Stormwater Management
Maintenance Manual

PROPERTY ADDRESS:

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_____

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1.0 Chapter 1 – STORMWATER MANAGEMENT FACILITIES

1.1 RESPONSIBILITY FOR MAINTENANCE

XXX will be responsible for maintaining the basin.

1.2 SEQUENCING

Care should be taken during construction to minimize the risk of premature failure of stormwater management facilities including the _____ (stormwater facilities). 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 _____ (stormwater facilities) 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 _____ (stormwater facilities) 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. Infiltration Basins: Sand layer (6-inch) thick is to consist of K5 sand with a maximum of 15% fines and a minimum permeability rate of 20 inches per hour.

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

J. 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 and side slopes, 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 STORMWATER BASINS

A. Pretreatment devices associated with basins should be inspected and cleaned at least twice a year, and ideally every other month.

B. Once the basin has gone on-line, inspections should occur after every major storm for the first few months to ensure proper stabilization and function. Attention should be paid to how long water remains standing in the basin after a storm; standing water within the basin more than 72 hours after a storm indicates that the infiltration capacity may have been reduced through poor construction practices and/or stabilization. Factors responsible for clogging (such as upland sediment erosion and excessive compaction of soils) should be repaired immediately. Also, the newly established vegetation should be inspected several times to determine if any remedial actions (reseeding, irrigation, etc.) are necessary.

C. All basins and 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 1 inch of rainfall.

    a. Basin components include basin bottom, riprap aprons, trash racks, outlet structures and inflow points.

D. 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. This also prevents smearing of the basin floor.

E. Light equipment, which will not compact the underlying soil, should be used to remove the top layer of sediment. The remaining soil should be tilled and revegetated as soon as possible.

F. 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.

G. 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 basin must be inspected for unwanted tree growth at least once a year.

H. When establishing or restoring vegetation, biweekly inspections of vegetation health should be performed during the first growing season or until 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.

I. Vegetative cover should be maintained at 85 percent. If vegetation has greater than 50 percent damage, the area should be reestablished in accordance with original specifications and inspection requirements.

J. 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.

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

L. All outlets, outlet structures and control structures are to be inspected at least four times annually.

M. The bottom sand layer of the infiltration basins should be inspected at least monthly as well as after every storm exceeding 1 inch of rainfall. 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.

N. The basins should be inspected at least four times per year. Important items to check include: differential accumulation of sediment, erosion of the basin floor, condition of riprap and the health of the vegetation. Eroded or barren spots should be replanted immediately after inspection to prevent additional erosion and accumulation of sediment.

O. Direct access to the basin shall be provided to simplify maintenance. Provision of a hardened access or staging pad adjacent to each basin is to be provided. Such an area helps protect the basin from excessive erosion resulting from operation of equipment used for maintenance. The pad area can be hardened by installing block pavers or similar material.

P. In addition, a fixed, vertical, sediment depth marker should be installed in each basin to measure the sediment deposition. The sediment depth marker will allow the owner to monitor the accumulation and anticipate maintenance needs. Clean out frequency will vary depending on the conditions of the upstream watershed and the given site.

1.4.2 WET PONDS

A. The wet pond should be inspected at least four times per year. Important items to check include: differential accumulation of sediment, erosion of the basin floor, condition of riprap and the health of the vegetation. Eroded or barren spots should be replanted immediately after inspection to prevent additional erosion and accumulation of sediment.

B. All outlets are to be inspected at least four times annually. Examine the condition of riprap and any structures associated with the pond.

C. Inspect the pond exposed surface to ensure the pond lining is not exposed or damaged, vegetation is intact and erosion is not occurring at the shore line.

D. Newly established vegetation should be inspected several times to determine if any remedial actions (reseeding, irrigation, etc.) are necessary.

E. In the event it becomes necessary to clean sediment from the bottom of the pond in order to restore the permanent pool elevation, pumping or a possible drawdown of the pool area may be required. Ensure proper dewatering methods are used and filtration of pumped water is provided.

1.4.3 BIORETENTION BASINS

A. The bioretention basin should be inspected at least four times per year. Important items to check include: differential accumulation of sediment, erosion of the basin floor, condition of riprap and the health of the vegetation. Eroded or barren spots should be replanted immediately after inspection to prevent additional erosion and accumulation of sediment.

B. Maintain vegetation in order to enhance appearance and prevent erosion/clogging of bioswale soil mix. Prune and weed to maintain appearance. Remove trash and debris.

C. Inspect soil and repair eroded areas one time per month.

D. Inspect grass filter strip for erosion or gullying. Re-seed as necessary. Two times per year, spring and fall.

E. Inspect vegetation to evaluate its health two times per year. Dead or severely diseased vegetation should be removed.Newly established vegetation should be inspected several times to determine if any remedial actions (reseeding, irrigation, etc.) are necessary.

F. Replace mulch within entire rain garden one time every 3 years in the spring. Remove old mulch prior to new mulch placement.

G. Inspect daylight pipes and overflow pipes to make sure that they are not clogged three times per year.

H. Inspect pH of infiltration/planting soils in the rain garden soil one time per year. If the pH is below 5.2, limestone should be applied. If the pH is above 7.0 to 8.0, then iron sulfate plus sulfur can be added to reduce the pH.

I. Monitor infiltration twice per year. The rain garden system should drain within 48 hours of a storm event.

J. Refresh infiltration capacity of rain garden if monitoring reveals reduced infiltration capacity as needed based on monitoring results. Core aeration can be used.

K. Clip standing dead vegetation stalks in order to maintain weed free vegetation. Stems and seed heads can be left for winter interest, wildlife cover, and bird food. Dead plant material should be trimmed when new growth is 4-6 inches tall.

L. Do not place grass clippings/landscape waste within rain garden in order to prevent clogging of bioswale soil mix, which would limit infiltration capacity.

