

Activity 125 Water Quality Facilities

Description

Activity 125 involves maintaining, repairing, and inspecting facilities designed to protect water and environmental quality. It includes:

- Storm water ponds
- Water Quality or Bio-filtration Swales
- Filter Strips
- Bio-slopes
- Detention Vaults
- Detention Tank (or Large Diameter Pipe)
- Proprietary water treatment systems

The work includes cleaning, mowing, rototilling, hauling and disposing of removed material, reseeding or replacing vegetation and repairing the facilities as needed. It also includes any remediation or disposal costs associated with operating the facilities.

General Information

Refer to discussion in the General Instructions section preceding Activity 120 in this section of the *Maintenance Guide* for additional information including environmental and traffic control recommendations and other important considerations.

Work with the District Manager and the Region Environmental staff (e.g., Region Environmental Coordinator or Hazardous Materials coordinator), if any harmful materials may be present or encountered, to determine and accomplish needed testing and containment before starting the work.

Inspect each facility as required, preferably at least annually. Clean as required. Seven Standard Maintenance tables are included in this activity.

- Table 1 contains general maintenance and inspection guidelines that are applicable to all water quality facilities
- Tables 2 through 7 list additional practices for specific types of facilities (e.g. swales or ponds).

Follow the recommendations in the appropriate table for the specific type of facility.

The best management practices listed in the standard maintenance tables have been reviewed by Geo-Environmental and have been accepted as adequate to maintain the facility and protect water quality. Some existing water quality features have Operations and Maintenance manuals (O&M) that were created prior to December 2010. It is important to note that the standard maintenance tables supersede O&M manuals that were created prior to December 2010.

O&M manuals (completed on or after December 2010) provide a detailed description of the facility and include special maintenance requirements and limitations on equipment access. The Transportation Maintenance Manager must ensure compliance with any limitations and/or special requirements listed in the O&M manual in addition to the standard maintenance listed in the attached tables. Completed O&M manuals are available online. For additional guidance, in coordination with your Region Environmental Coordinator, please contact the Senior Hydraulic Engineer in the Geo-Environmental Section of the Technical Services Branch at (503) 986-3365.

Work under this activity may involve areas that contain endangered species. Refer to the *RES/RAZ Maps* and comply with all restrictions for work in those areas. Seek assistance from the District Manager and the Region Environmental Coordinator as needed.

Equipment

Select equipment as needed for the work and situation.

Materials

Materials may include:

- Devices to control erosion, sedimentation, and pollutants or contaminants.
- Replacement components, such as compost filters.
- Seed, etc. or replacement plant materials.

Work Method

1. Implement appropriate traffic control.
2. Implement appropriate methods of erosion control, sediment control, or pollutants and contaminants control.
3. If needed, test any materials to be disturbed for harmful effects before starting work.
4. Perform needed cleaning, maintenance, restoration, or repairs using the standard maintenance tables in this section or appropriate O&M manual.
5. Remove traffic control.
6. To prevent environmental damage, clean tools and equipment using Best Management Practices.
7. Dispose of any removed or excess material in an appropriate location.

Measurement of Accomplishment, Expenditure Account, and Charge Activity

Measurement is number of worker hours involved. Expenditure account type is Highway EA; use a sub job appropriate for the crew performing the work.

- Charge Activity 125.

Table 1: General Maintenance

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|--|--|---|--|
| Annual Visual Inspection and Maintenance | Routine inspection | <p>Facilities should be inspected annually prior to fall rains.</p> <p>If appropriate, also inspect the facility after the first significant rain event following dry spell (e.g. the first 24-hour rainfall greater than 0.5 inches after summer)</p> | <p>Identify existing and potential operational problems.</p> <p>Repair damaged components that are critical to the operation of the feature (e.g. flow control valves, liners, under drains, and pipes) as soon as practical.</p> <p>Schedule routine maintenance such as mowing, sump cleanout, lube moving parts, repairs, etc.</p> <p>If the facility is problematic, schedule additional inspections or maintenance.</p> <p>Repair or replace facility field markers according to Technical Bulletin GE10-01(B). A marked facility has an O&M Plan.</p> |
| | <p>Maintenance of ancillary structures, if present</p> <p>Examples include</p> <ul style="list-style-type: none"> • Flow splitter manhole • Diversion manhole • Catch basin • Shut-off valve assembly • Pretreatment or primary treatment manhole • Large detention pipe • Vault • Outfall | Damage or problems are observed or anticipated during the annual inspection. | <p>Grease moving parts to ensure proper operation.</p> <p>Remove sediment from sumps, vaults, catch basins, and structures to prevent the release of oil or sediment. Annual cleaning is recommended. The use of a Vactor® truck is allowed unless prohibited in the facility's O&M manual</p> <p>Repair or replace damaged orifice assembly/riser pipe. Restore to design standards. Be aware of possible confined space requirements.</p> <p>Repair or replace damaged gates, locks, chains, etc that are used to secure valves and access points to prevent vandalism</p> |
| General | Temporary erosion control hampers maintenance | Erosion control remains from project construction (contractor did not remove) | Contact contractor to complete work OR remove temporary erosion control that is not specified in the O&M Plan. |

