# SECTION 01563

# EROSION AND SEDIMENT CONTROL

## PART 1 GENERAL

### 1.1 REFERENCES

A. FS O-F-241 – Federal Specification, Fertilizers, Mixed, Commercial.

### 1.2 DEFINITIONS

A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perrenial Sorrel and Brome Grass.

### 1.3 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Submit an erosion control plan including but not limited to sediment trap volume, and embankment cross section.

C. If required by the WSD or other agency, the Contractor shall submit a spill prevention plan.

### 1.4 QUALITY ASSURANCE

A. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

### 1.5 REGULATORY REQUIREMENTS

A. Construction shall be carried out in such a manner as to prevent any discharge that would cause a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of the waters on the property or downstream of the property for fish, aquatic life, livestock watering and wildlife, recreation, irrigation, navigation and industrial or domestic uses.

B. Contractor shall maintain erosion control and comply with requirements and reporting for the TDEC Erosion and Sediment Control Handbook, Stormwater Pollution Prevention Plans and/or Aquatic Resource Alteration Permits. If permits or specifications are in conflict with each other, the more restrictive requirement shall be followed.

C. In the event that a fine is assessed by a regulatory agency regarding a Contractor's failure to comply with an erosion control permit, those costs and any incidental costs resulting from it shall be borne by the Contractor.

D. Comply with regulatory agencies for fertilizer and herbicide composition.

E. Comply with Federal, State, and Local agencies' requirements.

F. Provide items, including but not limited to, straw wattles, siltation fences, rip-rap and special construction techniques, necessary to comply with the Tennessee Water Quality Control Act of 1977 as modified by the 1987 amendments.

G. Provide seed certified by the department of agriculture of the State of Tennessee.

H. In the event this Section conflicts with Federal, State, or Local agencies, the more restrictive regulations shall apply.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of Section 01600.

B. Deliver grass seed in original, sealed containers. Damaged packages are not acceptable.

C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.7 SEQUENCING AND SCHEDULING

A. Make efforts to maintain natural covers as long as possible and to stabilize graded areas as soon as possible.

B. Apply soil stabilization within 10 days to disturbed areas, and immediately if rain is forecast.

1.8 MAINTENANCE SERVICE

A. Maintain disturbed areas for 12 months from date of acceptance by the WSD.

PART 2 PRODUCTS

## 2.1 MATERIALS

A. Topsoil: Excavated from site and free of weeds.

B. Seed Mixture: Fast growing annuals such as cereal rye, annual ryegrass, sudan grass or millet.

C. Mulch: Oat or wheat straw, free from weeds and foreign matter detrimental to plant life, and dry. Hay or chopped cornstalks are not acceptable.

D. Fertilizer: FS O-F-241, type and grade recommended for grass, with 50% of elements derived from organic sources; of proportions necessary to eliminate deficiencies of topsoil to the following proportions: 18% nitrogen, 24% phosphoric acid, and 6% potassium.

E. Lime: Ground limestone, dolomite type, minimum 95 percent carbonates.

F. Water: Clean, fresh, and free of substance or matter which could inhibit vigorous growth of grass.

G. Stakes: 1 x 2 inches wood or equivalent metal with a minimum length of 3 feet.

H. String: Inorganic fiber.

I. Burlap: 10 ounces per square yard fabric.

J. Baled Hay: Hay or straw containing five cubic feet or more of material; either wire-bound or string-tied.

K. Rip-Rap: Irregular shaped rock, stone or broken concrete; solid and nonfriable.

L. Fill Material for Embankment: Materials that are free of roots or woody vegetation, organic material, large stones, and other deleterious material.

M. Other Materials: Chemical binders and tacks, nettings, and plastic filter sheets.

## 2.2 SILT FENCES

A. Fence Posts: 3-inch minimum diameter wood or 1.33 pounds per linear foot steel with a minimum length of 5 feet; steel posts with projections for fastening wire.

