SECTION 01500

PROTECTION OF THE ENVIRONMENT

01500.01 GENERAL

A. Description

1. Anne Arundel County requires the Contractor to at all times conform to the control measures stipulated in the Standard Details, these Specifications, as shown on the Plans, as directed by the Engineer, and as required by the Anne Arundel County Soil Conservation District.

2. Furnish, install, maintain, and remove temporary erosion, sediment, and environment protection and control measures as shown, specified, or both shown and specified on the approved sediment and erosion control plan and as directed by the Engineer.

3. Provide all labor, materials, equipment, and services necessary for and incidental to the complete and satisfactory application of the temporary erosion, sediment, and environment protection and control measures throughout the term of the Contract.

4. The measures shall include, but are not limited to, the use of berms, dikes, dams, sediment basins, sediment traps, gravel or stone, filters, silt fences, straw bale dikes, fiber mats, netting, gravel or crushed stone, mulch, grasses, slope drains, and other appropriate methods approved by the Anne Arundel County Soil Conservation District to control erosion and siltation from erodible material exposed by construction activity on the project.

5. Sediment control devices shall be provided by the Contractor, whether or not specifically shown on the plans, to control surface drainage from within the construction site; borrow, waste, and storage areas, and all other areas disturbed by the Contractor's operations.

6. The Contractor shall be responsible for obtaining Sediment Control approvals and/or Permits from the appropriate agency for all off-site borrow or spoil areas, off-site storage areas and other areas used by the Contractor but not provided for by the County.

7. The Contractor will be responsible for inspection of erosion control measures at least weekly and after each rain event. Any measure, which has been damaged or requires maintenance, shall be immediately repaired to ensure the maximum effectiveness of the installed measures. The Contractor shall maintain at the site a written record of his inspections and the type and time of completion of all corrective work.

8. The installation of control measures shall be coordinated with the construction of the permanent drainage and paving facilities and shall be constructed in accordance

with the phasing schedule on the approved sediment and erosion control plan to assure effective and continuous environmental control.

B. Related Work Included Elsewhere

1. Land, Air, and Water Pollution; Section GP7.13.

2. Excavating, placing embankments, permanent grading, dewatering of excavations, and all earthwork related to the construction of sediment control devices; Sections 02210, 02220, 02230, 02250, and 02260.

3. Clearing and grubbing; Section 02110.

4. Permanent seeding and sodding; Section 02820.

C. Standards

All work shall be performed in accordance with the "1983 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL" as adopted by the Anne Arundel Soil Conservation District and the State of Maryland Department of Natural Resources and all subsequent changes and addenda in effect at the time of receipt of Bids, as the official guide for erosion and sediment control measures for projects in Anne Arundel County.

D. Definitions

Land disturbance is defined as any surface disturbance, earth movement and/or land changes including, but not limited to, tilling, clearing, grading, excavating, stripping, filling, and related activities.

E. Permits and Agreements

1. Anne Arundel County Capital Improvement Projects

   a. The County has obtained Soil Conservation District approval for the Project, the conditions which are hereby incorporated into the Contract Documents. It is the Contractor's responsibility to meet all terms and conditions during the performance of the work.

   b. The County has obtained all Waterway Construction Permits from the Maryland Department of Natural Resources for any applicable construction within wetlands and/or flood plains of the waters of the State of Maryland and such permits as may be applicable from the United States Army, Corps of Engineers for construction within navigable waters. These permits, if applicable, are hereby incorporated into the Contract Documents, and it is the Contractor's responsibility to meet all terms and conditions of the permits during the performance of the work.

2. Developer Constructed Facilities

   a. The Developer must obtain all Sediment Control Permits and approvals for work constructed in Anne Arundel County. It is the Developer's responsibility to ensure that his Contractor meets all the terms and conditions of the permits and approvals during his performance of the work.

   b. The Developer must obtain all Waterway Construction Permits from the Maryland Department of Natural Resources for any applicable construction within wetlands and/or flood plains of the waters of the State of Maryland and such permits as may be applicable from the United States Army, Corps of Engineers for construction within navigable waters. It is the Developer's responsibility to ensure that his Contractor meets all the terms and conditions of the permit and approvals during his performance of the work.

3. All arrangements for access ways (other than County right-of-way) to borrow areas, spoil areas, etc., shall be obtained by the Contractor in writing and shall be shown on the sediment control plan and shall contain a clause to the effect that the requirements and standards for sediment control, restabilization and restoration of the access ways and other disturbed areas shall meet or exceed the restabilization and restoration standards for County rights-of-way. A copy of the access agreement and a copy of any additionally required State or County permits shall be sent to the Engineer prior to the Contractor beginning work in any areas outside of the right-of-way.

F. Notifications

1. The Contractor for Anne Arundel County Capital Improvement Projects, or the Developer for projects whose ownership is intended to be transferred to Anne Arundel County shall notify, at least 48 hours before commencing any construction on the Project:

   a. The Department of Public Works for projects administered by the Department of Public Works.

   b. Inspection and Permits, P.A.C.E. for development projects.

2. The site, work areas, materials, plans, specifications, and permits shall be available at all times at the project site during working hours for inspection by representatives of the respective Departments, the Anne Arundel County Soil Conservation District, and other governmental agencies from which permits were obtained.

01500.02 MATERIALS

A. Materials Furnished by the County

The County will not furnish any materials for protection of the Environment.

B. Contractor's Options

The Contractor may make such substitutions as allowed by the Anne Arundel County Soil Conservation District and approved by the Engineer.

C. Detailed Material Requirements

1. Stone

   Crushed stone shall meet the requirements of AASHTO M43 No. 1 (4" to 3/4") as specified in Section 02621. Crusher run stone (Maryland GA Base or GA S/B) is not acceptable.

2. Riprap

   Class I, small riprap 3" to 15" in size (2 pounds to 150 pounds) shall be as specified in Section 02291.

3. Filter Fabric

   a. For use in stabilized construction entrances and temporary access water crossings.

      1) Fabric shall consist of long chain polymeric filaments or yarns of polypropylene, polyethylene, polyester, polyamide or polyvinylidene-chloride formed into a stable network.

      2) Fabric shall be inert to chemicals commonly encountered in soil and to hydrocarbons.

      3) Fabric shall be resistant to mildew, rot, insect and rodent attack.

      4) Fabric shall contain ultraviolet ray inhibitors and stabilizers and be suitable at temperatures of 0°F to 120°F.

      5) Fabric shall conform to the following test criteria:

Test and Method	Specification Limits
Grab Tensile Strength, ASTM D 1682, lbs min	115
Tensile Elongation, ASTM D 1682, % min	50
Burst Strength, ASTM D 3786, psi min	190
Trapezoidal Tear Strength, ASTM D 117, psi min	45

   b. For use in riprap pipe outlets.

      1) Fabric shall be a non-woven fabric consisting of long chain polymeric filaments or yarns of polypropkylene, polyester, polyamide or polyvinylidene-chloride formed into a stabile network.

2) Fabric shall be inert to chemicals commonly encountered in soil and to hydrocarbons.

3) Fabric shall be resistant to mildew, rot, insects and rodent attack.

4) Fabric shall contain ultraviolet ray inhibitors and stabilizers and be suitable at temperatures of 0°F to 120°F.

