New Jersey Turnpike Authority
PO Box 5042, Woodbridge, NJ 07095

Document Change Announcement

2007 Design Manual

DCA2014-DM-01

DATE: March 5, 2014

Subject: Inclusion of a sample Stormwater Maintenance Plan and its submission requirements.

Description of Change

Updates to the Design Manual are necessary to incorporate a sample Stormwater Maintenance Plan and to clarify the submission requirements.

Instructions to Designers and Consultants

Effective immediately, the revisions contained in this announcement shall be applied to all projects that have not reached Phase C of design. Contact your NJTA Project Manager for instructions. Attached revision is noted in italics.

Designers may access these revisions in the NJTA Design Manual, which is available on the Authority's Web Page: http://www.state.nj.us/turnpike/professional-services.html.

Information for In-House Staff

The revisions have been incorporated into the Design Manual, which is available on the S drive @ S:\Project Files\Design-Procedure Manual. Please distribute the information to your respective Project Managers and have them direct their consultants appropriately.

Approved By:

Robert J. Fischer, P.E.
Chief Engineer

cc: Senior Staff Engineering, Operations & Maintenance Departments, All Prequalified Consultant Firms, File

New Jersey Turnpike Authority

DOCUMENT UPDATE REQUEST

Forward to

Chief Engineer

Initiator	Hamid Ghadimy	**Submittal Date**	1/14/14
Firm	NJTA	**Telephone**	732-750-5300

Document (check one)

- ☐ Procedures Manual
- X Design Manual
- ☐ Sample Plans
- ☐ Standard Drawings
- ☐ Standard Specifications

Description of Change

NJTA Design Manual page 4-12, – Under – 4.3.4. Stormwater Management:
Item 5. – remove "and provide it to the Authority's Division of Maintenance for review." and add "A sample Stormwater Maintenance Plan is provided as Exhibit 4-31".

Current language
5. The Engineer shall prepare a stormwater management facility maintenance plan in accordance with the New Jersey Stormwater Rule and provide it to the Authority's Division of Maintenance for review.

Corrected language
5. The Engineer shall prepare a stormwater management facility maintenance plan in accordance with the New Jersey Stormwater Rule. A sample Stormwater Maintenance Plan is provided in the References section, identified as Exhibit 4-33.

NJTA Design Manual page 4-92, – Under – 4.12.5. Stormwater Management Facility Maintenance:
Remove "to the Authority's Division of Maintenance for review" and add "A sample Stormwater Maintenance Plan is provided as Exhibit 4-31".

Current language
A copy of the Stormwater Management Facility Maintenance Plan shall be submitted to the Authority's Division of Maintenance for review.

Upon approval of the NJDEP Permit(s), a copy of the approved permit documentation shall be provided to the Division of Maintenance.

Corrected language
A copy of the Stormwater Management Facility Maintenance Plan shall be submitted. A sample Stormwater Maintenance Plan is provided as Exhibit 4-31.
Upon approval of the NJDEP Permit(s), a copy of the approved permit documentation shall be provided.

Reason for Change

These updates to the Design Manual are necessary to incorporate a sample Stormwater Maintenance Plan and to clarify the submission requirements.

MAINTENANCE PLAN FOR STORMWATER MANAGEMENT MEASURES

[*Roadway Name*]
[*Interchange, Service Area, Toll Plaza, Maintenance Yard, or Milepost Numbers*]
[*Town, County*], New Jersey

NJTA Construction Contract No. [*#####*]
Order for Professional Services No. [*#####*]

Prepared For:

The New Jersey Turnpike Authority
581 Main Street
Woodbridge, New Jersey 07095

Prepared By:

[*Firm Name*]
[*Street Address*]
[*City, State, Zip Code*]

[*Completion Date*]

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1.0 INTRODUCTION

Pursuant to New Jersey Turnpike Authority Construction Contract No. [*#####*], Order for Professional Services (OPS) No. [*#####*], [*Firm name*] has prepared this maintenance plan for the stormwater management measures constructed at [*Roadway Name*] [*Interchange, Service Area, Toll Plaza, Maintenance Yard or Milepost Numbers*] in [*Town, County*], New Jersey. This plan describes the preventative and corrective maintenance tasks and procedures to be implemented by the New Jersey Turnpike Authority to ensure the effective and reliable performance of the constructed stormwater management measures.

2.0 RESPONSIBLE PERSON

The New Jersey Turnpike Authority is the owner of the stormwater management measures described in this plan. The designated person with overall responsibility for maintenance of the stormwater management measures is:

Joseph Lentini, Director of Maintenance
New Jersey Turnpike Authority
P.O. Box 5042
Woodbridge, New Jersey 07095-5042
Phone: (732) 442-8600 Ext. 2800

The effectiveness of this plan must be evaluated annually. Revisions will be made to the plan if needed to maintain its effectiveness. If revised, a copy of the revised plan will be distributed to the appropriate maintenance personnel.

3.0 MAINTENANCE OBJECTIVES

Preventative and corrective maintenance is required to preserve the intended operation and safe condition of the stormwater management measures described in this plan.

- Preventative Maintenance – Regular preventative maintenance will reduce the occurrence of problems and malfunctions of the stormwater management measures. This plan identifies the specific preventative maintenance tasks and maintenance schedules required.

- Corrective Maintenance – Corrective maintenance is required on an as-needed basis to restore a stormwater management measure's intended operation when a problem or malfunction is identified. This plan identifies corrective maintenance tasks that may be required based on observed conditions.

Corrective responses to emergency conditions at the stormwater management measures may also be required at times. Recommended responses to emergency conditions are included within the corrective maintenance portion of this plan.

4.0 STORMWATER MANAGEMENT MEASURES

The stormwater management measures constructed at [*Roadway Name*] [*Interchange, Service Area, Toll Plaza, Maintenance Yard or Milepost Numbers*] and addressed in this plan are depicted schematically on Figure 1 (Location Map) and Figure 2 (Schematic Plan of Stormwater Management Measures.

The specific stormwater management measures addressed in this plan include the following [*list each structural and non-structural measure below. If a particular measure is used multiple times, it is only required to be listed once below*]:

- [*name of stormwater management measure*] – [*provide a brief description of the measure, its purpose, and its normal operating conditions*]. A schematic depiction of the [*name of stormwater management measure*] is provided in Figure 3. As-built drawings are available through the Authority's Plan File Room Section.