B. Fence Reinforcement: Wire mesh 42 inches minimum height, 14 gage minimum; maximum mesh spacing of 6 inches.

C. Filter Fabric: Pervious sheet of propylene, nylon, polyester or ethylene yarn, containing ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 to 120 degrees F; conforming to the following:

| PHYSICAL PROPERTY | TEST | REQUIREMENTS |
|---|---|---|
| Filtering Efficiency | ASTM D5141 | 75% (min.) |
| Tensile Strength at (max.) Elongation* | VTM-52 | Extra Strength- 20% 50 lbs/lin in (min.) Standard Strength- 30 lbs/lin in (min.) |
| Flow Rate | ASTM D5141 | 0.3 gal/sq ft/ (min.) |

* Requirements reduced by 50 percent after 6 months of installation.

PART 3 EXECUTION

3.1 GENERAL

A. Control erosion on cut and fill operations, excavation, backfill, and other construction activities within limits of construction site, easements, and borrow site used during construction.

B. Coordinate erosion and sediment control systems with erosion control features as specified under Division 2 sections to assure economical, effective, and continuous erosion control throughout construction and post-construction period.

C. Conduct construction in a manner which minimizes soil erosion and resulting sedimentation.

D. Protect properties adjacent to site from land disturbances due to sediment deposition.

E. Construct cut and fill slopes in a manner which will minimize erosion.

F. Soil stabilization measures shall be appropriate for time of year, site conditions, and estimated duration of use.

G. Stabilize or protect soil stockpiles with sediment trapping measures to prevent soil loss.

3.2 RIP-RAP

A. Stabilize slopes 2 to 1 or steeper with rip-rap. Place rip-rap by hand so that surfaces will be embedded and even with surface of slope or ground adjoining it at both top and bottom.

B. A geotextile fabric shall be placed beneath rip-rap to maintain separation from underlying soils.

C. Place rip-rap upon prepared foundation. Set stones as closely together as is practicable in order to keep voids to a minimum. Bed each stone with depth perpendicular to surface upon which it is set.

D. Place each main stone against adjoining stones with sides and ends in contact. Place stone in such manner as to stagger joints insofar as possible.

E. Reduce tracking of sediment onto public rights-of-way by placing a pad of crushed stone with a geotextile underliner at construction entrances. Maintain temporary entrances with placement of additional stone as conditions demand.

## 3.3 MULCH APPLICATION

A. Apply mulch to soil surface for temporary soil stabilization. Use mulch on graded or cleared areas for 6 months or less where seeding may not have a suitable growing season to produce an erosion resistant cover.

B. Apply mulch to a thickness of 1/8 inches.

C. Final grading is not required prior to mulching. Mulch may be applied to final grade.

D. Install structural erosion control features prior to mulching.

E. Mulch seeding installed in fall.

F. Mulch seeding installed on slopes greater than 4:1 and during excessively hot or dry weather.

## 3.4 TEMPORARY SEEDING

A. Stabilize soil surfaces that are not to be fine-graded for 14 days or longer by seeding disturbed areas. Such areas include but are not limited to soil stockpiles, dikes, dams, sides of sediment basins, and temporary road banks.

B. Install necessary erosion control devices such as berms, waterways, and basins, prior to seeding.

C. Where soils are acidic, pH 5.5 or lower, apply lime at rate of two tons per acre.

D. Apply fertilizer at rate of 450 lbs per acre. Incorporate lime and fertilizer into top 4 inches of soil.

E. Where area is compacted or hardened, loosen soil surface by discing, raking, harrowing, or other acceptable means.

F. Apply seed evenly with a cyclone seeder, drill, cultipacker seeder, or hydroseeder. Plant small grains no more than one (1) inch deep. Plant grasses and legumes no more than 1/4 inch deep.

