

APPENDIX A

MAINTENANCE REQUIREMENTS FOR FLOW CONTROL, CONVEYANCE, AND WQ FACILITIES

NO. 1 – DETENTION PONDS			
Maintenance Component	Defect or Problem	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 or Noxious Weeds	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 Seattle-King County Health Department
	Contaminants and 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 Seattle/King 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 or other causes.	Rodents destroyed and dam or berm repaired. (Coordination with Seattle/King County Health Department)
	Insects	When insects such as wasps and hornets interfere with maintenance activities. Mosquito complaints accompanied by presence of high mosquito larvae concentrations (aquatic phase).	Insects destroyed or removed from site. Mosquito control: Swallow nesting boxes or approved larvicide applied.
	Tree Growth	Tree growth threatens integrity of berms acting as dams, does not allow maintenance access, or interferes with maintenance activity (i.e., slope mowing, silt removal, vactoring, or equipment movements). If trees are a threat to berm integrity or not interfering with access, leave trees alone.	Trees do not hinder maintenance activities. Harvested trees should be recycled into mulch or other beneficial uses (e.g., alders for firewood).

NO. 1 – DETENTION PONDS			
Maintenance Component	Defect or Problem	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
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. Any erosion observed on a compacted berm embankment.	Slopes should be stabilized by using appropriate erosion control measure(s); e.g., rock reinforcement, planting of grass, compaction. If erosion is occurring on compacted berms a licensed civil engineer should be consulted to resolve source of erosion.
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.
	Liner Damage (If Applicable)	Liner is visible and has more than three ¼-inch holes in it.	Liner repaired or replaced.
Pond Berms (Dikes)	Settlement	Any part of berm that has settled 4 inches lower than the design elevation. Settling can be an indication of more severe problems with the berm or outlet works. A licensed civil engineer should be consulted to determine the source of the settlement.	Dike should be built back to the design elevation.
Emergency Overflow/Spillway and Berms over 4 feet in height.	Tree Growth	Tree growth on emergency spillways create blockage problems and may cause failure of the berm due to uncontrolled overtopping. Tree growth on berms over 4 feet in height may lead to piping through the berm which could lead to failure of the berm.	Trees should be removed. If root system is small (base less than 4 inches) the root system may be left in place. Otherwise the roots should be removed and the berm restored. A licensed civil engineer should be consulted for proper berm/spillway restoration.
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.

NO. 2 – INFILTRATION FACILITIES

Maintenance Component	Defect or Problem	Conditions When Maintenance Is Needed	Results Expected When Maintenance Is Performed
Infiltration Pond General	Trash & Debris	See "Detention Ponds" Table No. 1	See "Detention Ponds" Table No. 1
	Poisonous Vegetation or Noxious Weeds	See "Detention Ponds" Table No. 1	See "Detention Ponds" Table No. 1
	Contaminants and Pollution	See "Detention Ponds" Table No. 1	See "Detention Ponds" Table No. 1
	Unmowed Grass/Ground Cover	See "Detention Ponds" Table No. 1	See "Detention Ponds" Table No. 1
	Rodent Holes	See "Detention Ponds" Table No. 1	See "Detention Ponds" Table No. 1
	Insects	See "Detention Ponds" Table No. 1	See "Detention Ponds" Table No. 1
Infiltration Pond Side Slopes	Erosion	See "Detention Ponds" Table No. 1	See "Detention Ponds" Table No. 1
Infiltration Pond Emergency Overflow Spillway and Berms over 4 feet in height.	Tree Growth	See "Detention Ponds" Table No. 1	See "Detention Ponds" Table No. 1
Infiltration Pond Emergency Overflow Spillway	Rock Missing	See "Detention Ponds" Table No. 1	See "Detention Ponds" Table No. 1
Infiltration Facility Storage Area	Sediment	A percolation test pit (ponds) 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. Ponds are reseeded if necessary to control erosion.
Infiltration Facility Rock Filters (If Applicable)	Sediment and Debris	By visual inspection, little or no water flows through filter during heavy rain storms.	Replaced gravel in rock filter.
Infiltration Facility Sump	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.
Infiltration Facility Filter Bags (If Applicable)	Filled with Sediment and Debris	Sediment and debris fill bag more than $\frac{1}{2}$ full.	Replaced filter bag or redesign system.
Infiltration Facility Pre-settling Ponds and Vaults	Sediment	Remove when 6" or more.	Sediment cleaned out to designed pond shape and depth or sediment is removed from vault. Ponds are reseeded if necessary to control erosion.

