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GUIDE FOR PROPER OPERATION AND MAINTENANCE

Of Stormwater Management Infrastructure

November 2023

I. INTRODUCTION

This manual addresses the operation and maintenance of components of the stormwater management facilities in Robbinsville Township, Mercer County, New Jersey, to ensure effective, efficient, and enduring service. This plan contains preventative and corrective maintenance tasks and procedures. The manual was prepared in accordance with NJAC Section 7:8-5.8 "Maintenance Requirements". Stormwater infrastructure connected to privately owned infrastructure but located within Robbinsville Township, Mercer County, and/or NJDOT Right of Way (ROW) shall not be maintained by the private party. This manual shall apply only to existing stormwater management facilities as part of approved projects constructed after February 7, 1984, without a recorded Operation and Maintenance (O&M) manual.

As of the date of receipt of this document, the party responsible for the preventative and corrective maintenance of the stormwater measures described herein is:

Print Name: _____ *Signature:* _____ *Date:* ____

Pursuant to N.J.A.C. 7:8-5.8 (b),

> *"The maintenance plan shall contain specific preventative maintenance tasks and schedules; ... Maintenance guidelines for stormwater management measures are available in the New Jersey Stormwater Best Management Practices Manual. If the maintenance plan identifies a person other than the developer (for example, a public agency or homeowners' association) as having the responsibility for maintenance, the plan shall include documentation of such person's agreement to assume this responsibility, or of the developer's obligation to dedicate a stormwater management facility to such person under an applicable ordinance or regulation."*

and Pursuant to N.J.A.C. 7:8-5.8 (e),

> *"Preventative and corrective maintenance shall be performed to maintain the function of the stormwater management measure, including repairs or replacement to the structure; removal of sediment, debris, or trash; restoration of eroded areas; snow and ice removal; fence repair or replacement; restoration of vegetation; and repair or replacement of non-vegetated linings."*

The party responsible for maintenance identified under J(2)(c) of §142-35 “Stormwater Management” shall submit completed copies of the log sheets found in the appendices of this document, in addition to an annual inspection report, to the Township of Robbinsville Planning, Zoning, and Engineering department by **June 1 of each year**. If the responsible party possesses their own Operation and Maintenance manual developed by a Professional Engineer licensed in the state of New Jersey, then the procedures of that manual shall be followed. The responsible party shall submit completed copies of any log sheets and/or inspection reports to the Township of Robbinsville Planning, Zoning, and Engineering department by **June 1st of each year**. A copy of the manual shall also be submitted. During construction, the contractor is assigned to be the responsible party.

II. STORMWATER MAINTENANCE OBJECTIVES

This maintenance plan has been prepared to ensure that the stormwater management facilities in place are operating efficiently and reliably. The responsible party shall ensure the long-term/perpetual operation, maintenance, repair, and safety of the stormwater management facilities.

Maintenance procedures are required to maintain safe operation of the stormwater management facility by reducing the occurrence of problems and malfunctions. To be effective, maintenance shall be performed on a regular basis and include such routine procedures as training of staff, periodic inspections, silt and debris removal, and annual review of maintenance and inspection work to identify where the maintenance program could be more effective.

Repair procedures may be required to correct problems or malfunctions of stormwater management facilities and to restore the intended means of operation and safe condition of the facilities. Based upon the severity of the problem, repairs shall be performed on an as needed or emergency basis which may include procedures such as:

- Structural repairs
- Mosquito control
- Erosion repair
- Snow and ice removal
- Geese Mitigation
- Restoration of vegetation
- Removal of debris, sediment and trash which threaten discharge capacity or water quality

In the event that the stormwater management facility becomes a danger to public safety or public health, or if it is in need of maintenance, the municipality may notify the responsible party in writing. Upon receipt of the notice, the responsible party shall have fourteen (14) days to initiate maintenance and repair of the facility in a manner that is approved by the Township Engineer or their designee. If the responsible party fails or refuses to perform such maintenance and repair, the municipality may immediately proceed to do so and shall invoice the cost thereof to the responsible party.

The property owner shall engage the services of a New Jersey licensed professional engineer specializing in stormwater management to provide assistance regarding non-routine structural maintenance.

