SECTION 312514 – STABILIZATION MEASURES FOR EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Water, erosion, and sediment control.

1.2 REFERENCES

A. Rainwater and Land Development Manual, 2006, prepared by the Ohio Department of Natural Resources.

B. Ohio Department of Transportation Construction and Material Specifications (ODOT-CMS).

C. Section 329219 – Seeding and Mulching.

PART 2 - PRODUCTS

2.1 SILT FENCE MATERIALS

A. Silt fence fabric shall be ODOT Type C Geotextile fabric or as described in the chart below:

Fabric Properties	
Minimum Tensile Strength	120 lbs
Maximum Elongation at 60 lbs	50%
Minimum Puncture Strength	50 lbs
Minimum Tear Strength	40 lbs
Minimum Burst Strength	200 psi
Apparent Opening Size	≤ 0.84mm
Minimum Permittivity	$1x10^{-2}$ sec. $^{-1}$
Ultraviolet Exposure Strength Retention	70%

B. Fence Posts – The length shall be a minimum of 32 inches long. Wood posts will be 2 inch by 2 inch hardwood of sound quality. The maximum spacing between posts shall be 10 feet.

2.2 MULCH MATERIALS

A. Straw – Straw shall be unrotted small grain applied at the rate of 2 tons/acre or 90 pounds/1,000 square feet (two to three bales). The straw mulch shall be spread uniformly by hand or mechanically so the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 square foot sections and place two

45 pound bales of straw in each section.

B. Hydroseeders – Wood cellulose fiber should be used at 2,000 pounds/acre or 46 pounds/1,000 square feet.

C. Other – Other acceptable mulches include mulch matting applied according to manufacturer's recommendations or wood chips applied as 10-20 ton/acre.

2.3 MATTING MATERIALS

A. Excelsior matting shall be 48 inches wide and weigh an average of 0.75 pound/square yard or greater.

B. Jute matting shall be 48 inches wide and weigh an average of 0.75 pounds/square yard or greater.

C. Matting made of other material and providing equal or greater stabilization than the above may be submitted.

2.4 FILTER BERM MATERIALS

A. Compost used for filter berms shall be weed, pathogen and insect free and free of any refuse, contaminants or other materials toxic to plant growth. They shall be derived from a well-decomposed source of organic matter and consist of a particles ranging from 1/4" to 3".

2.5 FILTER SOCK MATERIALS

A. Compost used for filter socks shall be weed, pathogen and insect free and free of any refuse, contaminants or other materials toxic to plant growth. They shall be derived from a well-decomposed source of organic matter and consist of a particles ranging from 3/8" to 2".

B. Filter Socks shall be 3 or 5 mil continuous, tubular, HDPE 3/8" knitted mesh netting material, filled with compost passing the above specifications for compost products.

2.6 TEMPORARY SEED MIXTURES

A. Temporary seeding mixtures shall comply with the following table:

Seeding Dates	Species	Lb./1000 ft2	Lb/Acre
March 1 to August 15	Oats	3	128 (4 Bushel)
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Perennial Ryegrass	1	40
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Annual Ryegrass	1.25	55
	Perennial Ryegrass	3.25	142
	Creeping Red Fescue	0.4	17
	Kentucky Bluegrass	0.4	17
	Oats	3	128 (3 bushel)
	Tall Fescue	1	40
	Annual Ryegrass	1	40
August 16th to November	Rye	3	112 (2 bushel)
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Wheat	3	120 (2 bushel)
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Perennial Rye	1	40
	Tall Fescue	1	40
	Annual Ryegrass	1	40
	Annual Ryegrass	1.25	40
	Perennial Ryegrass	3.25	40
	Creeping Red Fescue	0.4	40
	Kentucky Bluegrass	0.4	
November 1 to Feb. 29	Use mulch only or dormant seeding.		
Note: Other approved species may be substituted.			

2.7 GEOTEXTILES FOR CONSTRUCTION ENTRANCES

A. Geotextiles utilized in the installation of construction entrances shall meet the following parameters:

Minimum Tensile Strength	200 lbs.
Minimum Puncture Strength	80 psi.
Minimum Tear Strength	50 lbs.
Minimum Burst Strength	320 psi.
Minimum Elongation	20%
Equivalent Opening Size	EOS < 0.6 mm.
Permittivity	1×10^{-3} cm/sec.

PART 3 - EXECUTION

3.1 GENERAL WATER, EROSION AND SEDIMENT CONTROL

A. CONTRACTOR shall grade site to drain and shall maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. CONTRACTOR shall protect site from puddling or running water.

C. CONTRACTOR shall provide erosion control measures as necessary to control discharge of sediment-laden water to surface waters and wetlands.

D. CONTRACTOR shall use jute or synthetic netting, silt fences, straw bales, dikes, channels, check dams and other applicable measures to prevent erosion of soils disturbed by its construction operation.

3.2 INSTALLATION OF SEDIMENT BASINS

A. Sediment basins shall be constructed and operational before upslope land disturbance begins.

B. Site Preparation - The area under the embankment shall be cleared, grubbed, and stripped of any vegetation and root mat. The pool area shall be cleared as needed to facilitate sediment cleanout. Gullies and sharp breaks shall be sloped to no steeper than 1:1. The surface of the foundation area will be thoroughly scarified before placement of the embankment material.

C. Cut-Off Trench -The cutoff trench shall be excavated along the centerline of the embankment. The minimum depth shall be 3 ft. unless specified deeper on the plans or as a result of site conditions. The minimum bottom width shall be 4 ft., but wide enough to permit operation of compaction equipment. The trench shall be kept free of standing water during backfill operations.

D. Embankment -The fill material shall be free of all sod, roots, frozen soil, stones over 6 in. in diameter, and other objectionable material. The placing and spreading of the fill material shall be started at the lowest point of the foundation and the fill shall be brought up in approximately 6 in. horizontal layers or of such thickness that the required compaction can be obtained with the equipment used. Construction equipment shall be operated over each layer in a way that will result in the required compaction. Special equipment shall be used when the required compaction cannot be obtained without it. The moisture content of fill material shall be such that the required degree of compaction can be obtained with the equipment used.

E. Pipe Spillway -The pipe conduit barrel shall be placed on a firm foundation to the lines and grades shown on the plans. Connections between the riser and barrel, the anti-seep collars and barrel and all pipe joints shall be watertight. Selected backfill material shall be placed around the conduit in layers and each layer shall be compacted to at least the same density as the adjacent embankment. All compaction within 2 ft. of the pipe spillway will be accomplished with hand-operated tamping equipment.

