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Stormwater Management Operations and Maintenance Manual

August 2023 – Revised February 2025

Jernee Mill Industrial

Block 58, Lots 2.01 & 9
Borough of Sayreville, Middlesex County, New Jersey

Prepared for:

CP MD Jernee Mill Road Urban Renewal, LLC
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Morristown, NJ 07960

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Colliers Engineering & Design

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Introduction

The purpose of this manual is to provide an operation and maintenance plan for the stormwater management facilities proposed as part of the most current set of site plans prepared by Colliers Engineering & Design entitled "Preliminary and Final Major Site Plan for Jernee Mill Industrial, Block 58, Lots 2.01 & 9, Borough of Sayreville, Middlesex County, New Jersey". This manual is prepared in accordance with the maintenance requirements of N.J.A.C 7:8-5.8, and with guidance from the New Jersey Stormwater Best Management Practices Manual and the NJDEP Stormwater Management Facilities Maintenance Manual.

Project Description

This operations and maintenance manual is being submitted as part of the development application known as "Preliminary and Final Major Site Plan for Jernee Mill Industrial, Block 58, Lots 2.01 & 9, Borough of Sayreville, Middlesex County, New Jersey", located on Block 58, Lots 2.01 & 9 as shown on the Borough of Sayreville Tax Map.

The project site is located along the west side of Jernee Mill Road (Middlesex County Route 675), opposite Red Oak Lane. The site is bound by Jernee Mill Road to the east and the South River to the west. Pond Creek is located along the northern property line and Duck Creek flows along the southern property lines, both of which flow into the South River. Portions of the site are within the flood hazard areas of the South River and tributaries. The central portion of the site contains a closed Superfund Site landfill. See the Appendix for maps of the subject site.

The proposed redevelopment will consist of a cold storage warehouse building with assembled trailer storage area and associated site improvements. Associated site improvements include proposed driveways, stormwater management facilities, utilities, lighting and landscaping.

Proposed Stormwater Management Facilities

Management of stormwater runoff for quantity, quality, and groundwater recharge will be provided by small-scale bioretention basins with underdrains, porous asphalt pavement with underdrains, and a detention basin.

Project Contracts

All onsite stormwater management facility construction shall be undertaken by an experienced, qualified, and licensed contractor in accordance with the latest set of "Preliminary and Final Major Site Plan for Jernee Mill Industrial, Block 58, Lots 2.01 & 9, Borough of Sayreville, Middlesex County, New Jersey" prepared by Colliers Engineering & Design.

Part II: Operation and Maintenance

General Information

This manual is intended as a guide for CP MD Jernee Mill Road Urban Renewal, LLC and outlines the proper procedure for conducting operations and maintenance for the stormwater management facilities described above. The operations and maintenance plan set forth in this manual is primarily based on the inspection and preventative maintenance of the stormwater management facilities to prevent the need for corrective action.

Responsible Party

The party responsible for the maintenance and repair of the stormwater management facilities onsite is:

CP MD Jernee Mill Road Urban Renewal, LLC
32 Mount Kemble Avenue
Morristown, NJ 07960
Attn: Mark Baumann
Phone: 484-788-1126

Pursuant to N.J.A.C. 7:8-5.8, the responsible party shall

a. Ensure this maintenance plan and any future revisions to the plan are recorded upon the deed of record for Block 58, Lots 2.01 and 9. If there is a change in ownership, copies of the maintenance plan shall be provided to the future owner and operator of the stormwater management collection system.
b. Perform preventative and corrective maintenance on the stormwater management facilities proposed within the most current set of site plans prepared by Colliers Engineering & Design entitled "Preliminary and Final Major Site Plan for Jernee Mill Industrial, Block 58, Lots 2.01 & 9, Borough of Sayreville, Middlesex County, New Jersey."
c. Maintain a detailed and continuous log of all preventative and corrective maintenance for the structural stormwater management measures incorporated into the most current set of site plans prepared by Colliers Engineering & Design entitled "Preliminary and Final Major Site Plan for Jernee Mill Industrial, Block 58, Lots 2.01 & 9, Borough of Sayreville, Middlesex County, New Jersey", including a record of all inspections and copies of all maintenance-related work orders.
d. Evaluate the effectiveness of this maintenance plan at least once per year and adjust the plan and the deed as needed.
e. Retain and make available to any public entity with administrative, health, environmental, or safety authority over the site the following:

    i. This maintenance plan and any revisions thereof
    ii. Maintenance and inspection logs and records
    iii. Maintenance-related work orders

The responsible party may contract with qualified outside contractors and inspectors to perform the operations and maintenance tasks described in this manual. All contracted parties shall receive and review a copy of the most current revision of this manual. This will aid in transferring knowledge of the stormwater management facilities on site to the contracted party and also allow for consistent maintenance work and inspection reports to be completed. The following section provides a location for the responsible party to document various contracted parties.