5) Fabric shall conform to the following test criteria:

Test and Method	Specification Limits
Grab Tensile Strength, ASTM D 1682, lbs min	90
Tensile Elongation, ASTM D 1682, % min	20
Burst Strength, ASTM D 3786, psi min	140
Trapezoidal Tear Strength, ASTM D 117, psi min	45
Equivalent Opening Size, U.S. Standard Sieve Size, CW-02215 Corps of Engineers	40-100 as shown on the Plans
Flow Rate, AASHTO M228 Appendix, gpm/sq ft min	40
Coefficient of Permeability, AASHTO M 228 Appendix, cm/sec min	0.05

c. For use in temporary inlet protection.

1) Fabric may be either woven or nonwoven.

a) Nonwoven fabric shall consist of long chain polymeric filaments or yarns of polyester.

b) Woven fabric shall consist of monon filaments of polypropylene treated with ultraviolet light stabilizers.

2) Fabric shall be inert to chemicals commonly encountered in soil and to hydrocarbons.

3) Fabric shall be resistant to mildew, rot, insects and rodent attack.

4) Fabric shall contain ultraviolet ray inhibitors and stabilizers and be suitable at temperatures of 0°F to 120°F.

5) Fabric shall conform to the following test criteria:

Test and Method	Specification Limits
Grab Tensile Strength, ASTM D 1682, lbs min	90
Tensile Elongation, ASTM D 1682, % min	50
Tensile Elongation, ASTM D 1682, % max	115
Burst Strength, ASTM D 3786, psi min	190
Puncture Strength, ASTM D 751, lbs min	60
Flow Rate, AASHTO M 228 Appendix, gpm/sq. ft. min	40
Coefficient of Permeability, AASHTO M228 Appendix, cm/sec min	0.1
Equivalent Opening Size, U.S. Standard Sieve Size, CW-02215 Corps of Engineers	40-100 as shown on the Plans
Ultraviolet Radiation Stability, ASTMG 26, %	90

6) Prefabricated silt fence units of the trade name Geofab or Envirofence or equal, at the Contractor's option, may be used in lieu of an on-site fabrication inlet barrier.

4. Silt Fence

a. Silt Fence Fabric

1) Fabric may be either woven or nonwoven.

a) nonwoven fabric shall consist of long chain polymeric filaments or yarns of polyester.

b) Woven fabric shall consist of monon filaments of polypropylene treated with ultraviolet light stabilizers.

2) Fabric shall be inert to chemicals commonly encountered in soil and to hydrocarbons.

3) Fabric shall be resistant to mildew, rot, insects and rodent attack.

4) Fabric shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0°F to 120°F.

5) Fabric shall conform to the following test criteria:

Test and Method	Specification Limits
Grab Tensile Strength, ASTM D 1682, lbs min	90
Tensile Elongation, ASTM D 1682, % min	50
Tensile Elongation, ASTM D 1682, % max	115
Burst Strength, ASTM D 3786, psi min	190
Puncture Strength, ASTM D 751, lbs min	60
Flow Rate, AASHTO M 228 Appendix, gpm/sq.ft. min.	40
Coefficient of Permeability, AASHTO M 228 Appendix, cm/sec min	0.1
Equivalent Opening Size, U.S. Standard Sieve Size, CW-02215 Corps of Engineers	40-100 as shown on the Plans
Ultraviolet Radiation Stability, ASTM G 26, %	90

b. Fence Posts (for fabricated units): The length shall be 36 inches minimum. Wood posts will be of sound quality hardwood with a minimum cross sectional area of three square inches.

Steel posts will be standard "T" and "U" sections weighing not less than 1.33 pounds per linear foot with a minimum length of 42 inches.

c. Wire Fence (for fabricated units): Wire fencing shall be a minimum 14-1/4 gauge welded wire fabric with a maximum 6-inch mesh opening, or as approved.

d. Prefabricated Units, at the Contractor's option, may be used in lieu of the fabricate site fence. The prefabricated unit shall be Geofab or Envirofence or equal and shall be installed per manufacturer's instructions.

5. Temporary Seeding and Mulching

a. Lime: ground dolomitic limestone containing not less than 85% calcium and magnesium carbonates with at least 10% magnesium as magnesium oxide. The ground limestone shall meet the following gradation:

Sieve Size	Percent Passing
No. 10	100
No. 20	98
No. 100	50

b. Fertilizer: standard commercial grade 10-10-10 or equivalent.

c. Seed: Perennial rye, Italian rye - (February 1 through April 30 or August 15 through November 1). Millet - (May 1 through August 15).

d. Mulch and mulch binders shall be as specified in Section 02820. From November 2 through January 31, use mulch only.

6. Temporary slope drains may be constructed of material acceptable to the Engineer, and shall be furnished with watertight joints.

7. Straw Bales shall consist of undecayed firmly-packed straw of nominal size 14 inches by 18 inches by 36 inches as prepared by any standard make baling machine and firmly bound by at least 2 separate circuits of rope or band material which will withstand weathering for a minimum of 3 months. Binding tension shall be set so as to produce a bale with voids no greater than the nominal thickness of the straw.

01500.03 EXECUTION

A. General

1. The Contractor shall be responsible for installation, maintenance, and removal of all items for the implementation of the work described herein for environmental protection including prevention and control of erosion and sedimentation that results directly or indirectly from all work performed during construction and until the final acceptance at the end of the one-year guarantee period as described in Section GP-5.11.2.

2. Prior to the start of any construction effort, the Contractor shall submit his schedules, which shall include and be compatible with the Sediment Control Plan Phasing Schedules, and sequences for accomplishing environmental protection including temporary and permanent erosion control work as is applicable to the clearing and grubbing, excavation, grading, utility installation, structure construction, paving, and permanent stabilization and landscaping phases of the project. No work shall be started until the schedules and methods of operation have been accepted by the Engineer.

3. Erosion control measures, such as stone inlet protection constructed in paved streets in use by the general public shall be short-term measures to be used only during construction in the immediate vicinity of the inlet. Stone inlet protection shall not be used to obstruct or divert the existing storm water flow patterns and in no circumstances shall stone inlet protection be used in existing sump locations or to divert unintercepted storm water to existing sump inlets.

B. Prevention of Water Pollution

1. The Contractor shall take all such precautions in the conduct of his operations as may be necessary to avoid contaminating the water in adjacent watercourses or water storage areas, including wells, whether natural or man-made.

2. All earthworks, moving of equipment, water control for excavations, and other operations likely to create silt, shall be conducted so as to prevent pollution of watercourses or water storage areas.

3. Water used during the conduct of any operations, which has become contaminated with oil, bitumens, harmful or objectionable chemicals, sewage, or other pollutants shall be disposed of so as to avoid affecting all nearby waters and lands. The Contractor shall not discharge pollutants into a watercourse or water storage area under any circumstances. The Contractor shall not allow water used in aggregate processing, concrete curing, foundation and concrete cleanup, or any other waste to enter a stream. When water from adjacent sources is used in the Contract work, intake methods shall be such as to avoid contaminating the source of supply or becoming a source of erosion.

C. Dust Control

Throughout the entire construction period, the Contractor shall maintain dust control by use of water sprinklers or chemical dust control binder as may be approved or directed by the Engineer.