- [*copy preceding paragraph and revise as appropriate for each additional stormwater management measure addressed in the plan*]

EXAMPLE

- *Infiltration Basin #1 – Infiltration Basin #1 is a basin constructed within highly permeable soils that provides temporary storage of stormwater runoff, removes pollutants, and infiltrates stormwater back into the ground. The basin does not have a structural outlet to discharge runoff, although it is equipped with a spillway to convey overflows downstream in a safe and stable manner. A schematic depiction of Infiltration Basin #1 is provided in Figure 3. As-built drawings are available through the Authority's Plan File Room Section.*

5.0 MAINTENANCE REQUIREMENTS

Preventative maintenance and corrective maintenance requirements for each stormwater management measure are summarized in the following sections.

Detailed maintenance checklists for each stormwater management measure are provided in Appendix B, and maintenance logs are provided in Appendix C. A checklist and maintenance log must be completed for each maintenance event. Copies of all maintenance-related work orders must be retained with the maintenance records.

Sediment, trash, debris and other materials removed from the stormwater management measures during maintenance operations shall be disposed of at disposal and/or recycling facilities permitted to accept such materials. The cost of all maintenance activities will be included in the Authority's annual budget.

5.1 [*Stormwater Management Measure Name*]

A schedule of regular preventative maintenance tasks and corrective maintenance tasks for the [*stormwater management measure name*] is provided in Table 1. The schedule identifies each maintenance task, frequency, required equipment, and recommended health and safety measures.

[*Copy preceding Section 5.1 and revise as appropriate for each additional stormwater management measure addressed in the plan*]

EXAMPLE

5.1 Infiltration Basin #1

A schedule of regular preventative maintenance tasks and corrective maintenance tasks for the infiltration basin is provided in Table 1. The schedule identifies each maintenance task, frequency, required equipment, and recommended health and safety measures. The required maintenance tasks include the following:

- *Inspect all components that receive or trap debris and sediment for clogging and excessive debris/sediment accumulation at least four times per year and after every storm exceeding 1 inch of rainfall. Remove excessive debris/sediment as needed, when the basin is thoroughly dry.*
- *Inspect all structural components annually for deterioration such as cracking, subsidence, spalling, and erosion. Repair deteriorated components as needed.*
- *Mow and/or trim vegetation regularly as needed based on site conditions. Grass shall be mowed at least once per month during the growing season.*
- *Inspect vegetated areas annually for erosion and scour. Repair erosion/scour and damaged vegetation as needed.*
- *Inspect vegetated areas annually for unwanted trees or other growth. Remove unwanted vegetation as needed with minimum disruption to the basin subsoil and vegetation to remain.*
- *When establishing or restoring vegetation, perform biweekly inspections of vegetation health during the first growing season or until the vegetation is established.*

- *Inspect established vegetation health, density, and diversity twice annually during growing and non-growing seasons. If vegetation has greater than 50 percent damage, re-establish the vegetation pursuant to the original project specifications.*
- *Maintain vegetation without the use of fertilizers or pesticides whenever possible. Any use of fertilizers, mechanical treatments, pesticides, and other means to assure optimum vegetation health must not compromise the intended purpose of the extended detention basin.*
- *The infiltration basin is expected to normally take [###] hours to completely drain. If significant increases or decreases in the normal drain time are observed, evaluation of the basin's bottom surface, subsoil, and both groundwater and tailwater levels is required to determine appropriate measures for maintaining the proper functioning of the basin.*
- *Inspect the bottom sand layer in the basin at least monthly as well as after every storm exceeding 1 inch of rainfall. The permeability rate of the soil below the basin may also be retested periodically. If the water fails to infiltrate 72 hours after the end of the storm, corrective measures must be taken. Annual tilling by light equipment can assist in maintaining infiltration capacity and break up clogged surfaces*

6.0 REFERENCE STANDARDS

This maintenance plan was prepared in accordance with the latest editions of the following applicable New Jersey administrative codes, New Jersey Department of Environmental Protection (NJDEP) guidance, and manufacturer literature:

- NJAC 7:8 – Stormwater Management
- NJ Stormwater Best Management Practices Manual (BMP Manual)
- NJDEP Stormwater Management Facilities Maintenance Manual
- [*reference applicable manufacturer literature, O&M manuals, etc.*]

TABLES

TABLE 1

MAINTENANCE SCHEDULE FOR [*NAME OF STORMWATER MANAGEMENT MEASURE*]

[*ROADWAY NAME*]

[*INTERCHANGE, SERVICE AREA, TOLL PLAZA, MAINTENANCE YARD, OR MILEPOST NUMBERS*]

[*TOWN, COUNTY*], NEW JERSEY

NJTA CONTRACT NO. [*######*], OPS NO. [*######*]

Task Name	Schedule	Task Description	Required Equipment	Health and Safety	Reference Documents
[*Name of task*]	[*task frequency or "as-needed" for corrective maintenance tasks*]	[*Describe activities and procedures for completing task*]	[*list equipment tools and supplies needed to complete task*]	[*Describe health and safety procedures to be considered*]	[*reference any applicable manufacturer maintenance/repair literature provided in Appendix E*]

FIGURES

[*Insert street map indicating:*

- *Roadway names*
- *Stormwater management measure locations with corresponding milepost numbers*
- *North arrow*]

[*Map Reference*]

New Jersey Turnpike Authority

[*ROADWAY NAME*]