Designated Inspectors List

This section must be updated periodically to reflect the name(s) and telephone number(s) of the Inspectors and Contractors who are appointed by Responsible Party to perform inspections and maintenance work on the stormwater management facilities.

Inspectors	Telephone Number

Designated Contractor

Professional Engineer

Colliers Engineering & Design
101 Crawfords Corner Road, Suite 3400
Holmdel, NJ 07733
(732) 383-1950

Officers

Description of System

The stormwater management system consists of small-scale bioretention basins with underdrains, porous asphalt pavement with underdrains, and a detention basin. A stormwater collection system conveys runoff from onsite areas to the proposed BMPs and from the proposed BMPs to the four (4) points of discharge. The stormwater management facilities are described in greater detail below.

Small-Scale Bioretention Basins

The proposed small-scale bioretention basins include an eighteen-inch-deep bioretention soil media bed (24-inch for Basin 2) and terrestrial forested community plantings. The basins are designed with underdrains to limit the potential for infiltration into the subsoil. Concrete outlet control structures, which include orifices and/or weirs, are provided to regulate flow from the basins. The basins are designed to fully drain in less than 72 hours.

Detention Basin

The proposed detention basins are designed as perforated HDPE pipe systems with six inches of clean stone around all sides, wrapped with an impermeable liner around the entire system to avoid infiltration into the subsoil. The basin and concrete outlet control structure, which includes orifices and/or weirs, are designed to regulate flow from the basins. The basin is designed to fully drain in less than 72 hours.

Maintenance Procedures and Schedules

There are three categories of maintenance: preventative maintenance, corrective maintenance and aesthetic maintenance. Emphasis should be placed on adequately performing preventative and aesthetic maintenance to prevent the need for corrective maintenance procedures. Below is a specific maintenance schedule and procedures applicable to small-scale bioretention basins with underdrains, porous asphalt pavement with underdrains, and detention basins. Debris, trash, sediment, and other waste material collected during any type of maintenance procedure shall be disposed of at approved disposal/ recycling sites in compliance with all applicable local, state and federal waste regulations.

Small-Scale Bioretention Basins

The proposed bioretention systems consist of a soil bed planted with vegetation and include underdrains. Pollutants are treated through the processes of settling, plus uptake and filtration by the vegetation. Pollutants are also treated within the soil bed through infiltration.

A bioretention system is a type of dry basin. Dry basins must fully drain within 72 hours of the most recent rainfall. Standing water in excess of 72 hours is a sign of basin failure. It may also contribute to mosquito breeding and other health and safety issues. The design drain time shall be closely monitored to ensure potential failure is recognized early. The following table provides a maintenance schedule for bioretention basins.

Small-Scale Surface Bioretention Basin Maintenance Schedule	
Frequency	**Action**
Monthly	Mowing perimeter grass during the growing season.
Unscheduled	Sediment removal shall take place as necessary when all runoff has drained, and the basin is dry.
	Mowing / trimming of vegetation based on specific site conditions. Vegetation within the bioretention system must be carefully maintained with lightweight equipment, such as a hand-held line trimmer, in order to maintain the permeability of the system.
	Corrective maintenance if the vegetated cover is below 85%. Damage in excess of 50% must be addressed through replanting in accordance with the original specifications.
	Remove unwanted growth as necessary with minimum disruption to the remaining vegetation.
	Corrective maintenance if the basin fails to drain within 72 hours.
	Corrective maintenance as necessary, which may include, but is not limited to, the general corrective maintenance procedures listed below.

Detention Basins

The proposed detention basins consists of two subsurface pipe systems interconnected. Pollutants are treated through leaf screens, the processes of settling, plus uptake and filtration by the grassed vegetation.

A detention system is a type of dry basin. Dry basins must fully drain within 72 hours of the most recent rainfall. Standing water in excess of 72 hours is a sign of basin failure. It may also contribute to mosquito breeding and other health and safety issues. The design drain time shall be closely monitored to ensure potential failure is recognized early. The following table provides a maintenance schedule for detention basins.