III. MAINTENANCE OF CONVEYANCE SYSTEMS

Conveyance systems, including inlets and pipes, are expected to receive and/or accumulate debris and sediment. **These systems must be inspected for clogging and excessive debris and sediment accumulation at least quarterly, as well as after every storm exceeding 1-inch of rainfall.** Sediment removal should take place when all runoff has drained from the conveyance network and the systems are reasonably dry. Extra awareness should be placed on pipes with design velocities less than 2 feet per second for 25-year storm events. Disposal of debris, trash, sediment, and other waste material shall be done at suitable disposal/recycling sites and in compliance with applicable local, county, state, and federal waste regulations.

Structural components must be inspected for cracking, subsidence, breaching, wearing, and deterioration at least annually. The condition of surrounding above ground areas shall be inspected for evidence of potential failures or deterioration of buried stormwater facilities.

The routine equipment expected to be utilized for the maintenance tasks include the maintenance log, a pen, a jet vacuum vehicle, shovels, lighting equipment, and a wheelbarrow or truck for the hauling of debris. Water and concrete repair materials may also be required depending on the condition of the structures. Instructions or user manuals for these components were not available from the manufacturer.

Conveyance system inspection and maintenance activities shall be recorded on copies of the logs provided in **Appendix A**. Completed logs shall be kept onsite with this manual and

used for future reference. The stormwater conveyance systems, including inlets and pipes, shall be video inspected every 10 years and the date of the video inspection shall be referenced within this Operation and Maintenance Manual.

IV. MAINTENANCE OF STORMWATER MANAGEMENT FACILITIES

The stormwater management facility inspection and maintenance activities shall be recorded on copies of the logs provided in **Appendix B** or in logs approved by the Township Engineer. The inspection and maintenance activities for each separate stormwater management basin shall be recorded separately on copies of the provided forms. Completed logs shall be kept by the responsible party with this manual and used for future reference. These facilities must be inspected at least quarterly, as well as after every storm exceeding 1-inch of rainfall. The sections below indicate the general maintenance requirements for common types of stormwater management facilities. Any not found below can be found in the NJDEP BMP manual chapters 9-11 in the sections titled “General Maintenance”.

Dry Wells

- The maintenance plan must indicate the dry well must not be connected to non-rooftop sources of runoff for its entire lifespan.
- All structural components must be inspected, at least once annually, for cracking, subsidence, spalling, erosion, and deterioration. Damaged components must be replaced.
- Components expected to receive and/or trap debris must be inspected for clogging at least four times annually, as well as after every storm exceeding 1 inch of rainfall.
- Disposal of debris, trash and other waste material must be done at suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations.
- Access points for maintenance are required on all dry wells; these access points must be clearly identified in the maintenance plan. In addition, any special training required for maintenance personnel to perform specific tasks, such as confined space entry, must be included in the plan. Furthermore, at the site, access ports must be labeled "Roof Runoff Only."
- A detailed, written log of all preventative and corrective maintenance performed on the dry well must be kept, including a record of all inspections and copies of maintenance-related work orders.

Pervious Paving Systems

- Failure to correctly maintain a pervious paving system will shorten its lifespan or result in system failure; therefore, the maintenance plan must ensure proper training of personnel and include the special equipment necessary in accordance with the industry's or manufacturer's requirements.
- The surface course must be inspected after every storm exceeding 1 inch of rainfall. If mud or sediment is tracked onto the surface course, it must be removed as soon as possible. Removal should take place when all runoff has drained from the surface course.
- The surface course must be inspected, at least once annually, for cracking, subsidence, spalling, erosion, deterioration, and unwanted vegetation. Remedial measures must be taken as soon as possible. Herbicides must not be applied.
- The surface course of a pervious paving system must be vacuum swept, not power swept, at least four times per year. Vacuum sweeping must be followed by either air blowing or high-pressure power washing performed in accordance with the