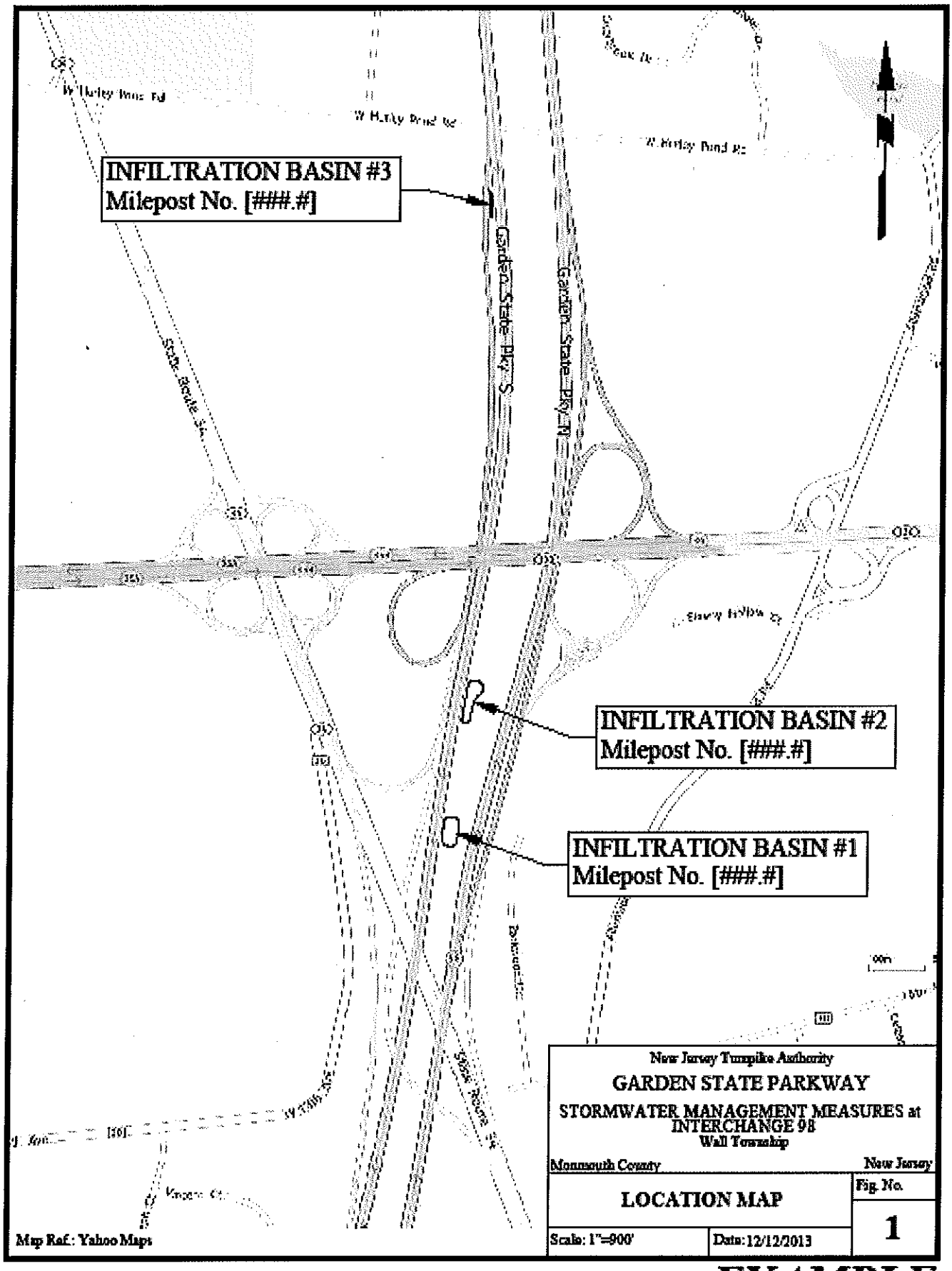
STORMWATER MANAGEMENT MEASURES at [*PROJECT LOCATION*]

LOCATION MAP

Fig. No. **1**

Scale: [*insert scale*]

Date: [*insert date*]


INFILTRATION BASIN #3
Milepost No. [###.#]
INFILTRATION BASIN #2
Milepost No. [###.#]
INFILTRATION BASIN #1
Milepost No. [###.#]
Garden State Pkwy S
Garden State Pkwy N
W Hurley Pond Rd
Map Ref.: Yahoo Maps
New Jersey Turnpike Authority
GARDEN STATE PARKWAY
STORMWATER MANAGEMENT MEASURES at INTERCHANGE 98
Wall Township
Monmouth County
New Jersey
LOCATION MAP
Fig. No.
1
Scale: 1"=900'
Date: 12/12/2013

EXAMPLE

[*Insert schematic plan view of the project area indicating:*

- *Stormwater management measure locations*
- *Major site features and/or reference points*
- *North arrow*
- *Other information to assist maintenance crews to locate the stormwater management measures in the field*]

[*Map Reference*]

New Jersey Turnpike Authority

[*ROADWAY NAME*]

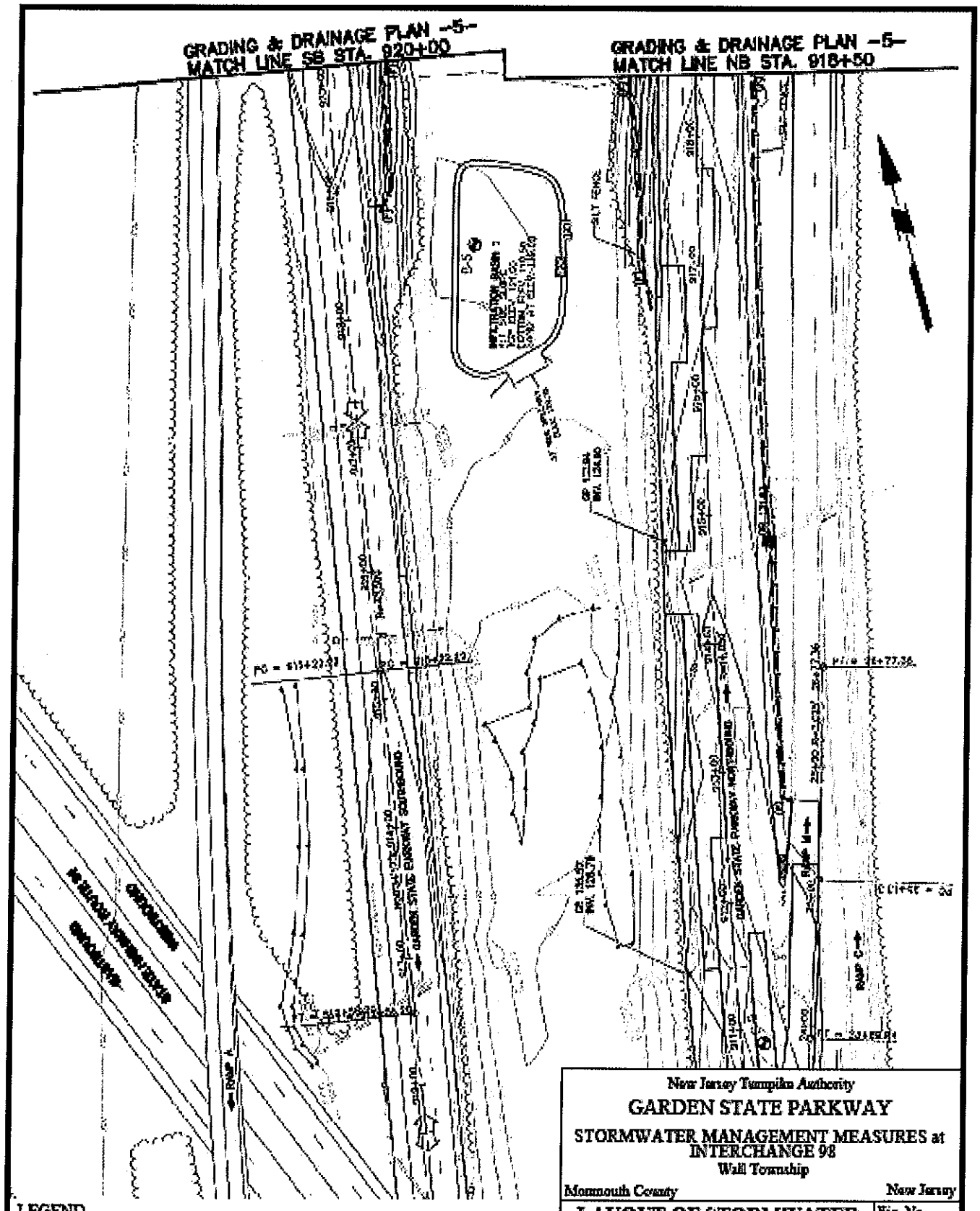
STORMWATER MANAGEMENT MEASURES at [*PROJECT LOCATION*]