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.

NO. 3 – DETENTION TANKS AND VAULTS			
Maintenance Component	Defect or Problem	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 its design shape.	Tank/pipe repaired or replaced to design.
Vault Structure	Damage to Wall, Frame, Bottom, and/or Top Slab	Cracks wider than ½-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.
	Damaged Pipe Joints	Cracks wider than ½-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 ¼-inch wide at the joint of the inlet/outlet pipe.
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	King 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.
Large access doors/plate	Gaps, Doesn't Cover Completely	Large access doors not flat and/or access hole not completely covered. NOTE however that grated doors are acceptable.	Doors closes flat and covers access hole completely.
	Lifting Rings Missing, Rusted	Lifting rings not capable of lifting weight of door or lid.	Lifting rings sufficient to remove lid.

NO. 4 – CONTROL STRUCTURE/FLOW RESTRICTOR			
Maintenance Component	Defect or Problem	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 1.5 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/rod 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 Missing	Control device is not working properly due to missing, out of place, or bent orifice plate.	Plate is in place and works as 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 “Detention Tanks and Vaults”	See “Detention Tanks and Vaults” Table No. 3	See “Detention Tanks and Vaults” Table No. 3

NO. 5 – CATCH BASINS			
Maintenance Component	Defect or Problem	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
General	Trash & Debris (Includes Sediment)	Trash or debris of more than ½ 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 ¼ 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 ¼ 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 ¼ inch of the frame from the top slab.	Frame is sitting flush on top slab.
	Cracks in Basin Walls/Bottom	Cracks wider than ½ 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 ½ 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.
	Settlement/ 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 6 inches tall and less than 6 inches apart.	No vegetation or root growth present.
	Pollution	Nonflammable chemicals of more than ½ 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 ½ 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.

NO. 5 – CATCH BASINS			
Maintenance Component	Defect or Problem	Conditions When Maintenance is Needed	Results Expected When Maintenance is performed
Metal Grates (If Applicable)	Unsafe Grate Opening	Grate with opening wider than $\frac{7}{8}$ 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.

NO. 6 – DEBRIS BARRIERS (E.G., TRASH RACKS)			
Maintenance Component	Defect or Problem	Condition 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 $\frac{3}{4}$ 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.

NO. 7 – ENERGY DISSIPATERS			
Maintenance Component	Defect or Problem	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 $\frac{1}{2}$ 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 $\frac{1}{2}$ or original size or any concentrated worn spot exceeding one square foot which would make structure unsound.	Replace structure to design standards.

NO. 8 – FENCING			
Maintenance Component	Defect or Problem	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 1½ 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 2½ inches between posts.	Barbed wire in place with less than ¾ inch sag between post.
		Extension arm missing, broken, or bent out of shape more than 1½ inches.	Extension arm in place with no bends larger than ¾ 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.

NO. 9 – GATES			
Maintenance Component	Defect or Problem	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" Table No. 8	See "Fencing" Table No. 8

NO. 10 – CONVEYANCE PIPES AND DITCHES			
Maintenance Component	Defect or Problem	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 "Detention Ponds" Table No. 1	See "Detention Ponds" Table No. 1
	Rock Lining Out of Place or Missing (If Applicable).	Maintenance person can see native soil beneath the rock lining.	Replace rocks to design standards.

NO. 11 – GROUNDS (LANDSCAPING)			
Maintenance Component	Defect or Problem	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
General	Weeds (Nonpoisonous, not noxious)	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.