D. Erosion and Sediment Control

1. The Contractor shall shape the graded areas in a manner as to permit the runoff of precipitation. Temporary earth berms shall be constructed along the top edges of embankments to intercept runoff water. Temporary slope drains shall be provided to carry runoff from cuts and embankments as shown on the Approved Sediment Control Plan. Slope drains may be constructed of flexible or rigid materials and should be capable of being readily shortened or extended as the excavation or fill advances. Pipe end sections or other approved entrances shall be provided at the slope drain entrances. Energy dissipaters shall be provided at drain outlets where indicated on the Plans and where demonstrated to be necessary during the term of the project. Temporary slope drains shall be outletted only into stabilized areas or sediment control devices.

2. Only those areas that are so designated shall be cleared and, where possible, a vegetative buffer zone between the disturbed working area and any watercourse shall be maintained.

3. Excavated material shall be protected from being eroded into any waters or onto any adjacent lands. Excavated material shall be stockpiled on the high side of trenches.

4. When sediment control devices are designated on the Plans, they shall be installed during the initial grading and clearing operations and be completed before trenching operations begin. They shall be maintained until final restabilization and restoration or until directed by the Engineer to remove them.

5. Critical areas, disturbed areas with a surface gradient exceeding ten percent, shall be immediately stabilized with vegetation after excavating or backfilling operations are completed. Those areas that cannot be planted shall be adequately covered with straw mulch, wood chips, matting, or other erosion prevention materials. Those

disturbed areas that are less than 10% in surface gradient shall be considered critical after diverting runoff from critical areas.

6. Erosion control measures such as straw bale dike, earth berm dike, pipe, or other diversion devices to divert and/or convey runoff around or through disturbed areas to prevent scour or gully erosion shall be provided. Pipes shall be provided with end sections and protected outlets.

7. A stone or paved entrance shall be provided at all points of egress onto public thoroughfares to provide a controlled location for the inspection of vehicles and the cleaning from the vehicles of all material which might be tracked from the site or lost from the vehicle when it enters onto the public thoroughfare.

8. Streams with a base flow shall only be crossed by one of the following methods:

   a. Fluming of water around construction.

   b. Pumping of water around construction.

   c. Temporary stream diversion within the confines of the existing channel.

   d. Tunneling of the stream.

9. Streams large enough to require the placement of a work area within the stream channel and/or flood plain generally will require a Maryland Department of Natural Resources Water Way Construction Permit. When utilizing a stream diversion flume within a large stream that requires a working area to be constructed in the stream, the initial diversion shall be constructed of non-erodible materials such as stone, sandbags, wood planking, or soil protected with stone or sandbags. The non-erodible material shall be placed upstream prior to constructing the working area. All soil used in the stream crossing shall be protected from the forces of the water in the channel with non-erodible materials approved by the Engineer. After completing the crossing, all materials associated with the temporary construction shall be removed.

10. All temporary sediment control devices that are disturbed during the construction operations shall be fully repaired by the end of that working day.

11. Construction operations shall comply with the requirements specified herein and/or as shown on the Plans. Violation of these requirements may result in suspension of the Work. Suspension of Work will not be lifted until the Contractor has corrected the violation. Time extensions requested as a result of delays occasioned by such suspensions will not be granted.

12. Should conditions arise that render the Erosion Sediment Control Plans inadequate or inappropriate in whole or part for work included in the Contract, the Contractor shall immediately notify the Engineer and the Anne Arundel Soil Conservation District. Additional plans or modifications where necessary will be furnished by the County and will become part and condition of the Sediment Control Permit.

E. Restabilization and Restoration

1. Construction clean up shall proceed as construction progresses and shall consist of the removal of all mud, oil, soil, gravel, trash, debris, and any other materials that are unsightly or can cause or result in erosion.

2. All areas disturbed by the Contractor's operations, including staging and stockpiling areas, construction strips, access roads, stream crossing sites, and areas within the acquired rights-of-way and easements shall be restored and restabilized as specified herein.

3. Final restoration and restabilization including seeding, sodding, and paving, when season permits, shall proceed immediately after construction activity is completed in a given area. The Contractor shall remove all temporary construction facilities constructed by the Contractor and leave the site in an orderly condition.

4. Tree protection, repair, and replacement shall be performed in accordance with Title 8, Subtitle 07, Chapter 02, Maryland Forest Service, and Roadside Tree Care.

5. Sod shall be provided on those disturbed areas designated on the Plans which supported a previously established stand of turf; on slopes of 3:1 and steeper; and/or where directed by the Engineer. Seeding and mulching shall be provided on all other disturbed and graded areas.

6. Separate agreements between the Contractor and property owners for clean-up, grading, seeding, sodding; and tree repair, removal, or replacement shall be submitted in writing to the Engineer prior to commencement of any work.

7. Public and private signs, markers, guardrails, and fences shall be preserved and maintained in their original condition unless written permission is obtained for removal and replacement. Such conflicting facilities shall be removed when grading operations begin, stored in a manner to keep them clean and dry, and re-erected at such new locations as to prevent damage to underground or overhead public utility facilities. Damaged items shall be replaced by the Contractor at no cost to the County.

8. Restabilization of turf areas shall be performed in accordance with Section 02820.

9. Gravel surfaces and shoulders shall be restored to original condition. Shoulder material shall not be reused if contaminated by foreign material. In such case, replace with new material of same quality and gradation. Materials and methods of construction shall be in accordance with Sections 02280 and 02630 and with applicable permits secured for this Contract.

F. Disposal of Waste Materials

1. Construction waste materials shall be disposed of by the Contractor in an authorized disposal area or in an area covered by a current grading or sediment control permit.

2. Waste material disposed of in an unauthorized area shall be removed by the Contractor and the area shall be restored to its original condition, at no cost to the County.

G. Sequence of Construction

1. In general, sediment control devices shall be installed prior to beginning any other earthwork under the Contract.

2. Inlet protection devices shall be installed immediately after new inlet boxes are constructed. Stone filter inlet protection devices for existing inlets in paved travel ways shall be installed only during grading operations in the immediate vicinity of the inlet where no other sediment control device outside the existing paved travel way is considered practical. Disturbed areas shall be stabilized and sediment control devices removed as soon as practical. The Contractor will be solely responsible, during the time the sediment control device is in place, for any damage resulting from the diversion of stormwater, which would normally be intercepted by the existing inlet.

3. Silt fences, sediment traps, and stabilized construction entrances shall be constructed prior to beginning any other earthwork. Temporary stabilization of earth dikes and sediment traps shall be undertaken as soon as practicable. Maintenance of silt fences, traps, etc. is required regularly to assure sediment storage volume and integrity of the individual practices.

4. Silt fences shall not be removed until graded areas are permanently stabilized.

5. Cut and fill slopes shall be dressed, prepared, and seeded as the work progresses. The slope stabilization shall be completed in vertical increments of not more than 10 feet as the grading operations proceed and immediately following the suspension of grading operations in any area.

6. Permanent or temporary stabilization of all contributing drainage areas is to be established prior to the removal of erosion control measures (See paragraph W). The stabilized construction entrance shall not be removed until the entire site is stabilized or until the need for all access has past.

H. Wheel Washing

When directed by the Engineer, vehicle wheels shall be cleaned by the Contractor to remove sediment prior to entrance onto public rights-of-way. When washing is required, it shall be done on an area stabilized with crushed stone, which drains into an approved sediment trap or sediment basin. All sediment shall be prevented from entering any storm drain, ditch, or watercourse.