M. Replace mulch in void areas or when erosion is evident in order to curtail/prevent erosion.

N. Inspect rain garden drainage basin to determine if sedimentation has significantly reduced infiltration capacity. Monitor infiltration capacity of bioretention basin by filling small area with water and record rate water percolates into soil. Scrape out basin and replace bioretention basin soil mix and vegetation if system is not draining. Perform the Percolation test one time per three years. Replace the soil one time per every twenty years or as needed.

O. Winter Maintenance: Snow and Ice Removal - Do not stockpile snow in rain garden.

1.4.4 POROUS PAVEMENT

A. Special Maintenance Considerations:
   1. Prevent clogging of pavement surface with sediment.
   2. Vacuum pavement four times per year. Dispose of particles off-site.
   3. Maintain planted areas adjacent to pavement. Immediately clean any soil deposited on pavement.
   4. Do not allow construction staging, soil/mulch storage, etc. on unprotected pavement surface.
   5. Clean inlets twice per year.

B. Repairs: Potholes in the porous pavement are extremely unlikely; though settling might occur if a soft spot in the subgrade is not removed during construction. For damaged areas of less than 50 square feet, a declivity could be patched by any means suitable with standard pavement, with the loss of porosity of that area being insignificant. The declivity can also be filled with porous mix. If an area greater than 50 sq. ft. is in need of repair, approval of patch type must be sought from either the engineer or owner. Under no circumstance is the pavement surface to ever be seal coated. Any required repair of drainage structures should be done promptly to ensure continued proper functioning of the system.
   1. Surface should never be seal-coated.
   2. Damaged areas less than 50 sq. ft. can be patched with porous or standard asphalt.
   3. Larger areas should be patched with an approved porous asphalt.

C. Winter Maintenance: Winter maintenance for a porous parking lot may be necessary but is usually less intensive than that required for a standard asphalt lot. By its very nature, a porous pavement system with subsurface aggregate bed has superior snow melting characteristics

than standard pavement. The underlying stone bed tends to absorb and retain heat so that freezing rain and snow melt faster on porous pavement. Therefore, ice and light snow accumulation are generally not as problematic. However, snow will accumulate during heavier storms. Abrasives such as sand or cinders should not be applied on or adjacent to the porous pavement. Snow plowing is fine, provided it is done carefully (i.e. by setting the blade slightly higher than usual, about an inch). Salt is acceptable for use as a deicer on the porous pavement, though nontoxic, organic deicers, applied either as blended, magnesium chloride-based liquid products or as pretreated salt, are preferable.

1. Snow and Ice Removal

    a) Do not apply abrasives such as sand or cinders on or adjacent to porous pavement

    b) Snow plowing is fine but should be done so as not to gouge the pavement (i.e. set the blade one-inch higher than usual).

    c) Salt application is acceptable, although more environmentally-benign deicers are preferable.

2.0 Chapter 2 – MAINTENANCE STANDARDS FOR DRAINAGE FACILITIES

2.1 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)
	Unmowed Grass/ Ground Cover	If facility is located in private residential area, mowing is needed when grass exceeds 18 inches in height. In other areas, the general policy is to make the pond site match adjacent ground cover and terrain as long as there is no interference with the function of the facility.	When mowing is needed, grass/ground cover should be mowed to 2 inches in height. Mowing of selected higher use areas rather than the entire slope may be acceptable for some situations.
	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.
Side Slopes of Pond	Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
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.
Emergency Overflow/Spillway	Rock Missing	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil at the top of out flow path of spillway. Rip-rap on inside slopes need not be replaced.	Replace rocks to design standards.

2.2 INFILTRATION 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 the public.	No danger of poisonous vegetation where the public might normally be.
	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 withCounty Health Department)
	Unmowed Grass/ Ground Cover	If facility is located in private residential area, mowing is needed when grass exceeds 18 inches in height. In other areas, the general policy is to make the pond site match adjacent ground cover and terrain as long as there is no interference with the function of the facility.	When mowing is needed, grass/ground cover should be mowed to 2 inches in height. Mowing of selected higher use areas rather than the entire slope may be acceptable for some situations.
	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.
Side Slopes of Basin	Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock, grass, compaction.
Storage Area	Sediment	A percolation test pit or test of facility indicates facility is only working at 90% of its designed capabilities. If two inches or more sediment is present, remove.	Sediment is removed and/or facility is cleaned so that infiltration system works according to design.
	Sheet Cover (If Applicable)	Sheet cover is visible and has more that three 1/4-inch holes in it.	Sheet cover repaired or replaced.
	Sump Filled with Sediment and Debris (If Applicable)	Any sediment and debris filling vault to 10% of depth from sump bottom to bottom of outlet pipe or obstructing flow into the connector pipe.	Clean out sump to design depth.
Filter Bags	Filled with Sediment and Debris	Sediment and debris fill bag more than 1/2 full.	Replace filter bag or redesign system.
Rock Filters	Sediment and Debris	By visual inspection, little or no water flows through filter during heavy rain storms.	Replace gravel in rock filter.

Emergency Overflow/Spillway	Rock Missing	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil at the top of out flow path of spillway.	Replace rocks to design standards.

2.3 WET PONDS

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 the public.	No danger of poisonous vegetation where the public might normally be.
	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)
	Unmowed Grass/ Ground Cover	If facility is located in private residential area, mowing is needed when grass exceeds 18 inches in height. In other areas, the general policy is to make the pond site match adjacent ground cover and terrain as long as there is no interference with the function of the facility.	When mowing is needed, grass/ground cover should be mowed to 2 inches in height. Mowing of selected higher use areas rather than the entire slope may be acceptable for some situations.
	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.
Side Slopes of Basin	Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
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.
Filter Bags	Filled with Sediment and Debris	Sediment and debris fill bag more than 1/2 full.	Replace filter bag or redesign system.
Rock Filters	Sediment and Debris	By visual inspection, little or no water flows through filter during heavy rain storms.	Replace gravel in rock filter.
Emergency Overflow/Spillway	Rock Missing	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of	Replace rocks to design standards.

	native soil at the top of out flow path of spillway. Rip-rap on inside slopes need not be replaced.