NO. 12 – ACCESS ROADS			
Maintenance Component	Defect or Problem	Condition 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.

NO. 13 – BASIC BIOFILTRATION SWALE			
Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Swale Section	Sediment Accumulation on Grass	Sediment depth exceeds 2 inches	Remove sediment deposits on grass treatment area of the bioswale. When finished, swale should be level from side to side and drain freely toward outlet. There should be no areas of standing water once inflow has ceased.
	Standing Water	When water stands in the swale between storms and does not drain freely.	Any of the following may apply: remove sediment or trash blockages, improve grade from head to foot of swale, remove clogged check dams, add underdrains or convert to a wet biofiltration swale.
	Constant Baseflow	When small quantities of water continually flow through the swale, even when it has been dry for weeks, and an eroded, muddy channel has formed in the swale bottom.	Add a low-flow pea-gravel drain the length of the swale or bypass the baseflow around the swale.
	Poor Vegetation Coverage	When grass is sparse or bare or eroded patches occur in more than 10% of the swale bottom.	Determine why grass growth is poor and correct that condition. Re-plant with plugs of grass from the upper slope: plant in the swale bottom at 8-inch intervals, or re-seed into loosened, fertile soil.
	Defective Vegetation	When the grass becomes excessively tall (greater than 10 inches) or when nuisance weeds and other vegetation starts to take over.	Mow vegetation or remove nuisance vegetation so that flow not impeded. Grass should be mowed to a height of 3 to 4 inches. Remove grass clippings.
	Excessive Shading	Grass growth is poor because sunlight does not reach swale.	If possible, trim back over-hanging limbs, remove brushy vegetation on adjacent slopes.
	Trash and Debris Accumulation	Trash and debris accumulated in the bioswale.	Remove trash and debris from bioswale.
	Erosion/Scouring	Eroded or scoured swale bottom 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 swale should be re-graded and re-seeded. For smaller bare areas, overseed when bare spots are evident, or take plugs of grass from the upper slope and plant in the swale bottom at 8-inch intervals.
Inlet/Outlet	Sediment and Debris	Inlet/outlet areas clogged with sediment and/or debris.	Remove material so that there is no clogging or blockage in the inlet and outlet area.
Flow Spreader	Concentrated Flow	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 swale width.

NO. 14 – WET BIOFILTRATION SWALE			
Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Swale Section	Sediment Accumulation	Sediment depth exceeds 2 inches in 10% of the swale treatment area.	Remove sediment deposits in treatment area.
	Water Depth	Water not retained to a depth of about 4 inches during the wet season.	Build up or repair outlet berm so that water is retained in the wet swale.
	Defective Wetland Vegetation	Vegetation becomes sparse and does not provide adequate filtration, OR vegetation is crowded out by very dense clumps of cattail which do not allow water to flow through the clumps.	Determine cause of lack of vigor of vegetation and correct. Replant as needed. For excessive cattail growth, cut cattail shoots back and compost offsite. <i>Note: normally wetland vegetation does not need to be harvested unless die-back is causing oxygen depletion in downstream waters.</i>
	Trash and Debris Accumulation	Trash and debris accumulated in the wet swale.	Remove trash and debris from wet swale.
	Erosion/Scouring	Swale has eroded or scoured due to flow channelization, or higher flows.	Check design flows to assure swale is large enough to handle flows. Bypass excess flows or enlarge swale. Replant eroded areas with fibrous-rooted plants such as <i>Juncus effusus</i> (soft rush) in wet areas or snowberry (<i>Symphoricarpos albus</i>) in dryer areas.
Inlet/Outlet	Sediment and Debris	Inlet/outlet area clogged with sediment and/or debris.	Remove clogging or blockage in the inlet and outlet areas.

NO. 15 – FILTER STRIP			
Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Grass 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.
	Defective Vegetation	When the grass becomes excessively tall (greater than 10 inches) or 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	Concentrated Flow	Flow spreader uneven or clogged so that flows are not uniformly distributed through entire filter width.	Level the spreader and clean so that flows are spread evenly over entire filter width.