I. Stabilized Construction Entrances

1. The Contractor shall construct stabilized construction entrances at all construction site vehicular access locations in accordance with Standard Drawing EC-SCE1 “Stabilized Construction Entrance”.

2. All surface water flowing or diverted toward construction entrances shall be piped across the entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.

3. The entrance shall be maintained by the Contractor in a condition which will prevent tracking or flowing of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. Reconstruction will be required when the stone becomes contaminated to the degree that the effectiveness of the device is lost.

4. All sediment spilled, dropped, washed, or tracked onto public rights-of-way shall be removed immediately by the Contractor.

J. Earth Dikes

1. Earth dikes shall be constructed by the Contractor where and to the size indicated on the Plans, and in accordance with Standard Drawing EC-ED1, “Perimeter Dike”. Earth dikes shall be used to intercept offsite water to prevent it from entering the disturbed area, or to divert sediment-laden water to sediment trapping devices.

2. All dikes shall be compacted, in 4-inch lifts, to a density of 90% of maximum at $\pm$2% of optimum moisture content as determined by AASHTO M 180, Method C or D.

3. All dikes shall have positive drainage to an outlet.

4. Top width may be wider and side slopes may be flatter if desired to facilitate crossing by construction traffic.

5. Field location may be adjusted as needed to utilize a stabilized safe outlet or to convey runoff to a sediment trapping device.

6. Earth dikes shall be inspected and maintained, if required, by the Contractor after each storm event.

7. Earth dikes shall be stabilized immediately after excavation and shaping.

K. Straw Bale Dikes

1. Straw Bale Dikes shall be constructed by the Contractor where indicated on the Plans and in accordance with Standard Drawings EC-SBD1, "Straw Bale Dike"

when the term of use will not exceed 3 months. Straw bale dikes shall be re-established, if required, using new material after 3 months.

2. At the Contractor's option Straw Bale Dikes may be used in lieu of "Silt Fence" where anticipated period of use is less than 3 months.

3. Bales shall be placed at the toe of a slope, or on the contour, in a row with ends tightly abutting.

4. Each bale shall be embedded in the soil a minimum of 4 inches and placed so the bindings are horizontal.

5. Bales shall be securely anchored in place by either two 3'-0" length 2-inch x 2-inch wood stakes, 1 1/2 -inch x 5/8-inch, 14 gauge steel fence pickets, or No. 4 re-bars driven through the bale. The first stake in each bale shall be driven toward the previously laid bale at an angle to force the bales together. Stakes shall be driven flush with the bale and shall extend 18 to 24 inches into the underlying soil.

6. Accumulated silt, debris and damaged or deteriorated bales shall be removed by the Contractor.

7. Bales shall be removed when they have served their usefulness so as not to block or impede storm flow or drainage but not before disturbed area is stabilized so as to prevent washout of newly stabilized area.

L. Silt Fences

1. Silt fences shall be constructed by the Contractor where indicated on the Plans and in accordance with Standard Drawings EC-SBD1, "Silt Fence" and EC-SBD2 “Channel Silt Fence”.

2. Welded wire fence fabric shall be fastened securely to the fence posts using wire ties or staples.

3. The cloth shall not be installed in a stretched condition but shall be installed loosely. The panels shall be overlapped a minimum of 12 inches before fastening to the fence fabric.

4. The filter cloth shall be fastened securely to the woven wire fence fabric by wire ties spaced horizontally every 24 inches at both top and midsection.

5. The top edge of the cloth shall be reinforced or shall have a one-inch tuck.

6. If any portion of the fence or filter cloth becomes damaged, it shall be immediately repaired or replaced.

7. Accumulated silt and debris shall be removed by the Contractor from the face of the fence or whenever "bugles" in the fence develop or silt deposits reach

approximately one half the height of the fabric. Clogged or damaged filter fabric shall be immediately replaced.

8. At the Contractor's option silt fences may be used in lieu of "Straw Bale Dikes".

M. Temporary Swales

1. Temporary swales shall be constructed by the Contractor where and to the size indicated on the Plans and in accordance with Standard Drawing EC-TS1, "Temporary Swale". Swales shall be used to intercept off-site water to prevent it from entering the disturbed areas, or to divert sediment-laden water to sediment trapping devices.

2. All temporary swales shall have positive drainage to an outlet.

3. Diverted runoff from a disturbed area shall be conveyed to a sediment trapping device.

4. Diverted runoff from an undisturbed area shall outlet directly into an undisturbed stabilized area at non-erosive velocity.

5. All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the swale.

6. The swale shall be excavated or shaped to line, grade, and cross section as required to meet the criteria specified herein, and shall be free of bank projections or other irregularities which will impede normal flow.

7. Fills shall be compacted to the density specified in Section 02260 prior to swale excavation.

8. All earth removed shall be placed so that it will not interfere with the functioning of the swale.

9. Field location may be adjusted as needed to utilize a stabilized safe outlet or to convey runoff to a sediment trapping device.

10. Temporary swales shall be stabilized immediately after excavation and shaping.

11. Temporary swales shall be inspected and maintained, if required, after each storm event.

N. Grade Stabilization Structures (Slope Drains)

1. Slope Drains shall be constructed by the Contractor where and to the size indicated on the Plans and in accordance with Standard Drawings EC-GSS2 or EC-GSS3, "Grade Stabilization Structures". Slope drains shall be used to convey surface water down slopes from drainage areas not to exceed 5 acres.

2. At the Contractor's option, pipe slope drains may be of rigid or flexible construction. Pipes shall be no smaller than the size indicated on the Plans.

3. The pipe slope drain shall have a minimum slope of 3%.

4. The top of the earth dike over the inlet pipe and those dikes carrying water to the pipe shall be at least 1 foot higher at all points than the top of the inlet pipe.

5. All pipes shall be provided with watertight connecting bands.

6. A flared end section shall be attached to the inlet end of pipe with a watertight connection.

7. The soil around and under the pipe and end section shall be compacted, in 4 inch lifts to an elevation equal to the top of the earth dike, to a density of 90% of maximum at ±2% of optimum moisture content as determined by AASHTO M180, Method C or D.

8. Where flexible tubing is used, it shall be the same diameter as the inlet pipe and shall be constructed of a durable material with hold-down grommets spaced 10 feet on centers.

9. Flexible tubing shall be securely fastened to the corrugated metal pipe with metal strapping or watertight connecting collars.

10. Flexible tubing shall be securely anchored to the slope by staking at the grommets provided.

11. Where a pipe slope drain outlets into a sediment trapping device, it shall discharge at the riser crest or weir elevation.

12. A riprap apron shall be used below the pipe outlet where clean water is being discharged into a stabilized area.

13. Slope drains shall be inspected and maintained by the Contractor after each storm event.

O. Sediment Traps

1. Sediment traps shall be constructed by the Contractor where indicated and of the type and size shown on the Plans. In no case shall sediment traps be constructed over sanitary sewer or water facilities.

2. The area under sediment trap embankments shall be cleared, grubbed, and stripped of all vegetation and root mat prior to placement of embankment fill.

3. Embankment fill material shall be free of organic material, roots, vegetation, oversized stones, rocks, or other debris which will prevent compaction by earth moving equipment.