Detention Basin Maintenance Schedule	
Frequency	**Action**
Monthly	Mowing perimeter grass during the growing season.
Unscheduled	Sediment removal shall take place as necessary when all runoff has drained, and the basin is dry.
	Mowing / trimming of vegetation based on specific site conditions. Vegetation within the detention basin must be carefully maintained with lightweight equipment, such as a

	hand-held line trimmer, in order to maintain the permeability of the system.
	Corrective maintenance if the vegetated cover is below 85%. Damage in excess of 50% must be addressed through replanting in accordance with the original specifications.
	Remove unwanted growth as necessary with minimum disruption to the remaining vegetation.
	Corrective maintenance if the basin fails to drain within 72 hours.
	Corrective maintenance as necessary, which may include, but is not limited to, the general corrective maintenance procedures listed below.

General

In addition to the above, general preventative, corrective, and aesthetic stormwater management facility maintenance procedures are described below. A schedule for each procedure is provided in parenthesis after its description.

1. Preventative Maintenance: Preventative maintenance includes tasks that help stormwater management facilities function effectively and safely. The life of stormwater facilities can be increased, and the potential for damage to the facilities reduced, with proper preventative maintenance. Preventative maintenance includes the following:

    a. Grass outside of bioretention and/or detention systems shall be trimmed and mowed to help maintain a tightly knit turf and help prevent diseases, pests and the intrusion of weeds. Grass shall not be allowed to grow more than 1 to 2 inches between cuttings as this may damage the grasses growing points and limit its continued healthy growth. (Weekly between the months of March and November or as needed to keep grass growth below 1 to 2 inches between cuttings). **NOTE:** Grass inside of bioretention and/or detention systems shall be maintained per the specific standards indicated in this manual for bioretention and/or detention basin maintenance.

    b. Damaged areas of grass cover shall be re-seeded and re-established to prevent the erosion of underlying soil and the potential for the underlying soil to enter the components of the stormwater management facilities. (Unscheduled – perform as needed).

    c. Trees, shrubs and ground cover surrounding all stormwater management facilities, including but not limited to basin and inlets, shall be pruned and fertilized. Pest control measures shall also be implemented in these areas. (Annually).

    d. Trash and debris which collect within the stormwater management facilities, including but not limited to at inlets, orifices of outlet control structures, and within basin, shall be

removed and disposed. Removal of trash and debris will help prevent damage to vegetated areas and eliminate potential mosquito breeding habitats. (Weekly).

e. Accumulated sediment within inlets and detention systems shall be removed before such accumulation threatens the operation of the system. Removal of sediments will also decrease the potential for areas of ponding water and thus aid in the elimination of mosquito breeding habitats. (Unscheduled – perform as needed).

2. Corrective Maintenance Procedures: Corrective maintenance procedures can be required on an emergency or non-routine basis and are used to correct any problems or malfunctions of the facilities and to restore the system back to its intended operation. Corrective maintenance includes both minor and major procedures to ensure the functioning of the systems. Corrective maintenance procedures include the following:

   a. Sediment, debris, and trash within the stormwater management facilities, including but not limited to inlets, pipes, and basin, shall be removed if the volume and/or discharge capacity of the system becomes compromised. Sediment removal shall be performed when the facility is totally dry. (Unscheduled – perform as needed).

   b. Structural damage to inlets, manholes, outlet control structures, the pipe conveyance system, and other structural components shall be repaired immediately. The damage to these systems dictates the immediacy of necessary repairs to ensure the continued function of the entire system. (Unscheduled – perform as needed).

   c. Should the outlet controls of the system become affected, any ponded water shall be removed. The system shall be repaired and restored to its original designed condition. Portable pumps may be necessary to remove the ponded water temporarily until the system can be repaired. (Unscheduled – perform as needed).

   d. Damage to the basin embankments, and side slopes shall be repaired promptly. Damage can occur from rain or flood events, vandalism, animals, vehicles, or neglect and include problems such as settlement, scouring, seepage and rutting. (Unscheduled – perform as needed).

   e. Unwanted trees and brush with extensive, woody root systems shall be completely removed from basin embankments to prevent the destabilization of the vegetation and the creation of seepage routes. Roots shall be removed completely to prevent their decomposition within the embankment. Voids and burrows shall be plugged by filling with a material similar to the existing material and capped just below grade with stone, concrete, or other material. (Unscheduled – perform as needed).