F. Riser Pipe Base -The riser pipe shall be set a minimum of 6 in. in the concrete base.

G. Trash Racks -The top of the riser shall be fitted with trash racks firmly fastened to the riser pipe.

H. Emergency Spillway – The emergency spillway shall be cut in undisturbed ground. Accurate construction of the spillway elevation and width is critical and shall be within a tolerance of 0.2 ft.

I. Seed and Mulch – The sediment basin shall be stabilized immediately following its construction. In no case shall the embankment or emergency spillway remain bare for more than 7 days.

J. Sediment Cleanout -Sediment shall be removed and the sediment basin restored to its original dimensions when the sediment has filled one-half the pond's original depth or as indicated on the plans. Sediment removed from the basin shall be placed so that it will not erode.

K. Final removal - Sediment basins shall be removed after the upstream drainage area is stabilized or as indicated in the plans. Dewatering and removal shall NOT cause sediment to be discharged. The sediment basin site and sediment removed from the basin shall be stabilized.

3.3 INSTALLATION OF SEDIMENT TRAPS

A. Work shall consist of the installation, maintenance and removal of all sediment traps at the locations designated on the drawings.

B. Sediment traps shall be constructed to the dimensions specified on the drawings and operational prior to upslope land disturbance.

C. The area beneath the embankment shall be cleared, grubbed and stripped of vegetation to a minimum depth of six (6) inches. The pool shall be cleared as needed to facilitate sediment cleanout.

D. Fill used for the embankment shall be evaluated to assure its suitability and it must be free of roots or other woody vegetation, large rocks, organics or other objectionable materials. Fill material shall be placed in six (6) inch lifts and shall be compacted by traversing with a sheepsfoot or other approved compaction equipment. Fill height shall be increased five (5) percent to allow for structure/foundation settlement. Construction shall not be permitted if either the earthfill or compaction surface is frozen.

E. The maximum height of embankment shall be five (5) feet. All cut and fill slopes shall be 2:1 (H:V) or flatter.

F. A minimum storage volume below the crest of the outlet of 67 yd3. for every acre of contributing drainage area shall be achieved at each location noted on the drawings with additional sediment storage volume provided below this elevation.

G. Temporary seeding shall be established and maintained over the useful life of the practice.

H. The outlet for the sediment trap structure shall be constructed to the dimensions shown on the drawings.

I. The outlet shall be constructed using the materials specified on the drawings. Where geotextile is used, all overlaps shall be a minimum of two (2) feet or as specified by the manufacturer, whichever is greater. All overlaps shall be made with the upper most layer placed last. Geotextile shall be keyed in at least 6" on the upstream side of the outlet.

J. Warning signs and safety fence shall be placed around the traps and maintained over the life of the practice.

K. After all sediment-producing areas have been permanently stabilized, the structure and all associated sediment shall be removed. Stabile earth materials shall be placed in the sediment trap area and compacted. The area shall be graded to blend in with adjoining land surfaces and have positive drainage. The area shall be immediately seeded.

3.4 INSTALLATION AND MAINTENANCE OF SILT FENCE

A. Silt fence shall be constructed before upslope land disturbance begins.

B. All silt fence shall be placed as close to the contour as possible so that water will not concentrate at low points in the fence and so that small swales or depressions that may carry small concentrated flows to the silt fence are dissipated along its length.

C. Ends of the silt fences shall be brought upslope slightly so that water ponded by the silt fence will be prevented from flowing around the ends.

D. Silt fence shall be placed on the flattest area available.

E. Where possible, vegetation shall be preserved for 5 feet (or as much as possible) upslope from the silt fence. If vegetation is removed, it shall be reestablished within 7 days from the installation of the silt fence.

F. The height of the silt fence shall be a minimum of 16 inches above the original ground surface.

G. The silt fence shall be placed in an excavated or sliced trench cut a minimum of 6 inches deep. The trench shall be made with a trencher, cable laying machine, slicing machine, or other suitable device that will ensure an adequately uniform trench depth.

H. The silt fence shall be placed with the stakes on the downslope side of the geotextile. A minimum of 8 inches of geotextile must be below the ground surface. Excess material shall lay on the bottom of the 6-inch deep trench. The trench shall be backfilled and compacted on both sides of the fabric.

I. Seams between sections of silt fence shall be spliced together only at a support post with

a minimum 6-in. overlap prior to driving into the ground.

J. Silt fence shall allow runoff to pass only as diffuse flow through the geotextile. If runoff overtops the silt fence, flows under the fabric or around the fence ends, or in any other way allows a concentrated flow discharge, one of the following shall be performed, as appropriate: 1) the layout of the silt fence shall be changed, 2) accumulated sediment shall be removed, or 3) other practices shall be installed.

K. Sediment deposits shall be routinely removed when the deposit reaches approximately one-half of the height of the silt fence.

L. Silt fences shall be inspected after each rainfall and at least daily during a prolonged rainfall. The location of existing silt fence shall be reviewed daily to ensure its proper location and effectiveness. If damaged, the silt fence shall be repaired immediately.

3.5 INSTALLATION OF STORM DRAIN INLET PROTECTION – EXCAVATED DROP INLET SEDIMENT PROTECTION

A. The excavated trap should be sized to provide a minimum storage capacity calculated at the rate of 135 cubic yards for one (1) acre of drainage area. A trap should be no less than one (1) foot, nor more than two (2) feet deep measured from the top of the inlet structure. Side slopes should not be steeper than 2:1.

B. The slopes of the trap may vary to fit the drainage area and terrain.

C. Where the area receives concentrated flows, such as in a highway median, provide the trap with a shape having a 2:1 ratio of length to width, with the length oriented in the direction of the flow.

D. Sediment should be removed and the trap restored to the original depth when the sediment has accumulated to 40% the design depth of the trap. Removed sediment should be spread in a suitable area and stabilized so it will not erode.

E. During final grading, the inlet should be protected with geotextile-stone inlet protection. Once final grading is achieved, sod or a suitable temporary erosion control material shall be implemented to protect the area until permanent vegetation is established.

3.6 INSTALLATION OF STORM DRAIN INLET PROTECTION – GEOTEXTILE INLET PROTECTION

A. Inlet protection shall be constructed either before upslope land disturbance begins or before the storm drain becomes operational.

B. The earth around the inlet shall be excavated completely to a depth of at least 18 inches.

C. The wooden frame shall be constructed of 2 inch by 4 inch construction grade lumber. The 2 inch by 4 inch posts shall be driven 1 foot into the ground at four corners of the inlet and 2 inch by 4 inch frame assembled using a lap joint. The top of the frame shall be at least 5 inches below adjacent road if ponded water would pose a safety hazard to

traffic.

