of erosion</li> <li>▪ Ensure minimal plant growth</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris and undesirable vegetation and properly dispose of off-site</li> <li>▪ Remove sediment from forebay when it exceeds 50% of storage capacity</li> <li>▪ Correct any structural problems</li> <li>▪ Replace erosion protection (riprap) as needed</li> </ul>
<b>Basin</b>	<ul style="list-style-type: none"> <li>▪ Inspection of the wetland should focus on the health, density and diversity of wetland vegetation</li> <li>▪ Ensure no aquatic weeds or invasive plants are present</li> <li>▪ Ensure algal growth covers less than 50% of wetland</li> <li>▪ Inspect the sides of the basin for structural integrity, noting any signs of burrowing animals, erosion, inadequate vegetation cover, or undesirable vegetation</li> <li>▪ Inspect water levels to be at or near the invert of the drawdown device</li> <li>▪ Ensure water is present in the wetland</li> </ul>	<ul style="list-style-type: none"> <li>▪ Replace any inadequate vegetation</li> <li>▪ If excessive algae is noted, develop a management plan for its removal</li> <li>▪ Repair animal burrows</li> <li>▪ Dredge sediment only if it is approaching the level of the drawdown orifice or impeding function of the basin</li> </ul>
<b>Outlet Control Structure</b>	<ul style="list-style-type: none"> <li>▪ Inspect for signs of damage such as cracks, holes or leaks</li> <li>▪ Ensure that water can flow freely</li> <li>▪ Ensure trash rack or grate is structurally sound</li> </ul>	<ul style="list-style-type: none"> <li>▪ Repair any damaged areas and remove sediment and debris</li> <li>▪ Replace metal components if necessary</li> </ul>
<b>Outlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Inspect the inside of structures or pipes to verify that they are free of sediment and debris</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> <li>▪ Inspect ditches for signs of erosion or undesirable vegetation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair eroded areas and damaged pipes</li> <li>▪ Replace outlet protection materials (riprap) as necessary</li> </ul>
<b>Emergency Spillway</b>	<ul style="list-style-type: none"> <li>▪ Inspect that it is free of trash and debris</li> <li>▪ Inspect concrete to verify that it is in good condition or that adequate riprap is present</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair concrete or replace riprap, areas of erosion</li> </ul>

**Inspection and Maintenance Summary**

- Observations made must be documented on the Checklist
- If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.
- A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.

## TREATMENT VAULT

A **TREATMENT VAULT** (hydrodynamic separator) is a flow-through device that removes trash, debris and coarse sediment from incoming flows using screening, gravity settling, and centrifugal forces generated by forcing the influent into a circular motion.



### Purpose and Description

- Moving the water in a circular motion forces significant removal of coarse sediment and attached pollutants with less space than traditional settling devices
- Can be designed to remove floating oils and grease using sorbent media and baffles; trash racks can be added.
- Pretreatment structures, such as drainage inlets (sediment traps, catchbasins, etc), can be installed upstream to treat stormwater runoff and remove trash and debris prior to stormwater entering treatment vaults.

### Inspection Frequency

- Semi-annual inspections should be made to inspect sediment accumulation depth is below outlet pipes.

COMPONENT	INSPECTION	MAINTENANCE
<b>Inlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Runoff should be allowed to flow freely into the structure</li> <li>▪ Inspect ditches, pipes, and catch basins for trash, sediment and debris</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove and properly dispose of debris, unwanted vegetation and major sediment accumulations</li> <li>▪ Repair eroded areas and damaged pipes</li> </ul>
<b>Vault</b>	<ul style="list-style-type: none"> <li>▪ Inspect for amount of trash and debris present</li> <li>▪ Inspect that the device is structurally sound and has not filled to its capacity</li> <li>▪ Check for standing water that could lead to vector issues</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove accumulated debris</li> <li>▪ Estimate from design plans the sump depth and remove sediment when functionality is impeding effectiveness</li> </ul>
<b>Outlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Ensure that water can flow freely</li> <li>▪ Ensure trash rack or grate is structurally sound</li> </ul>	<ul style="list-style-type: none"> <li>▪ Repair any damaged areas and remove sediment and debris</li> <li>▪ Replace metal components if necessary</li> </ul>
<b>Inspection and Maintenance Summary</b>		
<ul style="list-style-type: none"> <li>▪ Observations made must be documented on the Checklist</li> <li>▪ If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.</li> <li>▪ A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.</li> </ul>		



## TREE BOX FILTER

**TREE BOX FILTERS** are designed to mimic natural systems such as bioretention areas by incorporating plants, soil and microbes. These structures are very sensitive to installation and can fail if system is not installed properly.



