

SECTION 6

Routine Maintenance Activity Details

80. DEBRIS REMOVAL

When	<ul style="list-style-type: none"> • Deadfall, and other objects, such as shopping carts, tires, appliances, and mattresses have accumulated in the drain.
Why	<ul style="list-style-type: none"> • To prevent flooding. • To prevent or remove blockages and safety hazards. • To prevent bottom scour and drain bank erosion.
Where	<ul style="list-style-type: none"> • In county drains.
Scheduling	<ul style="list-style-type: none"> • Preferably during lower flow periods. • Some locations require routine debris removal. • During an emergency.
How	<ol style="list-style-type: none"> 1. Remove debris minimizing channel bottom and bank disturbance. 2. When trees are uprooted and fall into a drain, cut tree off above root ball and cut tree into manageable lengths and remove from the drain. If possible reposition root ball back into its original position anchoring appropriately or remove the root ball and fill and stabilize area.
Maintenance	<ul style="list-style-type: none"> • Inspect disturbed areas routinely and following each precipitation event that results in runoff until stabilized.
Limitations	<ul style="list-style-type: none"> • Access. • Cost of retrieval and disposal. • Equipment availability. • Safety concerns.

81. SEDIMENT REMOVAL

When	<ul style="list-style-type: none"> When sediment has accumulated above the dimensions of the drain as legally established or constructed and the drain is not providing adequate drainage.
Why	<ul style="list-style-type: none"> Remove sediment accumulation restoring proper drain function.
Where	<ul style="list-style-type: none"> Sediment has accumulated in reaches of a drain preventing the drain from functioning as legally established or constructed.
Scheduling	<ul style="list-style-type: none"> During low flow or frozen ground conditions. Avoid sediment removal and spreading of spoil piles during spring thaw due to soil instability and when crops will be damaged.
How	<ol style="list-style-type: none"> Inspect drain and document eroding outfalls, obstructions, and areas of sediment accumulation. Prioritize maintenance activities and identify needed equipment. Seek engineering support when needed to analyze the drain profile in identifying reaches that need to be dredged and/or to design SESC measures taking into account the soil type, flow conditions and length of time from initial earth disturbance to project completion. Develop a SESC plan prior to the initial earth disturbance when the project differs from these specifications or when removing sediment from a drain reach that exceeds 100 linear feet. Prioritize and schedule maintenance, taking into account adjacent land use activities. Prepare access along bank. When practical clear north and east banks to maintain shading of the stream. Install downstream sediment control measures such as sediment sumps and check dams or sheet piling prior to commencing earth change activities. Install all other necessary SESC measures. When practical, begin sediment removal downstream and work upstream. Deposit spoils along the edge of the drain easement as far away from the drain as possible maintaining a natural buffer strip and leaving openings for natural drainage to occur. Do not place spoils in a regulated wetland unless it is a historic spoil area without a wetlands permit. Seed, apply mulch when necessary, or otherwise stabilize disturbed drain banks daily and stabilize disturbed areas, either temporarily or permanently, within 5 days. Spread spoils to prevent erosion and ditch bank surcharge and seed or otherwise stabilize spread spoils within 5 days. If spoils will be spread at a later date, seed, apply mulch when necessary, or otherwise stabilize spoil piles within 5 days except where spoil piles will interfere with plowing tilling or the harvesting of crops. If spoil piles will be left slope spoils toward agricultural fields and away from the stream or drain. When removing sediment in the winter during freezing temperatures, dormant seed spoil piles daily using additional erosion control measures as required to prevent erosion.
Maintenance	<ul style="list-style-type: none"> Inspect erosion and sediment controls routinely and following a precipitation event that results in runoff until disturbed areas are stabilized.

Limitations	<ul style="list-style-type: none"> • Cost. • Access is limited by the drain easement dimensions. • The cost of frequent sediment removal resulting from unregulated sediment sources such as plowing and tilling, and urban land uses. • Additional SESC measures may be needed during the non growing season.
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Maintenance of a natural buffer strip between spoils and reconstructed drain prior to drain bank stabilization.



Excavated sediment and soils being trucked off-site during a drain reconstruction project.

Source: Sarah Pistro, Tuscola County Drain Commissioner

82. STORMWATER BASIN MAINTENANCE

When	<ul style="list-style-type: none"> • Sediment has accumulated and is limiting storage volume. • Excessive vegetation or brush accumulates in the bottom or along the banks. • Structural components require maintenance. • Wetland vegetation is being negatively impacted.
Why	<ul style="list-style-type: none"> • To maintain the design capacity and control sediment and other pollutants.
Where	<ul style="list-style-type: none"> • In constructed stormwater basins.
Scheduling	<ul style="list-style-type: none"> • When the basin water level is low and rainfall is not anticipated. • Brush removal during times of frozen ground, ice cover, or drought conditions will minimize soil disturbance.
How	<ol style="list-style-type: none"> 1. In wet basins, dewater basin if outlet structure can be adjusted for dewatering; and pump or divert incoming flow around basin until sediment removal is complete and vegetation is reestablished. Vegetation can be controlled by hand cutting or by applying an aquatic labeled herbicide by a certified applicator. 2. In dry basins, remove vegetation during low flow or dry periods by brushing or by applying an aquatic labeled herbicide by a certified applicator. Stabilize disturbed areas. 3. Remove brush to an upland area within the drain easement or haul offsite. 4. Test spoils, if required, to determine appropriate locations for disposal. 5. Spread sediment spoils in an upland area within the drain easement or haul to an appropriate offsite area and stabilize.
Maintenance	<ul style="list-style-type: none"> • Inspect spoil deposition and disturbed areas routinely until stabilized. • Monitor basin for future sediment and vegetation accumulation. • Establish a maintenance schedule for mowing of dry basins.
Limitations	<ul style="list-style-type: none"> • Herbicides must be applied by a certified applicator. • If an herbicide is used in water it must be labeled for aquatic use.