NO. 16 – WETPOND			
Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Pond Area	Water Level	First cell empty, doesn't hold water.	Line the first cell to maintain at least 4 feet of water. Although the second cell may drain, the first cell must remain full to control turbulence of the incoming flow and reduce sediment resuspension.
	Defective Vegetation	Vegetation such as grass and weeds need to be mowed when it starts to impede aesthetics of pond. Mowing is generally required when height exceeds 18 inches. Mowed vegetation should be removed from areas where it could enter the pond, either when the pond level rises, or by rainfall runoff.	Vegetation should be mowed to 4 to 5 inches in height. Trees and bushes should be removed where they are interfering with pond maintenance activities; that is, at the inlet, outlet and near engineered structures.
	Algae Mats	When algae mats develop over more than 10% of the water surface, they should be removed. Also remove mats in the late summer before fall rains, especially in Sensitive Lake Protection Areas. Excessive algae mats interfere with dissolved oxygen content in the water and pose a threat to downstream lakes if excess nutrients are released.	Algae mats that cover more than 10% of the surface of any cell should be removed. A rake or mechanical device should be used to remove the algae. Removed algae can be left to dry on the pond slope above the 100-year water surface.
	Trash and Debris	Accumulation that exceeds 1 cubic foot per 1000 square foot of pond area.	Trash and debris removed from pond.
	Sediment Accumulation	Sediment accumulations in pond bottom that exceeds the depth of sediment zone plus 6 inches, usually in the first cell.	Removal of sediment from pond bottom.
	Oil Sheen on Water	Prevalent and visible oil sheen.	Remove oil from water by use of oil-absorbent pads or by vactor truck. Refer problem to locate source and correct. If chronic low levels of oil persist, plant wetland plants such as <i>Juncus effusus</i> (soft rush) which can uptake small concentrations of oil.
	Erosion	Erosion of the pond's side slopes and/or scouring of the pond bottom, that exceeds 6 inches, or where continued erosion is prevalent.	Slopes should be stabilized by using proper erosion control measures, and repair methods.
Pond Dike/Berm	Settlement	Any part of these components that has settled 4 inches or lower than the design elevation, or inspector determines dike/berm is unsound.	Dike/berm is repaired to specifications.
Internal Berm	Concentrated Flow	Berm dividing cells should be level.	Build up low areas of berm or lower high areas so that the berm surface is level and water flows evenly over the entire length of the berm from the first cell to the second.
Inlet/Outlet Pipe	Sediment and Debris	Inlet/Outlet pipe clogged with sediment and/or debris material.	No clogging or blockage in the inlet and outlet piping.
Overflow Spillway	Rock Missing	Rock is missing and soil is exposed at top of spillway or outside slope.	Replace rocks to specifications.

NO. 17 – WETVAULT			
Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Vault Area	Trash/Debris Accumulation	Trash and debris accumulated in vault (includes floatables and non-floatables).	Remove trash and debris.
	Sediment Accumulation	Sediment accumulation in vault bottom exceeds the depth of the sediment zone plus 6 inches.	Remove sediment from vault.
	Ventilation	Ventilation area blocked or plugged	Remove or clear blocking material from ventilation area. A specified % of the vault surface area must provide ventilation to the vault interior (see p. 6-82 for required %).
Vault Structure	Damage to Wall, Frame, Bottom, and/or Top Slab	Cracks wider than ½-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.
	Damaged Pipe Joints	Cracks wider than ½-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 ¼-inch wide at the joint of the inlet/outlet pipe.
Baffles	Damaged/Defective	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection staff.	Repair or replace baffles to specifications.
Inlet/Outlet	Damaged Pipes	Inlet/outlet piping damaged or broken and in need of repair.	Pipe repaired and/or replaced.
	Trash/Debris Accumulation	Trash and debris accumulated in pipe or inlet/outlet (includes floatables and non-floatables).	Remove trash and debris.
Access Cover	Damaged/Not Working	Cover cannot be opened or removed, especially by one person.	Pipe repaired or replaced to proper working specifications.
Access Ladder	Damaged	Ladder is corroded or deteriorated, not functioning properly, missing rungs, has cracks and/or misaligned. Confined space warning sign missing.	Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel. Replace sign warning of confined space entry requirements.