### Purpose and Description

- Installed at curb level and consist of an open bottom concrete barrel filled with porous soil media, an underdrain in crushed gravel, and a tree.
- Highly adaptable and can be used in all types of development and soils, particularly ultra-urban areas

### Inspection Frequency

- Annually check tree
- Semi-annually rake media
- After 5-years replace media

COMPONENT	INSPECTION	MAINTENANCE
<b>Inlet and Outlet</b>	<ul style="list-style-type: none"> <li>▪ Inspect for trash and debris accumulated that may impede flow</li> <li>▪ Inspect energy dissipation at inlet and outlet</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove trash and debris</li> <li>▪ Repair any damaged or eroded riprap</li> </ul>
<b>Filter</b>	<ul style="list-style-type: none"> <li>▪ Inspect that tree looks healthy</li> </ul>	<ul style="list-style-type: none"> <li>▪ Replace media, ensure active drainage out of the system</li> </ul>

### Inspection and Maintenance Summary

- Observations made must be documented on the Checklist
- If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.
- A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.

## VEGETATED SWALE

A **VEGETATED SWALE** is a vegetated channel that treats and conveys runoff from small drainage areas.

### Purpose and Description

- Swales are broad and shallow so that water will flow slowly.
- Swales remove suspended solids, metals and nutrients through sedimentation, vegetated filtration, infiltration, and biological uptake.
- Designed to decrease runoff velocities, capture sediment, and decrease runoff volumes.



### Inspection

#### Frequency

- Inspect annually to ensure no standing water and healthy vegetation

COMPONENT	INSPECTION	MAINTENANCE
<b>Inlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Runoff should be allowed to freely flow into the swale</li> <li>▪ Inspect ditches, pipes, and catch basins for trash, sediment and debris</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove and properly dispose of debris, unwanted vegetation and major sediment accumulations</li> <li>▪ Repair eroded areas and damaged pipes</li> <li>▪ If riprap has been placed at the inlet inspect for undercutting or erosion and repair if necessary</li> </ul>
<b>Forebay</b>	<ul style="list-style-type: none"> <li>▪ Inspect for trash, debris, undesirable vegetation and sediment accumulation.</li> <li>▪ Structurally sound</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove trash, debris and undesirable vegetation and properly dispose of off-site</li> <li>▪ Remove sediment from forebay when it exceeds 50% of forebay storage capacity</li> <li>▪ Correct any structural problems</li> <li>▪ Replace erosion protection (riprap) as needed</li> </ul>
<b>Swale</b>	<ul style="list-style-type: none"> <li>▪ Inspect base, side slopes and areas around the swale for erosion</li> <li>▪ Inspect for undercutting of side slopes</li> <li>▪ Verify that grass is being mowed</li> <li>▪ Inspect for bare soils, sediment deposition, trash, debris and unwanted vegetation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove trash, debris and undesirable vegetation</li> <li>▪ Sediment should be removed when flow is altered or grass can no longer be seen</li> <li>▪ Stabilize any eroding surfaces in or around the swale by restoring the proper grade, reseeding</li> </ul>
<b>Check dams (if present)</b>	<ul style="list-style-type: none"> <li>▪ Inspect for trash, debris, undesirable vegetation, excessive sediment, and erosion</li> <li>▪ Verify that check dams retain the proper dimensions</li> </ul>	<ul style="list-style-type: none"> <li>▪ Maintenance should be performed when swale is dry</li> <li>▪ Replace riprap, repair erosion, and rebuild or reshape check dams as necessary.</li> <li>▪ Use hand-held equipment when mowing around the check dam structure.</li> </ul>

### Inspection and Maintenance Summary

- Observations made must be documented on the Checklist
- If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.
- A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.

## WET BASIN

A **WET BASIN** is a constructed basin that maintains a permanent pool of water, reduces peak stormwater flows, promotes the settling of suspended solids and biological uptake of pollutants, and reduces erosive velocities downstream of the outlet control structure.