D. Wire mesh shall be of sufficient strength to support fabric with water fully impounded against it. It shall be stretched tightly around the frame and fastened securely to the frame.

E. Geotextiles shall have an equivalent opening size of 20-40 sieve and be resistant to sunlight. It shall be stretched tightly around the frame and fastened securely. It shall extend from the top of the frame to 18 inches below the inlet notch elevation. The geotextile shall overlap across one side of the inlet so the ends of the cloth are not fastened to the same post.

F. Backfill shall be placed around the inlet in compacted 6 inch layers until the earth is even with notch elevation on ends and top elevation on sides.

G. A compacted earth dike or check dam shall be constructed in the ditch line below the inlet if the inlet is not in a depression and if runoff bypassing the inlet will flow to setting pond. The top of earth dikes shall be at least 6 inches higher than the top of the frame.

3.7 INSTALLATION OF STORM DRAIN INLET PROTECTION – GEOTEXTILE-STONE INLET PROTECTION

A. Inlet protection shall be constructed either before upslope land disturbance begins or before the inlet becomes functional.

B. Geotextile and/or wire material shall be placed over the top of the storm sewer and approximately six (6) inches of 2-inch or smaller clean aggregate placed on top. Extra support for geotextile is provided by placing hardware cloth or wire mesh across the inlet cover. The wire should be no larger than ½" mesh and should extend an extra 12 inches across the top and sides of the inlet cover.

C. Maintenance must be performed regularly, especially after storm events. When clogging of the stone or geotextile occurs, the material must be removed and replaced.

3.8 STORM DRAIN INLET PROTECTION – GEOTEXTILE-STONE INLET PROTECTION FOR CURB INLETS

A. Inlet protection shall be constructed either before upslope land disturbance begins or before the inlet becomes functional.

B. Construct a wooden frame of 2-by-4-in. construction-grade lumber. The end spacers shall be a minimum of 1 ft. beyond both ends of the throat opening. The anchors shall be nailed to 2-by-4-in. stakes driven on the opposite side of the curb.

C. The wire mesh shall be of sufficient strength to support fabric and stone. It shall be a continuous piece with a minimum width of 30 in. and 4 ft. longer than the throat length of the inlet, 2 ft. on each side.

D. Geotextile cloth shall have an equivalent opening size (EOS) of 20-40 sieve and be resistant to sunlight. It shall be at least the same size as the wire mesh.

E. The wire mesh and geotextile cloth shall be formed to the concrete gutter and against the face of the curb on both sides of the inlet and securely fastened to the 2-by-4-in. frame.

F. Two-inch stone shall be placed over the wire mesh and geotextile in such a manner as to prevent water from entering the inlet under or around the geotextile cloth.

G. This type of protection must be inspected frequently and the stone and/or geotextile replaced when clogged with sediment.

3.9 INSTALLATION OF STORM DRAIN INLET PROTECTION – BLOCK AND GRAVEL DROP INLET FILTER

A. Place 4-inch by 8-inch by 12-inch concrete blocks lengthwise on their sides in a single row around the perimeter of the inlet, with the ends of adjacent blocks abutting. The height of the barrier can be varied, depending upon the design needs, by stacking combinations of the same size blocks. The barrier of blocks should be at least 12-inches high but no greater than 24-inches high.

B. Wire mesh should be placed over the outside vertical face (webbing) of the concrete blocks to prevent stone from being washed through the block cores. Hardware cloth or comparable wire mesh with ½-inch openings should be used.

C. Two-inch stone should be piled against the wire to the top of the block barrier, as shown below.

D. If the stone filter becomes clogged with sediment so that it no longer adequately performs its function, pull stone away from the blocks, clean and/or replace.

3.10 INSTALLATION AND MAINTENANCE OF FILTER BERM

A. Filter berms will be placed on a level line across slopes, generally parallel to the base of the slope or other affected area. On slopes approaching 2:1, additional berms shall be provided at the top and as needed mid-slope.

B. Filter berms are not to be used in concentrated flow situations or in runoff channels.

C. Maintenance – Inspect filter berms after each significant rain, maintaining the berms in a functional condition at all times. Remove sediments collected at the base of the filter berms when they reach 1/3 of the exposed height of the practice. Where the filter berm deteriorates or fails it will be, it will be repaired or replaced with a more effective alternative.

D. Removal – Filter berms no longer needed will be dispersed on site in a manner that will facilitate seeding.

3.11 INSTALLATION AND MAINTENANCE OF FILTER SOCK

A. Filter socks will be placed on a level line across slopes, generally parallel to the base of

the slope or other affected area. On slopes approaching 2:1, additional socks shall be provided at the top and as needed mid-slope.

B. Filter socks intended to be left as a permanent filter or part of the natural landscape, shall be seeded at the time of installation for establishment of permanent vegetation.

C. Filter Socks are not to be used in concentrated flow situations or in runoff channels.

D. Routinely inspect filter socks after each significant rain, maintaining filter socks in a functional condition at all times.

E. Remove sediments collected at the base of the filter socks when they reach 1/3 of the exposed height of the practice.

F. Where the filter sock deteriorates or fails, it will be repaired or replaced with a more effective alternative.

G. Filter socks will be dispersed on site when no longer required in such a way as to facilitate and not obstruct seedings.

3.12 INSTALLATION OF ROCK CHECK DAMS

A. The check dam shall be constructed of 4-8 inch diameter stone, placed so that it completely covers the width of the channel. ODOT Type D stone is acceptable, but should be underlain with a gravel filter consisting of ODOT No. 3 or 4 or suitable filter fabric.

B. Maximum height of check dam shall not exceed 3.0 feet.

C. The midpoint of the rock check dam shall be a minimum of 6 inches lower than the sides in order to direct across the center and away from the channel sides.

D. The base of the check dam shall be entrenched approximately 6 inches.

E. Spacing of check dams shall be in a manner such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.

F. A Splash Apron shall be constructed where check dams are expected to be in use for an extended period of time, a stone apron shall be constructed immediately downstream of the check dam to prevent flows from undercutting the structure. The apron should be 6 in. thick and its length two times the height of the dam.

G. Stone placement shall be performed either by hand or mechanically as long as the center of check dam is lower than the sides and extends across entire channel.

H. Side slopes shall be a minimum of 2:1.

3.13 INSTALLATION OF SLOPE DRAINS

A. The slope drain shall be constructed on a minimum slope of 3 percent.

B. All points along the top of the dike/earthfill for the storage area shall be at least one (1) foot higher than the top of the inlet pipe.