Table 1: General Maintenance

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|------------------------------|---|---|---|
| General | Spilled material has entered the pond or structures | Oil, fuel, or other pollutants are evident following a spill event or accident. | <p>Utilize valves or other features, if present, to contain the spilled material.</p> <p>Remove and properly manage spilled material and contaminated soil.</p> <p>Contact Region HazMat or spill response company for spill cleanup assistance where appropriate.</p> <p>Contact a Region Hydraulic Engineer for technical assistance with pond restoration, if necessary.</p> |
| | Litter (trash and debris) | Trash poses a hazard, inhibits function, or is aesthetically unacceptable (e.g. evidence of dumping). | <p>Remove problematic trash and debris as soon as practical. There should be no evidence of dumping.</p> <p>Remove non-problematic trash in accordance with District litter practices.</p> |
| | Insects | Insects interfere with maintenance activities. | Implement vector control in accordance with County Health and District practices. |
| | Vegetation growth (mowing and brushing) | Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. | <p>Mow access, berms, bottom, and side-slopes of the facility as noted in the District Integrated Vegetation Management (IVM) Plan.</p> <p>Remove vegetation in or around grates that obstruct (or could obstruct) flow.</p> <p>Avoid mowing or removing vegetation that does not need to be controlled.</p> <p>Avoid removing vegetation too low to the ground. NOTE: Removing vegetation too near to the ground may result in scalping of the soil, unwanted damaged to vegetation, or growth of unwanted plant species.</p> <p>Heavy equipment is allowed within aboveground water quality and detention facilities unless access restrictions are listed in the O&M Manual.</p> |
| | Noxious weed growth | Control of noxious weeds is required by law or prescribed in the District IVM Plan | <p>Remove noxious weeds in accordance with the District IVM Plan.</p> <p>Follow Environmental Protection Agency (EPA) label and ODOT policies on herbicide usage.</p> |

Table 1: General Maintenance

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|-----------------------|-------------------|---|---|
| General | Hazard trees | Trees are found to be weakened, unsound, undermined, leaning, or exposed and may fall across the highway | <p>Remove hazard trees as soon as practical.</p> <p>Where appropriate, consult an ODOT Forester for help identifying or removing hazard trees.</p> |
| | Tree growth | Tree growth restricts access, obstructs function, jeopardizes infrastructure, or interferes with maintenance actions. | <p>Prune or remove as needed to maintain access, function, and tree health.</p> <p>Manage potentially problematic woody material before the trees reach 6 inches diameter at breast height (DBH).</p> <p>Consult an ODOT Forester for the removal or management of trees greater than 6 inches DBH. Obtain permits where appropriate.</p> <p>Refer to the District IVM Plan for the management of smaller trees.</p> <p>Avoid removing trees that will not interfere with the operation or maintenance of the facility.</p> |

Table 2: Maintenance of Stormwater Ponds

Stormwater ponds should retain water and slowly release by either infiltration or outflow.