### Purpose and Description

- Wet detention basins improve water quality by allowing sediment to settle and promoting the growth of wetland plants.
- The basin has additional capacity to detain and slowly release stormwater from a primary outlet control structure over a period of time.

### Inspection Frequency

- Annual inspection to ensure no vector issues, excessive sediment accumulation.

COMPONENT	INSPECTION	MAINTENANCE
<b>Inlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Runoff should be able to flow freely into the structure.</li> <li>▪ Inspect ditches, pipes, and catch basins for trash, sediment and debris</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove and properly dispose of debris, unwanted vegetation and major sediment accumulations.</li> <li>▪ Repair eroded areas and damaged pipes.</li> </ul>
<b>Forebay</b>	<ul style="list-style-type: none"> <li>▪ Inspect for trash, debris and undesirable vegetation</li> <li>▪ Ensure structure is sound</li> <li>▪ No excessive amount of accumulated sediment</li> <li>▪ Embankment should have structural integrity and no signs of erosion.</li> <li>▪ Ensure minimal plant growth</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris and undesirable vegetation and properly dispose of off-site</li> <li>▪ Remove sediment from forebay when it exceeds 50% of forebay storage capacity</li> <li>▪ Correct any structural problems</li> <li>▪ Replace erosion protection (riprap) as needed</li> </ul>
<b>Basin</b>	<ul style="list-style-type: none"> <li>▪ Inspect the sides of the basin for structural integrity, noting any signs of burrowing animals, erosion, inadequate vegetation cover, or undesirable vegetation.</li> <li>▪ Inspect the downstream toe for seepage.</li> <li>▪ Water levels should be at or near the invert of the drawdown device</li> <li>▪ Determine depth of sediment</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove undesirable vegetation by hand if possible</li> <li>▪ If erosion has occurred, reestablish grass, wetland vegetation or riprap as appropriate</li> <li>▪ Remove sediment if it is approaching the level of the drawdown orifice or impeding function of the basin</li> <li>▪ Repair animal burrows</li> </ul>
<b>Outlet Control Structure</b>	<ul style="list-style-type: none"> <li>▪ Inspect for signs of damage such as cracks, holes or leaks</li> <li>▪ Ensure that water can flow freely</li> <li>▪ Ensure trash rack or grate is structurally sound</li> </ul>	<ul style="list-style-type: none"> <li>▪ Repair any damaged areas and remove sediment and debris</li> <li>▪ Replace metal components if necessary</li> </ul>
<b>Outlet Drainage System</b>	<ul style="list-style-type: none"> <li>▪ Inspect the inside of structures or pipes to verify that they are free of sediment and debris</li> <li>▪ Inspect ground surface above buried pipes and structures for depressions or other signs of pipe breakage or separation</li> <li>▪ Inspect ditches for signs of erosion or undesirable vegetation.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair eroded areas and damaged pipes</li> <li>▪ Replace outlet protection materials (riprap) as necessary</li> </ul>
<b>Emergency Spillway</b>	<ul style="list-style-type: none"> <li>▪ Free of trash and debris</li> <li>▪ Verify that concrete is in good condition or that adequate riprap is present.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Remove sediment, trash, debris, and undesirable vegetation and properly dispose of off-site</li> <li>▪ Repair concrete or replace riprap, areas of erosion</li> </ul>

### Inspection and Maintenance Summary

- Observations made must be documented on the Checklist
- If emergency maintenance needs are identified, the inspector should either correct the problem or contact the maintenance manager.
- A follow-up inspection should be conducted to verify that actions have been taken and needs have been addressed. Document on Checklist.



# APPENDIX C

## Inspection and Maintenance Checklists

- Bioretention Basin
- Dry Basin
- Gross Solids Removal Devices (GSRD)
- Infiltration Basin
- Level Spreader
- Outfall
- Permeable Pavement
- Pipes and Culverts
- Riprap Slope Stabilization
- Sand Filter
- Sediment Trap
- Slopes
- Stormwater Wetland
- Tree Box Filter
- Vegetated Swale
- Wet Basin

**STORMWATER ASSET INSPECTION SHEET**

Structure Type: **BIORETENTION BASIN**

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_

County: \_\_\_\_\_

District:     1           2           3

Route: \_\_\_\_\_

Inspection Type: Routine   Follow-up   Other ( \_\_\_\_\_ )