83. VEGETATION REMOVAL WITHOUT GRUBBING

When	<ul style="list-style-type: none"> • Vegetation limits flow capacity. • Vegetation poses a threat to channel and bank stability. • Access is required.
Why	<ul style="list-style-type: none"> • Brushing without grubbing reduces sheet flow velocities preventing rilling and gulying, maintaining slope stability. • Trees and/or stumps located below the ordinary high water mark may cause channel restrictions, stream bottom scour, and drain bank erosion unless removed.
Where	<ul style="list-style-type: none"> • In drain easements, stream or drain banks and within the channel.
Scheduling	<ul style="list-style-type: none"> • Year around; consider nesting and spawning seasons and critical habitat.
How	<ol style="list-style-type: none"> 1. Identify areas which need to be sprayed or brushed. If possible, maintain vegetation on south and west drain banks. 2. Chemical applicators, heavy equipment, light machinery, and hand tools, may be needed. 3. Cut vegetation within a few inches of the ground surface, leave root zone intact and do not grade area. Stump treatments may be applied to prevent re-sprouting. 4. Remove cut vegetation and pile within drain easement. 5. If a tree must be cut from within the channel, cut during low flow conditions.
Maintenance	<ul style="list-style-type: none"> • Where vegetation growth hinders flow capacity mow or chemically spray as needed.
Limitations	<ul style="list-style-type: none"> • Stumps and other woody remnants inhibit mowing. • May temporarily disrupt habitat.

84. VEGETATION REMOVAL WITH SELECTIVE GRUBBING

When	<ul style="list-style-type: none"> • Vegetation roots pose a threat to channel and bank stability. • Access is required.
Why	<ul style="list-style-type: none"> • Selective grubbing maintains selective vegetation to reduce sheet flow velocities preventing rilling and gullyng, maintaining slope stability. • Trees and/or stumps located below the ordinary high water mark may cause channel restrictions, stream bottom scour, and drain bank erosion unless removed.
Where	<ul style="list-style-type: none"> • In drain easements, drain banks, or within the channel, and grubbing is isolated to less than 100 linear feet at any one location.
Scheduling	<ul style="list-style-type: none"> • Year around; consider nesting and spawning seasons and critical habitat.
How	<ol style="list-style-type: none"> 1. Selectively identify areas which must be grubbed leaving intermittent vegetation where feasible to reduce sheet flow velocities and assist in the reestablishment of vegetation (See Vegetation Removal without Grubbing). When possible, avoid the south and west drain banks. 2. Develop a SESC plan prior to the initial earth disturbance when the project differs from these specifications or when isolated areas of grubbing exceed 100 linear feet. 3. Place appropriate downstream sediment control measures, such as a check dam, when working in the channel. 4. Heavy equipment, light machinery, and hand tools, may be needed. 5. Flush cut trees wherever possible, to leave roots in place for bank stabilization. 6. In areas where grubbing is required, remove vegetation, minimizing the disturbance of surrounding vegetation. 7. Grade soil surface as required, fill in voids, compact soil, and seed. 8. Apply mulch and/or erosion control blankets during the non-growing season. (Mulch is optional during the growing season.) 9. Remove any accumulated sediment from behind downstream erosion control device(s). Place sediment in vegetation on the right of way, as far from the drain as possible. 10. Remove sediment control measures after disturbed area is covered with mulch and/or erosion control blanket, or after the disturbed area is stabilized. 11. If a tree must be removed from the channel bottom when the stream is flowing, install downstream temporary sediment controls, cut tree and pile within drain easement, pull stump, allow channel bottom to stabilize, and then remove downstream sediment control measures as described above.
Maintenance	<ul style="list-style-type: none"> • Inspect routinely and following each precipitation event that results in runoff until stabilized.
Limitations	<ul style="list-style-type: none"> • May temporarily disrupt habitat.

