



**OPERATION AND MAINTENANCE (O&M) PLAN
FOR
PERMANENT GRASS BUFFER STORMWATER CONTROL
FACILITY**

for:

Cherokee TDS Reduction Facility

Prepared for:

El Paso County Department of Public Works, 3278 Akers Dr, Colorado Springs, CO

Prepared by:

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REFERENCES:

TOWN OF PARKER, COLORADO, STORMWATER PERMANENT BEST MANAGEMENT
PRACTICES (PBMP) LONG-TERM OPERATION AND MAINTENANCE MANUAL, OCTOBER
2004

EL PASO COUNTY DRAINAGE CRITERIA MANUAL, OCTOBER 2018

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LIST OF ABBREVIATIONS

<u>Abbreviation</u>	<u>Term/Phrase/Name</u>
CDPHE	Colorado Department of Public Health and Environment
Cherokee	Cherokee Metropolitan District
CDPS	Colorado Discharge Permit System
cfs	Cubic feet per second
CWA	Clean Water Act
EDB	Extended Detention Basin
EPA	US Environmental Protection Agency
fps	feet per second
ft	feet
GIS	Geographic Information System
GB	Grass Buffer
GS	Grass Swale
MS4	Municipal Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
O&M	Operations and Maintenance
PBMP	Permanent Best Management Practices
PLD	Porous Landscape Detention
SDECM	Storm Drainage and Environmental Criteria Manual
SOP	Standard Operation Procedure
WQCD	Water Quality Control Division of the CDPHE
WQCV	Water Quality Capture Volume

OPERATION AND MAINTENANCE (O&M) PLAN PERMANENT GRASS BUFFER STORMWATER CONTROL FACILITY

1 Introduction

This plan addresses operation and maintenance of the permanent grass buffer stormwater control facility constructed as part of the Total Dissolved Solids (TDS) Reduction Facility at the Cherokee Metropolitan District (Cherokee) Water Reclamation Facility (WRF).

1.1 Background

The State of Colorado Department of Public Health and Environment, Water Quality Control Division (CDPHE), has implemented federal regulations within the State of Colorado through permitting, and has included El Paso County as one of numerous Municipal Separate Storm Sewer Systems (MS4s) required to be permitted in compliance with National Pollutant Discharge Elimination System (NPDES) Phase 2 Regulations, as defined within Colorado's Phase 2 Municipal Guidance.

NPDES Phase 2 MS4s stormwater discharges are covered under a general permit under the Colorado Discharge Permit System (CDPS) under Regulation 61, and as a minimum require the MS4's operator (e.g., El Paso County) to develop, implement, and enforce a stormwater management program to reduce the discharge of pollutants to the maximum extent practicable to protect water quality requirements of the Colorado Water Quality Control Act, Colorado Code of Regulations [CCR] 61.8(11)(a)(i)).

1.2 General Grass Buffer Concept

Grass Buffers and Grass Swales are common types of Stormwater Management Facilities utilized within the Front Range of Colorado. Grass Buffers promote filtration, infiltration, and settling to reduce runoff volume.

Grass Buffers are uniformly graded and densely vegetated areas of turf grass. They are designed to accommodate sheet flow rather than concentrated or channelized flow. They are typically located adjacent to impervious areas such as parking lots or along highways and roads. Grass

Buffers are designed to evenly distribute runoff across the width of the buffer to achieve uniform sheet-flow conditions. A flow spreader may be incorporated for this purpose. In some cases, grass buffers may have underdrain systems.

2 Inspecting Grass Buffers

2.1 Stormwater Management Facilities Locations

Inspection and maintenance personnel may utilize the Cherokee TDS Reduction Project Final Drainage Report Appendix E and project Site Plans containing the locations of the GBs within this development.