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|-----------------------|---|---|---|
| General | Follow applicable Guidance from Table 1 AND applicable guidance from this table. | | |
| | Vegetation growth in dry ponds (mowing and brushing) | Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. Collected water should drain. | Dry ponds need vegetation on the bottom and sides. Vegetation management typically occurs around and within the facility. Mow access, berms, bottom, and side-slopes as noted in the District Integrated Vegetation Management (IVM) Plan. (typically annually) Heavy equipment is allowed on dry pond bottoms unless access restrictions are listed in the O&M Manual. |
| | Vegetation growth in wet ponds (mowing and brushing) NOTE: Wet ponds are not typical. | Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. Water may be stored year-round without draining. | Wet ponds need vegetation on the bottom and sides. Vegetation management typically occurs around the facility. Mow access and berms as noted in the District Integrated Vegetation Management (IVM) Plan. Pond bottoms are intended to capture and store water. Vegetation removal from pond bottom is infrequent. |

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| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|-----------------------|--|---|---|
| | <p>Sediment accumulation in pre-treatment features (e.g. forebays, basins, or fully exposed impermeable liners)</p> <p>NOTE: Exposed liners are not typical.</p> | <p>Sediment affects flow.</p> <p>Sediment jeopardizes infrastructure.</p> | <p>Remove sediment from ponds and pipe ends as needed to ensure adequate drainage into treatment pond (grassy or wet pond).</p> <p>Use methods that minimize disturbance to surrounding vegetation.</p> <p>Heavy equipment is allowed on dry pond bottoms unless access restrictions are listed in the O&M Manual.</p> <p>Sediment may contain oil and other pollutants, especially in areas with high ADT. Refer to the ODOT Maintenance Environmental Management System (EMS) Manual and <i>ODOT Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices</i> or the disposal of contaminated sediment. Note: Pollutant concentrations may increase if sediment is not routinely removed.</p> |
| Storage areas | Sediment accumulation along bottom of grassy ponds | <p>Sediment inhibits the flow of water through the grass (>12 inches deep).</p> <p>Sediment inhibits grass growth.</p> | <p>Where practical use a Vactor® truck to remove sediment from grassy areas. When Vactoring® is not practical, follow ditch cleaning practices.</p> <p>Restore slope and geometry to design standards, if necessary.</p> <p>Reseed grass cover where needed.</p> <p>Stormwater should infiltrate or flow toward outlet once inflow has ceased.</p> <p>Refer to the general section of this table for side-slope mowing and other routine maintenance actions.</p> |

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Stormwater ponds should retain water and slowly release by either infiltration or outflow.

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|-----------------------|--|---|--|
| | <p>Sediment accumulation in wet ponds or channels.</p> <p>NOTE: Currently there is limited use of wet ponds to treat stormwater.</p> | <p>Capacity has noticeably decreased (examples below)</p> <ul style="list-style-type: none"> • low and medium flows go through the bypass, • the ordinary high water level has increased, • flooding occurs when the outflows are not blocked, • pond bottom is level with outlets. | <p>Remove sediment build-up from pipe ends as needed to ensure flow. Use methods that minimize disturbance to surrounding vegetation.</p> <p>Remove sediment to restore designed shape and depth.</p> <p>In high ADT areas, pond dredging may be required every 5 to 10 years to restore the capacity.</p> <p>Cease sediment removal when riprap or liner is encountered.</p> <p>Reseed if necessary to control erosion.</p> |
| | <p>Erosion</p> | <p>Side slopes show evidence of erosion greater than 4 inches deep and the potential for continued erosion is evident.</p> | <p>Promptly address erosion that causes immediate problems (e.g. damage to highway or highway structure)</p> <p>Schedule non-urgent repairs with routine work.</p> <p>Stabilize slope using appropriate erosion control and repair methods.</p> <p>Repair the cause of the erosion where possible.</p> <p>If necessary, contact the ODOT Erosion Control Coordinator to evaluate the condition.</p> |
| <p>Storage areas</p> | <p>Beaver dams</p> | <p>Dam inhibits function or jeopardizes the infrastructure.</p> | <p>Dispose of dam debris offsite or outside of the riparian area.</p> <p>Coordinate the removal or relocation of beaver with the REC and Oregon Department of Fish and Wildlife (ODFW). Consider installing deterrents where appropriate.</p> |

