Practice no. 6.73

STRUCTURAL STREAMBANK STABILIZATION

Consider structural measures for streambank stabilization where it is evident that vegetative stabilization will be inadequate. Channel reaches are often made stable by establishing vegetation where erosion potential is low and installing structural measures where the attack is more severe, such as the outside of channel bends and where the natural grade steepens.

Riprap is the most common structural method used, but other methods such as gabions, deflectors reinforced concrete, log cribbing, and grid pavers should be considered, depending on site conditions.

Structural streambank stabilization such as gabions and riprap is necessary where stream velocities are high and side slopes are steep.

Practice no. 6.74

BUFFER ZONES

A buffer zone is a natural area of vegetation that is adjacent to a natural stream, lake, wetland, marsh, or any other type of watercourse. The buffers protect the water courses by reducing the impact of upland pollution. They are most effective at filtering surface runoff and groundwater, filter dust from surrounding land-disturbing activities, cycle nutrients from vegetative roots, and provide leaves and woody debris used for food and shelter by aquatic organisms.

The protective buffer zones should be used for perennial streams, intermittent streams, lakes, ponds, estuaries, and modified natural streams. Check with local, state, and federal agencies about the assigned surface water classification for a water-body or stream on or adjacent to a property where land-disturbing activity is planned to take place.

Buffer zones are a crucial natural area of vegetation between a body of water and a construction site used to filter out sediment and other pollutants that could contaminate the water resource.

Practice no. 6.80

CONSTRUCTION ROAD STABILIZATION

CRS

Properly located and stabilized construction roads can significantly reduce on-site erosion during construction.

Ensure that construction routes follow the natural contour of the terrain where possible. Avoid steep slopes, excessively wet areas, and highly erodible soils.

Controlling surface runoff from the road surface and adjoining area is a key erosion control consideration. Construction traffic routes are especially susceptible to erosion because they become compacted and rutted, and collect and convey runoff water along their surfaces, often at erosive velocities. Provide surface drainage, and divert excess runoff to stable areas.

Proper grading and stabilization of construction roads and parking areas with stone often saves money for the contractor by reducing erosion, avoiding dust problems, and improving the overall efficiency of the construction operation.

Construction road stabilization improves work efficiency and prevents erosion.

Practice no. 6.81

SUBSURFACE DRAIN

A subsurface drain is often needed in construction operations and in developing areas to remove excess water from the soil. Drains usually consist of perforated, flexible conduit installed in a trench at designed depth and grade. The conduit is often placed in a sand-gravel filter or gravel envelope and sized to carry the design flow. Backfill over the drain should be an open, granular soil of high permeability.

Drains improve soil-water conditions for vegetative growth, prevent sloughing of steep slopes due to ground water seepage, and stabilize wet foundation conditions for erosion control structures and other installations.

Make sure the soil to be drained has sufficient depth and permeability to permit proper installation of an effective drainage system. An adequate outlet must be available. Properly designed and installed drains require little maintenance.

Subsurface drains remove excess water from the soil profile to improve stability and plant environment.

Practice no. 6.82

GRADE STABILIZATION STRUCTURE

Grade stabilization structures are used to control the grade in natural or constructed channels to prevent erosion. They may be vertical drop weir spillways, chutes, or pipe drop structures, and may be made of reinforced concrete, steel sheet piling, concrete block, riprap, corrugated metal, plastic, or concrete pipe, depending on the site conditions.

Grade stabilization structures control head cutting, or major gully erosion in channels on steep slopes, in locations where beds of intersecting channels are at different elevations, and where flatter grades are needed in proposed channels to control velocities.

Locate these structures in straight channel sections. Stabilize foundation materials, and ensure that flood bypass capability is available to protect the structure from flows greater than design. The design of large structures (100 cfs or larger) should be undertaken only by a qualified engineer, experienced in hydraulics and structural design.

Maintenance of grade stabilization structures should be minimal, but it is important that inspections be made periodically and after all major storms through the life of the structure.

Grade stabilization structure prevents head cutting in a vegetated channel.

Practice no. 6.83 CHECK DAM

Check dams are used to reduce gullying in the bottom of small channels or drainage ways that will be filled or permanently stabilized at a later date. These small channel blocks serve to reduce the velocity of flow by ponding runoff in the channel.