2.2 Grass Buffer (GB) Features

GBs are unique stormwater quality facilities, in that they are typically viewed as landscaping or ground cover, and are often overlooked as water quality treatment facilities. GBs have a number of features that are designed to serve a particular function. It is important for maintenance personnel to understand the function of each of these features. Below is a list of the common features of a Grass Buffer and the corresponding maintenance inspection items that can be anticipated:

Table 1: Typical Inspection & Maintenance Requirements Matrix

	Sediment Removal	Mowing Weed Control	Trash & Debris Removal	Erosion	Removal/ Replacement	Structural Repair
Buffer Strip	X	X	X	X		
Inflows	X	X	X	X	X	X
Grade Control-Level Spreader				X		X
Irrigation system					X	

2.2.1 Grass Buffer Strips

Grass Buffers require general maintenance of the turf grass and repair of any rill or gully development. The area of grass buffer strips should be maintained with dense vegetative cover,

and should not be eroded or bare. Inspection over the first few years will help to determine if any problems are developing.

The typical maintenance items that are required within grass buffer areas are as follows:

- a) *Sediment Accumulation.* The purpose of the grass buffer is to slow down flow and allow sedimentation to occur. To prevent a loss in performance of the buffer, sediment that accumulates must be removed on a timely basis.
- b) *Vegetation Sparse.* Grass Buffers rely on a healthy, dense cover of grass to decrease the flow velocities and promote sedimentation and infiltration. Grasses that are diseased, dying or otherwise damaged should be replaced. All bare areas should be reseeded or patched. Causes which contribute to the damaged grass cover, including lack of adequate irrigation, traces of pedestrian or vehicular traffic, uncontrolled weeds etc., should be identified and remedied.
- c) *Erosion Present.* Lack of adequate vegetative cover or excessive flow velocities may result in rill or gully development, and erosion of the buffer strip. Erosion will require maintenance to prevent further damage to the area and to prevent sediment transport.
- d) *Standing Water/Boggy Areas.* Grass buffers are generally intended to drain and be dry in between rain events. If areas of standing water are present, the buffer may need to be evaluated for proper grade to ensure drainage. In some cases, where underdrains are used, the underdrains should be inspected to ensure that they are not clogged.

2.2.2 Inflow Points

Inflow points are the points of stormwater discharge into the buffer. Inflow points are typically pipe outfalls, other grass swales or buffers, or curb cuts from upstream impervious areas, such as parking lots. Some form of energy dissipation is typically provided immediately downstream of the inflow point into the grass buffer. Energy dissipation devices may include riprap aprons, or flow spreader devices.

The typical maintenance items that are required at inflow points are as follows:

- a) Riprap Displaced/Rundown Damaged. Often, because of, the repeated impact/force of water, the riprap can shift and settle. If any portion of the riprap rundown or apron appears to have settled, if soil is present between the riprap, or if the riprap has shifted, maintenance may be required to ensure future erosion is prevented.
- b) Erosion Present/Outfall Undercut. In some situations, an energy dissipater may have not been provided, or may not have been sized, constructed, or maintained appropriately and erosion has occurred. Any erosion within the vicinity of the inflow point will require maintenance to prevent damage to the structure(s) and sediment transport within the facility.
- c) Sediment Accumulation. Because of the turbulence in the water created by the energy dissipater, sediment often deposits immediately downstream of the inflow point. To prevent a loss in performance, sediment that accumulates in this area must be removed on a timely basis.

2.2.3 Underdrain System

Some grass buffers that have a flatter slope or soils which do not allow adequate percolation or are in areas with a continuous base flow may have been installed with an underdrain system. Underdrains typically consist of an aggregate layer and slotted PVC pipe. The aggregate layer allows for storage of treated stormwater runoff prior to the discharge of the runoff through the slotted PVC pipe.

With proper maintenance of the grassed areas, there should be a minimum amount of maintenance required on the underdrain system. Generally the only maintenance performed on the underdrain system is jet-vac cleaning in the event that it becomes clogged.

2.2.4 Grade Control Level Spreader

Level Spreaders are installed on the upstream of grass buffers to evenly distribute flows along the design length. Level spreaders may consist of slotted curbing, modular block porous pavement, level walls or other spreader devices.

The typical maintenance activities that are required for level spreaders are as follows:

- a) Erosion present. Level spreaders are provided to reduce the potential for erosion of the grassed buffer areas. Erosion within the vicinity of the level spreader indicates that the structure is not functioning as intended and requires maintenance to prevent future erosion and damage.
- b) Structural damage. Structural damage can occur at anytime along the life of the facility. Typically, structural damage occurs with the deterioration of concrete, including cracking, spalling or settling and the erosion and deterioration of the riprap structures. Level spreaders may settle unevenly creating low areas, which concentrate the flows.