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| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|-----------------------|---|--|--|
| | Flooding | Water is flowing over or is approaching the top of the pond | <p>Check storm drain pipes and structures for blockage. Ensure valves are open. Remove obstructions to restore flow.</p> <p>Evaluate and remove excessive sediment from pond storage areas.</p> <p>Contact the Region Hydraulic Engineer to evaluate the source of flooding or provide design modifications.</p> |
| Treatment Components | Poor vegetation coverage | Vegetation (grass) is sparse or eroded patches occur in more than 10 percent of pond bottom. | <p>Repair and reseed as appropriate to restore coverage.</p> <p>Install erosion control measures as needed.</p> <p>Trim overhanging limbs and remove brushy vegetation that limit grass growth (provide too much shade).</p> |
| | Missing or eroded amended soil mix | Bare soil is observed over 10 percent of the amended area. | <p>Identify and resolve erosion problem</p> <p>Add amended soil. Contact a Region Hydraulics Engineer for required material specifications.</p> |
| | Amended soil mix along pond bottom is clogged | Standing water is observed for seven (7) consecutive days or longer from May through October. | <p>Remove and replace amended soil mix. Contact a Region Hydraulics Engineer for required material specifications.</p> <p>Replace or repair damaged underlying drainage geotextile, impermeable liner, drain piping, and granular drain backfill material when applicable.</p> |
| | Granular drain backfill material for under drain pipe plugged | Amended soil mix has been replaced and standing water is still observed for seven (7) consecutive days or longer from May through October. | <p>Remove and replace granular drain backfill material. Contact a Region Hydraulics Engineer for required material specifications.</p> <p>Install new drainage geotextile over new granular drain backfill material.</p> <p>Replace amended soil mix.</p> |

Table 2: Maintenance of Stormwater Ponds

Stormwater ponds should retain water and slowly release by either infiltration or outflow.

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|-----------------------|--|--|---|
| Treatment Components | <p>Impermeable liner damage</p> <p>NOTE: Liners (if installed) are typically below the grass surface and may not be visible.</p> | <p>Liner is damaged (e.g. during sediment removal or by motoring public). Liner is damaged when condition allows potential contamination to be released to the subsurface.</p> | <p>Repair or replace the liner with similar material.</p> <p>In many cases, rigid plastic liners may be repaired by welding a similar material over the damaged portion or using a non-toxic, waterproof epoxy.</p> <p>If necessary, contact a Region Hydraulics Engineer for technical assistance regarding permanent repair.</p> |
| Berms and Dikes | Settlement | <p>Any part of the berm has settled 4 inches or lower.</p> <p>Note: Settlement may indicate potential problems with the facility.</p> | <p>Repair berm to design height with similar materials.</p> <p>Contact a Region Hydraulics and Geotechnical Engineer as needed to evaluate the source of the settlement and determine repair options.</p> |
| | Flow-through | <p>Water is flowing through the pond berm.</p> | <p>Correct cause of flow through (e.g. eliminate burrowing rodents)</p> <p>Install erosion control measures where appropriate.</p> <p>Repair berm with similar materials.</p> <p>If necessary, contact a Region Geotechnical Engineer to evaluate the condition.</p> |
| | Sloughing | <p>Ongoing erosion is observed with potential for erosion to continue.</p> | <p>Where possible correct the cause of the erosion. Install or replace energy dissipaters where appropriate.</p> <p>Install erosion control measures where appropriate</p> <p>Repair berm with similar materials.</p> <p>If necessary, contact the REC and/or ODOT Erosion Control Program Coordinator to evaluate the condition.</p> |

Table 2: Maintenance of Stormwater Ponds

Stormwater ponds should retain water and slowly release by either infiltration or outflow.

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|--|--|--|---|
| <p>Structures and piping</p> <p>Includes</p> <ul style="list-style-type: none"> • flow splitters • vaults • inlets • bypasses • valves • catch basins • gates | <p>Damaged or missing components</p> | <p>Flow control assembly is not working properly (e.g. loose, bent, unattached, etc.).</p> | <p>Repair or replace valves, gates, orifices and pipes as necessary with similar components.</p> <p>Divert flows when needed.</p> |
| | <p>Obstruction or blockage</p> | <p>Water does not flow in, through, or out of the structure or piping.</p> | <p>If valves are part of the flow control assembly, verify the valves are open. Refer to the O&M for the location of control valves.</p> <p>Remove obstructions to restore flow (e.g. remove trash, debris, sediment, or vegetation as necessary).</p> <p>Jet rodders may be used to clean piping unless specifically prohibited in the O&M plan.</p> |
| <p>Outfalls</p> | <p>Insufficient rock armoring at outlets</p> <ul style="list-style-type: none"> • along channel side slopes and bottom • pipe outlet • along the length of spillway | <p>Minimal layer of rock exists</p> <p>Rock missing along armored area</p> <p>Flow channelization or high flows exposed native soil around the rock armored area</p> | <p>Install erosion control measures</p> <p>Repair or replace rock armoring to original design standard</p> <p>Repair, re-grade, and reseed eroded areas adjacent to rock armoring.</p> <p>Contact a Region Hydraulics Engineer for technical assistance if rock armoring problems continue or a highway structure is at risk</p> |

Table 3: Maintenance of Water Quality or Biofiltration Swales

Swales should provide even sheet flow that moves water from the inlet to the outlet.