LAYOUT OF STORMWATER MANAGEMENT MEASURES

Fig. No. **2**

Scale: [*insert scale*]

Date: [*insert date*]



LEGEND

Stormwater Flow Direction

Map Ref.: Contract No. P200.021, Grading & Drainage Plan -4-

New Jersey Turnpike Authority

GARDEN STATE PARKWAY

STORMWATER MANAGEMENT MEASURES at INTERCHANGE 98

Wall Township

Monmouth County — New Jersey

LAYOUT OF STORMWATER MANAGEMENT MEASURES	Fig. No. 2
Scale: 1"=100'	Date: 12/12/2013

EXAMPLE

[*Insert schematic plan view of each stormwater management measure indicating:*

- *Stormwater management measure*
- *Individual elements of the stormwater management measure requiring maintenance pursuant to this plan*
- *Stormwater flow directions*
- *North arrow*
- *Other information that may assist maintenance crews to inspect and maintain the stormwater management measure*]

[*Map Reference*]

New Jersey Turnpike Authority

[*ROADWAY NAME*]

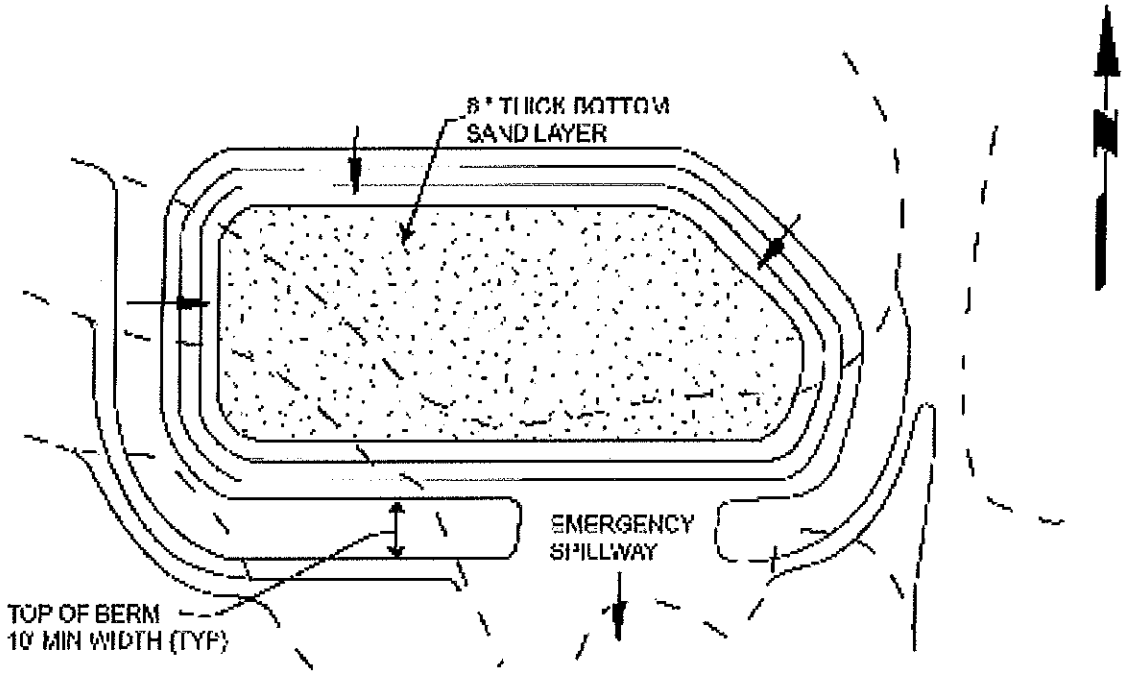
STORMWATER MANAGEMENT MEASURES at [*PROJECT LOCATION*]

SCHEMATIC PLAN OF [*STORMWATER MANAGEMENT MEASURE NAME*]

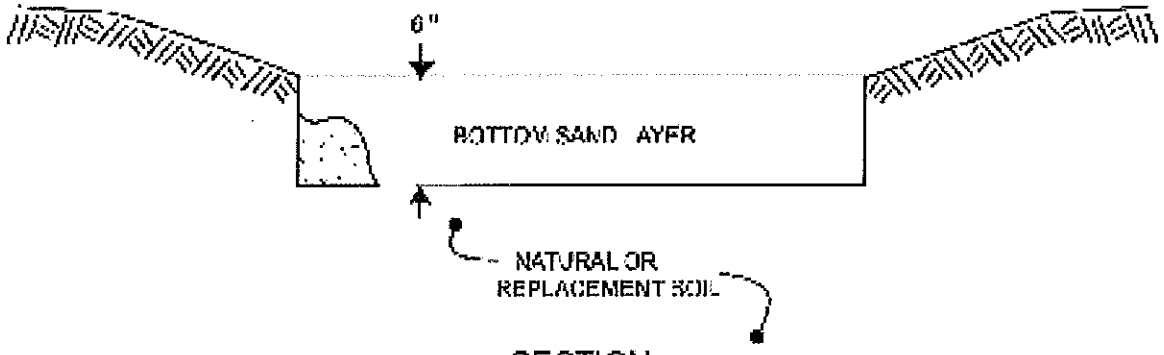
Fig. No. **3**

Scale: [*insert scale*]