specifications recommended for the system. All dislodged material must be promptly removed.
    - The first annual maintenance must be performed in the spring.
    - Maintenance must additionally be performed in the autumn, after the fallen leaves are collected and removed.
- Corrective action must be immediately taken to restore the infiltration capacity of the pervious paving system under the following scenarios:
    - Standing water is observed on the surface course; or
    - The testing methods above show an infiltration rate of 20 inches per hour or less for a system designed for quantity control or 6.4 or less for a system designed for water quality control only.
- Disposal of debris, trash, sediment, and other waste material must be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.
- Under no circumstances may any sealants or coatings be applied to pervious paving systems, except for those approved by the manufacturer to improve surface course resistance to de-icing chemicals or refresh traffic striping.
- Over the lifetime of the surface course, no more than 10% of its surface area may be patched with impervious material such as bituminous asphalt or concrete. All patching must be recorded in the maintenance manual for future reference to prevent exceedance of this maximum.
- A detailed, written log of all preventative and corrective maintenance performed on the pervious paving system must be kept, including a record of all inspections and copies of maintenance-related work orders.

Bioretention Systems

- Proper and timely maintenance is essential to continuous, effective operation; therefore, an access route must be incorporated into the design, and it must be properly maintained.
- All structural components must be inspected, at least once annually, for cracking, subsidence, spalling, erosion, and deterioration.
- Components expected to receive and/or trap debris and sediment must be inspected for clogging at least four times annually, as well as after every storm exceeding 1 inch of rainfall.
- Sediment removal must take place when all runoff has drained from the planting bed and the basin is dry.
- Disposal of debris, trash, sediment, and other waste material must be done at suitable disposal/recycling sites and in compliance with all applicable local, state

and federal waste regulations.

- In systems with underdrains, the underdrain piping must be connected, in a manner that is easily accessible for inspection and maintenance, to a downstream location.
- Access points for maintenance are required on all enclosed areas within a small-scale bioretention system; these access points must be clearly identified in the maintenance plan. In addition, any special training required for maintenance personnel to perform specific tasks, such as confined space entry, must be included in the plan.
- Stormwater BMPs may not be used for stockpiling of plowed snow and ice, compost, or any other material.
- A detailed, written log of all preventative and corrective maintenance performed on the bioretention system must be kept, including a record of all inspections and copies of maintenance-related work orders.

Infiltration Basins

- Proper and timely maintenance is essential to continuous, effective operation; therefore, an access route must be incorporated into the design, and it must be properly maintained.
- All structural components must be inspected, at least once annually, for cracking, subsidence, spalling, erosion, and deterioration.
- Components expected to receive and/or trap debris and sediment must be inspected for clogging at least four times annually, as well as after every storm exceeding 1 inch of rainfall.
- Sediment removal should take place when all runoff has drained, and the basin is dry.
- Disposal of debris, trash, sediment, and other waste material must be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.
- Access points for maintenance are required on all enclosed areas within a small-scale infiltration basin; these access points must be clearly identified in the maintenance plan. In addition, any special training required for maintenance personnel to perform specific tasks, such as confined space entry, must be included in the plan.
- Stormwater BMPs may not be used for stockpiling of plowed snow and ice, compost, or any other material.

Wet Ponds

- All wet pond components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive accumulation at least twice annually, or as needed; these components may include forebays, bottoms, trash racks, outlet structures, and riprap or gabion aprons. Additional inspections are required after every storm exceeding 1 inch of rainfall.
- The forebay must be cleaned when it accumulates either 6 inches of sediment, there is a 10% loss of forebay volume, or if it remains wet 9 hours after the end of a storm event.
- Disposal of debris, trash, sediment, and other waste material must be done at suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations.
- All structural components must be inspected, at least once annually, for cracking, subsidence, spalling, erosion, and deterioration.
- Access points for maintenance are required on all storage systems and reuse components; these access points must be clearly identified in the maintenance plan. In addition, any special training required for maintenance personnel to perform specific tasks must be included in the plan.
- All pumps, controls and alarms must be inspected at least annually and maintained in accordance with the manufacturer's requirements. Should a component fail, corrective action must be taken immediately. The maintenance logbook must include a section to record all maintenance information regarding pumps, controls, and alarms.
- A detailed, written log of all preventative and corrective maintenance performed on the storage system and reuse component must be kept, including a record of all inspections and copies of maintenance-related work orders.