   f. Evidence of excessive algae growth, siltation, and/or mosquito breeding shall necessitate the implementation of corrective measures to eliminate such problems. Qualified personnel such as the local Mosquito Extermination Commission shall accomplish extermination of mosquitoes immediately. If mosquito control cannot be handled through preventative measures alone, the maintenance program shall be re-evaluated to place more emphasis on the control of mosquito breeding habitats. (Unscheduled – perform as needed).

g. Where a re-seeding preventative maintenance program has not been effective in maintaining a non-erosive vegetative cover, other measures shall be initiated to prevent further loss of soil and any subsequent danger to the stability of the facility. Alternative methods and materials to control erosion include riprap, gabion lining, sod, seeding, concrete lining and re-grading. (Unscheduled – perform as needed).

h. Snow and ice accumulation can threaten the functioning of the entire system. Snow and ice shall be removed from critical areas to assure the continued functioning of the facility during winter months. (Unscheduled – perform as needed after every snow, sleet, or ice accumulation event).

3. Aesthetic Maintenance Procedures: Aesthetic maintenance procedures include the upkeep of the stormwater management facilities and their onsite surroundings to ensure the site is appealing to its user and the surrounding areas. Some of these procedures have the potential to complement or even reduce preventative and corrective maintenance. Aesthetic maintenance procedures include the following:

   a. Graffiti should be covered or removed in a timely manner to restore the aesthetic quality of the facilities as well as discourage subsequent vandalism. (Unscheduled – perform as needed).
   b. The trimming of grass edges around structures and fences can provide a neat and attractive appearance of the facilities. (Weekly between the months of March and November or as needed to keep grass growth below 1 to 2 inches between cuttings).
   c. Chemical or mechanical weeding can help prove aesthetic appeal as well as maintain healthy vegetated areas. (Annually between the months of March and November).

The maintenance work order and checklist included in Appendix A shall be copied and completed for the required items every time a maintenance procedure is performed. A copy of the maintenance log included in Appendix B shall be kept available and used to record the date and scope of all maintenance procedures. The aforementioned checklist and log are generic in nature and should only be completed for those items that are necessary for the maintenance of the onsite facilities.

Inspection Procedures and Schedules

Inspections conducted in accordance with this manual are either informal or regularly scheduled. Informal inspections shall occur during preventative and/or aesthetic maintenance procedures and after rainfall events of 1-inch or more. Informal inspections shall include the following tasks:

a. Inspect inlets for soil, debris and trash accumulation.

b. Inspect inlets for damage to curb and grates.

c. Inspect pavement for signs of settling (depressions) and ponding.

d. Inspect for standing water in the basin(s) while noting the approximate time from the beginning of the last storm event.

Regularly scheduled inspections shall occur as required by the primary stormwater management facilities described in the Description of System section of this manual. The regularly scheduled inspection requirements for the primary stormwater management facilities on site are shown below.

Bioretention Basin

Small-Scale Surface Bioretention Basin Inspection Schedule	
Frequency	**Action**
Biweekly	Inspection of vegetation (only when establishing / restoring vegetation)
Quarterly	Inspection of components expected to receive and/or trap debris and sediment.
Biannually	Inspection of the planting bed to determine if the permeability has decreased.
	Inspection of vegetation health, density, and diversity (once during the growing season and once during the non-growing season)
Annually	Inspection of structural components for cracking, subsidence, spalling, erosion, and deterioration.
	Inspection of vegetated areas for erosion, scour and unwanted growth.
Unscheduled	Inspection of components expected to receive and/or trap debris and sediment after every storm exceeding 1 inch of rainfall.
	Evaluation of the basin components when the actual drain time is longer than the design drain time.

Detention Basin

Detention Basin Inspection Schedule	
Frequency	**Action**
Biweekly	Inspection of vegetation (only when establishing / restoring vegetation)
Quarterly	Inspection of components expected to receive and/or trap debris and sediment.
Biannually	Inspection of vegetation health, density, and diversity (once during the growing season and once during the non-growing season)

Annually	Inspection of structural components for cracking, subsidence, spalling, erosion, and deterioration.
	Inspection of vegetated areas for erosion, scour and unwanted growth.
Unscheduled	Inspection of components expected to receive and/or trap debris and sediment after every storm exceeding 1 inch of rainfall.
	Evaluation of the basin components when the actual drain time is longer than the design drain time.

