



US Army Corps
of Engineers
Philadelphia District

PEARCE CREEK CONFINED DISPOSAL FACILITY MODIFICATION

**CECIL COUNTY
MARYLAND**

**EROSION AND SEDIMENT CONTROL
PLAN NARRATIVE**

**INITIAL SUBMISSION
JUNE 2014**

**PEARCE CREEK CONFINED DISPOSAL FACILITY MODIFICATION
CECIL COUNTY, MARYLAND
DIKE RAISING, INLAND WATERWAY DELAWARE
EROSION AND SEDIMENT CONTROL PLAN NARRATIVE
INITIAL SUBMISSION**

JUNE 2014

PREPARED BY:

**UNITED STATES ARMY CORPS OF ENGINEERS
PHILADELPHIA DISTRICT
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PEARCE CREEK CONFINED DISPOSAL FACILITY MODIFICATION EROSION AND SEDIMENT CONTROL PLAN NARRATIVE

PURPOSE

An NPDES permit for construction activities will be required for this project. Environmental Protection Regulation 833-R-92-001 requires permitting for projects that disturb 1 acre or more. This project will have a land disturbance of 260 acres and will need the NPDES permit.

The Erosion and Sediment Control Plan has been designed in accordance with the State of Maryland Department of the Environment (MDE) regulations as published in the “2011 Standards and Specifications for Soil Erosion and Sediment Control”.

PROJECT LOCATION

The Pearce Creek CDF, operated by the U.S. Army Corps of Engineers, Philadelphia District, is located in Cecil County, Maryland along the eastern shore of the Chesapeake Bay, south of the Chesapeake and Delaware (C&D) Canal. The facility was constructed at the confluence of Pearce Creek and the Elk River. The Pearce Creek CDF is one of several CDFs used to contain materials resulting from periodic dredging to maintain navigable depths in the C&D canal, Elk River and Chesapeake Bay. Figures 1 and 2 show the location of the Pearce Creek CDF, C&D canal, Elk River, and the Chesapeake Bay.

PROJECT DESCRIPTION

In response to community concerns, several studies were conducted to determine the extent of the connection between groundwater quality within the CDF and in the surrounding communities. Based on these studies, it was determined that a liner system would be installed within the CDF to isolate newly placed dredge material from the underlying aquifer. In conjunction with this liner placement, other aspects of the CDF will be improved prior to resuming dredge material placement operations at the Pearce Creek CDF. These improvements include:

- Site clearing and preparation of dike subgrade
- Excavation and drying of on-site material for use in the construction activities
- Re-grading of the site to ensure positive drainage
- Installation of the liner system
- Re-grading/raising the existing containment dikes to an elevation of 50 ft NAVD88
- Relocation of the existing sluice and associated piping

The Pearce Creek CDF is located adjacent to the Elk River, approximately 11.5 miles south west of Chesapeake City, MD. The existing containment dike varies in elevation from 43

to 50 feet NAVD88. The interior topography is currently sloped to drain to the southeast towards the existing sluice (See Figure 3). Drainage ditches along the outer perimeter of the CDF are sloped to drain stormwater runoff from the containment dike towards the Elk River or Pearce Creek Lake.

As part of the improvements being implemented at the Pearce Creek CDF, the location of the sluice and associated piping is being relocated. This modification will relocate the sluice from the southeast corner of the CDF to the north, adjacent to the Elk River (see Figure 4). The liner system and interior topographic contours will be graded to allow positive drainage to the new sluice location. Water resulting from dredge disposal operations and stormwater falling within the 260 acre containment will flow out of the sluice, through 4 x 36 inch diameter outflow pipes, and discharge to the Elk River over an improved riprap outlet.

The sluice drainage pipes will be constructed so that the inverts of the pipes are at mean high water (MHW) at the outlet to the Elk River. Stormwater runoff from the exterior face of the containment dike will continue to flow in the existing drainage ditches to the Elk River or Pearce Creek Lake.