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|-----------------------|--|--|--|
| General | Follow applicable Guidance from Table 1 AND applicable guidance from this table. | | |
| | Vegetation growth (mowing and brushing) | Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. Swales should be mowed annually. | Mow access, berms, swale, and side-slopes as noted in the District Integrated Vegetation Management (IVM) Plan. The use of heavy equipment is allowed unless access restrictions are listed in the O&M Manual. |
| Swale Components | Sediment accumulation in pre-treatment areas or ancillary structures (e.g. manholes) | Sediment affects flow. Sediment jeopardizes infrastructure. | Remove sediment that prevents adequate drainage into swale. Use methods that minimize disturbance to surrounding vegetation. The use of heavy equipment is allowed unless access restrictions are listed in the O&M Manual. Sediment may contain oil and other pollutants, especially in areas with high ADT. Refer to the ODOT Maintenance Environmental Management System (EMS) Manual and the <i>ODOT Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices</i> for the disposal of contaminated sediment. Note: Pollutant concentrations may increase if sediment is not routinely removed. |
| | Sediment accumulation along swale bottom | Sediment inhibits the flow of water through the grass (e.g. water is ponding or cutting a channel). | Remove sediment from grassy areas. The use of a Vactor® truck is allowed unless access restrictions are listed in the O&M Manual. Restore slope and geometry to design standards, if necessary. Reseed grass cover where needed. Stormwater should infiltrate or flow toward outlet once inflow has ceased. |

Table 3: Maintenance of Water Quality or Biofiltration Swales

Swales should provide even sheet flow that moves water from the inlet to the outlet.

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|-----------------------|---|--|---|
| Swale Components | Erosion | Side slopes show evidence of erosion greater than 2 inches deep and the potential for continued erosion is evident. | <p>Promptly address erosion that causes immediate problems (e.g. damage to highway or highway structure)</p> <p>Schedule non-urgent repairs with routine work.</p> <p>Stabilize slope using appropriate erosion control and repair methods.</p> <p>Repair the cause of the erosion where possible.</p> <p>If necessary, contact the ODOT Erosion Control Program Coordinator to evaluate the condition.</p> |
| | Poor vegetation coverage | <p>Vegetation (grass) is sparse or eroded patches occur in more than 10 percent of swale.</p> <p>NOTE: A single incident (e.g. vehicle accident) typically affects less than 10 percent of the area and is unlikely to trigger a repair.</p> | <p>Repair and reseed as appropriate to restore coverage.</p> <p>Install erosion control measures as needed.</p> <p>Trim overhanging limbs and remove brushy vegetation that limit grass growth (provide too much shade).</p> |
| | Missing or eroded amended soil mix | Bare soil is observed over 10 percent of the amended area. | <p>Identify and resolve erosion problem</p> <p>Add amended soil. Contact a Region Hydraulics Engineer for required material specifications.</p> |
| | Amended soil mix along swale bottom is clogged | Standing water is observed for seven (7) consecutive days or longer from May through October. | <p>Remove and replace amended soil mix. Contact a Region Hydraulics Engineer for required material specifications.</p> <p>Replace or repair damaged underlying drainage geotextile, impermeable liner, drain piping, and granular drain backfill material when applicable.</p> |
| | Granular drain backfill material for under drain pipe plugged | Amended soil mix has been replaced and standing water is still observed for seven (7) consecutive days or longer from May through October. | <p>Remove and replace granular drain backfill material. Contact a Region Hydraulics Engineer for required material specifications.</p> <p>Install new drainage geotextile over new granular drain backfill material.</p> <p>Replace amended soil mix.</p> |

Table 3: Maintenance of Water Quality or Biofiltration Swales

Swales should provide even sheet flow that moves water from the inlet to the outlet.