C. The pipe drain may be constructed of corrugated metal or PVC pipe. All pipe connections shall be watertight. Flexible tubing may be used, provided rigid pipe is use for the inlet, the flexible tubing is of the same diameter as the inlet, and pipe connections are made with metal strapping or watertight connecting collars. The flexible pipe shall be constructed with hold down apparatus spaced on 10 foot centers for anchoring the pipe.

D. The entrance to the pipe shall be a hooded type.

E. The soil around and/or under the pipe shall be placed in 4-inch layers and hand compacted to the top of the earth dike.

F. A riprap apron shall be installed at the pipe outlet where clean water is discharged into a stabilized area or drainageway.

3.14 INSTALLATION OF TEMPORARY DIVERSIONS

A. Drainage area should not exceed 10 acres. Larger areas require a more extensive design.

B. The channel cross section may be parabolic or trapezoidal. Disk the base of the dike before placing fill. Build the dike 10% higher than designed for settlement. The dike shall be compacted by traversing with tracked earth-moving equipment.

C. The minimum cross section of the levee or dike will be as follows: (Minimum design freeboard shall be 0.3 foot.) Where construction traffic will cross, the top width may be made wider and the side slopes flatter than specified below.

Dike Top Width (ft.)	Height (ft.)	Side Slopes	Shape
0	1.5	4.1	Trapezoidal
4	1.5	2.1	Parabolic

D. The grade may be variable depending upon the topography, but must have a positive drainage to the outlet and be stabilized to be non-erosive.

Temporary Diversion Stabilization Treatment			
Diversion	< 2 acres	2 – 5 acres	5 – 10 acres

Slope			
0 – 3 %	Seed and straw	Seed and straw	Seed and straw
3 – 5%	Seed and straw	Seed and straw	Matting
5 – 8%	Seed and straw	Matting	Matting
8 – 20%	Seed and straw	Matting	Engineered
Note: Diversions with steeper slopes or greater drainage areas are beyond the scope of this standard and must be designed for stability. Seed, straw and matting used shall meet the Specifications for Temporary Seeding, Mulching and Matting.			

E. Outlet runoff onto a stabilized area, into a properly designed waterway, grade stabilization structure, or sediment trapping facility.

F. Diversions shall be seeded and mulched in accordance with the requirements outlined herein as soon as they are constructed or other suitable stabilization shall be applied in order to preserve dike height and reduce maintenance.

3.15 INSTALLATION OF TEMPORARY DIVERSIONS ABOVE STEEP SLOPES

A. Drainage area should not exceed 5 acres. Larger areas require a more extensive design.

B. The channel cross section may be parabolic, v-shaped, or trapezoidal. Disk the base of the dike before placing fill. Build the dike 10% higher than designed for settlement. The dike shall be compacted by traversing with tracked earth-moving equipment.

C. The minimum cross section of the levee or dike will be as follows: (Minimum design freeboard shall be 0.3 foot.)

Dike Top Width (ft.)	Height (ft.)	Side Slopes	Shape
0	1.5	4.1	Trapezoidal
4	1.5	2.1	Parabolic

D. The grade may be variable depending upon the topography, but must have a positive drainage to the outlet and be stabilized to be non-erosive.

Temporary Diversion Stabilization Treatment			
Diversion	< 2 acres	2 – 5 acres	5 – 10 acres

Slope			
0 – 3 %	Seed and straw	Seed and straw	Seed and straw
3 – 5%	Seed and straw	Seed and straw	Matting
5 – 8%	Seed and straw	Matting	Matting
8 – 20%	Seed and straw	Matting	Engineered
Note: Diversions with steeper slopes or greater drainage areas are beyond the scope of this standard and must be designed for stability. Seed, straw and matting used shall meet the Specifications for Temporary Seeding, Mulching and Matting.			

E. Outlet runoff onto a stabilized area, settling pond, or into a drop structure.

F. Diversions shall be seeded and mulched in accordance with the requirements specified herein as soon as they are constructed or other suitable stabilization shall be applied in order to preserve dike height and reduce maintenance.

3.16 EROSION CONTROL METHODS FOR INSTALLATION OF STREAM UTILITY CROSSINGS

A. When site conditions allow, one of the following shall be used to divert stream flow or keep the flow away from construction activity.

1. Drill or bore the utility lines under the stream channel.
2. Construct a cofferdam or barricade of sheet pilings, sandbags or a turbidity curtain to keep flow from moving through the disturbed area. Turbidity curtains shall be a pre-assembled system and used only parallel to flow.
3. Stage construction by confining first one-half of the channel until work there is completed and stabilized, then move to the other side to complete the crossing.
4. Route the stream flow around the work area by bridging the trench with a rigid culvert, pumping, or constructing a temporary channel. Temporary channels shall be stabilized by rock or a geotextile completely lining the channel bottom and side slopes.

B. Crossing Width -The width of clearing shall be minimized through the riparian area. The limits of disturbance shall be as narrow as possible including not only construction operations within the channel itself but also clearing done through the vegetation growing on the streambanks.

C. Clearing shall be done by cutting NOT grubbing. The roots and stumps shall be left in place to help stabilize the banks and accelerate revegetation.

D. Material excavated from the trench shall be placed at least 20 ft. from the streambanks.

E. To the extent other constraints allow, stream shall be crossed during periods of low flow.

F. Duration of Construction -The time between initial disturbance of the stream and final stabilization shall be kept to a minimum. Construction shall not begin on the crossing until the utility line is in place to within 10 ft. of the streambank.

G. Fill Placed Within the Channel -The only fill permitted in the channel should be clean

aggregate, stone or rock. No soil or other fine erodible material shall be placed in the channel. This restriction includes all fill for temporary crossings, diversions, and trench backfill when placed in flowing water. If the stream flow is diverted away from construction activity the material originally excavated from the trench may be used to backfill the trench.

H. Streambank Restorations -Streambanks shall be restored to their original line and grade and stabilized with riprap or vegetative bank stabilization.

I. Runoff Control Along the Right-of-Way -To prevent sediment-laden runoff from flowing to the stream, runoff shall be diverted with water bar or swales to a sediment trapping practice a minimum of 50 ft. from the stream.

J. Sediment laden water from pumping or dewatering or pumping shall not be discharged directly to a stream. Flow shall be routed through a settling pond, dewatering sump or a flat, well-vegetated area adequate for removing sediment before the pumped water reaches the stream.

K. Dewatering operations shall not cause significant reductions in stream temperatures. If groundwater is to be discharged in high volumes during summer months, it shall first be routed through a settling pond or overland though a flat well-vegetated area.