FLOOD ZONE

The project site is located outside of the 100-year as indicated on Figure 5. According to the Flood Insurance Study for Cecil County, Maryland and Incorporated Areas dated July 8, 2013, the 100-year still water elevations for the surrounding areas are as follows:

<u>Location</u>	<u>100-year Elevation (ft. NAVD 1988)</u>
Elk Creek	10.4
Pearce Creek	10.4
Pond Creek	10.2

INTERIOR DRAINAGE

The separate Stormwater Management Plan Narrative describes in detail the drainage patterns within and exterior to the project site. A brief summary of interior and exterior drainage is provided as part of this narrative.

Since the proposed liner will effectively eliminate infiltration and the perimeter dikes will contain storm water falling within the CDF, it is assumed that all precipitation falling within the perimeter dikes will be contained and discharge will only occur through the sluice. During normal dredging operations, the water level in the CDF will vary. The maximum operational interior water level will be 48 ft NAVD88. This will leave a minimum of 2 feet of freeboard to the design dike crest of 50 ft NAVD88. A 100 year- 24 hour storm event would result in an additional 7.3 inches of rain within the CDF. Although this would reduce the available freeboard by 0.61 feet, the dike would not overtop under these conditions.

EXTERIOR DRAINAGE

Stormwater falling outside of the CDF is directed around the CDF through existing drainage ditches. These drainage ditches have gradual slopes and are generally grass lined. As shown in Figure 6, there are 5 drainage basins surrounding the CDF that capture the flow from the CDF perimeter dikes and surrounding areas.

SOILS

The NRCS soil delineations are provided on Figure 7. Soil data was downloaded from the SSURGO database and represents NRCS's soil survey which was completed in Dec. 2013 for Cecil County, Maryland. Additional soil information relating to drainage calculations is presented in the Stormwater Management Plan

SEQUENCE ON CONSTRUCTION ACTIVITIES

The following notes are taken from the E&S Plan Sheet CE-502.

1. Contractor shall obtain "notice to proceed".
2. At least 7 days before starting any earth disturbance activities, the contractor shall invite all contractors involved in those activities, all appropriate Municipal and State officials, the contracting officer, to an on-site meeting.
3. Contractor shall notify the MDE inspector 48 hours prior to any land disturbing activity.
4. Mobilize staging and provide construction entrance(s).
5. Clear and grub in those areas necessary for installation of perimeter controls. Establish perimeter controls using sediment barriers as shown in plans.
6. Clear and grub within the confined disposal area as needed for construction operations.
7. Install a temporary dike within the CDF as shown in the plans around the existing sluice prior to lowering the perimeter dike for existing pipe removal.
8. The existing sluice structure and outlet pipes shall be removed and the dike shall be regraded to +47 ft. NAVD88.
9. Achieve proposed grades within the confined disposal area as shown and install liner at elevation +47 ft. NAVD88 only along the perimeter dikes.
10. Raise dikes to final elevation of +50 ft. NAVD88.
11. During grading work, sediment shall be retained from runoff within the confined disposal area by utilizing approved dewatering BMPs such as filter bags and sump pits. Clear water shall be discharged by utilizing pumps and slope pipes up and over the external dike. The pipes shall discharge to stabilized areas.
12. Approved BMPs such as temporary dikes and swales shall be used as necessary to convey water from the work area to the dewatering BMPs.
13. Install the new sluice inlet structure.
14. Install a temporary dike within the CDF around the new sluice opening as shown on the plans prior to lowering the perimeter dike for pipe installation.