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|-----------------------|---|--|--|
| Swale Components | <p>Impermeable liner damage</p> <p>NOTE: Liners may not be visible.</p> <p>If present, liners are typically below the grass surface along the bottom of the swale</p> <p>Fabric wrapped around under drains is not a liner.</p> | <p>Liner is damaged (e.g. during sediment removal or by motoring public). Liner is damaged when condition allows potential contamination to be released to the subsurface.</p> | <p>Repair or replace the liner with similar material. Replace top soil and grass as appropriate.</p> <p>Features with liners, typically have maintenance option limitations; check the O&M Manual.</p> <p>If necessary, contact a Region Hydraulics Engineer for technical assistance.</p> |
| | <p>Obstruction or blockage of pipes</p> | <p>Water does not flow in, through, or out of the swale.</p> | <p>Remove obstructions to restore flow (e.g. remove trash, debris, sediment, or vegetation as necessary).</p> <p>Jet rodders may be used to clean piping unless specifically prohibited in the O&M plan.</p> |
| | <p>Flow spreader is uneven or clogged</p> | <p>Water does not flow evenly across the structure</p> | <p>Clean sump or forebay as needed to maintain capacity.</p> <p>Clean or repair spreader as needed to provide a uniform flow and prevent erosion. Level portions of the flow spreader that have settled.</p> |

Table 4: Filter Strips

Filter strips should provide even sheet flow that moves water from edge of pavement toward a downslope conveyance.

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|--------------------------|---|---|---|
| General | Follow applicable Guidance from Table 1 AND applicable guidance from this table. | | |
| | Vegetation growth (mowing and brushing) | Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. Filter strips should be mowed annually. | Mow as noted in the District Integrated Vegetation Management (IVM) Plan. The use of heavy equipment is allowed unless access restrictions are listed in the O&M Manual. |
| Filter Strip Components | Sediment accumulation | Sediment inhibits the flow of water through the grass (e.g. water is ponding or cutting a channel). | Remove sediment from grassy areas. The use of a Vactor® truck is allowed unless access restrictions are listed in the O&M Manual. Restore slope and geometry to design standards, if necessary. Reseed grass cover where needed. |
| | Missing or eroded amended soil mix | Bare soil is observed over 10 percent of the amended area. | Identify and resolve erosion problem Add amended soil. Contact a Region Hydraulics Engineer for required material specifications. |
| | Amended soil mix is clogged | Standing water is observed for seven (7) consecutive days or longer from May through October. | Remove and replace amended soil mix. Contact a Region Hydraulics Engineer for required material specifications. Replace or repair damaged underlying drainage geotextile, impermeable liner, drain piping, and granular drain backfill material when applicable. |
| | Flow spreader is uneven or clogged | Water does not flow evenly across the structure | Clean or repair spreader as needed to provide a uniform flow and prevent erosion. Level portions of the flow spreader that have settled. |
| | Erosion or rutting | Areas have eroded or channelized due to high flows or vehicular damage | Repair, regrade, and reseed (as needed) to restore uniform flow across grass. Repair and reseed as appropriate to restore coverage. Install erosion control measures as needed. |
| Poor vegetation coverage | Vegetation (grass) is sparse or eroded patches occur in more than 10% of the strip. NOTE: A single incident is unlikely to trigger a repair. | Repair and reseed as appropriate to restore coverage. Install erosion control measures as needed. | |

Table 5: Bioslopes

Bioslopes should provide even sheet flow that moves water from edge of pavement.

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|-----------------------|--|--|--|
| General | Follow applicable Guidance from Table 1 AND applicable guidance from this table. | | |
| | Vegetation growth (mowing and brushing) | Vegetation growth restricts access, limits sight distance, obstructs water flow, or interferes with maintenance activity. Slopes should be mowed annually. | Mow as noted in the District Integrated Vegetation Management (IVM) Plan. The use of heavy equipment is allowed unless access restrictions are listed in the O&M Manual. |
| Bioslope Components | Sediment accumulation | Sediment inhibits the flow of water to the bioslope (e.g. water is ponding or cutting a channel). | Remove sediment from grassy areas. The use of a Vactor® truck is allowed unless access restrictions are listed in the O&M Manual. Restore slope and geometry to design standards, if necessary. Reseed grass cover where needed. |
| | Ecology mix is clogged | Standing water is observed for seven (7) consecutive days or longer from May through October. | Remove and replace ecology mix. Contact a Region Hydraulics Engineer for required material specifications. Replace or repair damaged underlying drainage geotextile, impermeable liner, drain piping, and granular drain backfill material when applicable. |
| | Granular drain backfill material for under drain pipe plugged | Ecology mix has been replaced and standing water is still observed for seven (7) consecutive days or longer from May through October. | Remove and replace granular drain backfill material. Contact a Region Hydraulics Engineer for required material specifications. Install new drainage geotextile over new granular drain backfill material. Replace amended soil mix. |
| | Poor vegetation coverage | Vegetation (grass) is sparse or eroded patches occur in more than 10 percent of the strip | Repair and reseed as appropriate to restore coverage. Install erosion control measures as needed. |

Table 6: Detention Vaults

Detention vaults should temporarily hold water and slowly release through the outlet.