Note: Sediment accumulation of more than 0.25 inches per year may indicate excessive erosion is occurring upstream of the facility or that conveyance systems are not being properly maintained. The contributing drainage area should be checked for erosion problems or inadequate maintenance of conveyance systems if excessive sedimentation is noted in an infiltration facility.
Check twice a year during first 2 years of operation; once a year thereafter. Clean manholes/catch basins, repair damaged inlets/outlets, clean trash racks.

2.4 CLOSED DETENTION SYSTEMS (PIPES/TANKS)

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
Storage Area	Plugged Air Vents	One-half of the cross section of a vent is blocked at any point with debris and sediment	Vents free of debris and sediment
	Debris and Sediment	Accumulated sediment depth exceeds 10% of the diameter of the storage area for ½ length of storage vault or any point depth exceeds 15% of diameter. Example: 72-inch storage tank would require cleaning when sediment reaches depth of 7 inches for more than ½ length of tank.	All sediment and debris removed from storage area.
	Joints Between Tank/Pipe Section	Any crack allowing material to be transported into facility	All joint between tank /pipe sections are sealed
	Tank Pipe Bent Out of Shape	Any part of tank/pipe is bent out of shape more than 10% of it's design shape	Tank/ pipe repaired or replaced to design.
Manhole		See "Manholes" Section 2.8	See "Manholes" Section 2.8 See "Catch Basins
Catch Basins		See "Catch Basins" Section 2.8	See "Catch Basins" Section 2.8

2.5 POROUS PAVEMENT

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
Porous Pavement	Sediment Accumulation	Sediment accumulated. Pavement is to be vacuumed each season, four times per year.	No sediment accumulation in porous pavement.
Catch Basins		See "Catch Basins" Section 2.8.	See "Catch Basins" Section 2.8.
Planting Areas	Soil migration	Soil deposited on porous pavement. Immediately clean any soil deposited on pavement.	Stabilization of planting areas adjacent to porous pavement.

2.6 BIORETENTION BASINS

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
General	Trash & Debris	In general, there should be no visual evidence of trash and debris.	Trash and debris cleared from basin area.
	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.

	Insects/Pests	Monitor pest damage and treat only when necessary. Contact the Rutgers Cooperative Extension office and follow their recommendations for treatment.	Insects/pests destroyed or removed from site.
Storage Area	Sediment	A percolation test pit or test of facility indicates facility is only working at 90% of its designed capabilities.	The infiltration system (rain garden) is infiltrating at the desired rate.
Yard Drains	Structure Damaged or Clogged	Observation shows damage evident, or grate openings clogged.	Yard drain structures fully intact and grate openings clear to facilitate drainage.
Underdrains	Perforations Plugged.	Over 1/2 of perforations in pipe are plugged with debris and sediment.	Cleaned or replaced perforated pipes with unobstructed drainage.
Vegetation	Aggressive Invasive Species (Vegetation)	Unwanted plants (e.g. Asian Bittersweet, Japanese Stiltgrass, Garlic Mustard, Japanese Honeysuckle, Mugwort, Multiflora Rose) present. http://www.invasivespeciesinfo.gov/unitedstates/nj.shtml	Only desirable plant species present, per approved plan.
	Plant Health	Plant material not thriving ore exhibiting signs of stress	Healthy, robust plants.
	Poisonous Vegetation	Any poisonous or nuisance vegetation which may constitute a hazard to the public.	No danger of poisonous vegetation where the public might normally be.

2.7 OUTLET STRUCTURE/CONTROL STRUCTURE

MAINTENANCE COMPONENT	DEFECT	CONDITION WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
General	Trash and Debris (Includes Sediment)	Distance between debris build-up and bottom of orifice plate is less than 1-1/2 feet.	All trash and debris removed.
	Structural Damage	Structure is not securely attached to manhole wall and outlet pipe structure should support at least 1,000 lbs of up or down pressure.	Structure securely attached to wall and outlet pipe.
		Structure is not in upright position (allow up to 10% from plumb).	Structure in correct position.
		Connections to outlet pipe are not watertight and show signs of rust.	Connections to outlet pipe are water tight; structure repaired or replaced and works as designed.
		Any holes--other than designed holes--in the structure.	Structure has no holes other than designed holes.
Cleanout Gate	Damaged or Missing	Cleanout gate is not watertight or is missing.	Gate is watertight and works as designed.
		Gate cannot be moved up and down by one maintenance person.	Gate moves up and down easily and is watertight.
		Chain leading to gate is missing or damaged.	Chain is in place and works as designed.
		Gate is rusted over 50% of its surface area.	Gate is repaired or replaced to meet design standards.
Orifice Plate	Damaged or	Control device is not working properly due to	Plate is in place and works as

	Missing	missing, out of place, or bent orifice plate.	designed.
	Obstructions	Any trash, debris, sediment, or vegetation blocking the plate.	Plate is free of all obstructions and works as designed.
Overflow Pipe	Obstructions	Any trash or debris blocking (or having the potential of blocking) the overflow pipe.	Pipe is free of all obstructions and works as designed.
Manhole		See “Manholes” Section 2.8	See “Manholes” Section 2.8
Catch Basin		See “Catch Basins” Section 2.8	See ‘Catch Basins” Section 2.8