4. Pipe connection through embankments shall be watertight.

5. The stone outlets shall consist of Class I riprap with a 1-foot layer of crushed stone on the upgrade side of the riprap. Filter cloth shall be placed between the riprap and the stone and shall be embedded a minimum of 4 inches into existing ground at the toe of the riprap and shall extend onto the crest of the spillway.

6. Sediment traps shall be stabilized immediately after excavation and shaping.

7. Sediment shall be removed and trap restored to its original dimensions by the Contractor when sediment has accumulated to one-half of the design depth of the trap. Removed sediment shall be disposed of in a suitable area and in such a manner that it will not erode.

8. Sediment traps shall be inspected by the Contractor after each storm event.

P. Perimeter Dikes/Swales

1. Perimeter dikes/swales shall be constructed by the Contractor where indicated on the Plans and in accordance with Standard Drawing RC-PDS1, "Perimeter Dike/Swale".

2. All perimeter dike/swale shall have positive drainage to an outlet. Maximum grade shall be 20%.

3. Diverted runoff from a disturbed area shall be conveyed to a sediment trapping device.

4. Diverted runoff from an undisturbed area shall outlet into an undisturbed stabilized area at non-erosive velocity.

5. The swale shall be excavated or shaped to line, grade, and cross section as required to meet the criteria specified herein and be free of projections or other irregularities, which will impede normal flow.

6. The dike/swale shall be stabilized immediately after excavation and shaping.

7. The dike/swale shall be inspected and maintained (if required) by the Contractor after each storm event.

Q. Sediment Basins

1. Sediment Basins shall be constructed by the Contractor where indicated and in accordance with the details shown on the plans. In no case shall sediment basins be constructed over sanitary sewer or water facilities.

2. Sediment basins shall be stabilized immediately after excavation and shaping.

3. Sediment shall be removed and the basin restored to its original dimensions by the Contractor when sediment has accumulated to one-half of the design depth.

Removed sediment shall be disposed of in a suitable area and in such a manner that it will not erode.

4. Sediment basins shall be secured by the Contractor by the erection of a minimum 6 foot high temporary chain link fabric type fence which completely surrounds the pool area. The fence may be erected using Standard 2 inch diameter steel pipe posts or 4-inch x 4-inch wood posts set a maximum of 8 feet on centers. Top rails for the fence will not be required. Fabric shall be securely fastened to the posts using wire ties for steel posts and staples for the wood posts. Convenient locked access gates shall be provided to facilitate pool sediment cleaning and basin maintenance. Breaches of the security fence by swales or ditches shall be made with short pipe culverts to ensure security of the site from intrusion by animals or the public. Suitable hazard warning signs will be prominently displayed at maximum 100-foot intervals along the fence perimeter. The security fence shall not be removed until the pool area is drained and the area stabilized.

5. Sediment basins shall be inspected after each storm event.

R. Temporary Access Waterway Crossing

1. Temporary access waterway crossings shall be constructed by the Contractor where indicated and in accordance with the details shown on the Plans.

2. Where no stream crossing is indicated on the Plans but the Contractor desires to cross an existing stream for the efficient conduct of his operations, such additional crossing request shall be made in writing to the Engineer. Such crossing, when approved by the Engineer after consultation with the Soil Conservation District, will be made in accordance with these specifications and with Maryland Standards for “Temporary Access Waterway Crossings”. Stream crossings within state designated flood plains shall also require the Contractor to obtain Maryland Department of Natural Resources Waterway Construction Permits.

3. A temporary access waterway crossing is to provide access for construction equipment for a period of less than one year. Temporary access crossings shall not be utilized to maintain traffic for the general public.

4. This section is intended only to establish minimum standards and specifications for temporary access waterway crossings applicable in non-tidal waterways.

5. The three types of standard temporary crossings as detailed in the "1983 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL" are bridges, culverts, and fords. The following criteria for erosion and sediment control shall be considered when selecting a specific standard crossing method:

   a. Site aesthetics - Select a standard method that will least disrupt the existing terrain of the stream reach. Consider the effort that will be required to restore the area after the temporary crossing is removed.

b. Site location - Locate the temporary crossing where there will be the least disturbance to the soils of the existing waterway banks. When possible locate the crossing at a point receiving minimal surface runoff.

c. Physical site constraints - The physical constraints of a site may preclude the selection of one or more of the standard methods.

d. Time of year - The time of year may preclude the selection of one or more of the standard methods due to fish spawning or migration restrictions.

e. Vehicular loads and traffic patterns - Vehicular loads, traffic patterns, and frequency of crossings should be considered in choosing a specific method.

f. Maintenance of crossing - The standard methods will require various amounts of maintenance. The bridge method should require the least maintenance whereas the ford method will probably require more intensive maintenance.

g. Removal of the structure - Ease of removal and subsequent damage to the waterway should be primary factors in considering the choice of a standard method.

6. The following general requirements shall apply to all temporary access waterway crossings constructed by the Contractor.

a. In-stream Excavation - In-stream excavation shall be limited to only that necessary to allow installation of the crossing.

b. Elimination of Fish Migration Barriers - The temporary crossing shall minimize the potential for creating barriers to aquatic migration. Construction of any specific crossing method shall not cause a significant water level difference between the upstream and downstream water surface elevations. Fish spawning or migration within the waterway for Trout Waters is from October 1 to April 30 and from March 15 to June 15 for other streams.

c. Crossing Alignment - The temporary crossing shall be at right angles to the stream. Where approach conditions dictate, the crossing may vary 15° from a line drawn perpendicular to the centerline of the stream at the intended crossing location.

d. Road Approaches - The centerline of both roadway approaches shall coincide with the crossing alignment centerline for a minimum distance of 50 feet from each bank of the waterway being crossed. If physical or right-of-way restraints preclude the 50 feet minimum, a shorter distance may be provided. All fill materials associated with the roadway approach shall be limited to a maximum height of 2 feet above the existing flood plain elevation.

e. Surface Water Diverting Structure - To prevent roadway surface runoff from directly entering the waterway, a water diverting structure such as a swale shall be constructed (across the roadway on both roadway approaches) 50 feet (maximum) on either side of the waterway crossing. The 50 feet is measured from the top of the waterway bank. Design criteria for this diverting structure shall be in accordance with the "Standard and Specifications" for the individual design standard of choice. If the roadway approach is constructed with a reverse grade away from the waterway, a separate diverting structure is not required.

f. Road Width - All crossings shall have one traffic lane. The minimum width shall be 12 feet with a maximum width of 20 feet.

g. Time of Operation - All temporary crossings shall be removed within 14 calendar days after the structure is no longer needed. Unless prior written approval is obtained from the Water Resources Administration, all structures shall be removed within one year from the date of the installation.

h. Aggregate - There shall be no earth or soil materials used for construction within the waterway channel. Stone hereinbefore specified shall be the minimum acceptable stone aggregate size for temporary crossings. Larger aggregates will be allowed.

i. Filter Cloth - Filter cloth hereinbefore specified shall be used as required.