15. Install a sandbag/stone diversion BMP to keep work area dry prior to construction of the rock apron for the sluice box outlet pipes within the Elk River.
16. The new sluice outlet structure and piping through and outside the perimeter dike shall be completed. Upon completion of the piping within the footprint of the perimeter dike, raise the dike.
17. Complete project elements including site grading and drainage, and new sluice box.
18. When final grades are achieved, stabilize the side slopes and top of the exterior dike with permanent stabilization.
19. When stabilization is achieved, and with the permission of MDE and the contracting officer, remove all temporary sediment and erosion controls. Repair any erosion damage that may have occurred during construction. Repair and restore staging areas to pre-project conditions.

SUMMARY OF EROSION AND SEDIMENT CONTROL BMPs

All sediment and erosion control features are to be inspected on a weekly basis and kept in an effective operating condition at all times. Maintenance includes inspections of all erosion and sediment controls after each runoff event. All preventative and remedial maintenance work, including clean out, repair, replacement, regrading, reseeding, remulching, and renetting shall be performed as soon as possible. BMPs used before, during and after the earth disturbance activities include the following:

Grading and Stabilization BMPs

1. Stabilized Construction Entrance
2. Wash Rack Option for SCE
3. Vegetative Stabilization
 - a. Seeding and Mulching
 - b. Temporary Stabilization
 - c. Permanent Stabilization
 - d. Soil Stabilization Matting for Channels

Water Conveyance BMPs

1. Earth Dike
2. Temporary Swale

Erosion Control BMPs

1. Pipe Slope Drain
2. Rock Outlet Protection

Filtering

1. Silt Fence
2. Super Silt Fence
3. Clear Water Pipe Through Super Silt Fence

Dewatering BMPs

1. Sump Pits
2. Filter Bags

Miscellaneous BMPS

1. Sandbag/Stone Diversion

Locations and notes for BMPs are shown on the Erosion and Sediment Control Plans Sheet CE-500. Specifications and details for each of the measures are shown on the Erosion and Sediment Control Plan Sheets CE-501 to CE-503 and Figures 8-19 of this narrative.

EROSION SEDIMENT CONTROL NOTES

The following notes are taken from the E&S Plan Sheet CE-501.

The requirement of any of the following individual notes not applicable to the subject project is not binding upon the applicant or the applicant's contractor.

1. The contractor shall notify the Maryland Department of the Environment (MDE) Sediment Control Inspector at 410-901-4020 at least 48 hours prior to commencing any land disturbing activities and, unless waived by the Sediment Control Inspector, shall be required to hold a pre-construction meeting at the project site. The contractor must provide the name of the person on the site who is responsible for inspection and maintenance of erosion and sediment control measures and a copy of their green card to the Sediment Control Inspector.
2. All projects with construction activities disturbing 1 acre or more are required to submit a General Permit (NOI) to MDE to comply with the General Permit for Construction Activity for Stormwater Discharges. The General Permit (NOI) must be approved prior to disturbance activities. To obtain a General Permit (NOI) form, contact the Permits Coordinator at the MDE Compliance Program at 410-537-3510.
3. The limit of disturbance shall be clearly delineated in the field prior to the pre-construction meeting and any grading activities to ensure compliance with the approved plan.
4. The approved Erosion and Sediment Control Plan must be kept at the project site.
5. The MDE reserves the right to modify the Erosion and Sediment Control Plans.
6. The MDE may revoke the approval of the Erosion and Sediment Control Plan if work performed at the project site does not conform to the provisions of the grading permit, to the approved plan or to any written instructions from MDE.
7. The contractor must request that the Sediment Control Inspector approve work completed in accordance with the approved Erosion and Sediment Control Plan, at the following points of project development:
 - a. Upon completion of the installation of perimeter erosion and sediment control measures but before proceeding with any other earth disturbance or grading. Other