2.8 CATCH BASINS/MANHOLES

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
General	Trash & Debris (Includes Sediment)	Trash or debris of more than 1/2 cubic foot which is located immediately in front of the catch basin opening or is blocking capacity of the basin by more than 10%	No Trash or debris located immediately in front of catch basin opening.
		Trash or debris (in the basin) that exceeds 1/3 the depth from the bottom of basin to invert the lowest pipe into or out of the basin.	No trash or debris in the catch basin.
		Trash or debris in any inlet or outlet pipe blocking more than 1/3 of its height.	Inlet and outlet pipes free of trash or debris.
		Dead animals or vegetation that could generate odors that could cause complaints or dangerous gases (e.g., methane).	No dead animals or vegetation present within the catch basin.
		Deposits of garbage exceeding 1 cubic foot in volume	No condition present which would attract or support the breeding of insects or rodents.
	Structure Damage to Frame and/or Top Slab	Corner of frame extends more than 3/4 inch past curb face into the street (If applicable).	Frame is even with curb.
		Top slab has holes larger than 2 square inches or cracks wider than 1/4 inch (intent is to make sure all material is running into basin).	Top slab is free of holes and cracks.
		Frame not sitting flush on top slab, i.e., separation of more than 3/4 inch of the frame from the top slab.	Frame is sitting flush on top slab.
	Cracks in Basin Walls/ Bottom	Cracks wider than 1/2 inch and longer than 3 feet, any evidence of soil particles entering catch basin through cracks, or maintenance person judges that structure is unsound.	Basin replaced or repaired to design standards.
		Cracks wider than 1/2 inch and longer than 1 foot at the joint of any inlet/ outlet pipe or any evidence of soil particles entering catch basin through cracks.	No cracks more than 1/4 inch wide at the joint of inlet/outlet pipe.
	Sediment/ Misalignment	Basin has settled more than 1 inch or has rotated more than 2 inches out of alignment.	Basin replaced or repaired to design standards.
	Fire Hazard	Presence of chemicals such as natural gas, oil and gasoline.	No flammable chemicals present.
	Vegetation	Vegetation growing across and blocking more than 10% of the basin opening.	No vegetation blocking opening to basin.

		Vegetation growing in inlet/outlet pipe joints that is more than six inches tall and less than six inches apart.	No vegetation or root growth present.
	Pollution	Nonflammable chemicals of more than 1/2 cubic foot per three feet of basin length.	No pollution present other than surface film.
Catch Basin Cover	Cover Not in Place	Cover is missing or only partially in place. Any open catch basin requires maintenance.	Catch basin cover is closed
	Locking Mechanism Not Working	Mechanism cannot be opened by on maintenance person with proper tools. Bolts into frame have less than 1/2 inch of thread.	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying 80 lbs. of lift; intent is keep cover from sealing off access to maintenance.	Cover can be removed by one maintenance person.
Ladder	Ladder Rungs Unsafe	Ladder is unsafe due to missing rungs, misalignment, rust, cracks, or sharp edges.	Ladder meets design standards and allows maintenance person safe access.
Metal Grates (If Applicable)		Grate with opening wider than 7/8 inch.	Grate opening meets design standards.
	Trash and Debris	Trash and debris that is blocking more than 20% of grate surface.	Grate free of trash and debris.
	Damaged or Missing.	Grate missing or broken member(s) of the grate.	Grate is in place and meets design standards.
Manhole	Cover Not in Place	Cover is missing or only partially in place. Any open manhole requires maintenance.	Manhole is closed.
	Locking Mechanism Not Working	Mechanism cannot be opened by one maintenance person with proper tools. Bolts into frame have less than ½ inch of thread (may not apply to self-locking lids.)	Mechanism opens with proper tools.
	Cover Difficult to Remove	One maintenance person cannot remove lid after applying 80lbs of lift. Intent is to keep cover from sealing off access to maintenance.	Cover can be removed and reinstalled by one maintenance person.
	Ladder Rungs Unsafe	County Safety Office and/or maintenance person judges that ladder is unsafe due to missing rungs, misalignment, rust, or cracks.	Ladder meets design standards allows maintenance person safe access.

2.9 DEBRIS BARRIERS (TRASH RACKS)

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
General	Trash and Debris	Trash or debris that is plugging more than 20% of the openings in the barrier.	Barrier clear to receive capacity flow.
Metal	Damaged/ Missing Bars.	Bars are bent out of shape more than 3 inches.	Bars in place with no bends more than 3/4 inch.
		Bars are missing or entire barrier missing.	Bars in place according to design.
		Bars are loose and rust is causing 50% deterioration to any part of barrier.	Repair or replace barrier to design standards.

2.10 ENERGY DISSIPATERS

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
External:			
Rock Pad	Missing or Moved Rock	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil.	Replace rocks to design standards.
Dispersion Trench	Pipe Plugged with Sediment	Accumulated sediment that exceeds 20% of the design depth.	Pipe cleaned/ flushed so that it matches design.
	Not Discharging Water Properly	Visual evidence of water discharging at concentrated points along trench (normal condition is a "sheet flow" of water along trench). Intent is to prevent erosion damage.	Trench must be redesigned or rebuilt to standards.
	Perforations Plugged.	Over 1/2 of perforations in pipe are plugged with debris and sediment.	Clean or replace perforated pipe.
	Water Flows Out Top of "Distributor" Catch Basin.	Maintenance person observes water flowing out during any storm less than the design storm or its causing or appears likely to cause damage.	Facility must be rebuilt or redesigned to standards.
	Receiving Area Over-Saturated	Water in receiving area is causing or has potential of causing landslide problems.	No danger of landslides.
Internal:			
Manhole/ Chamber	Worn or Damaged Post. Baffles, Side of Chamber	Structure dissipating flow deteriorates to 1/2 or original size or any concentrated worn spot exceeding one square foot which would make structure unsound.	Replace structure to design standards.
	Other Defects	See "Catch Basins" Section 2.8	See "Catch Basins" Section 2.8