2.2.5 Irrigation

Grass Buffers depend on healthy, dense turf grass to function, and therefore require an irrigation system, to provide a consistent water supply. Typically, the condition of the grass cover will provide evidence of the effectiveness and maintenance needs of the irrigation system.

The typical maintenance activities that are required for irrigation systems are as follows:

Irrigation systems will generally require routine periodic maintenance and adjustment to ensure that proper amounts of water are being applied given the weather conditions, and that they are providing coverage to all areas of the grass to eliminate bare spots.

2.2.6 Miscellaneous

There are a variety of inspection/maintenance issues that may not be attributed to a single feature within the GB. This category on the inspection form is for maintenance items that are commonly found in the GB, but may not be attributed to an individual feature.

- a) Encroachment in Easement Area. Property owners may place landscaping, trash, fencing, or other items within a tract or drainage easement that may affect maintenance or the operation of the facility.
- b) Public Hazards. Public hazards include items such as containers of unknown/suspicious substances, and exposed metal/jagged concrete on structures. If any hazard is found

within the facility area that poses an immediate threat to public safety, call 911 immediately.

- c) Burrowing Animals/Pests. Prairie dogs and other burrowing rodents may cause damage to the GB features and negatively affect the vegetation within the GB.
- d) Other. Any miscellaneous inspection/maintenance items not contained on the form should be entered here.

2.3 Inspection Forms

An example of a GB Inspection form is included as Attachment 1. Inspection forms shall be completed by the person(s) conducting the inspection activities. Each form shall be reviewed and submitted by the property owner or property manager to El Paso County per the requirements of the Operations and Maintenance Plan. Copies of these inspection forms shall be kept indefinitely by the property owner or manager and made available to El Paso County upon request.

3 Maintaining Grass Buffers

3.1 Maintenance Personnel

Maintenance personnel must be experienced to properly maintain GB. Inadequately trained personnel can cause additional problems resulting in additional maintenance costs.

3.2 Equipment

It is imperative that the appropriate equipment and tools are taken to the field with the operations crew. The types of equipment/tools will vary depending on the task at hand. Below is a list of tools, equipment, and material(s) that may be necessary to perform maintenance on a GB:

1. Mowing Tractors
2. Trimmers (extra string)
3. Shovels
4. Rakes
5. All Surface Vehicle (ASVs)
6. Engineers Level (laser)

7. Erosion Control Blanket(s)
8. Mulch
9. Sod or Seed
10. Illicit Discharge Cleanup Kits
11. Trash Bags
12. Stormwater Facility Operation and Maintenance Manual

Some of the items identified above may not be needed for every maintenance operation. However, this equipment should be available to the maintenance operations crews should the need arise.

3.3 Maintenance Forms

The GB Maintenance Form provides a record of each maintenance operation performed by maintenance contractors. The GB Maintenance Form shall be filled out in the field after the completion of the maintenance operation. Each form shall be reviewed and submitted by the property owner or property manager to El Paso County per the requirements of the Operations and Maintenance Plan. The GB Maintenance form is included as Attachment 2.

3.4 Maintenance Categories and Activities

A typical GB Maintenance Program will consist of three broad categories of work: Routine, Minor and Major. Within each category of work, a variety of maintenance activities can be performed on a GB. A maintenance activity can be specific to each feature within the GB, or general to the overall facility. This section of the O&M Plan explains each of the categories and briefly describes the typical maintenance activities for a GB.

A variety of maintenance activities are typical of GBs. The maintenance activities range in magnitude from routine trash pickup to the reconstruction of the GB or underdrain system. Below is a description of each maintenance activity, the objectives, and frequency of actions.

3.5 Routine Maintenance Activities

The majority of this work consists of scheduled mowing, trash and debris pickups and landscape care for the GB during the growing season. It also includes activities such as weed control. These activities normally will be performed numerous times during the year. These items

typically do not require any prior correspondence with El Paso County, however, completed inspection and maintenance forms shall be submitted to the County for each inspection and maintenance period.

The Routine Maintenance Activities are summarized below, and further described in the following sections.