7. Temporary Access Bridge - A temporary access bridge is a structure constructed by the Contractor of wood, metal, or other materials, which provides access across a stream or waterway.

a. Restriction - Construction, use, or removal of a temporary access bridge will not normally have any time of year restrictions.

b. Bridge Placement - Any temporary bridge structure shall be constructed at or above bank elevation.

c. Abutments - Abutments shall be placed parallel to and on stable stream or waterway banks.

d. Bridge Span - Bridges shall be constructed to span the entire channel. If the channel width exceeds 8 feet (as measured from top-of-bank to top-of-bank) then a footing, pier or bridge support may be constructed within the waterway. One additional footing, pier or bridge support will be permitted for each additional 8-foot width of the channel. However, no footing, pier or bridge support will be permitted within the channel for waterways less than 8 feet wide.

e. Stringers - Stringers may be logs, sawn timber, pre-stressed concrete beams, metal beams, or other approved materials.

f. Deck Material - Decking materials shall be of sufficient strength to support the anticipated load. All decking members shall be placed perpendicular to the stringers, butted tightly, and securely fastened to the stringers. Decking materials must be butted tightly to prevent any soil material from falling into the waterway.

g. Run Planks (optional) - Run planking, if used, shall be securely fastened to the length of the span. One run plank shall be provided for each track of the equipment wheels. Although optional, run planks may be necessary to properly distribute loads.

h. Curbs or Fenders - Curbs or fenders are optional and may be installed along the outer sides of the deck.

i. Bridge Anchors - Bridges shall be securely anchored by the Contractor at only one end using steel cable or chain. Anchoring at only one end will prevent channel obstruction in the event that floodwaters float the bridge. Acceptable anchors are large trees, large boulders, or driven steel anchors. Anchoring shall be sufficient to prevent the bridge from floating downstream.

j. Stabilization - All areas disturbed during installation shall be stabilized within 14 calendar days of that disturbance in accordance with the Standard for "Critical Areas Stabilization with Permanent Seeding".

k. Inspection - Periodic inspection shall be performed by the Contractor to ensure that the bridge, streambed, and streambanks are maintained and not damaged.

l. Maintenance - Maintenance shall be performed by the Contractor, as needed, to ensure that the structure complies with the Standards and Specifications. This shall include removal and disposal of any trapped sediment or debris. Sediment shall be disposed of outside of the flood plain and stabilized.

m. Removal - When the temporary bridge is no longer needed, the Contractor shall remove all structures including abutments and other bridging materials within 14 calendar days. In all cases, the bridge materials shall be removed within one year of installation.

n. Final Cleanup - Final cleanup shall consist of removal of the temporary bridge from the waterway, permanent stabilization and protection of stream or waterway banks from erosion, and removal from the flood plain of all construction materials. All removed materials shall be temporarily stored, if required at the Project site outside the waterway flood plain.

o. Method - Removal of the bridge and clean up of the area shall be accomplished without construction equipment working in the waterway channel.

p. Final Stabilization - All areas disturbed during removal shall be stabilized within 14 calendar days of that disturbance in accordance with the Standards for "Critical Area Stabilization with Permanent Seeding".

8. Temporary Access Culvert - A temporary access culvert is a structure constructed by the Contractor of a section(s) of circular pipe, pipe arches, or oval pipes of reinforced concrete, corrugated metal, or structural plate, which is used to convey flowing water through the crossing.

a. Restrictions - No construction or removal of a temporary access culvert will be permitted between October 1 through April 30 for all Class III and Class IV trout waters or between March 15 through June 15 for non-trout waterways.

b. Culvert Strength - All culverts shall be strong enough to support their cross sectional area under maximum expected loads.

c. Culvert Size - The size of the culvert pipe shall be the largest pipe diameter that will fit into the existing channel without major excavation of the waterway channel or without major approach fills. If a channel width exceeds 3 feet, additional pipes may be used until the cross sectional area of the pipes is greater than 60 percent of the cross sectional area of the existing channel. The minimum size culvert shall be 12-inch diameter pipe.

d. Culvert Length - The culvert(s) shall extend a minimum of one foot beyond the upstream and downstream toe of the aggregate placed around the culvert. In no case shall the culvert exceed 40 feet in length.

e. Filter Cloth - Filter cloth shall be placed on the streambed and stream banks prior to placement of the pipe culvert(s) and aggregate. The filter cloth shall cover the streambed and extend a minimum six inches and a maximum one-foot beyond the end of the culvert and bedding material.

f. Culvert Placement - The invert elevation of the culvert shall be installed on the natural streambed grade.

g. Culvert Protection - The culvert(s) shall be covered with a minimum of one foot of aggregate. If multiple culverts are used, they shall be separated by at least 12 inches of compacted aggregate fill.

h. Stabilization - All areas disturbed during culvert installation shall be stabilized within 14 calendar days of the disturbance in accordance with the Standard for "Critical Area Stabilization with Permanent Seeding".

i. Inspection - Periodic inspection shall be performed by the Contractor to ensure that the culverts, streambed, and streambanks are not damaged, and that sediment is not entering the stream or blocking fish passage or migration.

j. Maintenance - Maintenance shall be performed by the Contractor, as needed, in a timely manner to ensure that structures are in compliance with the Specifications. This shall include removal and disposal of any trapped sediment or debris. Sediment shall be disposed of and stabilized outside the waterway flood plain.

k. Removal - When the crossing has served its purpose, the Contractor shall remove all structures including culverts, bedding and filter cloth materials within 14 calendar days. In all cases, the culvert materials shall be removed within one year of installation. No structure shall be removed during fish spawning season (March 15 through June 15).

l. Final Cleanup - Final cleanup shall consist of removal of the temporary structure from the waterway, removal from the flood plain of all construction materials, permanent stabilization and restoration of original stream channel cross section, and permanent stabilization and protection of the stream banks from erosion. Removed material shall be temporarily stored, if required at the Project Site, outside of the waterway flood plain.

m. Method - Removal of the structure and clean up of the area shall be accomplished without construction equipment working in the waterway channel.

n. Final Stabilization - All areas disturbed during culvert removal shall be stabilized within 14 calendar days of the disturbance in accordance with the Standard for "Critical Area Stabilization with Permanent Seeding".

9. Temporary Ford - A temporary access ford is a shallow structure placed by the Contractor in the bottom of a waterway over which the water flows while still allowing traffic to cross the waterway.

a. Restrictions - Use or removal of a temporary access will not be permitted between October 1 and April 30 for all Class III and Class IV trout waters. For other streams, use or removal of a temporary ford will be prohibited from March 15 through June 15 of each year.

b. The approaches to the structure shall consist of stone pads constructed to comply with the aggregate requirements of this Section.

Where stream banks require excavation, the entire ford approach shall be covered with filter cloth and protected with aggregate to a depth of 4 inches.

c. Fords are prohibited when the stream banks are 4 feet or more in height above the invert of the stream.

d. The approach roads at the cut banks shall be no steeper than 5:1. Spoil material from the banks shall be stored out of the flood plain and stabilized.

e. One layer of filter cloth shall be placed on the streambed, stream banks and road approaches prior to placing the bedding material on the stream channel or approaches. The filter cloth shall extend a minimum of 6 inches and a maximum one-foot beyond bedding material.

f. The bedding material shall be a coarse aggregate or gabion mattress filled with coarse aggregate.

g. Aggregate used in ford construction shall meet the minimum requirements of this Section.

h. All fords shall be constructed to minimize the blockage of stream flow and shall allow free flow over the ford. The placing of any material in the waterway bed will cause some upstream ponding. The depth of this ponding will be equivalent to the depth of the material placed within the stream and therefore should be kept to a minimum height. However, in no case will the bedding material be placed deeper than 12 inches or one-half (1/2) the height of the existing banks, whichever is smaller.

i. Stabilization - All areas disturbed during ford installation shall be stabilized within 14 calendar days of that disturbance, in accordance with the standards for "Critical Area Stabilization with Permanent Seeding".

j. Removal - When the temporary structure has served its purpose, the Contractor will not be required to remove the excess material used for this structure. The Contractor shall exercise care so that aggregate left does not create an impoundment or restrict fish passage.

k. Final Cleanup - Final cleanup shall consist of removal of excess temporary ford materials from the waterway. All materials shall be temporarily stored, if required at the Project Site, outside the waterway flood plain.

l. Method - Cleanup shall be accomplished without construction equipment working in the stream channel.

m. Approach Disposition - The approach slopes of the cut banks shall not be backfilled.

n. Final Stabilization - All areas disturbed during ford removal shall be stabilized within 14 calendar days of that disturbance, in accordance with the standards for "Critical Area Stabilization with Permanent Seeding".