2.11 FENCING

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
General	Missing or Broken Parts	Any defect in the fence that permits easy entry to a facility.	Parts in place to provide adequate security.
	Erosion	Erosion more than 4 inches high and 12-18 inches wide permitting an opening under a fence.	No opening under the fence that exceeds 4 inches in height.
Wire Fences	Damaged Parts	Post out of plumb more than 6 inches.	Post plumb to within 1-1/2 inches.
		Top rails bent more than 6 inches.	Top rail free of bends greater than 1 inch.
		Any part of fence (including post, top rails, and fabric) more than 1 foot out of design alignment.	Fence is aligned and meets design standards.
		Missing or loose tension wire.	Tension wire in place and holding fabric.
		Missing or loose barbed wire that is sagging more than 2-1/2 inches between posts.	Barbed wire in place with less than 3/4 inch sag between post.
		Extension arm missing, broken, or bent out of shape more than 1 1/2 inches.	Extension arm in place with no bends larger than 3/4 inch.
	Deteriorated Paint or Protective Coating	Part or parts that have a rusting or scaling condition that has affected structural adequacy.	Structurally adequate posts or parts with a uniform protective coating.

	Openings in Fabric	Openings in fabric are such that an 8-inch-diameter ball could fit through.	No openings in fabric.

2.12 GATES

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
General	Damaged or Missing Members	Missing gate or locking devices.	Gates and Locking devices in place.
		Broken or missing hinges such that gate cannot be easily opened and closed by a maintenance person.	Hinges intact and lubed. Gate is working freely.
		Gate is out of plumb more than 6 inches and more than 1 foot out of design alignment.	Gate is aligned and vertical.
		Missing stretcher bar, stretcher bands, and ties.	Stretcher bar, bands and ties in place.
	Openings in Fabric	See “Fencing” Section 2.11	See “Fencing” Section 2.11

2.13 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 2.8	See “Catch Basins” Section 2.8
Debris Barriers (e.g., Trash Rack)		See “Debris Barriers” Section 2.9	See “Debris Barriers” Section 2.9

2.14 GROUNDS (LANDSCAPING)

MAINTENANCE	DEFECT	CONDITIONS WHEN MAINTENANCE IS	RESULTS EXPECTED WHEN

COMPONENT		NEEDED	MAINTENANCE IS PERFORMED
General	Weeds (Nonpoisonous)	Weeds growing in more than 20% of the landscaped area (trees and shrubs only).	Weeds present in less than 5% of the landscaped area.
	Safety Hazard	Any presence of poison ivy or other poisonous vegetation.	No poisonous vegetation present in landscaped area.
	Trash or Litter	Paper, cans, bottles, totaling more than 1 cubic foot within a landscaped area (trees and shrubs only) of 1,000 square feet.	Area clear of litter.
Trees and Shrubs	Damaged	Limbs or parts of trees or shrubs that are split or broken which affect more than 25% of the total foliage of the tree or shrub.	Trees and shrubs with less than 5% of total foliage with split or broken limbs.
		Trees or shrubs that have been blown down or knocked over.	Tree or shrub in place free of injury.
		Trees or shrubs which are not adequately supported or are leaning over, causing exposure of the roots.	Tree or shrub in place and adequately supported; remove any dead or diseased trees.

2.15 ACCESS ROADS/EASEMENTS

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
General	Trash and Debris	Trash and debris exceeds 1 cubic foot per 1,000 square feet i.e., trash and debris would fill up one standards size garbage can.	Roadway free of debris which could damage tires.
	Blocked Roadway	Debris which could damage vehicle tires (glass or metal).	Roadway free of debris which could damage tires.
		Any obstruction which reduces clearance above road surface to less than 14 feet.	Roadway overhead clear to 14 feet high.
		Any obstruction restricting the access to a 10 to 12 foot width for a distance of more than 12 feet or any point restricting access to less than a 10 foot width.	Obstruction removed to allow at least a 12 foot access.
Road Surface	Settlement, Potholes, Mush Spots, Ruts	When any surface defect exceeds 6 inches in depth and 6 square feet in area. In general, any surface defect which hinders or prevents maintenance access.	Road surface uniformly smooth with no evidence of settlement, potholes, mush spots, or ruts.
	Vegetation in Road Surface	Weeds growing in the road surface that are more than 6 inches tall and less than 6 inches tall and less than 6 inches apart within a 400-square foot area.	Road surface free of weeds taller than 2 inches.

	Modular Grid Pavement	Build-up of sediment mildly contaminated with petroleum hydrocarbons.	Removal of sediment and disposal in keeping with Health Department recommendations for mildly contaminated soils or catch basin sediments.
Shoulders and Ditches	Erosion Damage	Erosion within 1 foot of the roadway more than 8 inches wide and 6 inches deep.	Shoulder free of erosion and matching the surrounding road.
	Weeds and Brush	Weeds and brush exceed 18 inches in height or hinder maintenance access.	Weeds and brush cut to 2 inches in height or cleared in such a way as to allow maintenance access.

2.16 WATER QUALITY FACILITIES

2.16.1 VEGETATED FILTER STRIP

MAINTENANCE COMPONENT	DEFECT OR PROBLEM	CONDITION WHEN MAINTENANCE IS NEEDED	RECOMMENDED MAINTENANCE TO CORRECT PROBLEM
Filter Strip	Sediment Accumulation on Grass	Sediment depth exceeds 2 inches.	Remove sediment deposits, re-level so slope is even and flows pass evenly through strip.
	Vegetation	When the grass becomes excessively tall (greater than 10-inches); when nuisance weeds and other vegetation starts to take over.	Mow grass, control nuisance vegetation, such that flow not impeded. Grass should be mowed to a height between 3-4 inches.
	Trash and Debris Accumulation	Trash and debris accumulated on the filter strip	Remove trash and Debris from filter.
	Erosion/ Scouring	Eroded or scoured areas due to flow channelization, or higher flows.	For ruts or bare areas less than 12 inches wide, repair the damaged area by filling with crushed gravel. The grass will creep in over the rock in time. If bare areas are large, generally greater than 12 inches wide, the filter strip should be re-graded and re-seeded. For smaller bare areas, overseed when bare spots are evident.
	Flow spreader	Flow spreader uneven or clogged so that flows are not uniformly distributed through entire swale width.	Level the spreader and clean so that flows are spread evenly over entire wale width.

