Stormwater Management Maintenance Manual

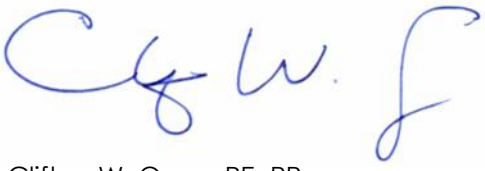
501-503 Station Avenue

Block 25, Lots 16 & 17.01
Borough of Haddon Heights
Camden County, New Jersey

Prepared for:
Gary Farrell
Broken Ground Properties, LLC
5 Circle Lane
Cherry Hill, NJ 08003

Prepared by:
Stantec Consulting Services Inc.
10000 Midlantic Drive, Suite 300 West
Mount Laurel, NJ 08054
Phone: (856) 234-0800
Fax: (856) 234-5928

Stantec No. 192520466



Clifton W. Quay, PE, PP
NJ P.E. License #42670

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1.0 Chapter 1 – STORMWATER MANAGEMENT FACILITIES

1.1 RESPONSIBILITY FOR MAINTENANCE

Broken Ground Properties, LLC will be responsible for maintaining the basin.

5 Circle Lane
Cherry Hill, NJ 08003
609-774-5434

1.2 SEQUENCING

Care should be taken during construction to minimize the risk of premature failure of stormwater management facilities including the underground basin. This failure is caused by the deposition of sediments from disturbed, unstabilized areas. This can be minimized or avoided by proper sequencing.

A. Construction of the underground basin should take place after the site has been stabilized. All applicable erosion and sediment control practices shall be in place prior to any grading operation and installation of proposed structures or utilities.

B. No runoff should enter the underground basin prior to completion of construction and the complete stabilization of the tributary areas.

C. Diversion berms or silt fence should be placed around the perimeter of the basins during all phases of construction. Sediment and erosion controls should be used to keep runoff and sediment away from the basins.

D. Initial excavation of basins should be carried out to within one foot of the final grade of the basin floor. Final excavation of the basin floor should be delayed until all distributed areas in the drainage area are stabilized. All excavation should be performed by equipment with tracks exerting relatively light pressures. This will prevent compacting of the basin floor, which would reduce the detention capacity.

E. In order to avoid soil compaction, absolutely no equipment should be driven in the area of the basin before and after its construction.

F. Infiltration Basins: Basin construction must not compact soils below the infiltration basin bottom. Excavate infiltration basins from outside of the perimeter of the basin. No heavy equipment is permitted in the basin at any time.

G. Infiltration Basins: After final grading, the basin floor should be tilled to a depth of at least 6 inches to provide a well-aerated, porous surface texture. Six inches of compost should be tilled in at this time if soils are even the slightest bit compacted. This will help to facilitate infiltration.

H. During and after excavation, all excavated materials should be placed downstream, away from the basins, to prevent redepositing during runoff events.

I. Immediately following basin construction, the bottom and side slopes of the basin should be stabilized with a dense stand of appropriate plants.

1.3 CONSTRUCTION

Experience has shown that the longevity of a basin is strongly influenced by the care taken during construction. The construction sequence and specifications for each basin must be precisely followed.

A. Protection of the subgrade soils from compaction by construction equipment and contamination and clogging by sediment are vital.

B. Prior to the basin construction, the area of basins should be cordoned or roped off to prevent construction equipment and stockpiled materials from compacting the subgrade soils.

C. Basin construction should be delayed until all other construction within its drainage area is completed, and the drainage area stabilized.

D. The use of basins as a temporary sediment basin during construction is strongly discouraged.

E. Smearing of the soil at the interface with the basin floor must be avoided and/or corrected by raking or rototilling.

F. Light earth-moving equipment should be used to excavate the basins. Use of heavy equipment causes compaction of the soils beneath the basin floor, resulting in reduced capacity.

G. Once the final grading of the basin is reached, the bottom of the basin should be deeply tilled with a rotary tiller or disc harrow and then smoothed out with a leveling drag or equivalent grading equipment.

H. Protection of the subgrade soils from compaction by construction equipment and contamination and clogging by sediment are vital.

1.4 MAINTENANCE

Maintenance is required for the proper operation of stormwater (detention/retention and infiltration) basins, as it is with all BMPs. The use and regular maintenance of pretreatment BMPs will significantly minimize maintenance requirements for the basin.

1.4.1 UNDERGROUND BASIN

A. All 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.
    a. Basin components include basin bottom, overflow structures and inflow points.

b. Using a flashlight and stadia rod, measure depth of sediment and record results on maintenance log. If sediment is at or above 1 inch, then the chambers will have to be cleaned out using the JetVac process. Mirrors on poles or cameras may be used to check the other end of the chambers.
c. If cleanout is required,
    i. A fixed culvert cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
    ii. Apply multiple passes of JetVac until backflush water is clean
    iii. Vacuum as required

B. Sediment removal should take place when the basin is thoroughly dry. Sediment removal within the basin should be performed when the sediment is dry enough so that it is cracked and readily separates from the basin floor.
C. Disposal of debris, trash, sediment and other waste material should be done at a suitable disposal/recycling sites and in compliance with all applicable local, state and federal waste regulations.
D. All outlets and overflow structures are to be inspected at least four times annually.
E. Direct access to the Drywells shall be provided to simplify maintenance. A cleanout/inspection port is provided for each drywell row.