Each spring, after the last snow or ice event, the infiltration rate of the surface course must be tested in accordance with the methods of either ASTM C1701 or C1781, as corresponds to the post-construction test performed for the system. At least 3 locations must be tested. One of the locations must be in an area where sediment is most likely to be deposited, such as, but not limited to, a parking lot entrance. The other test locations must be evenly spaced across the system surface. The locations and results obtained must be recorded in the maintenance plan for future reference and compared to the as-built testing results as a metric for determining if a system requires corrective action. The chart provided below shows the approximate infiltration rate based upon the time it takes to infiltrate either 8 or 40 pounds of water specified in the above-cited tests. This chart should be included in the maintenance plan for future reference. The infiltration rate, I, is based upon the following calculation:

$I = (KK * MM)/ (DD2 * tt)$,

where K = 126,870 in-lbs

M = water mass, lbs

DD = ring diameter = 12 inches

tt = time, in seconds

Test Methods Per ASTM C1701 or C1781		
Time to Infiltrate the Specified Amount of Water (seconds)	Approximate Surface Infiltration Rate (inches per hour)	
	M = 8 lbs	M = 40 lbs
30	235	1175
60	118	587
100	70.5	352
200	35.2	176
350	20.1	100.7
360	19.6	97.9
380	18.5	92.7
900	7.8	39.2
1760	4.0	20.0
1910	3.7	18.5
3600	2.0	9.8
5400	1.3	6.5
5470	1.3	6.4
6000	1.2	5.9

General

In addition to the preceding inspection and maintenance tasks associated with the primary stormwater management facilities, regularly scheduled inspections shall include the following:

a. All informal inspection tasks.

b. Inspect manholes, inlets, basin, and outlet control structures for sediment, debris, and garbage.

c. Inspect pipes for clogging.

The inspection checklist included in Appendix C shall be copied and completed for the required items every time an inspection is performed. A copy of the inspection log, included in Appendix D, shall be kept available and used to record the date, type, and results of each inspection conducted. If a given inspection reveals the need for maintenance operations, the inspector shall notify the responsible party immediately. Maintenance operations shall then be directed as necessary and completed as soon as possible thereafter.

Maintenance Tools and Equipment

The following is a list of required inspection equipment for routine operation and maintenance procedures and inspections.

a. A clipboard, a pencil and the inspection checklist - the inspection checklist is included in Appendix C.
b. A standard 6-foot collapsible ruler - measurements of cracks in concrete, sediment thickness, etc. can provide important data needed to make maintenance decisions.
c. A camera - photographs of observed portions of the facilities will provide a measure of performance when comparing past and present maintenance practices or conditions.
d. A flashlight - a flashlight can be used to observe the inside of the inlets onsite.

The following is a list of tools and machinery typically required to maintain a Stormwater Management facility.

Grass Maintenance Equipment	
Tractor Mounted Mowers	Fertilizer Spreaders
Riding Mowers	De-thatching Equipment
Hand Mowers	Pesticide & Herbicide Application Equipment
Gas Powered Trimmers	Grass Clipping & Leaf Collection Equipment
Gas Powered Edgers	Seed Spreaders

Vegetative Cover Maintenance Equipment	
Saws	Hedge Trimmers
Pruning Shears	Wood Clippers

Transportation Equipment
Trucks for Transportation of Materials
Trucks for Transportation of Equipment
Vehicles for Transportation of Personnel

Debris Trash & Sediment Removal Equipment	
Loader	Grader
Backhoe	

Miscellaneous Equipment	
Shovels	Tools for maintenance of equipment
Rakes	Office Space
Picks	Office Equipment
Painting Equipment	Telephones
Gloves	Safety Equipment
Standard Mechanic Tools	Tools for Concrete Work (mixers, forms, etc.)

Materials	
Topsoil	Mulch
File	Paint
Seed	Paint Removers
Soil Amenities (fertilizer, lime, etc.)	Spare Parts for Equipment
Chemicals	Oil and Grease for Equipment
	Concrete

Maintenance Costs

In order to properly implement a stormwater management facilities maintenance plan, the costs associated with the maintenance procedures must be budgeted into the overall cost of the facilities. Appendix E provides costs associated with equipment commonly required to maintain stormwater management facilities. In addition, the cost of the labor, in man-hours, is provided to budget the amount of time necessary to implement the maintenance procedures.