G. Re-seed areas which fail to establish adequate vegetative cover as determined by the WSD.

## 3.5 RUNOFF CONTROL

A. Temporarily divert surface water which flows toward construction area around construction area.

B. Temporary Berms: Construct temporary berms of compacted soil, with a shallow ditch, and grade to drain.
   1. Construct berms with a minimum height of 18 inches, maximum side slopes of 1.5:1, and a minimum base width of 4.5 feet. Provide channel behind berm with a positive grade to a stabilized outlet.
   2. Use temporary berms above newly constructed cut and fill slopes to prevent excessive erosion until more permanent control features are established.
   3. Apply seed and mulch to berm within 15 days of construction.
   4. After slope has stabilized, remove temporary berm.

C. Temporary Swales: Use temporary swales above and below disturbed areas to intercept runoff and divert runoff to a safe disposal area.
   1. Provide channel with a slope of 5% or less; otherwise use a temporary slope drain.
   2. Place rock check dams in drainage way as needed to control sediment deposition. Check dams are barriers composed of large stones or other non-corrodible materials.
   3. Remove temporary swale after disturbed area is permanently stabilized.

D. Temporary Slope Drain: Use a temporary slope drain to carry concentrated runoff down a slope prior to installation of permanent facilities or growth of adequate ground cover on slopes.

1. Construct a temporary slope drain consisting of stone gutters, fiber mats, plastic sheets, concrete or asphalt gutters, half-round pipe, metal pipe, plastic pipe, sod or other materials to carry water down slopes and reduce erosion.
2. Remove temporary slope drain after disturbed area is stabilized.

## 3.6 SEDIMENT CONTROL

A. Silt Fences: Use silt fences along downgrade edges of construction to prevent sediment from leaving construction site. Use only where sheet or overland flows are expected.
1. Place silt fences on downgrade side of soil stockpiles.
2. Drainage area shall be less than 1/4 acre per 100 feet of silt fence length, maximum slope length behind barrier shall be 100 feet, and maximum grade behind fence shall be 2:1.
3. Do not use silt fences where flows are likely to exceed 1 cfs.
4. Remove sediment deposits when deposits reach one-half height of barrier.
5. Staple or wire filter fabric to fence. Extend 8 inches of fabric into trench. Do not extend fabric more than 36 inches above original ground surface. Do not staple filter fabric to existing trees.
6. Backfill trench and compact soil over filter fabric.
7. Remove silt fences when they have served their useful purpose, but not before upslope area has been permanently stabilized.

B. Inlet protection: Inlet protection shall be installed at the entrance to storm drain systems to prevent sediment from getting into the storm drain. Inlet protection may be a manufactured device or may be constructed in the field as approved by TDEC.

C. Construct sediment traps consisting of a small, temporary ponding area, formed by constructing an earthen embankment with a gravel outlet, across a drainage swale to detain runoff from disturbed areas long enough to allow majority of sediment to settle out. Use below drainage areas of 5 acres or less.
1. Sediment traps shall not be used longer than 18 months.
2. Periodically remove sediment from trap.
3. When used, install sediment traps before land disturbance takes place in drainage area. Clear, grub, and strip area under embankment of vegetation and root mat.
4. Compact embankment in 8-inch layers by traversing with construction equipment.
5. Seed earthen embankment within 14 days of construction.
6. Remove structure and stabilize area when upslope drainage area has been stabilized.
7. Cut and fill slopes shall be 2:1 or flatter.

## 3.7 MAINTENANCE

A. Inspect erosion and sediment control facilities immediately after each rainfall and at least daily during construction activities. Make required repairs immediately.

B. Should fabric on a silt fence decompose or become ineffective prior to end of expected usable life and barrier still be necessary, replace fabric promptly.

C. Remove sediment deposits after each storm event. Remove deposits when deposits reach approximately one-half height of barrier. Spread deposits on a stockpile area and allow to dry.

D. Maintain silt fence sediment areas and insure that water is not short circuiting filter cloth. Inspect downstream area for erosion caused by discharge from sediment area. Correct erosion problems.

E. Dress, prepare and seed sediment deposits remaining in place after a silt fence is no longer required to conform with existing grade.

END OF SECTION 01563 - EROSION AND SEDIMENT CONTROL