2.0 Chapter 2 – MAINTENANCE STANDARDS FOR DRAINAGE FACILITIES

2.1 UNDERGROUND DETENTION BASINS

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
General	Trash & Debris	Any trash and debris which exceed 1 cubic foot per 1,000 square feet (this is about equal to the amount of trash it would take to fill up one standard size office garbage can). In general, there should be no visual evidence of dumping.	Trash and debris cleared from site.
	Poisonous Vegetation	Any poisonous or nuisance vegetation which may constitute a hazard to County personnel or the public.	No danger of poisonous vegetation where County personnel or the public might normally be. (Coordination with County Health Department)
	Pollution	Oil, gasoline, or other contaminants of one gallon or more or any amount found that could: 1) cause damage to plant, animal, or marine life; 2) constitute a fire hazard; or 3) be flushed downstream during rain storms.	No contaminants present other than a surface film. (Coordination with County Health Department)
	Rodent Holes	Any evidence of rodent holes if facility is acting as a dam or berm, or any evidence of water piping through dam or berm via rodent holes.	Rodents destroyed and dam or berm repaired. (Coordination with County Health Department)
	Insects	When insects such as wasps and hornets interfere with maintenance activities.	Insects destroyed or removed from site.
	Tree Growth	Tree growth does not allow maintenance access or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements). If trees are not interfering with access, leave trees alone.	Trees do not hinder maintenance activities. Selectively cultivate trees such as alders for firewood.
Storage Area	Sediment	Accumulated sediment that exceeds 10% of the designed pond depth.	Sediment cleaned out to designed pond shape and depth; pond reseeded if necessary to control erosion.
Pond Dikes	Settlements	Any part of dike which has settled 4 inches lower than the design elevation.	Dike should be built back to the design elevation.

2.2 CONVEYANCE SYSTEMS (PIPES & DITCHES)

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
Pipes	Sediment & Debris	Accumulated sediment that exceeds 20% of the diameter of the pipe.	Pipe cleaned of all sediment and debris.
	Vegetation	Vegetation that reduces free movement of water through pipes.	All vegetation removed so water flows freely through pipes.
	Damaged	Protective coating is damaged; rust is causing more than 50% deterioration to any part of pipe.	Pipe repaired or replaced.
		Any dent that decreases the cross section area of pipe by more than 20%.	Pipe repaired or replaced.
Open Ditches	Trash & Debris	Trash and debris exceeds 1 cubic foot per 1,000 square feet of ditch and slopes.	Trash and debris cleared from ditches.
	Sediment	Accumulated sediment that exceeds 20 % of the design depth.	Ditch cleaned/ flushed of all sediment and debris so that it matches design.
	Vegetation	Vegetation that reduces free movement of water through ditches.	Water flows freely through ditches.
	Erosion Damage to Slopes	See “Infiltration Basins” Section 2.2	See “Infiltration Basins” Section 2.2
	Rock Lining Out of Place or Missing (If Applicable).	Maintenance person can see native soil beneath the rock lining.	Replace rocks to design standards.
Catch Basins		See “Catch Basins: Section 2.3	See “Catch Basins” Section 2.3

3.0 Chapter 3 – BMP MAINTENANCE SCHEDULE

3.1 BMP MAINTENANCE SCHEDULE

BMP	ACTIVITY	SCHEDULE
UNDERGROUND STORMWATER BASINS	▪ Cleaning and removal of debris and accumulated sediment. ▪ Cleanout basin bottom ▪ Repair of outlet control structure ▪ Cleanout Inlets with sump	Inspect basin at least four (4) times annually as well as after every storm exceeding one (1) inch of rainfall. Inspect & clean out Bi-Annually

4.0 Chapter 4 – INSPECTION CHECKLISTS FOR DRAINAGE FACILITIES

4.1 STORMWATER BASINS

Project/Location:_____

"As Built" Plans Available?_____

Date/Time:_____

Days Since Previous Rainfall and Rainfall Amount:_____

Inspector: _____

Maintenance Item	Satisfactory	Unsatisfactory	Comments
1. Debris Cleanout			
○ Basin bottom or trench surface clear of debris			
○ Inlet/Inflow pipes clear of debris			
○ Overflow spillway clear of debris			
○ Outlet clear of debris			
2. Sediment Traps or Forebays			
○ Sedimentation noted			
○ Greater than 50% of storage volume remaining			
3. Vegetation (Basins)			
○ Mowing performed as necessary			
○ No evidence of erosion			
4. Dewatering			
○ Basin/Trench dewaters between storms			
○ Drawdown time does not exceed 36 to 48 hours			
5. Sediment Accumulation			
○ Approximate depth of accumulated sediment			
6. Catch Basins			
○ Good condition			
○ No evidence of erosion			
7. Outlet/Overflow Spillway			
○ Good condition, no need for repair			
○ No evidence of erosion			
8. Aggregate Repairs (Trench)			
○ Surface of aggregate clean			
○ Top layer of stone does not need replacement			
○ Trench does not need rehabilitation			
9. Structural Repairs			
○ Embankment in good repair			

○ Site slopes are stable			
○ No evidence of erosion			
10. Fences/Access Repairs			
○ Fences in good condition			
○ No damage which would allow undesired entry			
○ Access point in good condition			
○ Locks and gate function property			
Actions to Be Taken:			
To Be Completed By (Date):			

5.0 Chapter 5 – ESTIMATED ANNUAL COSTS

5.1 STORMWATER BASIN/CONVEYANCE SYSTEM MAINTENANCE COSTS

Maintenance Item	Maintenance Timeframe	Total Cost
Remove Sediment in Basin	Twice per Year	$2,000