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Appendix A

SWM Maintenance Work Order and Checklist

Maintenance Work Order and Checklist
for
Stormwater Management Facilities

Name of Facility: _____

Location: _____ Date of Work Order: _____

Crew: _____ Work Started: date _____ time _____

Equipment: _____ Work Completed: date _____ time _____

Weather: _____ Total Manhours of Work: _____

Instructions: The original of this form should be kept unmarked, and in the O&M Manual at all times. Following each inspection, a copy of this form should be made and kept with the corresponding inspection checklist. The purpose of this form is to identify the maintenance items required based on the inspection.

The inspector should complete the general information above, including the facility name, location and the date of the work order. Next, the inspector should identify which items below require maintenance using a check mark in the appropriate box. Details should be given as to the location of the item(s) requiring maintenance. Upon completion the inspector shall submit the inspection checklist and maintenance work order to the property owner, or responsible party as designated in Part II, Section B of the O&M Manual.

The contractor responsible for adressing the maintemance requirements, as determined by the inspector, should complete the maintenance info above at the time maintenance is performed. Additionally, as the specific tasks are completed, the contractor should mark the appropriate box below identifying their completion, and sign the last sheet verifying that all items have been addressed.

A. Preventative Maintenance

Work Item	**Items Required (√)**	**Items Done (√)**	Comments and Special Instructions
1. Grass Cutting			
A. Bottoms			
B. Embankments and Side Slopes			
C. Perimeter Areas			
D. Other:			
2. Grass Maintenance			
A. Fertilizing			
B. Re-Seeding			
C. De-Thatching			
D. Pest Control			
E. Other:			
3. Vegetative Cover			
A. Fertilizing			
B. Pruning			
C. Pest Control			
D. Other:			

SWM Maintenance List

Work Item	Items Required (√)	Items Done (√)	Comments and Special Instructions
4. Trash and Debris Removal			
A. Bottoms			
B. Embankments and Side Slopes			
C. Perimeter Areas			
D. Inlets			
E. Outlets and Trash Racks			
F. Other:			
5. Sediment Removal			
A. Inlets			
B. Outlets and Trash Racks			
C. Bottoms			
D. Other:			
6. Elimination of Petential Mosquito Breeding Habitats			
A. Mosquito Habitats			
7. Basin Maintenance			
A. Debris and Trash Removal			
B. Weed Removal			
C. Other:			

B. Corrective Maintenance

1. Removal of Debris & Sediment			
2. Structural Repairs			
3. Dam, Embankment & Slope Repairs			
4. Dewatering			
5. Basin Maintenance			
6. Control of Mosquitoes			
7. Erosion Repair			

Work Item	Items Required (√)	Items Done (√)	Comments and Special Instructions
9. Elimination of Trees, Brush, Roots & Animal Burrows			
10. Snow & Ice Removal			
11. Other			

C. Aesthetic Maintenance

1. Graffiti Removal			
2. Grass Trimming			
3. Weeding			
4. Other			

SWM Maintenance List

Work Item	**Items Required (√)**	**Items Done (√)**	Comments and Special Instructions

Remarks (Refer to Item No. , If Applicable):

Work Order Prepared By: _____

Work Completed By: _____

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Appendix B

SWM Maintenance Log

Maintenance Log
for
Stormwater Management Facilities

Name of Facility: _____ Log Year: 20____

Location: _____

Instructions: The original of this form should be kept unmarked, and in the O&M Manual at all times. Each calendar year a copy of this form should be made and kept with the corresponding "Inspection Log" in a separate binder to be completed by the personel performing the inspections.

Begin by entering the date that any maintenance is performed in accordance with a maintenance work order created after an inspection, in the first available "Date" box below. Following the completion of the item(s) required on the maintenance work order and checklist, the inspector should verify completion of those items by placing a check mark in the corresponding box below.

Date:										

A. Preventative Maintenance

1. Grass Cutting	(√) Completed									
A. Bottoms										
B. Embankments and Side Slopes										
C. Perimeter Areas										
D. Other:										

2. Grass Maintenance										
A. Fertilizing										
B. Re-Seeding										
C. De-Thatching										
D. Pest Control										
E. Other:										

3. Vegetative Cover										
A. Fertilizing										
B. Pruning										
C. Pest Control										
D. Other:										

4. Trash and Debris Removal										
A. Bottoms										

B. Embankments and Side Slopes										
C. Perimeter										
D. Inlets										
E. Outlets and Trash Racks										
F. Other:										