2.16.2 VORTECHS SYSTEM ™

MAINTENANCE COMPONENT	DEFECT OR PROBLEM	CONDITION WHEN MAINTENANCE IS NEEDED	RECOMMENDED MAINTENANCE TO CORRECT PROBLEM
Below Ground Vault	Sediment Accumulation on Media.	Sediment depth exceeds 0.25-inches.	No sediment deposits which would impede permeability of the compost media.
	Sediment Accumulation in Vault	Sediment depth exceeds 6-inches in first chamber.	No sediment deposits in vault bottom of first chamber.
	Trash/ Debris Accumulation	Trash and debris accumulated on compost filter bed.	Trash and debris removed from the compost filter bed.
	Sediment in Drain Pipes/Clean-Outs	When drain pipes, clean-outs, become full with sediment and/ or debris.	Remove the accumulated material from the facilities.
Below Ground Cartridge type	Compost Media	Drawdown of water through the media takes longer than 1 hour, and/ or overflow occurs frequently.	Replace media cartridges.
	Short Circuiting	Flows do not properly enter filter cartridges.	Replace filter cartridges.
	Damaged Pipes	Any part of the pipes that are crushed, damaged due to corrosion and/ or settlement.	Pipe repaired and/ or replaced.
	Access Cover Damaged/ Not Working	Cover cannot be opened, one person cannot open the cover, corrosion/ deformation of cover.	Cover repaired to proper working specifications or replaced.
	Vault Structure Includes Cracks in Wall, Bottom, Damage to Frame and/ or Top Slab	Cracks wider than 1/2-inch and any evidence of soil particles entering the structure through the cracks, or maintenance/ inspection personnel determines that the vault is not structurally sound.	Vault replaced or repaired to design specifications.
		Cracks wider than 1/2-inch at the joint of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls.	No cracks more than 1/4-inch wide at the joint of the inlet/ outlet pipe.
	Baffles	Baffles corroding, cracking warping, and/ or showing signs of failure as determined by maintenance/ inspection person.	Repair or replace baffles to specification.
	Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, missing rungs, cracks, and misaligned.	Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel.

2.16.3 OIL/WATER SEPARATOR

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
API Type OWS (baffle type)	Monitoring	Inspection of discharge water for obvious signs of poor water quality.	Effluent discharge from vault should be clear with out thick visible sheen.
	Sediment Accumulation	Sediment depth in bottom of vault exceeds 6-inches in depth.	No sediment deposits on vault bottom which would impede flow through the vault and separation efficiency.
	Trash and Debris Accumulation	Trash and debris accumulation in vault, or pipe inlet/ outlet, floatables and non-floatables.	Trash and debris removed from vault, and inlet/ outlet piping.
	Oil Accumulation	Oil accumulations that exceed 1-inch, at the surface of the water	Extract oil from vault by vactoring. Disposal in accordance with state and local rules and regulations.
	Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired or replaced.
	Access Cover Damaged/ Not Working	Cover cannot be opened, corrosion/ deformation of cover.	Cover repaired to proper working specifications or replaced.
	Vault Structure Damage- Includes Cracks in Walls Bottom, Damage to Frame and/ or Top Slab	Cracks wider than 1/2-inch or evidence of soil particles entering the structure through the cracks, or maintenance/ inspection personnel determines that the vault is not structurally sound.	Vault replaced or repaired to design specifications.
	Baffles	Baffles corroding, cracking, warping and/ or showing signs of failure as determined by maintenance/ inspection person.	Repair or replace baffles to specifications.
	Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, missing rungs, cracks, and misaligned.	Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel.
		Cracks wider than 1/2-inch at the joint of any inlet/ outlet pipe or any evidence of soil particles entering the vault through the walls.	No cracks more than 1/4-inch wide at the joint of the inlet/ outlet pipe.
CPS-Type OWS	Monitoring	Inspection of discharge water for obvious signs of poor water quality.	Effluent discharge from vault should be clear with no thick visible sheen.
	Sediment Accumulation	Sediment depth in bottom of vault exceeds 6-inches in depth and/ or visible signs of sediment on plates.	No sediment deposits on vault bottom and plate media, which would impede flow through the vault and separation efficiency.
	Trash and Debris Accumulation	Trash and debris accumulated in vault, or pipe inlet/ outlet, floatables and non-floatables.	Trash and debris removed from vault, and inlet/ outlet piping.
	Oil Accumulation	Oil accumulation that exceeds 1-inch at the water surface.	Extract oil from vault by vactoring methods. Clean coalescing plates by thoroughly rinsing and flushing. Should be no visible oil depth on water.
	Damaged Coalescing Plates	Plate media broken, deformed, cracked and/ or showing signs of failure.	Replace that portion of media pack or entire plate pack depending on severity of failure.

	Damaged Pipes	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired and or replaced.
	Baffles	Baffles corroding, cracking, warping and/ or showing signs of failure as determined by maintenance/ inspection person.	Repair or replace baffles to specifications.
	Vault Structure Damage- Includes Cracks in Walls, Bottom, Damage to Frame and/ or Top Slab	Cracks wider than 1/2-inch and any evidence of soil particles entering the structure through the cracks, or maintenance inspection personnel determines that the vault is not structurally sound.	Vault replaced or repaired to design specifications.
	Access Ladder Damaged	Ladder is corroded or deteriorated, not functioning properly, missing rungs, cracks, and misaligned.	Ladder replaced or repaired and meets specifications, and is safe to use as determined by inspection personnel.
		Cracks wider than 1/2-inch at the joint of any inlet/ outlet pipe or any evidence of soil particles entering the vault through the walls.	No cracks more than 1/4-inch wide at the joint of the inlet/ outlet pipe.