L. Permits -In addition to these specifications, stream crossings shall conform to the rules and regulations of the U.S. Army Corps of Engineers for in-stream modifications (404 permits) and Ohio Environmental Protection Agency's State Water Quality Certification (401 permits).

3.17 INSTALLATION OF CULVERT STREAM CROSSING

A. Stream Disturbance -Disturbance to the stream shall be kept to a minimum. Streambank vegetation shall be preserved to the maximum extent practical and the stream crossing shall be as narrow as practical.

B. Clearing shall be done by cutting NOT grubbing. The roots and stumps shall be left in place to help stabilize the banks and accelerate revegetation.

C. To minimize interference with fish spawning and migration, crossing construction should be avoided where practical from March 15 through June 15.

D. Water shall not be allowed to flow along the road directly to the stream. Diversions and swales shall direct runoff away from the access road to a sediment-control practice.

E. Placement -Culverts shall be placed on the existing streambed to avoid a drop or waterfall at the downstream end of the pipe, which would be a barrier to fish migration. Crossings shall be made in shallow areas rather than deep pools where possible.

F. Culvert Size -Culvert diameter shall be at least three times the depth of normal stream flow at the point of the stream crossing. If the crossing must be placed in deep, slow-moving pools, the culvert diameter may be reduced to twice the depth of normal stream flow. The minimum size culvert that may be used is 18 in.

G. Number of Culverts -There shall be sufficient number of culverts to completely cross the stream channel from streambank to streambank with no more than a 12-in. space between each one.

H. Fill and Surface Material -All material placed in the stream channel, around the culverts and on the surface of the crossing shall be stone, rock or aggregate. ODOT No. 1 shall be the minimum acceptable size. To prevent washouts, larger stone and rock may be used and they may be placed in gabion mattresses. No soil shall be used in the construction of a stream crossing or placed in the steam channel.

I. Removal -Aggregate stone and rock used for this structure does not need to be removed. Care should be taken so that any aggregate left does not create an impoundment or impede fish passage. All pipes, culverts, gabions or structures must be removed.

J. Stabilization -Streambanks shall be stabilized. Plantings shall include woody vegetation where practical.

3.18 INSTALLATION OF TEMPORARY STREAM FORD

A. Timing -No construction or removal of a temporary stream ford will be permitted on perennial streams from March 15 through June 15 to minimize interference with fish spawning and migration.

B. Stream Disturbance -Disturbance to the stream shall be kept to a minimum. Streambank vegetation shall be preserved to the maximum extent practical and the stream crossing shall be as narrow as practical. Clearing shall be done by cutting NOT grubbing where possible.

C. Surface Runoff -Water shall not be allowed to flow along the road directly to the stream. Diversions and swales shall direct runoff away from the access road to a sediment-control practice.

D. Fill and Surface Material -All material placed in the stream channel shall be stone, rock or aggregate. ODOT No. 1 shall be the minimum acceptable size. Larger stone and rock may be used. No soil shall be used in the construction of a stream ford or placed in the steam channel.

E. Removal - Aggregate, stone and rock used for the stream crossing shall NOT be removed but shall be formed so it does not create an impoundment, impede fish passage, or cause erosion of streambanks.

F. Stabilization -Streambanks shall be stabilized. Plantings shall include woody vegetation where practical.

3.19 INSTALLATION OF A WATER BAR

A. The minimum water bar dimensions shall be:
   1. Top width of berm/dike – 2 feet minimum.
   2. Height/depth – 18 inches unless otherwise noted on plans.

3. Side Slopes – Sufficiently flat to accommodate the expected traffic.

B. The spacing between water bars shall be as follows:

Road Grade (%)	Distance (Ft.)
1	400
2	250
5	135
10	80
15	60
20	45

C. The field location shall be adjusted as needed to provide a stabilized safe outlet.

D. The diverted runoff shall be directed onto an undisturbed vegetative area, to a settling trap or basin or trap if contributing area is stable.

E. Diversions/dikes shall be compacted by traversing with equipment during construction.

F. The water bars shall be angled slightly downslope across the centerline of the travel lane.

3.20 EROSION CONTROL METHODS RELATED TO DEWATERING OPERATIONS

A. A de-watering plan shall be developed prior to the commencement of any pumping activities.

B. The de-watering plan shall include all pumps and related equipment necessary for the dewatering activities and designate areas for placement of practices. Outlets for practices shall be protected from scour either by riprap protection, fabric liner, or other acceptable method of outlet protection.

C. Water that is not discharged into a settling/treatment basin but directly into waters of the state shall be monitored hourly. Discharged water shall be within +/- 5° F of the receiving waters.

D. Settling basins shall not be greater than four (4) feet in depth. The basin shall be constructed for sediment storage as outlined herein for a Sediment Basin Or Sediment Trap. The inlet and outlet for the basin shall be located at the furthest points of the storage. A floating outlet shall be used to ensure that settled solids do not re-suspend during the discharge process. The settling basin shall be cleaned out when the storage has been reduced by 50% of its original capacity.

E. All necessary National, State and Local permits shall be secured prior to discharging into waters of the state.

3.21 TREE AND NATURAL PRESERVATION AREAS

A. Tree and natural preservation areas shall be fenced prior to beginning clearing operations.

B. Fence materials shall be metal fence posts with two strands of high tensile wire, plastic fence or snow fence.

C. Signage shall clearly identify the tree and natural preservation area and state that no clearing or equipment is allowed within it.

D. Fence shall be placed as shown on plans and beyond the drip line or canopy of trees to be protected.

E. If any clearing is done around specimen trees it shall be done by cutting at ground level with hand held tools and shall not be grubbed or pulled out. No clearing shall be done in buffer strips or other preserved forested areas.

F. If any clearing is done around specimen trees it shall be done by cutting at ground level with hand held tools and shall not be grubbed or pulled out. No clearing shall be done in buffer strips or other preserved forested areas.

G. No filling or stockpiling of materials shall occur within the tree protection area, including deposition of sediment.

3.22 TREE PROTECTION DURING UTILITY INSTALLATION

A. Where utilities must run through a tree's dripline are, tunneling should be used to minimize root damage. Tunneling should be performed at a minimum depth of 24 inches for trees less than 12 inches in diameter or at a minimum depth of 36 inches for larger diameter trees.

B. Where tunneling will be performed within the dripline of a tree, the tunnel should be placed a minimum of 2 feet away from the tree trunk to avoid taproots.