NO. 18 – SAND FILTER POND			
Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Pond Area	Sediment Accumulation on top layer	Sediment depth exceeds ½-inch.	No sediment deposit on grass layer of sand filter that would impede permeability of the filter section.
	Trash and Debris Accumulation	Trash and debris accumulated on sand filter bed.	Trash and debris removed from sand filter bed.
	Defective Vegetation <i>(Note: grass is optional)</i>	When the grass becomes excessively tall (greater than 6 inches) or when nuisance weeds and other vegetation starts to take over.	Mow vegetation and/or remove nuisance vegetation.
	Erosion Damage to Slopes	Erosion over 2 inches deep where cause of damage is prevalent or potential for continued erosion is evident.	Slopes should be stabilized by using proper erosion control measures.
Clean-Outs	Sediment/Debris	When the clean-outs become full or partially plugged with sediment and/or debris.	Sediment removed from the clean-outs.
Sand Filter Media	Plugging	Drawdown of water through the sand filter media, takes longer than 24 hours, and/or flow through the overflow pipes occurs frequently.	Usually requires scraping of top several inches of sand. May occasionally require replacement of entire sand filter depth, depending on extent of plugging. A sieve analysis is helpful to determine if the lower sand has too high a proportion of fine material.
	Prolonged flows	Sand is saturated for prolonged periods of time (several weeks) and does not dry out between storms due to continuous base flow or prolonged flows from detention facilities.	Limit the low, continuous flows to a small portion of the facility by using a low wooden divider or slightly depressed sand surface.
	Short Circuiting	When flows become concentrated over one section of the sand filter rather than dispersed.	Flow and percolation of water through the sand filter is uniform and dispersed across the entire filter area.
Rock Pad	Missing or Out of Place	Soil beneath the rock is visible.	Replace or rebuild the rock pad to design specifications.
Flow spreader	Concentrated Flow	Flow spreader uneven or clogged so that flows are not uniformly distributed across sand filter.	Level the spreader and clean so that flows are spread evenly over sand filter.
Pipes	Damaged	Any part of the piping that is crushed or deformed more than 20% or any other failure to the piping.	Pipe repaired or replaced.

NO. 19 – SAND FILTER VAULT			
Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Sand Media Section	Sediment Accumulation	Sediment depth exceeds ½-inch.	Remove sediment deposits on sand filter section, which would impede permeability of the filter section.
	Trash/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.
	Short Circuiting	When seepage/flow occurs along the vault walls and corners. Sand eroding near inflow area.	Sand filter media section re-laid and compacted along perimeter of vault to form a semi-seal. Add erosion protection to dissipate force of incoming flow and curtail erosion.
Pre-Settling Section	Sediment Accumulation	Sediment accumulation in vault bottom exceeds the depth of the sediment zone plus 6 inches.	Remove sediment deposit in the first chamber of the vault.
Drain Pipes/Cleanouts	Sediment Accumulation	When drain pipes, cleanouts become full with sediment and/or debris.	Remove the material from the facilities.
Inlet/Outlet Pipes	Trash/Debris Accumulation	Trash and debris accumulated in inlet/outlet pipes (floatables and non-floatables)	Trash and debris removed from vault, and inlet/outlet piping.
	Damaged	Inlet or outlet piping damaged or broken and in need of repair.	Pipe repaired and/or replaced.
Vault Structure	Damaged to Walls, Frame, Bottom and/or Top Slab.	Cracks wider than ½-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.
	Damaged Pipe Joints	Cracks wider than ½-inch at the joints of any inlet/outlet pipe or any evidence of soil particles entering the vault through the walls.	No cracks more than ¼-inch wide at the joint of the inlet/outlet pipe.
	Ventilation	Ventilation area blocked or plugged	Remove or clear blocking material from ventilation area. A specified % of the vault surface area must provide ventilation to the vault interior (see p. 6-122 for required %).
Baffles/Internal Walls	Damaged	Baffles or walls corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Repair or replace baffles or walls to specifications.
Access Cover	Damaged/Not Working	Cover cannot be opened, corrosion/deformation of cover.	Cover repaired to proper working specifications or replaced.
Access Ladder	Damaged	Ladder is corroded or deteriorated, not functioning properly, missing rungs, cracks, and misaligned.	Ladder replaced or repaired to specifications, and is safe to use as determined by inspection personnel.