2.16.4 CATCH BASIN INSERTS

MAINTENANCE COMPONENT	DEFECT	CONDITIONS WHEN MAINTENANCE IS NEEDED	RESULTS EXPECTED WHEN MAINTENANCE IS PERFORMED
Catch Basin	Sediment Accumulation	When sediment forms a cap over the insert media of the insert and/ or unit.	No sediment cap on the insert media and its unit.
	Trash and Debris Accumulation	Trash and debris accumulates on insert unit creating a blockage/ restriction.	Trash and debris removed from insert unit. Runoff freely flows into catch basin.
	Inspection	Inspection of media insert is required.	Effluent water from media insert is free of oils and has no visible sheen.
	Media Insert-Water Saturated	Catch basin insert is saturated with water, which no longer has the capacity to absorb.	Remove and replace media insert
	Media Insert-Oil Saturated	Media oil saturated due to petroleum spill that drains into catch basin.	Remove and replace media insert.
	General	Regular interval replacement due to typical average life of media insert product.	Remove and replace media at regular intervals, depending on insert product.

2.16.5 SEDIMENT FOREBAY

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 the public.	No danger of poisonous vegetation where the public might normally be.
	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 withCounty Health Department)
	Unmowed Grass/ Ground Cover	If facility is located in private residential area, mowing is needed when grass exceeds 18 inches in height. In other areas, the general policy is to make the pond site match adjacent ground cover and terrain as long as there is no interference with the function of the facility.	When mowing is needed, grass/ground cover should be mowed to 2 inches in height. Mowing of selected higher use areas rather than the entire slope may be acceptable for some situations.
	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.
Side Slopes of Forebay	Erosion	Eroded damage over 2 inches deep where cause of damage is still present or where there is potential for continued erosion.	Slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction.
Storage Area	Sediment	A percolation test pit or test of facility indicates facility is only working at 90% of its designed capabilities. If two inches or more sediment is present, remove.	Sediment is removed and/or facility is cleaned so that infiltration system works according to design.
	Sheet Cover (If Applicable)	Sheet cover is visible and has more that three 1/4-inch holes in it.	Sheet cover repaired or replaced.
	Sump Filled with Sediment and Debris (If Applicable)	Any sediment and debris filling vault to 10% of depth from sump bottom to bottom of outlet pipe or obstructing flow into the connector pipe.	Clean out sump to design depth.
Rock Filters	Sediment and Debris	By visual inspection, little or no water flows through filter during heavy rain storms.	Replace gravel in rock filter.

Emergency Overflow/Spillway	Rock Missing	Only one layer of rock exists above native soil in area five square feet or larger, or any exposure of native soil at the top of out flow path of spillway. Rip-rap on inside slopes need not be replaced.	Replace rocks to design standards.

3.0 Chapter 3 – BMP MAINTENANCE SCHEDULE

3.1 BMP MAINTENANCE SCHEDULE

BMP	ACTIVITY	SCHEDULE
STORMWATER BASINS SEDIMENT FOREBAY	▪ Cleaning and removal of debris and accumulated sediment. ▪ Repair of embankment and side slopes. ▪ Repair or restore basin bottom. ▪ Repair of outlet control structure and emergency spillway. ▪ Repair or restore riprap. ▪ Repair or restore emergency spillway.	Inspect basin at least four (4) times annually as well as after every storm exceeding one (1) inch of rainfall. Bottom sand layer to be inspected monthly as well as after every storm exceeding one (1) inch of rainfall.
	▪ Grass to be mowed at least once monthly. ▪ Vegetative cover to be maintained at 85%.	Vegetative cover to be inspected annually.
WET POND	▪ Cleaning and removal of debris and accumulated sediment. ▪ Repair of embankment and side slopes. ▪ Repair of outlet control structure. ▪ Outlet valves to be inspected and exercised.	Inspect at least four (4) times annually as well as after every storm exceeding one (1) inch of rainfall. Inspect and exercise outlet valves at least four times annually.
	▪ Grass to be mowed at least once monthly. ▪ Vegetative cover to be maintained at 85%.	Vegetative cover to be inspected annually.
POROUS PAVEMENT	▪ Cleaning and removal of debris and accumulated sediment. ▪ Repair of damaged areas.	Inspect pavement at least four (4) times annually. Patch to be approved by Engineer.
	▪ Winter Maintenance: Abrasives (sand or cinders) should NOT be applied. Plow carefully by setting blade one-inch higher than typical.	As required during winter season.

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):			

4.2 WET PONDS

Project/Location:_____

"As Built" Plans Available?_____

Date/Time:_____

Days Since Previous Rainfall and Rainfall Amount:_____

Inspector: _____

Maintenance Item	Satisfactory	Unsatisfactory	Comments
1. Embankment and Emergency Spillway			
○ Vegetation and ground cover adequate			
○ Embankment erosion			
○ Animal burrows			
○ Unauthorized planting			
○ Cracking, bulging, or sliding of embankment/dam			
a. Upstream face			
b. Downstream face			
c. At or beyond toe			
d. Emergency spillway			
○ Pond, toe & chimney drains clear and functioning			
○ Seeps/leaks on downstream face			
○ Slope protection or riprap failure			