Detention Basins

- All structural components must be inspected, at least once annually, for cracking, subsidence, spalling, erosion, and deterioration.
- Components expected to receive and/or trap debris must be inspected for clogging at least twice annually, as well as after every storm exceeding 1 inch of rainfall.
- If accumulated sediment is detected during an inspection, it must be removed; otherwise, it can lead to loss of detention volume. Sediment removal should take place when the basin is thoroughly dry.
- Disposal of debris, trash, sediment, and other waste material must be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.

- Access points for maintenance are required on all extended detention basins; these access points should be clearly identified in the maintenance plan. In addition, any special training required for maintenance personnel to perform specific tasks should be included in the plan.
- If the detention basin fails to fully drain within 72 hours, corrective action must be taken, and the maintenance manual revised accordingly to prevent similar failures in the future.

Notes for Vegetated Areas

- Bi-weekly inspections are required when establishing/restoring vegetation.
- A minimum of one inspection during the growing season and one inspection during the nongrowing season is required to ensure the health, density, and diversity of the vegetation.
- Vegetative cover must be maintained at 85%; damage in excess of 50% must be addressed through replanting in accordance with the original specifications.
- Vegetated areas must be inspected at least once annually for erosion, scour, and unwanted growth; any unwanted growth should be removed with minimum disruption to the remaining vegetation.
- All use of fertilizers, pesticides, mechanical treatments, and other means to ensure optimum vegetation health must not compromise the intended purpose of the facility.

V. MAINTENANCE OF STORMWATER OUTFALLS

Inspections shall be conducted at least quarterly, as well as after every storm exceeding 1-inch of rainfall. The inspection and maintenance of stormwater outfalls shall be recorded on copies of the logs provided in **Appendix B**. The inspection and maintenance activities for **each** separate storm water management basin shall be recorded separately on copies of the provided forms. Completed logs shall be kept onsite with this manual and used for future reference. Stormwater outfalls shall be inspected for stream scour and illicit discharges. If stream scour is found, corrective maintenance shall be taken immediately, and the Township Engineer shall be notified. If illicit discharge is detected, the Township Engineer shall be notified, and the responsible party shall follow NJDEP protocols for illicit discharge elimination. The Robbinsville outfall map can be found online at https://www.robbinsville-twp.org/departments/engineering/stormwater_management.php.

VI. RECCOMENDATIONS

It is recommended that the maintenance and inspection of stormwater management infrastructure is performed by a professional licensed in the state of New Jersey. Inspections and any corrective maintenance shall be conducted at least quarterly, as well as after every storm exceeding 1-inch of rainfall. Completed copies of the attached logs for each stormwater management structure shall be submitted to the Robbinsville Township Planning/Zoning/Engineering department. For additional information and guidance on stormwater management facilities, refer to chapters 9 and 10 of the NJDEP BMP manual found at https://dep.nj.gov/stormwater/bmp-manual/. Each type of stormwater facility contains its own document which includes a maintenance guide. Additional guidance may be found at https://dep.nj.gov/stormwater/maintenance-guidance/#field-manuals.

APPENDIX A
Conveyance Systems Maintenance
and
Inspection Logs

MAINTENANCE INSPECTION FOR STORMWATER CONVEYANCE SYSTEMS

NOTE: INSPECTIONS TO BE PERFORMED DURING A PERIOD OF DRYWEATHER.

Yes	No	Maintenance Evaluation	Action(s) Required if Answer is "Yes"
□	□	Is there and standing water?	Evaluate downstream systems for clogging or trash sediment build up
□	□	Is there a buildup of sediment (in excess of 3 inches), trash, debris or any other stormwater pollution?	Remove and dispose of debris in accordance with local, county, state, and federal requirements.
□	□	Is there any structural failure?	Consult engineer to determine safety and/or stability of the system.
□	□	Are there visible signs of cracking, subsidence, erosion, or deterioration of the storm conveyance systems?	Consult engineer to determine safety and/or stability of the system.
□	□	Are there any root intrusions or any other vegetation within the storm conveyance systems?	Remove roots and dispose vegetation in accordance with local, county, state, and federal requirements.
□	□	Are ladder rungs in the catch basins or manholes damaged, missing, or misaligned?	Repair or replace.
□	□	Are trash racks missing, damaged or only partially in place at the outlet structure?	Repair or replace.
□	□	Are basin fences broken or damaged	Repair or replace.
□	□	Does the existing maintenance program need to be amended to provide a more effective maintenance program?	Address suggested changes to the responsible party for the stormwater maintenance facility.