Date: [*insert date*]



PLAN



SECTION

LEGEND

Stormwater Flow Direction

Map Ref.: *[Contract No., Drawing Name, Drawing No.]*

New Jersey Turnpike Authority

GARDEN STATE PARKWAY

STORMWATER MANAGEMENT MEASURES at INTERCHANGE 98

Wall Township

Monmouth County — New Jersey

SCHEMATIC PLAN OF INFILTRATION BASIN NO. 1

Fig. No. **3**

Scale: *[1"=##']* | Date: 12/12/2013

EXAMPLE

APPENDIX A

STORMWATER BMP GENERAL MAINTENANCE REQUIREMENTS

BIORETENTION SYSTEMS

A bioretention system consists of a soil bed planted with suitable non-invasive (preferably native) vegetation. Stormwater runoff entering the bioretention system is filtered through the soil planting bed before being either conveyed downstream by an underdrain system or infiltrated into the existing subsoil below the soil bed. Vegetation in the soil planting bed provides uptake of pollutants and runoff and helps maintain the pores and associated infiltration rates of the soil in the bed.

Maintenance requirements for bioretention systems are summarized below. Further information is provided in the NJ Stormwater Best Management Practices Manual at http://www.njstormwater.org/bmp_manual2.htm

A. General Maintenance

All bioretention system components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding 1 inch of rainfall. Such components may include bottoms, trash racks, low flow channels, outlet structures, riprap or gabion aprons, and cleanouts.

Sediment removal should take place when the basin is thoroughly dry. Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations.

B. Vegetated Areas

Mowing and/or trimming of vegetation must be performed on a regular schedule based on specific site conditions. Grass outside of the bioretention system should be mowed at least once a month during the growing season. Grasses within the bioretention system must be carefully maintained so as not to compact the soil, and through hand-held equipment, such as a hand held line trimmer. Vegetated areas must be inspected at least annually for erosion and scour. Vegetated areas should also be inspected at least annually for unwanted growth, which should be removed with minimum disruption to the planting soil bed and remaining vegetation.

When establishing or restoring vegetation, biweekly inspections of vegetation health should be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density, and diversity should be performed at least twice annually during both the growing and non-growing seasons. The vegetative cover should be maintained at 85 percent. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with the original specifications and the inspection requirements presented above.

All use of fertilizers, mechanical treatments, pesticides and other means to assure optimum vegetation health should not compromise the intended purpose of the bioretention system. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

C. Structural Components

All structural components must be inspected for cracking, subsidence, spalling, erosion, and deterioration at least annually.

D. Other Maintenance Criteria

The maintenance plan must indicate the approximate time it would normally take to drain the maximum design storm runoff volume below the ground surface in the bioretention system. This normal drain time should then be used to evaluate the system's actual performance. If significant increases or decreases in the normal drain time are observed or if the 72 hour maximum is exceeded, the system's planting soil bed, underdrain system, and both groundwater and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the system.

The planting soil bed at the bottom of the system should be inspected at least twice annually. The permeability rate of the soil bed material may also be retested. If the water fails to infiltrate 72 hours after the end of the storm, corrective measures must be taken.

CONSTRUCTED STORMWATER WETLANDS

Constructed stormwater wetlands are wetland systems designed to maximize the removal of pollutants from stormwater runoff through settling and both uptake and filtering by vegetation. Constructed stormwater wetlands temporarily store runoff in relatively shallow pools that support conditions suitable for the growth of wetland plants.

Maintenance requirements for constructed stormwater wetlands are summarized below. Further information is provided in the NJ Stormwater Best Management Practices Manual at http://www.njstormwater.org/bmp_manual2.htm

A. General Maintenance

All constructed stormwater wetland components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding 1 inch of rainfall. Such components may include forebays, bottoms, trash racks, outlet structures, and riprap or gabion aprons. Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations.

B. Vegetated Areas

Mowing and/or trimming of vegetation must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season. Vegetated areas must be inspected at least annually for erosion and scour. Vegetated areas should also be inspected at least annually for unwanted growth, which should be removed with minimum disruption to the remaining vegetation.

When establishing or restoring vegetation, biweekly inspections of vegetation health should be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density, and diversity should be performed at least twice annually during both the growing and non-growing seasons. The vegetative cover should be maintained at 85 percent. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with the original specifications and the inspection requirements presented above.

The types and distribution of the dominant plants must also be assessed during the semi-annual wetland inspections described above. This assessment should be based on the health and relative extent of both the original species remaining and all volunteer species that have subsequently grown in the wetland. Appropriate steps must be taken to achieve and maintain an acceptable balance of original and volunteer species in accordance with the intent of the wetland's original design.

All use of fertilizers, mechanical treatments, pesticides and other means to assure optimum vegetation health should not compromise the intended purpose of the constructed stormwater wetland. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

C. Structural Components

All structural components must be inspected for cracking, subsidence, spalling, erosion, and deterioration at least annually.

D. Other Maintenance Criteria

The maintenance plan must indicate the approximate time it would normally take to drain the maximum design storm runoff and return the various wetland pools to their normal standing water levels. This drain or drawdown time should then be used to evaluate the wetland's actual performance. If significant increases or decreases in the normal drain time are observed, the wetland's outlet structure, forebay, and groundwater and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the wetland.

DRY WELLS

A dry well is a subsurface storage facility that receives and temporarily stores stormwater runoff from roofs of structures. Discharge of this stored runoff from a dry well occurs through infiltration into the surrounding soils. A dry well may be either a structural chamber and/or an excavated pit filled with aggregate.