○ Vertical/horizontal alignment of top of dam "As-Built"			
○ Emergency spillway clear of obstructions and debris			
○ Other (specify)			
2. Riser/Outlet Structure			
○ Low flow orifice obstructed			
○ Low flow trash rack obstructed with debris			
○ Weir trash rack obstructed with debris			
○ Excessive sediment accumulation insider riser			
○ Concrete/masonry condition riser and barrels			
a. Cracks or displacement			
b. Minor spalling (less than one-inch)			
c. Major spalling (rebars exposed)			
d. Joint failures			
e. Water tightness			
○ Metal pipe condition			
○ Control valve			
a. Operational/exercised			
b. Chained and locked			
○ Pond drain valve			
a. Operational/exercised			
b. Chained and locked			
○ Outfall channels functioning			
○ Other (specify)			
3. Permanent Pool (Wet Ponds)			
○ Undesirable vegetative growth			
○ Floating or floatable debris removal required			
○ Visible pollution			
○ Shoreline problem			
○ Other (specify)			
4. Sediment Forebay			
○ Sedimentation noted			
○ Greater than 50% of storage volume remaining			
5. Dry Pond Areas			
○ Vegetation coverage adequate			
○ Undesirable vegetative growth			
○ Undesirable woody vegetation			
○ Low flow channels clear of obstructions			
○ Standing water of wet spots			
○ Sediment and/or trash accumulation			

○ Other (specify)			
6. Condition of Outfalls			
○ Riprap failures			
○ Slope erosion			
○ Storm drain pipes			
○ Endwalls/Headwalls			
○ Other (specify)			
7. Other			
○ Complaints from residents (odors, insects, other)			
○ Aesthetics (graffiti, algae, other)			
○ Conditions of maintenance access routes			
○ Signs of hydrocarbon build-up			
○ Any public hazards (specify)			
8. Wetland Vegetation			
○ Vegetation healthy and growing			
○ Wetland maintaining 50% surface area coverage of wetland plants after the second growing season. (If unsatisfactory, reinforcement plantings needed)			
○ Survival of desired wetland plant species distribution according to landscaping plan?			
○ Evidence of invasive species			
○ Maintenance of adequate water depths for desired wetland plant species			
○ Harvesting of emergent plantings needed			
○ Have sediment accumulations reduced pool volume significantly or are plants choked with sediment?			
○ Other (specify)			
Actions to Be Taken:			
To Be Completed By (Date):			

4.3 POROUS PAVEMENT

Project/Location:_____

"As Built" Plans Available?_____

Date/Time:_____

Days Since Previous Rainfall and Rainfall Amount:_____

Inspector: _____

Maintenance Item	Satisfactory	Unsatisfactory	Comments
1. Sediment Accumulation			
○ No sediment accumulation identified in porous pavement.			
2. Debris Cleanout			
○ No excessive trash and debris on pavement or in areas immediately adjacent to pavement.			
3. Adjacent Landscaping			
○ Landscape beds adjacent to porous pavement stabilized and no soil, mud or sediment is being deposited on the porous pavement.			
4. Structural Stability			
○ Damaged areas repaired with approved patch.			
5. Catch Basins			
○ Good condition			
○ No sediment or trash accumulation			
Actions to Be Taken:			
To Be Completed By (Date):			

4.4 VEGETATED SWALES

Project/Location:_____

"As Built" Plans Available?_____

Date/Time:_____

Days Since Previous Rainfall and Rainfall Amount:_____

Inspector: _____

Maintenance Item	Satisfactory	Unsatisfactory	Comments
1. Debris Cleanout			
○ No excessive trash and debris in contributing areas, forebay, or channel			
2. Check Dams or Energy Dissipators			
○ No evidence of flow going around structures			
○ No evidence of erosion at downstream toe			

3. Vegetation			
○ Mowing performed as necessary (to maintain grass height of 4 to 6 inches during growing season)			
○ No evidence of erosion (channel bottom or side slopes)			
○ Fertilized per specification			
4. Dewatering			
○ Dewaters between storms (dry swales)			
5. Sediment Accumulation			
○ Approximate depth of accumulated sediment			
○ Sediment accumulation is less than 25% of forebay or channel capacity (cleaning recommended otherwise)			
6. Outlet/Overflow Spillway			
○ Good condition, no need for repairs			
○ No evidence of erosion			
Actions to Be Taken:			
To Be Completed By (Date):			

4.5 BIORETENTION

Project/Location:_____

"As Built" Plans Available?_____

Date/Time:_____

Days Since Previous Rainfall and Rainfall Amount:_____

Inspector: _____

Maintenance Item	Satisfactory	Unsatisfactory	Comments
1. Debris Cleanout			
○ Bioretention and contributing areas clean of debris			
○ No dumping of yard wastes into practice			
○ Litter (branches, etc.) has been removed			
2. Check Dams or Energy Dissipators			
○ No evidence of flow going around structures			

○ No evidence of erosion at downstream toe			
3. Vegetation			
○ Plant height not less than design water depth			
○ No evidence of erosion			
○ Fertilized per specification			
○ Grass height not greater than 6 inches			
○ No placement of inappropriate plants			
○ Plant composition according to approved plans			
4. Dewatering			
○ Dewaters between storms			
5. Sediment Accumulation			
○ Approximate depth of accumulated sediment			
○ Depth of sediment in forebay or sump should not be more than 12 inches or 10 percent of the pretreatment volume			
○ Sediment accumulation on filter bed does not exceed 1” or drawdown time does not exceed 36 to 48 hours			
6. Outlet/Overflow Spillway			
○ Good condition, no need for repairs			
○ No evidence of erosion			
○ No evidence of any blockages			
7. Integrity of Filter Bed			
○ Filter bed has not been blocked or filled inappropriately			
Actions to Be Taken:			
To Be Completed By (Date):			

5.0 Chapter 5 – ESTIMATED ANNUAL COSTS

5.1 STORMWATER DRYWELL/CONVEYANCE SYSTEM MAINTENANCE COSTS

Maintenance Item	Maintenance Timeframe	Total Cost
Remove Sediment in Drywell	Annually	$1,000
Vacuum Porous Pavement	Three times per year	$1,500
Remove Sediment in Infiltration trench	Bi-Annually	$1,000

6.0 Chapter 6 – MANUFACTURERS INFORMATION & AS-BUILT PLANS

6.1 MANUFACTURERS WARRANTIES

6.2 AS-BUILT CONSTRUCTION PLANS