Tanks and pipes may be classified as confined space. Refer to the ODOT Confined Space program (PRO96003) before entering.

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|-----------------------|--|--|---|
| General | Follow applicable Guidance from Table 1 AND applicable guidance from this table. | | |
| Components | Sediment accumulation | <p>Sediment exceeds (or could exceed) the capacity of the sump.</p> <p>Sediment is observed at the outlet.</p> | <p>Remove sediment from sump and bottom of tank floor.</p> <p>Annual cleaning is recommended.</p> <p>The use of a Vactor® truck is allowed unless prohibited in the facility's O&M manual.</p> <p>Sediment may contain oil and other pollutants, especially in areas with high ADT. Refer to the ODOT Maintenance Environmental Management System (EMS) Manual and <i>ODOT Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices</i>. for the disposal of contaminated sediment.</p> <p>Note: Pollutant concentrations may increase if sediment is not routinely removed.</p> |
| | Damaged or missing components | Flow control assembly is not working properly (e.g. loose, bent, unattached, etc.). | <p>Repair or replace valves, gates, orifices and pipes as necessary with similar components.</p> <p>Divert flows when needed.</p> |
| | Obstruction or blockage | Water does not flow in, through, or out of the structure or piping. | <p>If valves are part of the flow control assembly, verify the valves are open. Refer to the O&M for the location of control valves.</p> <p>Remove obstructions to restore flow (e.g. remove trash, debris, sediment, or vegetation as necessary).</p> <p>Jet rodders may be used to clean piping unless specifically prohibited in the O&M plan.</p> |
| | Structure or access is hidden | Site condition conceal the location of the facility | Mark facilities that may become hidden |
| Clogged air vent | Pressure or a vacuum is created within the tank. | Clean air vents as needed to ensure air flows into and out of the tank. | |

Table 7: Detention Tank (or Large Diameter Pipe)

Detention tanks should temporarily hold water and slowly release through the outlet.

Detention tanks and pipes may be classified as confined space. Refer to the ODOT Confined Space program (PRO96003) before entering.

| Maintenance Component | Defect or Problem | Condition When Maintenance is Needed | Recommended Maintenance to Correct Problem |
|-----------------------|--|--|--|
| General | Follow applicable Guidance from Table 1 AND applicable guidance from this table. | | |
| Components | Sediment accumulation | <p>Sediment exceeds (or could exceed) the capacity of the sump.</p> <p>Sediment is observed at the outlet.</p> | <p>Remove sediment from sump and bottom of tank floor.</p> <p>Annual cleaning is recommended.</p> <p>The use of a Vactor® truck is allowed unless prohibited in the facility's O&M manual.</p> <p>Sediment may contain oil and other pollutants, especially in areas with high ADT. Refer to the ODOT Maintenance Environmental Management System (EMS) Manual and <i>ODOT Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices</i> for the disposal of contaminated sediment.</p> <p>Note: Pollutant concentrations may increase if sediment is not routinely removed.</p> |
| | Damaged or missing components | Flow control assembly is not working properly (e.g. loose, bent, unattached, etc.). | <p>Repair or replace valves, gates, orifices and pipes as necessary with similar components.</p> <p>Divert flows when needed.</p> |
| | Obstruction or blockage | Water does not flow in, through, or out of the structure or piping. | <p>If valves are part of the flow control assembly, verify the valves are open. Refer to the O&M for the location of control valves.</p> <p>Remove obstructions to restore flow (e.g. remove trash, debris, sediment, or vegetation as necessary).</p> <p>Jet rodders may be used to clean piping unless specifically prohibited in the O&M plan.</p> |
| | Structure or access is hidden | Site condition conceal the location of the facility | Mark facilities that may become hidden |
| | Clogged air vent | Pressure or a vacuum is created within the tank. | Clean air vents as needed to ensure air flows into and out of the tank. |