Maintenance requirements for dry wells are summarized below. Further information is provided in the NJ Stormwater Best Management Practices Manual at http://www.njstormwater.org/bmp_manual2.htm

A. General Maintenance

A dry well should be inspected at least four times annually as well as after every storm exceeding 1 inch of rainfall. The water level in the test well should be the primary means of measuring infiltration rates and drain times. Pumping stored runoff from an impaired or failed dry well can also be accomplished through the test well. Therefore, adequate inspection and maintenance access to the test well must be provided.

Disposal of debris, trash, sediment, and other waste material removed from a dry well should be done at suitable disposal/recycling sites and in compliance with local, state, and federal waste regulations.

B. Other Maintenance Criteria

The maintenance plan must indicate the approximate time it would normally take to drain the maximum design storm runoff volume from the dry well. This normal drain time should then be used to evaluate the dry well's actual performance. If significant increases in the normal drain time are observed or if it exceeds the 72 hour maximum, appropriate measures must be taken to comply with the drain time requirements and maintain the proper functioning of the dry well.

EXTENDED DETENTION BASINS

An extended detention basin is a facility constructed through filling and/or excavation that provides temporary storage of stormwater runoff. It has an outlet structure that detains and attenuates runoff inflows and promotes the settlement of pollutants.

Maintenance requirements for extended detention basins are summarized below. Further information is provided in the NJ Stormwater Best Management Practices Manual at http://www.njstormwater.org/bmp_manual2.htm

A. General Maintenance

All extended detention basin components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding 1 inch of rainfall. Such components may include bottoms, trash racks, low flow channels, outlet structures, riprap or gabion aprons, and inlets.

Sediment removal should take place when the basin is thoroughly dry. Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations

B. Vegetated Areas

Mowing and/or trimming of vegetation must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season. Vegetated areas must be inspected at least annually for erosion and scour. Vegetated areas should also be inspected at least annually for unwanted growth, which should be removed with minimum disruption to the bottom surface and remaining vegetation.

When establishing or restoring vegetation, biweekly inspections of vegetation health should be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density, and diversity should be performed at least twice annually during both the growing and non-growing seasons. The vegetative cover should be maintained at 85 percent. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with the original specifications and the inspection requirements presented above.

All use of fertilizers, mechanical treatments, pesticides, and other means to assure optimum vegetation health must not compromise the intended purpose of the extended detention basin. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

C. Structural Components

All structural components must be inspected for cracking, subsidence, spalling, erosion, and deterioration at least annually.

D. Other Maintenance Criteria

The maintenance plan must indicate the approximate time it would normally take to completely drain the maximum design storm runoff volume from the basin. This normal drain time should then be used to evaluate the basin's actual performance. If significant increases or decreases in the normal drain time are observed, the basin's outlet structure, underdrain system, and both groundwater and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the basin.

INFILTRATION BASINS

An infiltration basin is a facility constructed within highly permeable soils that provides temporary storage of stormwater runoff. An infiltration basin does not normally have a structural outlet to discharge runoff from the stormwater quality design storm. Instead, outflow from an infiltration basin is through the surrounding soil.

Maintenance requirements for infiltration basins are summarized below. Further information is provided in the NJ Stormwater Best Management Practices Manual at http://www.njstormwater.org/bmp_manual2.htm

A. General Maintenance

All infiltration basin components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding 1 inch of rainfall. Such components may include bottoms, riprap or gabion aprons, and inflow points. This applies to both surface and subsurface infiltration basins.

Sediment removal should take place when the basin is thoroughly dry. Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations.

B. Vegetated Areas

Mowing and/or trimming of vegetation must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season. Vegetated areas must also be inspected at least annually for erosion and scour. The structure must be inspected for unwanted tree growth at least once a year.

When establishing or restoring vegetation, biweekly inspections of vegetation health should be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density, and diversity should be performed at least twice annually during both the growing and non-growing season. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with the original specifications and the inspection requirements presented above.

All use of fertilizers, mechanical treatments, pesticides, and other means to assure optimum vegetation health must not compromise the intended purpose of the infiltration basin. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

All vegetated areas should be inspected at least annually for unwanted growth, which should be removed with minimum disruption to the remaining vegetation and basin subsoil.

C. Structural Components

All structural components must be inspected for cracking, subsidence, spalling, erosion, and deterioration at least annually.

D. Other Maintenance Criteria

The maintenance plan must indicate the approximate time it would normally take to drain the maximum design storm runoff volume below the bottom of the basin. This normal drain or drawdown time should then be used to evaluate the basin's actual performance. If significant increases or decreases in the normal drain time are observed, the basin's bottom surface, subsoil, and both groundwater and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the basin. This applies to both surface and subsurface infiltration basins.

The bottom sand layer in a surface infiltration basin should be inspected at least monthly as well as after every storm exceeding 1 inch of rainfall. The permeability rate of the soil below the basin may also be retested periodically. If the water fails to infiltrate 72 hours after the end of the storm, corrective measures must be taken. Annual tilling by light equipment can assist in maintaining infiltration capacity and break up clogged surfaces.

MANUFACTURED TREATMENT DEVICES

A manufactured treatment device is a pre-fabricated stormwater treatment structure utilizing settling, filtration, absorptive/adsorptive materials, vortex separation, vegetative components, and/or other appropriate technology to remove pollutants from stormwater runoff.

Maintenance requirements for manufactured treatment devices are summarized below. Further information is provided in the NJ Stormwater Best Management Practices Manual at http://www.njstormwater.org/bmp_manual2.htm

A. General Maintenance

All manufactured treatment devices should be inspected and maintained in accordance with the manufacturer's instructions and/or recommendations and any maintenance requirements associated with the device's certification by the NJDEP Office of Innovative Technology. In addition, all device components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding 1 inch of rainfall.

Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations.

B. Vegetation

In those devices utilizing vegetation, trimming of vegetation must be performed on a regular schedule based on specific site conditions. Vegetated areas must be inspected at least annually for erosion and scour as well as unwanted growth, which should be removed with minimum disruption to the planting soil bed and remaining vegetation. All use of fertilizers, mechanical treatments, pesticides, and other means to ensure optimum vegetation health in devices utilizing vegetation should not compromise the intended purpose of the device. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

C. Structural Components

All structural components must be inspected for cracking, subsidence, spalling, erosion, and deterioration at least annually.

D. Other Maintenance Criteria

The maintenance plan must indicate the maximum level of oil, sediment, and debris accumulation allowed before removal is required. These levels should then be monitored during device inspections to help determine the need for removal and other device maintenance.