Table 2: Summary of Routine Maintenance Activities

Maintenance Activity	Minimum Frequency	Indication Action is Needed	Maintenance Action
Trash/Debris Removal	Twice annual and before mowing	Trash & debris in GB	Remove and properly dispose of trash and debris
Mowing	Routine – as necessary to maintain 2”-4” grass height	Excessive grass height/aesthetics	2”-4” grass height for turf grass; 4”-6” for native grass
Irrigation (Automatic)	Three times annually	Areas of insufficient or excess watering; broken or missing parts	SPRING: start up system; test for coverage and correct timer settings SUMMER: test for even coverage and correct timer settings FALL: drain and winterize system (follow watering regulations)
Irrigation (Not automatic)	As needed to maintain healthy grass	Areas if insufficient or excess watering	Water as needed to maintain healthy grass (follow watering regulations)
Weed Control	Minimum twice annually	Noxious weeds; unwanted vegetation	Treat w/ herbicide or pull; consult a local Weed Inspector
Mosquito Treatment	As needed, based upon inspections	Standing water/mosquito habitat	Perform maintenance to eliminate standing water; Treat w/ EPA approved chemicals
Level Spreader	As needed, based upon inspections	Evidence of uneven flow/localized erosion	Look for cause; repair, fill or revegetate areas of erosion
Rodent Damage	As needed, based upon inspections	Holes, small piles of dirt, raised burrows	Evaluate damage; contact the County for guidance

3.5.1 Trash/Debris Removal

Trash and debris must be removed from the GB area to allow for proper functioning and to improve aesthetics. This activity must be performed prior to mowing operations.

Frequency: Routine – Prior to mowing operations and a minimum of twice annually.

3.5.2 Mowing

Routine mowing of the turf grass embankments is necessary to maintain an appropriate grass height and to improve the overall appearance of the GB. Turf grass should be mowed to a height of 2 to 4- inches (4–6- inches for native grass) and shall be bagged to prevent potential contamination of the filter media.

Frequency: Routine – as necessary to maintain grass height.

3.5.3 Irrigation

Irrigation systems should be maintained in proper working order to provide an adequate water supply to support the grass cover. When automatic irrigation systems are not available, alternate methods for providing a water supply during times of drought must be provided.

Automatic irrigation systems should be maintained routinely throughout the growing season to ensure that they are providing the appropriate amounts of water and are providing complete coverage of the area. Sprinkler heads should be adjusted as necessary and checked for broken or missing parts.

Frequency: Routine as needed throughout the growing season, plus the following:

 SPRING: Start up the system and test for even coverage and correct timer settings.

 SUMMER: Test for even coverage and correct timer settings.

 FALL: Drain and winterize the system.

3.5.4 Weed Control

Noxious weeds and other unwanted vegetation must be treated as needed throughout the GB. This activity can be performed either through mechanical means (mowing/pulling) or with herbicide. Consultation with El Paso County is highly recommended prior to the use of herbicide. Herbicides should be utilized sparingly and as a last resort. All herbicide applications should be in accordance with the manufacturer's recommendations.

Frequency: Routine – As needed based upon inspections.

3.5.5 Mosquito Treatment

GB facilities are intended to drain and should not have areas of standing water which creates mosquito habitat. Causes of the standing water or boggy conditions should be investigated and remediated as necessary to eliminate the standing water. Only EPA approved chemicals should be applied in accordance with the recommendations of the manufacturer.

Frequency: As needed based upon inspections.

3.5.6 Level Spreader

Evidence of uneven flow and localized erosion downstream of the level spreader indicate that the flow is not evenly distributed along the length of the spreader. Areas of erosion should be repaired, filled and revegetated. Causes for the erosion should be investigated and repaired.

Frequency: As needed based upon inspections.

3.5.7 Rodent Damage

Evidence of uneven flow and localized erosion downstream of the level spreader indicate that the flow is not evenly distributed along the length of the spreader. Areas of erosion should be repaired, filled and revegetated. Causes for the erosion should be investigated and repaired.

Frequency: As needed based upon inspections.

3.6 Minor Maintenance Activities

This work consists of a variety of isolated or small-scale maintenance/operational problems. Most of this work can be completed by a small crew, hand tools, and small equipment. These items require prior approval from El Paso County. Completed inspection and maintenance forms shall be submitted to the County for each inspection and maintenance period.