APPENDIX B
Stormwater Management Maintenance and Inspection Logs

MAINTENANCE INSPECTION FOR STORMWATER CONVEYANCE SYSTEMS

NOTE:

1. INSPECTIONS TO BE PERFORMED DURING A PERIOD OF DRYWEATHER.
2. EACH STORMWATER FACILITY COMPONENT SHALL UTILIZE A SEPARATE COPY OF THIS MAINTENANCE INSPECTION CHECKLIST.
3. TYPE OF STORMWATER FACILITY: _____

Yes	No	N/A	Maintenance Evaluation	Action(s) Required if Answer "Yes"
□	□	□	Is there a buildup of sediment in a localized area of the basin?	Remove and dispose of sediment in accordance with local, county, state, and federal requirements.
□	□	□	Is there an excessive buildup of sediment that threatens the storage volume of the basin?	Remove and dispose of sediment in accordance with local, county, state, and federal requirements.
□	□	□	Is there a buildup of trash, debris, or any other stormwater pollution?	Remove and dispose of debris in accordance with local, county, state, and federal requirements.
□	□	□	Are there any areas of settlement, scouring, cracking, sloughing, seepage, or rutting on the embankments?	Consult engineer to determine safety and/or stability of the system.
□	□	□	Are there any areas of erosion or scouring at the conveyance system outfalls?	Regrade and revegetate the areas. Repair/replace rip- rap apron if it has been disturbed.
□	□	□	Are there any areas of erosion or scouring at the basin outfall headwall?	Consult engineer to determine safety and/or stability of the system.
□	□	□	Is there a buildup of sediment (in excess of 3 inches), trash, debris or any other stormwater pollution in the outlet structure?	Evaluate downstream systems for clogging or trash sediment buildup.
□	□	□	Is there any structural failure in the outlet structure?	Consult engineer to determine safety and/or stability of the system.

☐	☐	☐	Are there visible signs of cracking, subsidence, erosion, or deterioration of the outlet pipe?	Consult engineer to determine safety and/or stability of the system.
☐	☐	☐	Are there any root intrusions or any other vegetation within the outlet structure?	Remove roots and dispose vegetation in accordance with local, county, state, and federal requirements.
☐	☐	☐	Are ladder rungs in the outlet structure damaged, missing, or misaligned?	Repair or replace.
☐	☐	☐	Are trash racks missing, damaged or only partially in place at the outlet structure?	Repair or replace.
☐	☐	☐	Are nut and bolt connections, hinges and locks damaged or missing?	Repair or replace.
☐	☐	☐	Are there any areas with damaged vegetation or a lack of vegetation outside of the micropools?	Evaluate causes of vegetation damage and reestablish vegetation.
☐	☐	☐	Is the vegetation on the embankments improperly mowed/trimmed?	Evaluate if proper maintenance procedures are being followed.
☐	☐	☐	Are there local areas of poor infiltration?	Scarify the areas to promote better infiltration.
☐	☐	☐	Does the existing maintenance program need to be amended to provide a more effective maintenance program?	Address suggested changes to the responsible party for the stormwater maintenance facility.

CHECKLIST PREPARED BY: _____

ADDRESS: _____

TELEPHONE: _____

DATE: _____

NOTE TO THE INSPECTOR: THIS FORM SHALL BE COPIED AND UTILIZED AS A TEMPLATE FOR EACH INDIVIDUAL INSPECTION AND EACH INDIVIDUAL STORMWATER FEATURE.

STORMWATER MANAGEMENT FACILITY MAINTENANCE LOG

NOTE:
EACH STORMWATER FACILITY COMPONENT SHALL UTILIZE A SEPARATE COPY OF THIS MAINTENANCE INSPECTION CHECKLIST.

STORMWATER FACILITY: _____

DATE	PERSON CONDUCTING MAINTENANCE	AREA OF MAINTENANCE	PROBLEM(S) FOUND	ACTION(S) TAKEN