C. Minimize excavation or trenching within the dripline of the tree. Route trenches around the dripline of trees.

D. Roots two inches or larger that are severed by trenching should be sawn off neatly in order to encourage new growth and discourage decay.

E. Soil excavated during trenching shall be piled on the side away from the tree.

F. Roots shall be kept moist while trenches are open and refilled immediately after utilities are installed or repaired.

3.23 INSTALLATION OF CONSTRUCTION ENTRANCES

A. Stone Size—ODOT # 2 (1.5-2.5 inch) stone shall be used, or recycled concrete equivalent.

B. Length—The Construction entrance shall be as long as required to stabilize high traffic areas but not less than 70 ft. (exception: apply 30 ft. minimum to single residence lots).

C. Thickness -The stone layer shall be at least 6 inches thick for light duty entrances or at least 10 inches for heavy duty use.

D. Width -The entrance shall be at least 14 feet wide, but not less than the full width at points where ingress or egress occurs.

E. Geotextile -A geotextile shall be laid over the entire area prior to placing stone. It shall be composed of strong rot-proof polymeric fibers and meet the material specifications outlined above.

F. Timing—The construction entrance shall be installed as soon as is practicable before major grading activities.

G. Culvert -A pipe or culvert shall be constructed under the entrance if needed to prevent surface water from flowing across the entrance or to prevent runoff from being directed out onto paved surfaces.

H. Water Bar -A water bar shall be constructed as part of the construction entrance if needed to prevent surface runoff from flowing the length of the construction entrance and out onto paved surfaces.

I. Maintenance -Top dressing of additional stone shall be applied as conditions demand. Mud spilled, dropped, washed or tracked onto public roads, or any surface where runoff is not checked by sediment controls, shall be removed immediately. Removal shall be accomplished by scraping or sweeping.

J. Construction entrances shall not be relied upon to remove mud from vehicles and prevent off-site tracking. Vehicles that enter and leave the construction-site shall be restricted from muddy areas.

K. Removal—the entrance shall remain in place until the disturbed area is stabilized or replaced with a permanent roadway or entrance.

3.24 DUST CONTROL OPERATIONS

A. Vegetative Cover and/mulch – Apply temporary or permanent seeding and mulch to areas that will remain idle for over 21 days. Saving existing trees and large shrubs will also reduce soil and air movement across disturbed areas. See Temporary Seeding; Permanent Seeding; Mulching Practices; and Tree and Natural Area Protection practices.

B. Watering – Spray site with water until the surface is wet before and during grading and repeat as needed, especially on haul roads and other heavy traffic routes. Watering shall be done at a rate that prevents dust but does not cause soil erosion. Wetting agents shall be utilized according to manufacturer’s instructions.

C. Spray-On Adhesives – Apply adhesive according to the following table or manufacturers' instructions.

Adhesive	Water Dilution (Adhesive: Water)	Nozzle Type	Application Rate Gal./Ac.
Latex Emulsion	12.5:1	Fine	235
Resin in Water Acrylic Emulsion (No-traffic)	4:1	Fine	300
Acrylic Emulsion (No-traffic)	7:1	Coarse	450
Acrylic Emulsion (Traffic)	3.5:1	Coarse	350

D. Stone – Graded roadways and other suitable areas will be stabilized using crushed stone or coarse gravel as soon as practicable after reaching an interim or final grade. Crushed stone or coarse gravel can be used as a permanent cover to provide control of soil emissions.

E. Barriers – Existing windbreak vegetation shall be marked and preserved. Snow fencing or other suitable barrier may be placed perpendicular to prevailing air currents at intervals of about 15 times the barrier height to control air currents and blowing soil.

F. Calcium Chloride - This chemical may be applied by mechanical spreader as loose, dry granules or flakes at a rate that keeps the surface moist but not so high as to cause water pollution or plant damage. Application rates should be strictly in accordance with suppliers' specified rates.

G. Operation and Maintenance - When Temporary Dust Control measures are used; repetitive treatment should be applied as needed to accomplish control.

H. Street Cleaning - Paved areas that have accumulated sediment from construction should be cleaned daily, or as needed, utilizing a street sweeper or bucket -type endloader or scraper.

3.25 GRADE TREATMENT (SLOPE ROUGHENING) FOR EROSION CONTROL

A. Cut Slopes-Greater than 3:1 Slopes

1. Stair-step grading may be carried out on any material soft enough to be ripped with a bulldozer. The ratio of the horizontal distance to the vertical cut distance shall be flatter than 1:1 and the horizontal portion of the "step" shall slope toward the vertical wall. Individual vertical cuts shall not be more than 24 inches on soft soil materials and not more than 36 inches in rocky materials.
2. Grooving may be made with any appropriate implement which can be safely operated on the slope and which will not cause undue compaction. Suggested implements include discs, tillers, spring harrows, and the teeth on a front-end loader bucket. Such grooves shall not be less than 3 inches deep nor further than 15 inches apart.

B. Fill Slopes-Greater than 3:1 Slopes - Fill slopes steeper than 3:1 shall be grooved or allowed to remain rough as they are constructed utilizing one of the following methods:

1. Grooving may be made with any appropriate implement which can be safely operated on the slope and which will not cause undue compaction such as discs, tillers, spring harrows, and the teeth on a front-end loader bucket. Grooves left shall not be less than 3 inches deep nor further than 15 inches apart.
2. As lifts of the fill are constructed, soil and rock materials may be allowed to fall naturally onto the slope surface. At no time shall slopes be bladed or scraped to produce a smooth, hard surface.

C. Cuts, Fills, and Graded Areas Which Will Be Mowed

1. Mowed slopes should not be steeper than 3:1 and shall avoid excessive roughness. These areas may be roughened with shallow grooves such as those, which remain after tilling, discing, harrowing, raking, or use of a cultipacker-seeder. The final pass of any such tillage implement shall be on the contour (perpendicular to the slope).
2. Grooves formed by implements shall be not less than 1 inch deep and not further than 12 inches apart. Fill slopes that are left rough during construction may be smoothed with a chain harrow or similar implement to facilitate mowing.

D. Roughening With Tracked Machinery

1. Avoid tracking clayey soils if possible, due to their potential for compaction. Conversely sandy soils will have low potential for compaction.
2. Operate tracked machinery up and down the slope to leave horizontal depressions in the soil. As few passes of the machinery should be made as possible to minimize compaction.