Table 3: Summary of Minor Maintenance Activities

Maintenance Activity	Minimum Frequency	Indication Action is Needed	Maintenance Action
Sediment Removal	As needed	Sediment build-up	Remove and properly dispose of sediment
Erosion Repair	As needed, based upon inspection	Rills and gullies forming on slopes and other areas	Repair eroded areas and revegetate; address cause
Vegetation Removal	As needed, based upon inspection	Trees, willows, shrubs impeding flow	Remove vegetation; restore correct grade and surface
Revegetation	As needed, based upon inspection	Areas without grass	Replace grass by sodding or seeding
Irrigation (Automatic)	As needed, based upon inspection	Evidence of broken or missing parts	Replace parts and test system
Level Spreader	As needed, based upon inspection	Evidence of uneven flow; erosion; or rills/gullies	Repair sections of level spreader and address cause
Fertilization or Soil Amendment	As needed, minimize fertilization	Grass with pale color; areas with poor grass growth not due to irrigation problems	Consult with turf specialist; test soil
Vehicle Tracks (Along Roadways)	As needed, based upon inspection	Depressions from vehicle tracks; vegetation damage	Repair and fill depressions; sod or seed damaged areas

3.6.1 Sediment Removal

Sediment removal is necessary to ensure proper function of the grass buffer. Care should be taken when removing sediment to prevent damage to the turf grass and surrounding areas.

Excessive amounts of sediment are an indication of upstream erosion or lack of adequate BMPs during construction activities. Causes for contributions of excess sediment should be investigated and addressed.

Frequency: As needed based upon inspections.

3.6.2 Erosion Repair

The repair of eroded areas is necessary to ensure the proper functioning of the GB, to minimize sediment transport, and to reduce potential impacts to other features. Erosion can vary in magnitude from minor repairs to vegetation and embankments, to rills and gullies in the embankments and inflow points. The repair of eroded areas may require the use of excavators, riprap, concrete, and sod. Extreme care should be taken when utilizing motorized or heavy equipment to ensure damage to the underdrain system does not occur. Major erosion in a GB is

generally the result of excessive velocities caused by steep slopes. It may be necessary to make design improvements to the swale or buffer when erosion becomes a major maintenance item.

Frequency: As necessary, based upon inspections.

3.6.3 Vegetation Removal

Weeds, Shrubs, Willows and other unwanted vegetation that develops in the grass buffer area may impede the flow and cause standing water or back flow problems. It is necessary to remove unwanted vegetation as soon as it appears. Remove the unwanted vegetation and restore the correct grade. Revegetate with seed or sod.

Frequency: As necessary, based upon inspections.

3.6.4 Revegetation

Bare areas should be repaired as soon as possible. Repair bare areas with grass or sod. Causes of the problem, such as inadequate water supply or diseased grasses, should be investigated and resolved.

Frequency: As necessary, based upon inspections.

3.6.5 Irrigation (Automatic)

Irrigation systems require routine maintenance in accordance with the manufacturer's recommendations (valves, timer, etc.), and maintenance of the pipe and heads to ensure that even coverage is being applied, and that there are no missing or broken parts. Timing systems should be checked to verify that the correct amount of water is being applied to the grassed areas for the seasonal conditions.

Frequency: As necessary, based upon inspections.

3.6.6 Level Spreader

Level Spreaders that are no longer level, or have developed damaged areas of cracking or spalling, allow flows to concentrate in these depressed areas instead of being distributed over the length of the structure. Also, build up of grasses along the edge of the spreader may create an

uneven flow distribution. Rills, gullies and other erosion that develops downstream of level spreaders should be repaired and reseeded or sodded. Causes of the erosion should be investigated and addressed.

Frequency: As necessary, based upon inspections.

3.6.7 Fertilization/Soil Amendment

Grass Buffers rely on healthy, dense turf in order to function properly. Grasses that appear to be diseased, dying or unhealthy may require amendments. Fertilizers should be applied in the minimum amounts recommended by the manufacturer.

Frequency: As necessary, based upon inspections.

3.6.8 Vehicle Tracks

GBs that are adjacent to roadway sections may be damaged by vehicle tracks. Rutted areas should be filled in and revegetated as soon as possible. Frequent problems associated with vehicle traffic (such as around corners) may require a barrier or sign to avoid vehicular traffic within the grassed areas.