Milepost: \_\_\_\_\_

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Structural Components	GOOD	FAIR	POOR	
1. Forebay or level spreader is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Inlet, outlet or underdrain system has been damaged or plugged affecting functionality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Embankment and Spillway are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Evidence of water ponding more than 72 hours after a storm event	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Filter media and underdrain, including cleanouts are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris/Trash				
6. Forebay or level spreader is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Inlet/outlet ditches, pipes clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Basin and trash rack are clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance				
9. Unhealthy grass cover, bare areas, or dead grass cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Undesirable vegetation threatening the function or integrity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Any evidence of erosion, gullies, animal activity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Is there sediment accumulation, <10% of the basin bottom?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
13. Are structural repairs needed at this site?	Yes		No	
14. Is sediment removal needed at this site?	Yes		No	
15. Are there general maintenance needs at this site?	Yes		No	
16. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_

\_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_

**STORMWATER ASSET INSPECTION SHEET**

Structure Type: DRY BASIN

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_

County: \_\_\_\_\_

District:     1           2           3

Route: \_\_\_\_\_

Inspection Type: Routine   Follow-up   Other (\_\_\_\_\_)

Milepost: \_\_\_\_\_

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Structural Components	GOOD	FAIR	POOR	
1. Forebay is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Inlet and outlet has been damaged or plugged affecting functionality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Embankment and Spillway are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Evidence of water ponding more than 4 days after a storm event in the basin or above outlet/ orifice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris/Trash				
5. Forebay is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Inlet/outlet ditches pipes clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Basin is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance				
8. Unhealthy grass cover, bare areas, or dead grass cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Undesirable vegetation threatening the function or integrity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Any evidence of erosion, gullies, animal activity, or other problems?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Is there sediment accumulation, 10% of the basin bottom?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
12. Are structural repairs needed at this site?	Yes		No	
13. Is sediment removal needed at this site?	Yes		No	
14. Are there general maintenance needs at this site?	Yes		No	
15. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_

\_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_



**STORMWATER ASSET INSPECTION SHEET**  
**Structure Type: GROSS SOLIDS REMOVAL DEVICE**

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_  
 County: \_\_\_\_\_  
 Route: \_\_\_\_\_  
 Milepost: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_  
 District:     1           2           3  
 Inspection Type: Routine   Follow-up   Other ( \_\_\_\_\_ )

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Structural Components	GOOD	FAIR	POOR	
1. Forebay is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Inlet, outlet or underdrain system has been damaged or plugged affecting functionality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Embankment and Spillway are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Evidence of water ponding more than 3 days after a storm event in the basin or above outlet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris/Trash				
5. Forebay is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Inlet/outlet ditches pipes clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Basin is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance				
8. Unhealthy grass cover, bare areas, or dead grass cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Undesirable vegetation threatening the function or integrity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Any evidence of erosion, gullies, animal activity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Is there sediment accumulation, 10% of the basin bottom?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
12. Are structural repairs needed at this site?	Yes		No	
13. Is sediment removal needed at this site?	Yes		No	
14. Are there general maintenance needs at this site?	Yes		No	
15. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_

\_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_

**STORMWATER ASSET INSPECTION SHEET**

Structure Type: **INFILTRATION BASIN**

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_  
 County: \_\_\_\_\_  
 Route: \_\_\_\_\_  
 Milepost: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_  
 District:     1            2            3  
 Inspection Type: Routine   Follow-up   Other ( \_\_\_\_\_ )

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Structural Components	GOOD	FAIR	POOR	
1. Forebay is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Inlet, outlet systems have been damaged or plugged affecting functionality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Embankment, Spillway or flow bypass are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Evidence of water ponding more than 3 days after a storm event	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris/Trash				
5. Forebay and basin are clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Inlet/outlet ditches pipes clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Basin is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance				
8. Unhealthy grass cover, bare areas, or dead grass cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Undesirable vegetation threatening the function or integrity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Any evidence of erosion, gullies, animal activity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Is there sediment accumulation, 10% of the basin bottom?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
12. Are structural repairs needed at this site?	Yes		No	
13. Is sediment removal needed at this site?	Yes		No	
14. Are there general maintenance needs at this site?	Yes		No	
15. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_

**STORMWATER ASSET INSPECTION SHEET**

Structure Type: LEVEL SPREADER

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_

County: \_\_\_\_\_

District: 1                      2                      3

Route: \_\_\_\_\_

Inspection Type: Routine    Follow-up    Other ( \_\_\_\_\_ )