PERVIOUS PAVING SYSTEMS

Pervious paving systems are paved areas that produce less stormwater runoff than areas paved with conventional paving. This reduction is achieved primarily through the infiltration of a greater portion of the rain falling on the area than would occur with conventional paving. This increased infiltration occurs either through the paving material itself or through void spaces between individual paving blocks known as pavers.

Maintenance requirements for pervious paving systems are summarized below. Further information is provided in the NJ Stormwater Best Management Practices Manual at http://www.njstormwater.org/bmp_manual2.htm

A. General Maintenance

The surface course of all pervious paving systems must be inspected for cracking, subsidence, spalling, deterioration, erosion, and the growth of unwanted vegetation at least once a year. Remedial measures must be taken as soon as practical.

Care must be taken when removing snow from the pervious paving surface courses. Pervious paving surface courses can be damaged by snow plows or loader buckets that are set too low to the ground. This is particularly true at permeable paver systems where differential settlement of pavers has occurred. Sand, grit, or cinders should not be used on pervious paving surface courses for snow or ice control.

If mud or sediment is tracked onto the surface course of a pervious paving system, it must be removed as soon as possible. Removal should take place when the surface course is thoroughly dry. Disposal of debris, trash, sediment, and other waste matter removed from pervious paving surface courses should be done at suitable disposal/recycling sites and in compliance with local, state, and federal waste regulations.

B. Porous Paving Systems

The surface course of a porous paving system must be vacuum swept at least four times a year. This should be following by a high pressure hosing. All dislodged sediment and other particulate matter must be removed and properly disposed.

C. Permeable Paver Systems

Maintenance of permeable pavers should be consistent with the manufacturer's recommendations.

D. Vegetation

Mowing and/or trimming of turf grass used with permeable pavers must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season. All vegetated areas must be inspected at least annually for erosion and scour. Vegetated areas should also be inspected at least annually for unwanted growth, which should be removed with minimum disruption to the paver and remaining vegetation.

When establishing or restoring vegetation, biweekly inspections of vegetation health should be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density, and diversity should be performed at least twice annually during both the growing and non-growing seasons. The vegetative cover should be maintained at 85 percent. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with the original specifications and the inspection requirements presented above.

All use of fertilizers, pesticides and other means to assure optimum vegetation health should not compromise the intended purpose of a pervious paving system. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

E. Other Maintenance Criteria

The maintenance plan must indicate the approximate time it would normally take to drain the maximum design storm runoff volume below the pervious paving system's surface course. This normal drain time should then be used to evaluate the system's actual performance. If significant increases or decreases in the normal drain time are observed or if the 72 hour maximum is exceeded, the various system components and groundwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the system.

SAND FILTERS

A sand filter consists of a forebay and underdrained sand bed. It can be configured as either a surface or subsurface facility. Runoff entering the sand filter is conveyed first through the forebay, which removes trash, debris, and coarse sediment, and then through the sand bed to an outlet pipe.

Maintenance requirements for sand filters are summarized below. Further information is provided in the NJ Stormwater Best Management Practices Manual at http://www.njstormwater.org/bmp_manual2.htm

A. General Maintenance

All sand filter components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding 1 inch of rainfall. Such components may include inlets and diversion structures, forebays, sand beds, and overflows.

Sediment removal should take place when all runoff has drained from the sand bed and the sand is reasonably dry. In addition, runoff should be drained or pumped from forebays with permanent pools before removing sediment. Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state, and federal waste regulations.

B. Vegetated Areas

In surface sand filters with turf grass bottom surfaces, mowing and/or trimming of vegetation must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season. Vegetated areas must also be inspected at least annually for erosion and scour. The filter bottom must be inspected for unwanted underbrush and tree growth at least once a year.

When establishing or restoring vegetation, biweekly inspections of vegetation health should be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density, and diversity should be performed during both the growing and non-growing season at least twice annually. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with the original specifications and the inspection requirements presented above.

All use of fertilizers, mechanical treatments, pesticides and other means to assure optimum vegetation health must not compromise the intended purpose of the sand filter. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

C. Structural Components

All structural components must be inspected for cracking, subsidence, spalling, erosion, and deterioration at least annually.

D. Other Maintenance Criteria

The maintenance plan must indicate the approximate time it would normally take to drain the maximum design storm runoff volume below the top of the filter's sand bed. This normal drain or drawdown time should then be used to evaluate the filter's actual performance. If significant increases or decreases in the normal drain time are observed, the filter's sand bed, underdrain system, and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the filter.

The sand bed should be inspected at least twice annually. The infiltration rate of the sand bed material may also be retested. If the water fails to infiltrate 72 hours after the end of the stormwater quality design storm, corrective measures must be taken.

VEGETATIVE FILTERS

A vegetative filter is an area designed to remove suspended solids and other pollutants from stormwater runoff flowing through a length of vegetation called a vegetated filter strip. The vegetation in a filter strip can range from turf and native grasses to herbaceous and woody vegetation, all of which can either be planted or indigenous.

Maintenance requirements for vegetative filters are summarized below. Further information is provided in the NJ Stormwater Best Management Practices Manual at http://www.njstormwater.org/bmp_manual2.htm

A. General Maintenance

All vegetated filter strip components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four times annually and after every storm exceeding 1 inch of rainfall. Such components may include vegetated areas and stone cutoffs and, in particular, the upstream edge of the filter strip where coarse sediment and/or debris accumulation could cause inflow to concentrate.

Sediment removal should take place when the filter strip is thoroughly dry. Disposal of debris and trash should be done only at suitable disposal/recycling sites and must comply with all applicable local, state, and federal waste regulations.

B. Vegetated Areas

Mowing and/or trimming of vegetation must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season. Vegetated areas must be inspected at least annually for erosion and scour. Vegetated areas should also be inspected at least annually for unwanted growth, which should be removed with minimum disruption to the planting soil bed and remaining vegetation.

When establishing or restoring vegetation, biweekly inspections of vegetation health should be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density, and diversity should be performed during both the growing and non-growing season at least twice annually. The vegetative cover should be maintained at 85 percent. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with the original specifications and the inspection requirements presented above.

All use of fertilizers, mechanical treatments, pesticides and other means to assure optimum vegetation health must not compromise the intended purpose of the vegetative filter. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

All areas of the filter strip should be inspected for excess ponding after significant storm events. Corrective measures should be taken when excessive ponding occurs.