Frequency: As necessary, based upon inspections.

3.7 Major Maintenance Activities

This work consists of larger maintenance/operational problems and failures within the stormwater management facilities. All of this work requires consultation with El Paso County to ensure the proper maintenance is performed. This work requires that the County Staff review the original design and construction drawings to assess the situation and assign the necessary maintenance. This work may also require more specialized maintenance equipment, design/details, surveying, or assistance through private contractors and consultants.

Table 4: Summary of Major Maintenance Activities

Maintenance Activity	Minimum Frequency	Indication Action is Needed:	Maintenance Action
Major Sediment/Pollutant Removal	Ass needed – based upon scheduled inspections	Large quantities of sediment	Remove and dispose of sediment. Repair vegetation as needed
Major Erosion Repair	As needed – based upon scheduled inspections	Severe erosion including gullies, excessive soil displacement, areas of settlement, holes	Repair erosion – find cause of problem and address to avoid future erosion
Structural Repair	As needed – based upon scheduled inspections	Deterioration and/or damage to structural components – level spreader, grade control structures, irrigation components, and ponding water	Structural repair to restore the structure to its original design
Grass Buffer Rebuild	As needed – due to complete failure of GB	Removal of filter media and underdrain system	Contact El Paso County

3.7.1 Major Sediment/Pollutant Removal

Major sediment removal consists of removal of large quantities of pollutants/sediment /landscaping material. Stormwater sediments removed from GBs does not meet the regulatory definition of “hazardous waste”. However, these sediments can be contaminated with a wide array of organic and inorganic pollutants and handling must be done with care to insure proper removal and disposal. Sediments should be transported by motor vehicle only after they are dewatered. All sediments must be taken to a licensed landfill for proper disposal. Should a spill occur during transportation, prompt and thorough cleanup and disposal is imperative. Vegetated areas need special care to ensure design volumes and grades are preserved or may need to be replaced due to the removal activities.

Frequency: Non-routine – Repair as needed, based upon inspections.

3.7.2 Major Erosion Repair

Major erosion repair consists of filling and revegetating areas of severe erosion. Determining the cause of the erosion as well as correcting the condition that caused the erosion should also be part of the erosion repair. Care should be given to ensure design grades and volumes are preserved.

Frequency: Non-routine – Repair as needed, based upon inspections.

3.7.3 Structural Repair

A GB generally includes a level spreader that can deteriorate or be damaged during the service life of the facility. These structures are constructed of steel and concrete that can degrade or be damaged and may need to be repaired or re-constructed from time to time. Major repairs to structures may require input from a structural engineer and specialized contractors. Consultation with El Paso County shall take place prior to all structural repairs.

Frequency: Non-routine – Repair as needed, based upon inspections.

3.7.4 GB/GS Rebuild

In very rare cases, a GB may need to be rebuilt. Generally, the need for a complete rebuild is a result of improper construction, improper maintenance resulting in structural damage to the underdrain system, or extensive contamination of the GB. Consultation with El Paso County shall take place prior to any rebuild project.

Frequency: Non-routine – As needed based upon inspections.

4 Attachments

ATTACHMENT 1

INSPECTION CHECKLIST



GRASS BUFFER-GRASS SWALE INSPECTION FORM

Date: _____
Subdivision/Business Name: _____ Inspector: _____
Subdivision/Business Address: _____
Weather: _____
Date of Last Rainfall: _____ Amount: _____ Inches

Property Classification: Residential Multi Family Commercial Other: _____
(Circle One)

Reason for Inspection: Routine Complaint After Significant Rainfall Event
(Circle One)

INSPECTION SCORING - For each facility inspection item, insert one of the following scores:

0 = No deficiencies identified

2 = Routine maintenance required

1 = Monitor (potential for future problem)