Milepost: \_\_\_\_\_

Rate Condition as:  *Green: Good condition, no corrective action required*  
 *Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking*  
 *Red: Poor condition, needing maintenance, repair and/or replacement*  
 *Blank: Photo was taken*

Structural Components	GOOD	FAIR	POOR	
1. Trough is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Level spreader lip is uniform across entire length	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Bypass structure and channel is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Evidence of water ponding more than 3 days after a storm event in the trough	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris/Trash				
5. Trough is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Inlet/outlet ditches pipes clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Bypass channel and filter strip are free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance				
8. Unhealthy grass cover, bare areas, or dead grass cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Undesirable vegetation threatening the function or integrity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Does the filter strip or bypass channel show evidence of erosion or gullies?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Is there sediment accumulation, 10% of the trough bottom?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
12. Are structural repairs needed at this site?	Yes		No	
13. Is sediment removal needed at this site?	Yes		No	
14. Are there general maintenance needs at this site?	Yes		No	
15. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_

\_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_



**STORMWATER ASSET INSPECTION SHEET**

Structure Type: **OUTFALL**

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_

County: \_\_\_\_\_

District:     1             2             3

Route: \_\_\_\_\_

Inspection Type: Routine   Follow-up   Other ( \_\_\_\_\_ )

Milepost: \_\_\_\_\_

Pipe ID: \_\_\_\_\_

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Drop Inlet Components	GOOD	FAIR	POOR	
1. Inlet or outlet is clean, free of sediment or other debris, and functioning properly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Evidence of scour/erosion occurring around the inlet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Sediment accumulation is <30% (good), 30-60% (fair), >60% (poor)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Overall, the drop inlet is clean, clear and functioning properly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pipes				
1. Inlet or outlet has been damaged or clogged affecting functionality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Evidence of scour/erosion occurring around the inlet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Sediment accumulation is <30% (good), 30-60% (fair), >60% (poor)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Overall, the pipe is structurally sound and functioning properly	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local Area Assessment				
1. Is there evidence of flowing water?	Yes		No	
2. Is sediment removal needed at this site? Remove if sediment fills more than 1/3 of facility.	Yes		No	
3. Are roadway cut/fill slopes contributing sediment to the facility?	Yes		No	
4. Is flow from the roadway able to get into the facility?	Yes		No	
IDDE Inspection				
5. Are there unidentified/potentially hazardous containers in the waterway?	Yes		No	
6. Are there pipes that do not appear to be part of the stormwater network?	Yes		No	
7. Is there running water that is not weather related (i.e., no ppt for 24 hrs)	Yes		No	
8. Is the water discolored, foamy, or does it have a bad odor?	Yes		No	
9. Is there anything else out of the ordinary that might cause concern?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_

**STORMWATER ASSET INSPECTION SHEET**

Structure Type: **PERMEABLE PAVEMENT**

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_

County: \_\_\_\_\_

District:      1                      2                      3

Route: \_\_\_\_\_

Inspection Type: Routine    Follow-up    Other ( \_\_\_\_\_ )

Milepost: \_\_\_\_\_

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Structural Components	GOOD	FAIR	POOR	
1. Pavers are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Underdrain system and observation wells are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Subbase, base, bedding and joints are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Evidence of water ponding after a storm event	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Overflow system is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance – Debris/Trash				
6. Pavers are clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Joints are clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Observation well is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Overflow system is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
10. Are structural repairs needed at this site?	Yes		No	
11. Is sediment removal needed at this site?	Yes		No	
12. Are there general maintenance needs at this site?	Yes		No	
13. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_

# STORMWATER ASSET INSPECTION SHEET

Structure Type: **PIPES AND CULVERTS**

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_

Inspector Name: \_\_\_\_\_

County: \_\_\_\_\_

District:            1            2            3

Route/Milepost: \_\_\_\_\_

Inspection Type:    Annual    Semi-annual    Long-term

ID Number: \_\_\_\_\_

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up in 6 months or per recommendations  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
■ White: Photo was taken

Check all that apply. See Appendix B for example photos and detailed descriptions:

Pipe Type								
<input type="checkbox"/>	Box Culvert	<input type="checkbox"/>	Elliptical Pipe					
<input type="checkbox"/>	Circular Pipe	<input type="checkbox"/>	Trench Drain					
<input type="checkbox"/>	Arch Pipe	<input type="checkbox"/>	Multi-Barrel					
Pipe Material								
<input type="checkbox"/>	Aluminized Steel	<input type="checkbox"/>	Corrugated Plastic Pipe	<input type="checkbox"/>	Concrete			
<input type="checkbox"/>	Corrugated Metal Pipe	<input type="checkbox"/>	HDPE	<input type="checkbox"/>	Vitrified Clay			
<input type="checkbox"/>	Iron	<input type="checkbox"/>	PVC	<input type="checkbox"/>	Other/Unknown			
Pipe Size & Quantity								
Rise:		Span:		Number of Barrels:				
Inlet/Outlet Type and Description								
INLET	<input type="checkbox"/>	Standard Drop	<input type="checkbox"/>	Drain Inlet	<input type="checkbox"/>	Type "V"		
OUTLET	<input type="checkbox"/>	Weir	<input type="checkbox"/>	Orifice	<input type="checkbox"/>	Box Culvert End		
HEADWALL	<input type="checkbox"/>	Std. Pipe Culvert Concrete	<input type="checkbox"/>	Standard Tapered Inlet/Outlet	<input type="checkbox"/>	Standard Masonry		
END WALL	<input type="checkbox"/>	Std. Pipe Arch Culverts	<input type="checkbox"/>	Std. Sand Cement Bag Rip Rap	<input type="checkbox"/>	Std. Precast Reinforced Concrete		
END SECTION:	<input type="checkbox"/>	Std. for End Wall & Apron	<input type="checkbox"/>	Std. Safety (Metal)				
Physical Description					GOOD	FAIR	POOR	
1.	Blockage				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.	Water Level				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Erosion Around Pipe								
3.	Sod/grass				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4.	Rip Rap				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.	Paved				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.	Active Waterway						Y/N	
7.	Other:							
Condition of the Surface Surrounding the Pipe								
8.	Scouring/Undermining				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9.	Syphon Holes				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10.	Settling				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11.	Erosion				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12.	Exposed Pipe				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13.	Other:				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Structural Defect Related to Pipe				
14. Cracks/Joint Separation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Pipe Collapsed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Surface Settlement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Pipe Corrosion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Root Intrusion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Surge Flow	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Leaking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Action Items (circle "Yes" or "No")		
21. Are structural repairs needed at this site?	Yes	No
22. Are there any failed structural items that are imminent for collapse or collapsed?	Yes	No
23. Were maintenance activities conducted at the time of this inspection?	Yes	No

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_

\_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_



**STORMWATER ASSET INSPECTION SHEET**  
**Structure Type: RIPRAP SLOPE STABILIZATION**

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_  
 County: \_\_\_\_\_  
 Route: \_\_\_\_\_  
 Milepost: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_  
 District:     1           2           3  
 Inspection Type: Routine   Follow-up   Other ( \_\_\_\_\_ )

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Structural Components	GOOD	FAIR	POOR	
1. Forebay is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Inlet, outlet or underdrain system has been damaged or plugged affecting functionality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Embankment and Spillway are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Evidence of water ponding more than 3 days after a storm event in the basin or above outlet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris/Trash				
5. Forebay is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Inlet/outlet ditches pipes clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Basin is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance				
8. Unhealthy grass cover, bare areas, or dead grass cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Undesirable vegetation threatening the function or integrity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Any evidence of erosion, gullies, animal activity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Is there sediment accumulation, <10% of the basin bottom?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
12. Are structural repairs needed at this site?	Yes		No	
13. Is sediment removal needed at this site?	Yes		No	
14. Are there general maintenance needs at this site?	Yes		No	
15. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_

**STORMWATER ASSET INSPECTION SHEET**

Structure Type: **SAND FILTER**

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_

County: \_\_\_\_\_

District:     1                   2                   3

Route: \_\_\_\_\_

Inspection Type: Routine   Follow-up   Other ( \_\_\_\_\_ )

Milepost: \_\_\_\_\_

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Structural Components	GOOD	FAIR	POOR	
1. Forebay is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Inlet, outlet or underdrain system has been damaged or plugged affecting functionality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Embankment and Spillway are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Evidence of water ponding more than 3 days after a storm event in the basin or above outlet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris/Trash				
5. Forebay is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Inlet/outlet ditches pipes clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Basin is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance				
8. Unhealthy grass cover, bare areas, or dead grass cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Undesirable vegetation threatening the function or integrity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Any evidence of erosion, gullies, animal activity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Is there sediment accumulation, 10% of the basin bottom?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
12. Are structural repairs needed at this site?	Yes		No	
13. Is sediment removal needed at this site?	Yes		No	
14. Are there general maintenance needs at this site?	Yes		No	
15. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_