85. SLOPE AND STREAMBANK STABILIZATION

When	<ul style="list-style-type: none"> • Existing slope or drain bank is failing and erosion is occurring. • Runoff inflows must be redirected within the drain easements.
Why	<ul style="list-style-type: none"> • To reduce flow to non erosive velocities, prevent erosion, and stabilize the slope or drain bank.
Where	<ul style="list-style-type: none"> • Isolated locations where total corrective action(s) will disturb less than 100 linear feet.
Scheduling	<ul style="list-style-type: none"> • During low flow conditions, often concurrently with sediment removal, ditch reconstruction or maintenance activities.
How	<ol style="list-style-type: none"> 1. Identify areas where slope flattening or other corrective measures would stabilize bank 2. Develop a SESC plan prior to the initial earth disturbance when the project differs from these specifications or when isolated corrective actions will disturb more than 100 linear feet. 3. Determine the cause of the problem and necessary corrective actions. 4. Determine the appropriate start date and scheduling for the project. 5. Define construction work and staging limits. 6. Place appropriate downstream sediment control measures such as check dam and sediment sump. 7. Divert off site concentrated sources of runoff (if present) away from earthwork area. 8. Remove selected trees, if necessary, minimizing the disturbance of existing vegetation. 9. Salvage topsoil and temporarily store in drain easement leaving a natural buffer of vegetation between the spoils and the drain. 10. Reshape slopes and bottom to design dimensions or to match upstream and downstream slopes and bottom contours. 11. In areas requiring filling, place fill material and compact it with excavator bucket. (Note: if using geogrids, live fascines, or wattles of native vegetation, they should be placed prior to, or in conjunction with, the fill material.) 12. Replace topsoil and pack it in with excavator bucket. 13. Place seed and the appropriate mulch/BMP on the repaired and stockpile areas. Hydroseeding may be used in lieu of seed and mulch. 14. Place and stake erosion control blanket from top of slope to the bottom of the channel. 15. Install appropriate BMP at the toe of the reshaped bank to protect it from erosive velocities. 16. Remove any accumulated sediment from behind the check dam and place sediment in vegetation on the right of way, as far from the drain as possible. 17. Remove downstream sediment control measure(s). 18. Hydroseeding may be used in lieu of seed and mulch.
Maintenance	<ul style="list-style-type: none"> • Inspect routinely and following each significant precipitation event that results in runoff until stabilized then remove temporary control measures.
Limitations	<ul style="list-style-type: none"> • During hot, dry summer conditions and/or in sandy soil conditions where stabilization is difficult.

86. DRAIN CROSSING MAINTENANCE

When	<ul style="list-style-type: none"> • Flow is restricted due to sediment and debris accumulation in a culvert or bridge opening.
Why	<ul style="list-style-type: none"> • To maintain proper flow capacity.
Where	<ul style="list-style-type: none"> • Inside and adjacent to a culvert or bridge.
Scheduling	<ul style="list-style-type: none"> • During lower flow conditions. • When an emergency occurs as a result of blockage.
How	<ol style="list-style-type: none"> 1. When sediments are removed by hand; or with an auger machine, pressurized water jet, or excavator, temporary sediment controls, such as a <i>sediment sump, check dam, or polymer flocculent</i>, shall be installed downstream within 100 feet of the structure outlet prior to cleanout. Remove sediment and downstream temporary control measures when cleanout is complete. 2. Use a vacuum truck.
Maintenance	<ul style="list-style-type: none"> • Monitor culvert or bridge to assure maintenance of flow capacity. • If sediment accumulation is a continued maintenance problem and erosion problems have been resolved, utilize an engineer to evaluate if the crossing should be replaced with an alternative design configuration. This may include placing the culvert or bridge at a different elevation, realigning the structure, or replacing the culvert, multiple culverts, or a bridge with an alternate design.
Limitations	<ul style="list-style-type: none"> • Cost. • Access. • Equipment availability.

87. ENCLOSED DRAIN MAINTENANCE

When	<ul style="list-style-type: none"> • When sink (blow) holes are observed above tile or a tile blockage is evident. • When tile has deteriorated and needs to be replaced or lined.
Why	<ul style="list-style-type: none"> • To maintain drainage.
Where	<ul style="list-style-type: none"> • In enclosed tile drainage systems.
Scheduling	<ul style="list-style-type: none"> • When the drain is dry or at a low flow if possible. • When an emergency blockage has occurred. • Immediately upon notification or discovery of a sink hole.
How	<ol style="list-style-type: none"> 1. If flow is present, water diversion may be required and sediment must be controlled. 2. Excavate existing tile as necessary. If possible bulkhead downstream end of existing tile during repair. 3. Install tile, sealing joints when necessary, or follow manufacturer's recommendations for new pipe installation. 4. Backfill with appropriate material, compacting bedding to provide adequate support for tile. 5. When tile is in a road right-of-way compact in lifts adequate to prevent settling of the road surface. Contact MDOT or County Road Commission for guidance. 6. Check tile outlet to assure it is operating properly and is not blocked. 7. Stabilize disturbed areas. 8. Install downstream SESC measures prior to using an auger machine or water jet to remove sediment or a blockage from an enclosed drain.
Maintenance	<ul style="list-style-type: none"> • Inspect disturbed areas routinely and following each precipitation event that results in runoff until disturbed areas are stabilized. • Remove trapped sediment and temporary control measures after the area has stabilized.
Limitations	<ul style="list-style-type: none"> • Soil must be properly compacted to prevent road failure. • Equipment availability. • Flow conditions. • Cost.