10. Any temporary access crossing shall conform to the technical requirements of this Specification as well as any specific requirements imposed by the Water Resources Administration's Watershed Permits Division, Annapolis, Maryland.

S. Inlet Protection

1. Inlet protection shall be installed by the Contractor where indicated on the Plans and at all existing inlets subject to runoff from areas disturbed by the Contractor, in accordance with Standard Drawing EC-IPD1, "Storm Drain Inlet Protection".

2. Filter cloth shall be securely fastened across the top of the inlet box in such a manner that it will intercept all stormwater flows entering the inlet. The cloth shall be kept clean of accumulated debris. Any cloth that becomes torn, clogged, or otherwise damaged shall be replaced.

3. Swale, ditch line, or yard inlet protection shall be constructed as follows:

    a. Excavate completely around inlet to a depth of 18 inches below notch elevation.

    b. Drive 2-inch x 4-inch post 1 foot into ground at each corner of the inlet. Place nail strips between posts on ends of inlet. Assemble top portion of 2-inch x 4-inch frame using overlap point. Top of frame (weir) must be 6 inches below edge of earth dike or swale to inlet.

    c. Stretch wire mesh tightly around frame and fasten securely without gaps.

    d. Stretch filter cloth tightly over wire mesh, with the cloth extending from top of frame to 18 inches below inlet notch elevation. Fasten securely to frame. Ends must meet at post, be overlapped and folded, then fastened down.

    e. Backfill around inlet in compacted 6-inch layers until layer of earth is even with notch elevation on ends and top elevation on side.

    f. If the inlet is not in a low point, construct a compacted earth dike in the ditchline below it. The top of this dike is to be at least 6 inches higher than the top of frame (weir).

4. Curb inlet Protection shall be constructed as follows:

    a. Attach a continuous piece of wire mesh (30 inches min. width by throat length plus 4 feet) to the 2-inch x 4-inch weir (measuring throat length plus 2 feet).

    b. Place a piece of filter cloth of the same dimensions as the wire mesh over the wire mesh and securely attached to the 2-inch x 4-inch weir.

    c. Securely nail the 2-inch x 4-inch weir to 9-inch long vertical spacers to be located between the weir and inlet face (max. 6 feet apart).

    d. Place the assembly against the inlet throat and nail (minimum 2-foot lengths of 2-inch x 4-inch) to the top of the weir at spacer locations. These 2-inch

x 4-inch anchors shall extend across the inlet top and be held in place by sandbags or other approved weights.

e. The assembly shall be placed so that the end spacers are a minimum of 1 foot beyond both ends of the throat opening.

f. Form the wire mesh and filter cloth to the concrete gutter and against the face of curb on both sides of the inlet. Place clean AASHTO M43 No. 1 stone over the wire mesh and filter fabric in such a manner as to prevent water from entering the inlet under or around the filter cloth.

g. Assure that storm flow does not bypass inlet by installing temporary earth or asphalt dikes directing flow into inlet.

5. Inlet protection shall be inspected and maintained, if required, by the Contractor after each storm event.

6. Inlet protection shall be removed from the Project Site by the Contractor after the contributing area is stabilized.

T. Temporary Storm Drain Diversions

Temporary storm drain diversions shall be constructed by the Contractor where indicated and in accordance with the details shown on the Plans.

U. Temporary Grading

1. The Contractor shall temporarily grade the site in such a manner that runoff from the disturbed or unstabilized work areas will flow to protected inlets, sediment traps, or silt fences.

2. The ground at sediment traps shall be restored to original grades after all other earthwork is completed, the area stabilized, and the sediment control devices are removed.

V. Ground Stabilization

1. General

Following initial soil disturbance or redisturbance, the Contractor shall complete permanent or temporary soil stabilization within:

a. Seven calendar days as to the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes greater than 3 horizontal to 1 vertical (3:1) and

b. Fourteen calendar days as to all other disturbed or graded areas on the project site.

These requirements do not apply to those areas, which are shown on the Plan

and are currently being used for material storage, or for those areas where construction activities are currently being performed.

2. Temporary Stabilization

a. The embankments and cuts around sediment traps; earth dikes; all stockpiles of topsoil or earth; and all cleared or graded areas shall be temporarily stabilized by the Contractor with seed and/or mulch.

b. Temporary seeding shall be applied to any disturbed area scheduled to be left or remaining inactive more than 15 days as follows:

1) Loosen top 2 inches of seedbed.

2) Apply lime at the rate of 50 pounds per 1000 square feet and fertilizer at the rate of 15 pounds per 1000 square feet.

3) Moisten seedbed during periods of high temperature and when directed by the Engineer.

4) Apply appropriate seasonal seed mixture uniformly at the rate of 0.92 pounds per 1000 square feet with mechanical power drawn seeders, mechanical cyclone hand seeders, or hydroseeding equipment (Slurry for hydroseeder may contain seed and fertilizer only).

5) Disc seed 1 inch into soil in floodplain areas. Rake, roll, or drag seedbed in all others areas.

6) Apply mulch in accordance with Section 02820.03.

7) Anchor mulch in accordance with Section 02820.03.

8) The Contractor shall maintain seeded areas including watering if soil moisture becomes deficient. Repair as periodic inspection by the Contractor dictates including replacement and/or reseeding.

c. Temporary mulching only

1) Apply mulch materials uniformly by hand or mechanically at the following rates:

Straw mulch: 70 to 90 pounds per 1,000 square feet

Mulch matting: full coverage with minimum 6-inch overlap between blankets

Wood chips: 275 pounds per 1,000 square feet

Crush rock, stones or gravel: 900 to 4500 pounds per 1000 square feet

with coarsest material applied at highest rate

2) Anchor mulch immediately after placement by one of the following methods:

a) Mulch Anchoring Tool: For use on slopes flatter than 3:1 only. Use mechanical equipment operated on the surface to punch and anchor the mulch into the surface a minimum of 2 inches at each punch location. Anchorage shall be provided at a minimum of 1 location per square feet.

b) Mulch Tracking: Use tracked type construction equipment to cut the mulch into the soil with cleated type tracks to a depth of 1 1/2 inches. Tracking shall be done uniformly across the entire surface.

c) Mulch Netting: Staple lightweight biodegradable paper, plastic or cotton netting over mulch using manufacturer's recommendation for type and spacing of staples.

d) Liquid Mulch Binders: Apply liquid mulch binders uniformly to entire mulched area with heavier application rate applied along edges and where wind tends to catch the mulch, in valleys and at crests of banks. Caution shall be used to prevent damage to adjacent structures and undisturbed areas. The type of binder and the application rates may be as follows:

(1) Cutback asphalt - Apply RC-70, RC-250, RC-800, MC-250 or MC-800 cutback asphalt at minimum rate of 5 gallons per 1000 square feet on flat areas and slopes less than 8 feet in height. On slopes 8 feet or greater in height apply at minimum rate of 8 gallons per 1000 square feet.