3.26 EROSION CONTROL DURING TOPSOILING OPERATIONS

A. Salvaging and Stockpiling

1. Determine the depth and suitability of topsoil at the site. (For help, contact your local SWCD office to obtain a county soil survey report).
2. Prior to stripping topsoil, install appropriate downslope erosion and sedimentation controls such as sediment traps and basins.
3. Remove the soil material no deeper than what the county soil survey describes as “surface soil” (ie. A or Ap horizon).
4. Construct stockpiles in accessible locations that do not interfere with natural drainage. Install appropriate sediment controls to trap sediment such as silt fence immediately adjacent to the stockpile or sediment traps or basins downstream of the stockpile. Stockpile side slopes shall not exceed a ratio of 2:1.
5. If topsoil is stored for more than 21 days, it should be temporary seeded, or covered with a tarp.

B. Spreading the Topsoil

1. Prior to applying topsoil, the topsoil should be pulverized.
2. To ensure bonding, grade the subsoil and roughen the top 3-4 in. by disking.
3. Do not apply when site is wet, muddy, or frozen, because it makes spreading difficult, causes compaction problems, and inhibits bonding with subsoil.
4. Apply topsoil evenly to a depth of at least 4 inches and compact slightly to improve contact with subsoil.
5. After spreading, grade and stabilize with seeding or appropriate vegetation.

3.27 TEMPORARY SEEDING OPERATIONS FOR EROSION CONTROL

A. Structural erosion and sediment control practices such as diversions and sediment traps shall be installed and stabilized with temporary seeding prior to grading the rest of the construction site.

B. Temporary seed shall be applied between construction operations on soil that will not be graded or reworked for 21 days or greater. These idle areas shall be seeded within 7 days after grading.

C. The seedbed should be pulverized and loose to ensure the success of establishing vegetation. Temporary seeding should not be postponed if ideal seedbed preparation is not possible.

D. Soil Amendments—Temporary vegetation seeding rates shall establish adequate stands of vegetation, which may require the use of soil amendments. Base rates for lime and fertilizer shall be used.

E. Seeding Method—Seed shall be applied uniformly with a cyclone spreader, drill, cultipacker seeder, or hydroseeder. When feasible, seed that has been broadcast shall be covered by raking or dragging and then lightly tamped into place using a roller or cultipacker. If hydroseeding is used, the seed and fertilizer will be mixed on-site and the seeding shall be done immediately and without interruption.

3.28 MULCHING OF TEMPORARY SEEDING AREAS

A. Applications of temporary seeding shall include mulch, which shall be applied during or immediately after seeding. Seedings made during optimum seeding dates on favorable, very flat soil conditions may not need mulch to achieve adequate stabilization.

B. Materials:

1. Straw—If straw is used, it shall be unrotted small-grain straw applied at a rate of 2 tons per acre or 90 lbs./ 1,000 sq. ft. (2-3 bales)

2. Hydroseeders—If wood cellulose fiber is used, it shall be used at 2000 lbs./ ac. or 46 lb./ 1,000-sq.-ft.
3. Other—Other acceptable mulches include mulch mattings applied according to manufacturer’s recommendations or wood chips applied at 6 ton/ ac.

C. Straw Mulch shall be anchored immediately to minimize loss by wind or water.

Anchoring methods:

1. Mechanical—A disk, crimper, or similar type tool shall be set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but left to a length of approximately 6 inches.
2. Mulch Netting—Netting shall be used according to the manufacturers recommendations. Netting may be necessary to hold mulch in place in areas of concentrated runoff and on critical slopes.
3. Synthetic Binders—Synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Track or equivalent may be used at rates recommended by the manufacturer.
4. Wood-Cellulose Fiber—Wood-cellulose fiber binder shall be applied at a net dry wt. of 750 lb./ac. The wood-cellulose fiber shall be mixed with water and the mixture shall contain a maximum of 50 lb. / 100 gal.

3.29 MULCHING FOR EROSION CONTROL

A. Mulch and other appropriate vegetative practices shall be applied to disturbed areas within 7 days of grading if the area is to remain dormant (undisturbed) for more than 21 days or on areas and portions of the site which can be brought to final grade.

B. Mulch shall consist of one of the following:

1. Straw - Straw shall be unrotted small grain straw applied at the rate of 2 tons/ac. or 90 lb./1,000 sq. ft. (two to three bales). The straw mulch shall be spread uniformly by hand or mechanically so the soil surface is covered. For uniform distribution of hand-spread mulch, divide area into approximately 1,000 sq.ft. sections and place two 45-lb. bales of straw in each section.
2. Hydroseeders - Wood cellulose fiber should be used at 2,000 lb./ac. or 46 lb./1,000 sq. ft.
3. Other - Acceptable mulches include mulch mattings and rolled erosion control products applied according to manufacturer’s recommendations or wood mulch/chips applied at 10-20 tons/ac.

C. Mulch Anchoring - Mulch shall be anchored immediately to minimize loss by wind or runoff. The following are acceptable methods for anchoring mulch.

1. Mechanical - Use a disk, crimper, or similar type tool set straight to punch or anchor the mulch material into the soil. Straw mechanically anchored shall not be finely chopped but be left generally longer than 6 inches.
2. Mulch Nettings - Use according to the manufacturer’s recommendations, following all placement and anchoring requirements. Use in areas of water concentration and steep slopes to hold mulch in place.
3. Synthetic Binders - For straw mulch, synthetic binders such as Acrylic DLR (Agri-Tac), DCA-70, Petroset, Terra Tack or equal may be used at rates recommended by the manufacturer. All applications of Synthetic Binders must be conducted in such a manner where there is no contact with waters of the state.
4. Wood Cellulose Fiber - Wood cellulose fiber may be used for anchoring straw. The fiber binder shall be applied at a net dry weight of 750 lb./acre. The wood cellulose

fiber shall be mixed with water and the mixture shall contain a maximum of 50 lb./100 gal. of wood cellulose fiber.

3.30 INSTALLATION OF TEMPORARY ROLLED EROSION CONTROL PRODUCT (EROSION CONTROL MATTING)

A. Channel/Slope Soil Preparation Grade and compact area of installation, preparing seedbed by loosening 2”-3” of topsoil above final grade. Incorporate amendments such as lime and fertilizer into soil. Remove all rocks, clods, vegetation or other debris so that installed RECP will have direct contact with the soil surface.

B. Channel/Slope Seeding Apply seed to soil surface prior to installation. All check slots, anchor trenches, and other disturbed areas must be reseeded. Refer to the Permanent Seeding specification for seeding recommendations.