- building or grading inspection approvals may not be authorized until this initial approval by MDE is made.
- b. Prior to removal or modification of any sediment control structure(s).
 - c. Upon final stabilization of the site and prior to the removal of any sediment control measures.
8. The contractor shall construct all erosion and sediment control measures per the approved plan and construction sequence and shall have them inspected and approved by the Sediment Control Inspector prior to beginning any other land disturbances.
 9. The contractor shall ensure that all runoff from disturbed areas is directed to the sediment control devices and shall not remove any erosion or sediment control measure without prior permission from the Sediment Control Inspector.
 10. The following minor plan modifications may be approved by the Sediment Control Inspector in the field:
 - a. Sediment control structures (except basins and traps) may be moved to meet the existing contours and field conditions, when moving these structures would have no impact on their function or design criteria.
 - b. Substitution of perimeter control measures may be made provided the measure substituted is equivalent (i.e., silt fence for straw bales) or is an upgrade of the original measure (i.e., silt fence to a perimeter berm with properly sized outlet).
 - c. Addition and extension of perimeter controls (including stone construction entrances) may be made to meet field conditions. Any modifications to the plan which are not listed above require the plan to be submitted to the MDE for review and approval.
 11. The contractor shall protect all points of construction ingress and egress to prevent the deposition of materials onto public roads. All materials deposited onto public roads shall be removed immediately.
 12. On-site temporary stockpile areas must be placed as shown on the approved plan. If the construction schedule is to exceed 3 days, the stockpile areas must be stabilized. Stockpile areas should not exceed fifteen feet in height. If a stockpile is to exceed fifteen feet in height, it must be shown on the plan to be terraced with pipe slope drains installed and approved by MDE. Upon the completion of the use of the stockpile area, existing ground surfaces shall be restored to their original conditions and permanently stabilized.
 13. Various steps in the sequence of construction may require the contractor to remove excess excavated material to an approved location or to import material from an approved location. For purposes of this plan, an approved location shall be one which is operating under approved erosion and sediment control plan and an active grading permit at the time of construction.
 14. The contractor shall inspect daily and maintain continuously in an effective operating condition all erosion and sediment control measures until such time as they are removed with prior permission from the Sediment Control Inspector.

15. Following initial soil disturbance or re-disturbance, permanent or temporary stabilization shall be completed within:
 - a. Three (3) calendar days as to the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes equal to or greater than 3 horizontal to 1 vertical (3:1), and
 - b. Seven (7) days as to all other disturbed or graded areas on the project site.The above 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 on which actual construction activities are currently being performed or to interior areas of a surface mine site where the stabilization material would contaminate the recoverable resource. Maintenance shall be performed as necessary to ensure that the stabilized areas continuously meet the appropriate requirements of the most current Maryland Standards and Specifications for Soil Erosion and Sediment Control.
16. Sediment control practices will be maintained until the entire contributing area to the practice has been permanently stabilized and meets the satisfaction of the Sediment Control Inspector. Sediment controls may only be removed with the authorization of the Sediment Control Inspector.
17. All areas disturbed by the removal of sediment control devices must be immediately stabilized.
18. Surface drainage flows over unstabilized cut and fill slopes shall be controlled by either preventing drainage flows from traversing the slopes or by installing protective devices to convey the water downslope without causing erosion. Dikes shall be installed and maintained at the top of cut or fill slopes until the slope and drainage area to it are fully stabilized, at which time the dikes must be removed and final grading done to promote sheet flow drainage. Erosion control measures must be implemented at points of concentrated flow where erosion is likely to occur.
19. No permanent cut or fill slope with a gradient steeper than 3:1 will be permitted in lawn maintenance areas. A slope gradient of up to 2:1 will be permitted in non-maintenance areas provided that those areas are indicated on the erosion and sediment control plans with a low-maintenance ground cover specified for permanent stabilization. Slope gradient steeper than 2:1 will not be permitted with vegetation stabilization.
20. All flow lines are to be stabilized with sod or seed with erosion control matting to a depth of flow of 1 foot.
21. Sediment traps or basins are not permitted within 20 feet of a foundation which is existing or under construction. No structure may be constructed within 20 feet of an active sediment trap or basin.
22. Temporary sediment traps and sediment basins shall be cleaned out and restored to the original dimensions when sediment has accumulated to one half (1/2) the wet storage depth of the trap or basin.