5. Sediment Removal

A. Inlets										
B. Outlets and Trash Racks										
C. Bottoms										
D. Other:										

6. Elimination of Petential Mosquito Breeding Habitats

A. Mosquito Habitats										

7. Basin Maintenance

A. Aeration Equipment										
B. Debris and Trash Removal										
C. Weed Removal										
D. Other:										

B. Corrective Maintenance

1. Removal of Debris and Sediment										
2. Structural Repairs										
3. Dam, Embankment & Slope Repairs										
4. Dewatering										
5. Basin Maintenance										
6. Control of Mosquitoes										
7. Erosion Repair										
8. Fence Repair										
9. Elimination of Trees, Brush, Roots & Animal Burrows										

10. Snow & Ice Removal										
11. Other										

C. Aesthetic Maintenance

1. Graffiti Removal										
2. Grass Trimming										
3. Weeding										
4. Other:										

Remarks (Refer to Item No. , If Applicable):

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Appendix C

SWM Inspection Checklist

Inspection Checklist
For
Stormwater Management Facilities

Name of Facility:_____
Location:_____ Date:_____

Weather:_____

Facility Item	OK[1]	Routine[2]	Urgent[3]	Comments[4]
1. Inlet Structures				
A. Conditional Structure				
B. Erosion				
C. Trash and Debris				
D. Sediment				
E. Aesthetics				
F. Other				
2. Outlet Structures				
A. Condition of Structure				
B. Erosion				
C. Trash and Debris				
D. Sediment				
E. Mechanical Components				
F. Aesthetics				
G. Standing Water After 72 Hours				
H. Other				
3. Site Perimeter				
A. Vegetation				
B. Erosion				
C. Trash and Debris				
D. Fences and Gates				
E. Aesthetics				
F. Other				
3. Access Roads/Parking Facilities				
A. Vegetation				
B. Road Surface				
C. Fences and Gates				
D. Erosion				
E. Aesthetics				
F. Other				
4. Miscellaneous				
A. Effectiveness of Exist.Maint.Program				
B. Mosquitoes				
C.				

1 The item checked is in good condition and the maintenance program is adequate.
2 The item checked requires attention, but does not present an immediate threat to the facility or other facility components.
3 The item checked requires immediate attention to keep the facility operational or to prevent damage to other facility components.
4 Provide explanation and details if columns 2 or 3 are checked.

Remarks (Refer to Item No. If Applicable):

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Appendix D

SWM Inspection Log

Inspection Log
For
Stormwater Management Facilities

Name of Facility:_____
Location:_____ Date:_____

Weather:_____

Facility Item	OK[1]	Routine[2]	Urgent[3]	Comments[4]
1. Inlet Structures				
A. Conditional Structure				
B. Erosion				
C. Trash and Debris				
D. Sediment				
E. Aesthetics				
F. Other				
2. Outlet Structures				
A. Condition of Structure				
B. Erosion				
C. Trash and Debris				
D. Sediment				
E. Mechanical Components				
F. Aesthetics				
G. Standing Water After 72 Hours				
H. Other				
3. Site Perimeter				
A. Vegetation				
B. Erosion				
C. Trash and Debris				
D. Fences and Gates				
E. Aesthetics				
F. Other				
3. Access Roads/Parking Facilities				
A. Vegetation				
B. Road Surface				
C. Fences and Gates				
D. Erosion				
E. Aesthetics				
F. Other				
4. Miscellaneous				
A. Effectiveness of Exist.Maint.Program				
B. Mosquitoes				
C.				

1 The item checked is in good condition and the maintenance program is adequate.
2 The item checked requires attention, but does not present an immediate threat to the facility or other facility components.
3 The item checked requires immediate attention to keep the facility operational or to prevent damage to other facility components.
4 Provide explanation and details if columns 2 or 3 are checked.