(2) Emulsified asphalt - Apply SS-1, CSS-1, CMS-2, MS-2, RS-1, RS-2, CDRS-1 or CRS-2 emulsified asphalt at minimum rate of 5 gallons per 1000 square feet on flat areas and slopes less than 8 feet in height. On slopes 8 feet or greater in height apply at minimum rate of 8 gallons per 1000 square feet.

(3) Synthetic binders - Apply Acrylic BCR (agri-tac), DCA-70, Petroset or Terra Tac or equal at rates recommended by the manufacturer.

e) Wood Cellulose Fiber Binder - Apply fiber binder at a net dry weight of 750 lbs/acre using approved mechanical slurry application equipment. The slurry shall consist of a water

and fiber mixture of not more than 50 pounds wood cellulose fiber per 1000 gallons of clean water.

f) Peg and Twine - The peg and twine anchorage system shall consist of 8 to 10 inch long wooden pegs driven either before or after mulch placement to within 2 to 3 inches of the soil surface at a maximum spacing of 4 feet on centers with the mulch secured to the soil surface by stretching twine between and secured to the pegs in a criss-cross within a square pattern.

3) The Contractor shall maintain as required until final grading and permanent surface stabilization is completed. Repair as periodic inspection by the Contractor requires.

3. Permanent Stabilization

a. The Contractor shall apply permanent stabilization measures to the finished grading surface of all areas disturbed by construction as soon as possible subject to the seasonal limitations for seed and shrubbery planting.

b. All areas disturbed by construction not indicated to be paved or occupied by structures shall be permanently stabilized with vegetative cover in accordance with Section 02820, "Turf Establishment".

W. Class I Small Riprap

The Contractor shall construct Class I small riprap in accordance with Section 02291.03.

X. Crushed Stone for Sediment Control

The Contractor shall construct items of crushed stone for sediment control in accordance with Section 01500.03.

Y. Removal of Sediment Control Devices

The Contractor shall restore to the original grade, or construct to the finished grades as shown on the Plans, all areas on which temporary facilities were constructed and all areas disturbed by the Contractor.

01500.04 METHOD OF MEASUREMENT

A. General

No measurement will be made for the installation, maintenance, and removal of the temporary environmental protection measures and devices shown on the Plans and required by this Section except as provided hereafter. No measurement will be made for the installation, maintenance, and removal of temporary environmental protection measures and devices

required for protection of the Contractor's storage, stockpile and/or staging areas.

B. Straw Bale Dikes and Silt Fences

Measurement for furnishing materials for and installing straw bale dikes and/or silt fences, including maintenance and removal, will be made of the actual length in feet installed in addition to and/or deleted from that shown on the Plans by written order of the Engineer. No measurement will be made of straw bale dikes required to be re-established after three months of use.

C. Crushed Stone and Riprap

Measurement for furnishing materials for and installing crushed stone and/or Class I Small Riprap will be made of the actual weight in tons installed in addition to and/or deleted from that shown on the Plans by written order of the Engineer.

D. Calcium Chloride

Measurement for calcium chloride for dust control will be made under the Fixed Price Contingent Item for calcium chloride in accordance with Section 02951.

01500.05 BASIS OF PAYMENT

A. General

Where no bid item for environmental protection is contained in the Proposal no separate payment will be made for the installation, maintenance, and removal of temporary environmental protection devices including protection of on and off-site storage, stockpile and/or staging areas, except as provided hereafter. All work associated with environmental protection is incidental to the item of work contained in the Proposal. No measurement will be made for the installation, maintenance and removal of temporary environmental protection measures and devices required for protection of the Contractor's storage, stockpile and/or staging areas.

B. Lump Sum

Where a bid item for environmental protection is contained in the Proposal, payment will be made for one-half of the bid price upon the completion of the installation of all erosion, sediment, and environmental protection measures and devices required by the soil and erosion control plan as shown on the Plans and the provisions of this Section except as provided hereafter. Final payment for the balance of the price bid (one-half) will be made upon the removal of all temporary devices and the satisfactory permanent restabilization and restoration of all areas disturbed by construction activities.

C. Straw Bale Dikes

1. Payment or credit assessment for furnishing and installing straw bale dikes complete, including maintenance and removal, will be made at the price bid per

linear foot of dike satisfactorily installed. The bid price shall include the furnishing of all labor, tools, equipment and materials necessary to complete and maintain the work as directed in accordance with the Contract Documents.

2. Payment or credit assessment will be made only for materials, which are utilized in addition to or deleted from that shown on the Plans at the direction of the Engineer. No payment will be made for quantities in excess of those ordered, added, or deleted by the Engineer. No payment will be made for straw bale dikes required to be re-established as a result of damage, loss of effectiveness and/or after three months of use.

D. Silt Fence

1. Payment or credit assessment for furnishing and installing silt fence complete, including maintenance and removal, will be made at the bid price per linear foot of silt fence satisfactorily installed. The price bid shall include the furnishing of all labor, tools, equipment and materials necessary to complete, maintain, remove and restore the work area as directed in accordance with the Contract Documents.

2. Payment or credit assessment will be made only for materials, which are utilized in addition to or deleted from that shown on the Plans at the direction of the Engineer. No payment will be made for quantities in excess of those added or deleted by the Engineer. No payment will be made for silt fence required to be re-established as a result of damage or loss of effectiveness.

E. Crushed Stone for Erosion Control

1. Payment or credit assessment for furnishing and placing crushed stone (Size No. 1) for erosion control complete will be made at the price bid per ton. The price bid shall include the furnishing of all labor, tools, equipment and materials necessary to complete the work area as directed in accordance with the Contract Documents.

2. Payment or credit assessment will only be made for materials, which are utilized in addition to or deleted from that shown on the Plans at the direction of the Engineer.

3. A delivery ticket system shall be provided for accurately determining the amount of material delivered to the work. The tickets shall be serially numbered and show date of delivery, gross weight, tare weight, and net weight of the material and the number of the truck. One copy of the ticket shall be given to the Engineer.

F. Class I Small Riprap for Erosion Control

1. Payment or credit assessment for furnishing and placing Class I Small Riprap for erosion control complete will be made at the bid price per ton. The price bid shall include the furnishing of all labor, tools, equipment and materials necessary to complete the work as directed in accordance with the Contract Documents.

2. Payment or credit assessment will only be made for materials, which are utilized in addition to or deleted from that shown on the Plans at the direction of the Engineer.

3. A delivery ticket system shall be provided for accurately determining the amount of material delivered to the work. The tickets shall be serially numbered and show date of delivery, gross weight, tare weight, and net weight of the material and the number of the truck. One copy of the ticket shall be given to the Engineer.

G. Payment for Calcium Chloride

Payment for calcium chloride for dust control will be made under the Fixed Price Contingent Item for calcium chloride in accordance with Section 02951.

END OF SECTION