\_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_

**STORMWATER ASSET INSPECTION SHEET**

Structure Type: SEDIMENT TRAP

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_

County: \_\_\_\_\_

District:     1           2           3

Route: \_\_\_\_\_

Inspection Type: Routine   Follow-up   Other ( \_\_\_\_\_ )

Milepost: \_\_\_\_\_

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Structural Components	GOOD	FAIR	POOR	
1. Forebay is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Inlet, outlet or underdrain system has been damaged or plugged affecting functionality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Embankment and Spillway are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Evidence of water ponding more than 3 days after a storm event in the basin or above outlet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris/Trash				
5. Forebay is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Inlet/outlet ditches pipes clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Basin is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance				
8. Unhealthy grass cover, bare areas, or dead grass cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Undesirable vegetation threatening the function or integrity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Any evidence of erosion, gullies, animal activity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Is there sediment accumulation, 10% of the basin bottom?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
12. Are structural repairs needed at this site?	Yes		No	
13. Is sediment removal needed at this site?	Yes		No	
14. Are there general maintenance needs at this site?	Yes		No	
15. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_

\_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_

**SLOPE INSPECTION SHEET**

Category: SLOPES

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_  
 County: \_\_\_\_\_  
 Route: \_\_\_\_\_  
 Milepost: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_  
 District:     1             2             3  
 Inspection Type: Routine   Follow-up   Other ( \_\_\_\_\_ )

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Structural Components	GOOD	FAIR	POOR	
1. Slope is structurally stable.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Gullies and rills are not present. No visible signs of erosion.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Vegetation or stabilization BMPs are structurally sound and functional.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. No evidence of water damage or pooling more than 3 days after a storm event.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Engineered drainage features functioning properly.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sedimentation				
6. Top of slope shows no visible signs of erosion, sedimentation or other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Engineered drainage features showing no signs of sedimentation or sloughing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Base of slope is free of sediment and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance				
9. Unhealthy grass cover, bare areas, or no stable cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Undesirable vegetation threatening the function or integrity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Any evidence of erosion, gullies, animal activity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Is there sediment accumulation, 10% of the basin bottom?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
13. Are structural repairs needed at this site?	Yes		No	
14. Is sediment removal needed at this site?	Yes		No	
15. Are there general maintenance needs at this site?	Yes		No	
16. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	No sign of erosion, sediment discharge or debris.
<b>Fair - Yellow</b>	Minor to moderate erosion and sedimentation has occurred. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration, sediment discharge, sloughing and/or major maintenance needs were found. Slope is unstable and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_



**STORMWATER ASSET INSPECTION SHEET**  
**Structure Type: STORMWATER WETLAND**

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_  
 County: \_\_\_\_\_  
 Route: \_\_\_\_\_  
 Milepost: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_  
 District:     1           2           3  
 Inspection Type: Routine   Follow-Up   Other ( \_\_\_\_\_ )

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Structural Components	GOOD	FAIR	POOR	
1. Forebay is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Inlet, outlet systems have been damaged or plugged affecting functionality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Embankment and Spillway are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Evidence of water level at or near the invert of the orifice and the drawdown device/orifice is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris/Trash				
5. Forebay and pools are clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Inlet/outlet ditches pipes clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance				
7. Unhealthy grass cover, bare areas, or dead grass cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Undesirable vegetation or algae threatening the function or integrity of the pools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
9. Are structural repairs needed at this site?	Yes		No	
10. Is sediment removal needed at this site?	Yes		No	
11. Are there general maintenance needs at this site?	Yes		No	
12. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_

**STORMWATER ASSET INSPECTION SHEET**

Structure Type: TREE BOX FILTER

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_

County: \_\_\_\_\_

District:     1             2             3

Route: \_\_\_\_\_

Inspection Type: Routine   Follow-up   Other ( \_\_\_\_\_ )