Remarks (Refer to Item No. If Applicable):

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Appendix E

Maintenance Costs

Cost Data SWMF Maintenance Equipment and Material Costs		
Grass Maintenance Equipment		
	Purchase	**Rent (Per Day)**
Hand Mower	$300-$500	$25-$40
Riding Mower	$3,000-$5,000	$75-$100
Tractor Mower	$15,000-$20,000	$100-$300
Trimmer/ Edger	$200-$500	$25-$35
Spreader	$100-$200	$20-$30
Chemical Sprayer	$200-$500	$25-$40

Vegetative Cover Maintenance Equipment		
	Purchase	**Rent (Per Day)**
Hand Saw	$15	$5
Chain Saw	$300-$500	$15-$35
Pruning Shears	$25	$5
Shrub Trimmer	$200	$25-$35
Brush Chipper	$1,000-$5,000	$50-$150

Transportation Equipment			
	Purchase	**Lease (per month)**	**Rent (Per Day)**
Van	$10,000-$15,000	$400	$50-$70
Pickup Truck	$10,000-$15,000	$400	$50-$70
Dump Truck	$30,000-$50,000	$1,200	$75-$150
Light Duty Trailer	$3,000-$5,000	$150	$30-$50
Heavy Duty Trailer	$10,000-$20,000	$500	$100-$200

Debris, Trash and Sediment Removal Equipment			
	Purchase	**Lease (per month)**	**Rent (Per Day)**
Front End Loader	$50,000-$100,000	$1,500-$2,000	$200-$400
Backhoe	$30,000-$50,000	$1,200	$150-$300
Excavator	$100,000+	$2,000+	$400-$1,000
Vacuum Truck	$100,000+	$2,000+	$400-$1,000

Miscellaneous Equipment		
	Purchase	**Rent (Per Day)**
Shovel	$15	$5
Leaf Rake	$15	$5
Soil Rake	$15	$5
Pick	$15	$5
Wheelbarrow	$100-$200	$10
Gloves	$5	N/A
Portable Compressor	$500-$1,000	$50-$100
Portable Generator	$500-$1,000	$50-$100
Concrete Mixer	$500-$1,000	$25-$50
Welding Equipment	$500-$1,500	$35-$70

Materials	
	Purchase
Topsoil	$35/Cubic Yard
Fill Soil	$15/Cubic Yard
Grass Seed	$5/Pound
Soil Amenities (Fertilizer, Lime, etc.)	$0.05/sq.ft.
Chemicals (Pesticides, Herbicides, etc.)	$10/gallon
Mulch	$25/Cubic Yard
Paint	$20/gallon
Paint Remover	$10/gallon
Machine/Motor Lubricants	$5/gallon
Dry Mortar Mix	$4/50 pound bag
Concrete Delivered to Site	$60-$100/Cubic Yard

Notes:

1. Estimated equipment costs are based upon Industrial/Commercial grade equipment

2. The cost estimates presented above are intended for general planning and comparison purposes. See text for information regarding the basis of the cost estimates, instructions regarding their recommended use, and procedures for developing more specific cost estimates where necessary.

3. See CHAPTER FOUR - MAINTENANCE EQUIPMENT AND PROCEDURES for additional information on SWMF maintenance equipment and materials.

Cost Data Costs of SWMF Maintenance Tasks		
Preventative Maintenance Tasks (Values expressed in Man-Hours)		
	Small Facility	**Large Facility**
Grass Cutting	1	1-2
Grass Maintenance	0.5	1
Trash & Debris Removal	0.5	1
Sediment Removal	4	8
Mobilization	1	1
Inspection & Reporting	1	2

Corrective Maintenance Tasks (Values expressed in Man-Hours)		
	Small Facility	**Large Facility**
Trash & Debris Removal	4	8
Structural Repairs	24	40
Dewatering	4	80
Mosquito Extermination	1	2-4
Erosion Repair	4	8
Fence Repair	2-4	4-8
Snow & Ice Removal	1	2
Mobilization	2	2

Aesthetic Maintenance Tasks (Values expressed in Man-Hours)		
	Small Facility	**Large Facility**
Grass Trimming	0.5	2
Weed Control	0.5	2
Landscape Maintenance	1-2	2-4
Graffiti Removal	2-4	4-8

Notes:

1. Facility Size Definitions:

   Small Facility: Total SWMF Site Area ¼ Acre
   Large Facility: Total SWMF Site Area 1 Acre

Appropriate adjustments to the cost estimates presented above should be made as necessary to account for actual SWMF size. See text for further information.

2. Cost estimates are presented in terms of man-hours. These values should be used in conjunction with applicable personnel rates to determine labor costs for a specific program or facility.

3. The cost estimates presented above are intended for general planning and comparison purposes. See text for information regarding the basis of the cost estimates, instructions regarding their recommended use, and procedures for developing more specific cost estimates where necessary.

4. See CHAPTER FOUR - MAINTENANCE EQUIPMENT AND PROCEDURES for detailed information regarding SWMF maintenance tasks listed above.

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