NO. 20 – STORMFILTER®			
Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Media Section	Sediment Accumulation on Media.	Sediment depth exceeds 0.25 inches.	No sediment deposits that would impede permeability of the compost media.
	Trash/Debris Accumulation	Trash and debris accumulated on compost filter bed.	Trash and debris removed from the compost filter bed.
First Chamber	Sediment Accumulation	Sediment depth exceeds 6 inches in first chamber.	No sediment deposits in vault bottom of first chamber.
Drain Pipes Clean-Outs	Sediment Accumulation	When drain pipes, clean-outs, become full with sediment and/or debris.	Remove the accumulated material from the facilities.

NO. 21 – STORMFILTER® (CARTRIDGE TYPE)			
Maintenance Component	Defect or Problem	Condition When Maintenance is Needed	Recommended Maintenance to Correct Problem
Compost Media	Plugged	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.
Pipes	Damaged	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	Damage to Wall, Frame, Bottom, and/or Top Slab	Cracks wider than ½-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.
	Damaged Pipe Joints	Cracks wider than ½-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 ¼-inch wide at the joint of the inlet/outlet pipe.
Baffles	Damaged	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.

NO. 22 – BAFFLE OIL/WATER SEPARATOR			
Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed.
Vault Area	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 (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.
Vault Structure	Damage to Wall, Frame, Bottom, and/or Top Slab	Cracks wider than ½-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.
	Damaged Pipe Joints	Cracks wider than ½-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 ¼-inch wide at the joint of the inlet/outlet pipe.
Baffles	Damaged	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Repair or replace baffles to specifications.
Inlet/Outlet Pipes	Trash and Debris Accumulation	Trash and debris accumulation in inlet/outlet (floatables and non-floatables).	Trash and debris removed from vault, and inlet/outlet piping.
	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.
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.

NO. 23 – COALESCING PLATE OIL/WATER SEPARATOR			
Maintenance Component	Defect	Condition When Maintenance is Needed	Results Expected When Maintenance is Performed
Vault Area	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.
Coalescing Plates	Damaged	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.
Vault Structure	Damage to Wall, Frame, Bottom, and/or Top Slab	Cracks wider than ½-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.
	Damaged Pipe Joints	Cracks wider than ½-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 ¼-inch wide at the joint of the inlet/outlet pipe.
Baffles	Damaged	Baffles corroding, cracking, warping and/or showing signs of failure as determined by maintenance/inspection person.	Repair or replace baffles to specifications.
Inlet/Outlet Pipes	Trash and Debris Accumulation	Trash and debris accumulation in inlet/outlet (floatables and non-floatables).	Trash and debris removed from vault, and inlet/outlet piping.
	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.
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.

NO. 24 – CATCHBASIN INSERT			
Maintenance Component	Defect or Problem	Conditions When Maintenance is Needed	Results Expected When Maintenance is Performed
Catch Basin	Inspection	Inspection of media insert is required.	Effluent water from media insert is free of oils and has no visible sheen.
	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.
Media Insert	Water Saturated	Catch basin insert is saturated with water, which no longer has the capacity to absorb.	Remove and replace media insert
	Oil Saturated	Media oil saturated due to petroleum spill that drains into catch basin.	Remove and replace media insert.
	Service Life Exceeded	Regular interval replacement due to typical average life of media insert product.	Remove and replace media at regular intervals, depending on insert product.