Check dams are usually made of stone. The center section must be lower than the edges. Space the dams so that the toe of the upstream dam is at the same elevation as the top of the downstream dam. Ensure that overflow areas along the channel are resistant to erosion from out-of-bank flow caused by the check dams. Restrict the drainage area to one half acre.

Check dams are temporary expedient practices to reduce channel erosion until permanent stabilization measures can be installed. Inspect the dams weekly and after significant rainfall events.

Check dams slow velocity of flow in temporary, low-flow channels.

Practice no. 6.84 DUST CONTROL

DC

Large quantities of dust can be generated during land grading activities for commercial, industrial, or subdivision development, especially during dry, windy weather. In planning for dust control, it is important to schedule construction activities so that the least area of disturbed soil is exposed at one time. Install temporary or permanent surface stabilization measures immediately after completing a land grading unit.

For disturbed areas not subject to traffic, vegetation (temporary or permanent) provides the most practical and effective means of dust control. For other areas, control measures include mulching, sprinkling, spraying adhesive or calcium chloride, wind barriers, and surface roughening by tillage.

Maintain dust control measures properly through dry weather periods until all disturbed areas have been permanently stabilized.

Dust control by watering provides immediate protection, but water must be applied periodically throughout dry periods (source: SCS).

Practice no. 6.85 SAND FENCE (Wind Fence)

A sand or wind fence is a low fence of wooden slats erected perpendicular to the prevailing wind. The fence traps blowing sand by reducing the wind velocity at the ground surface.

Wind fences are used primarily to build frontal ocean dunes to help prevent flooding and erosion from wave overwash, but they may also serve to prevent sand from blowing onto roads or other off-site areas.

Wind fences are usually made commercially of light wooden slats wired together with spaces between the slats. The fences are erected 2 to 4 feet high in parallel rows spaced 20 to 40 feet apart over the area to be protected. Fences are supported by wooded posts.

When wind fences are approximately two-thirds full, another series of fences is erected. In this manner, dunes can be built 2 to 6 feet high or more during a single season. When the dune has reached the approximate height of other mature dunes or when the building process slows significantly, stabilize with appropriate vegetation.

When wind fences are used to protect off-site areas from blowing sand, maintain them until the sand source has been stabilized.

Sand fence captures blowing sand to rebuild frontal dune. Natural or planted vegetation helps stabilize the dune.

Practice no. 6.86 FLOCCULANTS

F

Flocculation is the process of causing small, suspended materials to stick to each other to form “flocs”. These flocs more readily settle out compared to the individual particles. Soil that is exposed during construction or stormwater runoff can be picked up and carried to the nearest water conveyance. As the flow rate slows, the larger sand or pebble particles will settle out of the water, however, the smaller particles take a much longer time to settle out. The flocculants will cause the clay particles to clump together and settle out more quickly.

Water that is discharged from sediment traps and basins can still contain high levels of suspended clays and fine silts that are very difficult to settle out. Other ways to reduce the suspended sediment are storing the runoff long enough for the small particles to settle or to filter it further and store until settlement. Flocculants are often the most practical method to settle fine particles.

Flocculants should be used to prevent sedimentation damage to sensitive water resources such as ponds, lakes, and trout streams, or whenever turbidity control is required. Application of flocculants is very soil-type dependent.

Flocculants are used to pull the finer particles out of the water to reduce turbidity, and protect sensitive water reources.

Practice no. 6.87 CHECK DAM WITH WEIR

A temporary check dam with a weir is a small dam structure with a weir outlet. They are used to reduce erosion in the drainage channel by restricting the velocity of flow and trap sediment, allowing the channel to stabilize.

The dams are temporary practices that can be used at outlets of temporary diversions, graded channels, temporary slope drains, and where the dams can be easily cleaned and maintained on a regular basis.

Do not use a check dam with a weir in intermittent or perennial streams.

Riprap and wash stone are the most common materials for this practice. The weir length varies due to the drainage area. The center of the check dam should always be at least 9 inches lower than the outer edges at natural ground level. Frequent inspections are required.

Check dams with weirs control the velocity of runoff through channels and reduce erosion.