C. Slope Installation

1. Excavate top and bottom trenches (12”x6”). Intermittent erosion check slots (6”x6”) may be required based on slope length. Excavate top anchor trench 2’ x 3’ over crest of the slope.
2. If intermittent erosion check slots are required, install RECP in 6”x6” slot at a maximum of 30’ centers or the mid-point of the slope. RECP should be stapled into trench on 12” centers.
3. Install RECP in top anchor trench, anchor on 12” spacings, backfill and compact soil.
4. Unroll RECP down slope with adjacent rolls overlapped a minimum of 3”. Anchor the seam every 18”. Lay the RECP loose to maintain direct soil contact, do not pull taught.
5. Overlap roll ends a minimum of 12” with upslope RECP on top for a shingle effect. Begin all new rolls in an erosion check slot if required, double anchor across roll every 12”.
6. Install RECP in bottom anchor trench (12”x6”), anchor every 12”. Place all other staples throughout slope at 1 to 2.5 per square yard dependent on slope. Refer to manufacturer’s anchor guide.

D. Channel Installation

1. Excavate initial anchor trench (12”x6”) across the lower end of the project area.
2. Excavate intermittent check slots (6”x6”) across the channel at 30’ intervals along the channel.
3. Excavate longitudinal channel anchor slots (4”x4”) along both sides of the channel to bury the edges. Whenever possible extend the RECP 2’-3’ above the crest of channel side slopes.
4. Install RECP in initial anchor trench (downstream) anchor every 12”, backfill and compact soil.
5. Roll out RECP beginning in the center of the channel toward the intermittent check slot. Do not pull taught. Unroll adjacent rolls upstream with a 3” minimum overlap (anchor every 18”) and up each channel side slope.
6. At top of channel side slopes install RECP in the longitudinal anchor slots, anchor

every 18”.

7. Install RECP in intermittent check slots. Lay into trench and secure with anchors every 12”, backfill with soil and compact.
8. Overlap roll ends a minimum of 12” with upstream RECP on top for a shingling effect. Begin all new rolls in an intermittent check slot, double anchored every 12”.
9. Install upstream end in a terminal anchor trench (12”x6”); anchor every 12”, backfill and compact.
10. Complete anchoring throughout channel at 2.5 per square yard using suitable ground anchoring devices (U shaped wire staples, metal geotextile pins, plastic stakes, and triangular wooden stakes). Anchors should be of sufficient length to resist pullout. Longer anchors may be required in loose sandy or gravelly soils.

3.31 INSTALLATION OF TURF REINFORCEMENT MATTING (PERMANENT ROLLED EROSION CONTROL PRODUCTS)

A. Channel/Slope Soil Preparation Grade and compact area of installation, preparing seedbed by loosening 2”-3” of topsoil above final grade. Incorporate amendments such as lime and fertilizer into soil. Remove all rocks, clods, vegetation or other debris so that installed TRM will have direct contact with the soil surface.

B. Channel/Slope Seeding Apply seed to soil surface prior to installation. All check slots, anchor trenches, and other disturbed areas must be reseeded. Refer to the Permanent Seeding specification for seeding recommendations.

C. Slope Installation

1. Excavate top and bottom trenches (12”x6”). Intermittent erosion check slots (6”x6”) may be required based on slope length. Excavate top anchor trench 2’ x 3’ over crest of the slope.
2. If intermittent erosion check slots are required install Turf Reinforcement Matting (TRM) in 6”x6” slot at a maximum of 30’ centers or the mid point of the slope. TRM should be stapled into trench on 12” centers.
3. Install TRM in top anchor trench, anchor on 12” spacings, backfill and compact soil.
4. Unroll TRM down slope with adjacent rolls overlapped a minimum of 3”. Anchor the seam every 18”. Lay the TRM loose to maintain direct soil contact, do not pull taught.
5. Overlap roll ends a minimum of 12” with upslope TRM on top for a shingle effect. Begin all new rolls in an erosion check slot if required, double anchor across roll every 12”.
6. Install TRM in bottom anchor trench (12”x6”), anchor every 12”. Place all other staples throughout slope at 1 to 2.5 per square yard dependant on slope. Refer to manufacturer’s anchor guide.

D. Channel Installation

1. Excavate initial anchor trench (12”x6”) across the lower end of the project area.

2. Excavate intermittent check slots (6”x6”) across the channel at 30’ intervals along the channel.
3. Excavate longitudinal channel anchor slots (4”x4”) along both sides of the channel to bury the edges. Whenever possible extend the TRM 2’-3’ above the crest of channel side slopes.
4. Install TRM in initial anchor trench (downstream) anchor every 12”, backfill and compact soil.
5. Roll out TRM beginning in the center of the channel toward the intermittent check slot. Do not pull taught. Unroll adjacent rolls upstream with a 3” minimum overlap (anchor every 18”) and up each channel side slope.
6. At top of channel side slopes install TRM in the longitudinal anchor slots, anchor every 18”.
7. Install TRM in intermittent check slots. Lay into trench and secure with anchors every 12”, backfill with soil and compact.
8. Overlap roll ends a minimum of 12” with upstream TRM on top for a shingling effect. Begin all new rolls in an intermittent check slot, double anchored every 12”.
9. Install upstream end in a terminal anchor trench (12”x6”); anchor every 12”, backfill and compact.
10. Complete anchoring throughout channel at 2.5 per square yard using suitable ground anchoring devices (U shaped wire staples, metal geotextile pins, plastic stakes, and triangular wooden stakes). Anchors should be of sufficient length to resist pullout. Longer anchors may be required in loose sandy or gravelly soils.

3.32 GENERAL SMALL CONSTRUCTION SITE CONTROLS

A. Preexisting vegetation shall be retained on idle portions of the building area for as long as construction operations allow. Clearing shall be done so only active working areas are bare.

B. Temporary seed and/or mulch shall be applied to areas, such as stockpiles and rough graded areas, that are bare and not actively being worked. This shall apply to areas that will not be reworked for 21 days or more.

C. Stockpiles created from excavation and grading shall be situated away from streets, swales, or other waterways and shall be seeded and/or mulched immediately.

D. Silt fence or other sediment barriers shall control sheet flow runoff from the construction area. These shall not be constructed in channels or areas of concentrated flow. Other sediment controls such as sediment traps and inlet protection shall also be used as needed to control sediment runoff. Sediment control practices shall be inspected weekly after storm events, and maintained in good working condition.

E. Construction vehicle access shall be limited to one route, to the greatest extent practical. The access shall be gravel or crushed rock underlain with geotextile.

F. Mud tracked onto streets or sediment settled around curb inlet protection shall be removed daily or as needed to prevent it from accumulating. It shall be removed by shoveling and scraping and shall NOT be washed off paved surfaces or into storm drains. Sediment removed shall be placed where it will not be subject to erosion or concentrated runoff.

END OF SECTION 312514