Milepost: \_\_\_\_\_

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Structural Components	GOOD	FAIR	POOR	
1. Forebay is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Inlet, outlet or underdrain system has been damaged or plugged affecting functionality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Embankment and Spillway are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Evidence of water ponding more than 3 days after a storm event in the basin or above outlet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris/Trash				
5. Forebay is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Inlet/outlet ditches pipes clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Basin is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance				
8. Unhealthy grass cover, bare areas, or dead grass cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Undesirable vegetation threatening the function or integrity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Any evidence of erosion, gullies, animal activity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Is there sediment accumulation, <10% of the basin bottom?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
12. Are structural repairs needed at this site?	Yes		No	
13. Is sediment removal needed at this site?	Yes		No	
14. Are there general maintenance needs at this site?	Yes		No	
15. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_

\_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_

**STORMWATER ASSET INSPECTION SHEET**

Structure Type: VEGETATED SWALE

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_

County: \_\_\_\_\_

District:     1             2             3

Route: \_\_\_\_\_

Inspection Type: Routine    Follow-up    Other ( \_\_\_\_\_ )

Milepost: \_\_\_\_\_

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Structural Components	GOOD	FAIR	POOR	
1. Forebay is structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Inlet, outlet systems have been damaged or plugged affecting functionality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Side slopes are structurally sound and functional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Rock check dams are structurally sound and functional if present	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris/Trash				
5. Forebay is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Inlet/outlet ditches pipes clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Swale is clean, free of sediment, leaves, trash and other debris	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance				
8. Unhealthy grass cover, bare areas, or dead grass cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Undesirable vegetation threatening the function or integrity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Any evidence of erosion within the swale?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Is there sediment accumulation behind the check dams? If applicable	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
12. Are structural repairs needed at this site?	Yes		No	
13. Is sediment removal needed at this site?	Yes		No	
14. Are there general maintenance needs at this site?	Yes		No	
15. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_

\_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_

**STORMWATER ASSET INSPECTION SHEET**

Structure Type: WET BASIN

*Inspector shall fill in all blanks, circle the appropriate response, and indicate if any further action is required*

Inspection Date: \_\_\_\_\_  
 County: \_\_\_\_\_  
 Route: \_\_\_\_\_  
 Milepost: \_\_\_\_\_

Inspector Name/Division: \_\_\_\_\_  
 District:     1             2             3  
 Inspection Type: Routine   Follow-up   Other ( \_\_\_\_\_ )

Rate Condition as: ■ Green: Good condition, no corrective action required  
■ Yellow: Fair condition but still functional. Follow-up based upon annual prioritization ranking  
■ Red: Poor condition, needing maintenance, repair and/or replacement  
 Blank: Photo was taken

Structural Components	GOOD	FAIR	POOR	
1. Forebay, transition berm and basin are structurally sound and functional	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Inlet, outlet systems have been damaged or plugged affecting functionality	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Embankment and Spillway are structurally sound and functional	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Evidence of water level at or near the invert of the orifice and the drawdown device/orifice is structurally sound and functional	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Debris/Trash				
5. Forebay and basin are clean, free of sediment, leaves, trash and other debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Inlet/outlet ditches pipes and trash rack are clean, free of sediment, leaves, trash and other debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
General Maintenance				
7. Unhealthy grass cover, bare areas, or dead grass cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Undesirable vegetation or algae threatening the function or integrity of the basin or permanent pool	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Any evidence of erosion, gullies, animal activity?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Is there sediment accumulation, <10% of the basin bottom?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Action Items (circle "Yes" or "No")				
11. Are structural repairs needed at this site?	Yes		No	
12. Is sediment removal needed at this site?	Yes		No	
13. Are there general maintenance needs at this site?	Yes		No	
14. Were maintenance activities conducted at the time of this inspection?	Yes		No	

If "Yes" to any of the above provide - Comments/Recommendations/Actions: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Overall Ranking (Circle One)**

Category	Description
<b>Good - Green</b>	Some aging and wear has occurred, but no structural deterioration or maintenance needs were found. Device is functioning properly.
<b>Fair - Yellow</b>	Minor to moderate structural deterioration and/or maintenance needs were found, but function of the device has not been significantly affected. Minor maintenance is necessary.
<b>Poor - Red</b>	Serious deterioration and/or major maintenance needs were found. Function of the device is inadequate and failure will occur if maintenance not performed.

Forwarded to \_\_\_\_\_ on \_\_\_\_\_