3 = Immediate repair necessary

N/A = Not applicable

FEATURES

1.) Grass Swale Bottom & Side Slopes

____ Sediment/Debris Accumulation
____ Vegetation Cover
____ Erosion Present
____ Standing Water/Boggy Areas

2.) Grass Buffer

____ Sediment/Debris Accumulation
____ Vegetation Cover
____ Erosion Present
____ Standing Water/Boggy Areas

3.) Inflow Points

____ Rip Rap Displaced/Rundown or Pipe Damage
____ Erosion Present/Outfall Undercut
____ Sediment Accumulation

4.) Underdrain System

____ Standing water/Not draining
____ Evidence of clogged system

5.) Grade Control

____ Erosion Present
____ Structural Damage

6.) Level Spreader

____ Erosion Present
____ Structural Damage
____ Uneven/Uneven Distribution of flow

7.) Irrigation

____ General Grass Condition
____ Bare Spots
____ Broken sprinkler heads

8.) Miscellaneous

____ Encroachment in Easement Area
____ Public Hazards
____ Burrowing Animals/Pests
____ Other

Inspection Summary / Additional Comments: _____

OVERALL FACILITY RATING (Circle One)

0 = No Deficiencies Identified

2 = Routine Maintenance Required

1 = Monitor (potential for future problem exists)

3 = Immediate Repair Necessary

This inspection form shall be kept a minimum of 5 years and made available to the City of Colorado Springs upon request.

ATTACHMENT 2

MAINTENANCE CHECKLIST



GRASS BUFFERS AND GRASS SWALES (GB-GS) MAINTENANCE FORM

Subdivision/Business Name: _____ Completion Date: _____

Subdivision/Business Address: _____ Contact Name: _____

Maintenance Category: Routine Restoration Rehabilitation
(Circle all that apply)

MAINTENANCE ACTIVITIES PERFORMED

ROUTINE WORK

- ___ MOWING
- ___ TRASH/DEBRIS REMOVAL
- ___ OUTLET WORKS CLEANING (TRASH RACK/WELL SCREEN)
- ___ WEED CONTROL (HERBICIDE APPLICATION)

RESTORATION WORK

- ___ SEDIMENT REMOVAL
 - ___ INFLOW POINT
 - ___ SWALE BOTTOM
 - ___ SIDE SLOPE
 - ___ BUFFER STRIP
- ___ EROSION REPAIR
 - ___ INFLOW POINT
 - ___ SWALE BOTTOM
 - ___ SIDE SLOPE
 - ___ BUFFER STRIP
 - ___ GRADE CONTROL/LEVEL SPREADER
- ___ REVEGETATION
 - ___ SWALE BOTTOM
 - ___ SIDE SLOPE
 - ___ BUFFER STRIP

REHABILITATION WORK

- ___ SEDIMENT REMOVAL (DREDGING)
 - ___ SWALE BOTTOM
 - ___ INFLOW POINT
- ___ EROSION REPAIR
 - ___ INFLOW POINT
 - ___ SWALE BOTTOM
 - ___ SIDE SLOPE
 - ___ BUFFER STRIP
- ___ STRUCTURAL REPAIR
 - ___ INFLOW
 - ___ UNDERDRAIN
 - ___ LEVEL SPREADER

OTHER _____

ESTIMATED TOTAL MANHOURS: _____

COSTS INCURRED (include description of costs): _____

EQUIPMENT/MATERIAL USED (include hours of equipment usage and quantity of material used):

COMMENTS/ADDITIONAL INFO:

ATTACHMENT 3

ANNUAL INSPECTION AND MAINTENANCE REPORTING FORM

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Appendix E: Annual Inspection and Maintenance Submittal Form



Annual Inspection and Maintenance Reporting Form for Stormwater BMPs

(This form to be submitted to City of Colorado Springs prior to May 31 of each year)

Date: _____

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To: City of Colorado Springs/Stormwater Team
Attn: Ensure Operations and Maintenance Program Inspector
PO Box 1575, MC 520
Colorado Springs, CO 80901-1575

Re: Certification of Inspection and Maintenance; Submittal of forms

Property/Subdivision Name: _____

Property Address: _____

Contact Name: _____

Contact Phone #: _____

Contact Email Address: _____

I verify that the required stormwater facility inspections and required maintenance have been completed in accordance with the Stormwater BMP Maintenance Agreement and the Inspection and Maintenance Manual associated with the above referenced property.

The required Stormwater Facility Inspection and Maintenance forms are attached to this form.

Name of Party Responsible for Inspection
& Maintenance

Property Owner

Authorized Signature

Signature