C. Other Maintenance Criteria

The maintenance plan must indicate the approximate time it would normally take for the filter strip to drain the maximum design storm runoff volume and begin to dry. This normal drain time should then be used to evaluate the filter's actual performance. If significant increases or decreases in the normal drain time are observed or if the 72 hour maximum is exceeded, the filter strip's planting soil bed, vegetation, and groundwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements and maintain the proper functioning of the filter strip.

WET PONDS

A wet pond (also known as a retention basin) is a stormwater facility constructed through filling and/or excavation that provides both permanent and temporary storage of stormwater runoff. It has an outlet structure that creates a permanent pool and detains and attenuates runoff inflows and promotes the settlement of pollutants.

Maintenance requirements for wet ponds are summarized below. Further information is provided in the NJ Stormwater Best Management Practices Manual at http://www.njstormwater.org/bmp_manual2.htm

A. General Maintenance

All wet pond components expected to receive and/or trap debris and sediment must be inspected for clogging and excessive debris and sediment accumulation at least four times annually as well as after every storm exceeding one inch of rainfall. The primary location for debris and particularly sediment accumulation will be within a wet pond's permanent pool. Additional components may include forebays, inflow points, trash racks, outlet structures, and riprap or gabion aprons.

Disposal of debris, trash, sediment, and other waste material should be done at suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.

B. Vegetated Areas

Mowing and/or trimming of vegetation must be performed on a regular schedule based on specific site conditions. Grass should be mowed at least once a month during the growing season. Vegetated areas must also be inspected at least annually for erosion and scour. Vegetated areas should also be inspected at least annually for unwanted growth, which should be removed with minimum disruption to the remaining vegetation.

When establishing or restoring vegetation, biweekly inspections of vegetation health should be performed during the first growing season or until the vegetation is established. Once established, inspections of vegetation health, density and diversity should be performed at least twice annually during both the growing and non-growing season. The vegetative cover should be maintained at 85 percent. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with the original specifications and the inspection requirements presented above.

All use of fertilizers, mechanical treatments, pesticides and other means to ensure optimum vegetation health must not compromise the intended purpose of the wet pond. All vegetation deficiencies should be addressed without the use of fertilizers and pesticides whenever possible.

C. Structural Components

All structural components must be inspected for cracking, subsidence, spalling, erosion and deterioration at least annually. All outlet valves are to be inspected and exercised at least four times annually.

D. Other Maintenance Criteria

The maintenance plan must indicate the approximate time it would normally take to completely drain the maximum design storm runoff volume and return the pond to its permanent pool level. This normal drain time should then be used to evaluate the pond's actual performance. If significant increases or decreases in the normal drain time are observed, the pond's outlet structure and both groundwater and tailwater levels must be evaluated and appropriate measures taken to comply with the maximum drain time requirements.

APPENDIX B

MAINTENANCE CHECKLISTS

MAINTENANCE CHECKLIST FOR
[*STORMWATER MANAGEMENT MEASURE NAME*]

[*ROADWAY NAME*]
[*INTERCHANGE, SERVICE AREA, TOLL PLAZA, MAINTENANCE YARD, OR MILEPOST*]
[*TOWN, COUNTY*], NEW JERSEY

DATE:
TIME:
WEATHER CONDITIONS:
INSPECTOR:

Yes	No	Maintenance Evaluation	Action(s) Required if Answer "Yes"
☐	☐	[*describe specific evaluation/inspection item and conditions indicating that corrective action is required*]	[*describe specific corrective actions required if deficiency is identified*]
☐	☐		
☐	☐		
☐	☐		
☐	☐		
☐	☐		
☐	☐		
☐	☐		

MAINTENANCE CHECKLIST FOR INFILTRATION BASIN #1

INTERCHANGE 98
MILEPOST No. [###]
WALL TOWNSHIP, MONMOUTH COUNTY, NEW JERSEY

DATE:
TIME:
WEATHER CONDITIONS:

Yes	No	Maintenance Evaluation	Action(s) Required if Answer "Yes"
❑	❑	Is there a buildup of sediment (in excess of two inches), trash, debris or any other stormwater pollution within the basin and/or outlet structure?	Remove sediment, trash, debris, etc. Dispose debris in accordance with local, state and federal requirements.
❑	❑	Is there any structural failure to headwalls/retaining walls?	Consult engineer to determine safety and stability of the structures.
❑	❑	Are there visible signs of cracking (wider than half an inch), damage or deterioration on the outlet structure?	Consult engineer to determine safety and stability of the system.
❑	❑	Are there any signs of unusual color, odor or turbidity within the discharged water?	Evaluate upstream conveyance system for possible sediment, trash and debris. Cleanse system if any of the aforementioned obstructions are encountered. Dispose obstructions in accordance with local, state and federal requirements.
❑	❑	Are there root intrusions or any other plant growth occurring with the retaining wall system(s)?	Remove vegetation and dispose in accordance with local, state and federal requirements.
❑	❑	Is the recharge basin draining within 72-hours?	Investigate draining time in more detail (clogged outlet?, excessive debris buildup at outlet structure? etc.) and if basin is still not draining within 72-hours, remove and properly dispose of basin bottom soil and replace with new soil meeting basin soil specifications.

APPENDIX C

MAINTENANCE LOGS

MAINTENANCE LOG FOR

[*STORMWATER MANAGEMENT MEASURE NAME*]

[*ROADWAY NAME*]

[*INTERCHANGE, SERVICE AREA, TOLL PLAZA, MAINTENANCE YARD, OR MILEPOST*]

[*TOWN, COUNTY*], NEW JERSEY

DATE	PERSON CONDUCTING MAINTENANCE	AREA OF MAINTENANCE	PROBLEM(S) FOUND	ACTION(S) TAKEN
[*date maintenance performed*]	[*person(s) performing maintenance*]	[*item being maintained*]	[*deficiency being corrected*]	[*corrective actions performed*]

APPENDIX D

PHOTOS OF STORMWATER MANAGEMENT MEASURES

[*insert photographs of each stormwater management measure in plan*]

APPENDIX E

MANUFACTURER LITERATURE

[*insert manufacturers literature for each stormwater management measure in plan, including as applicable:*

- *Operation and maintenance instructions*
- *User manuals*
- *Product information*
- *Warranties*]