23. Sediment removed from traps (and basins) shall be placed and stabilized in approved areas, but not within a floodplain, wetland or forest retention area. When pumping sediment laden water, the discharge must be directed to a sediment trapping device prior to release from the site.
24. For approved dewatering strategies for traps and basins, see section F of the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control. Pumping sediment laden water into the waters of the State without filtration is strictly forbidden.
25. Sediment control devices placed in infiltration areas must have bottom elevations at least two (2) feet higher than the finished grade elevation of the infiltration practice. When converting a sediment trap to an infiltration device, all accumulated sediment must be removed and disposed of prior to final grading of infiltration device.
26. The developer is responsible for obtaining all necessary permits prior to any construction activities. Further, the issuance of a grading permit does not relieve the developer of the responsibility to obtain any additional local, state or federal permits.
27. Site Information:
 - a. Total Area of CDF: 260 acres
 - b. Total Area of Project: 267 acres
 - c. Area Disturbed: 267 acres
 - d. Area to Roofed or Paved: 0 acres
 - e. Total Cut: 1,400,000 cubic yards
 - f. Total Fill: 1,400,000 cubic yards
 - g. Off-Site Waste/Borrow Area Location: N/A

STABILIZATION NOTES

The following notes are taken from the E&S Plan Sheets CE-501 & CE-502.

B-4-2 Standards and Specifications for Soil Preparation, Topsoiling and Soil Amendments

1. Soil Preparation
 - a) Temporary stabilization
 - i) Seedbed preparation consists of loosening soil to a depth of 3 to 5 inches by means of suitable agricultural or construction equipment, such as disc harrows or chisel plows or rippers mounted on construction equipment. After the soil is loosened, it must not be rolled or dragged smooth but left in the roughened condition. Slopes 3:1 or flatter are to be tracked with ridges running parallel to the contour of the slope.
 - ii) Apply fertilizer and lime as prescribed on the plans.
 - iii) Incorporate lime and fertilizer into the top 3 to 5 inches of soil by disking or other suitable means.

2. Permanent stabilization

- a) A soil test is required for any earth disturbance of 5 acres or more. The minimum soil conditions required for permanent vegetative establishment are:
 - i) Soil ph between 6.0 and 7.0.
 - ii) Soluble salts less than 500 parts per million (ppm).
 - iii) Soil contains less than 40 percent clay but enough fine grained material (greater than 30 percent silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception: if lovegrass will be planted, then a sandy soil (less than 30 percent silt plus clay) would be acceptable.
 - iv) Soil contains 1.5 percent minimum organic matter by weight.
 - v) Soil contains sufficient pore space to permit adequate root penetration.
- b) Application of amendments or topsoil is required if on-site soils do not meet the above conditions.
- c) Graded areas must be maintained in a true and even grade as specified on the approved plan, then scarified or otherwise loosened to a depth of 3 to 5 inches.
- d) Apply soil amendments as specified on the approved plan or as indicated by the results of a soil test.
- e) Mix soil amendments into the top 3 to 5 inches of soil by disking or other suitable means. Rake lawn areas to smooth the surface, remove large objects like stones and branches, and ready the area for seed application. Loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface where site conditions will not permit normal seedbed preparation. Track slopes 3:1 or flatter with tracked equipment leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. Leave the top 1 to 3 inches of soil loose and friable. Seedbed loosening may be unnecessary on newly disturbed areas.

3. Topsoiling

- a) Topsoil is placed over prepared subsoil prior to establishment of permanent vegetation. The purpose is to provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low ph, materials toxic to plants, and/or unacceptable soil gradation.
- b) Topsoil salvaged from an existing site may be used provided it meets the standards as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the soil survey published by USDA-NRCS.
- c) Topsoiling is limited to areas having 2:1 or flatter slopes where:
 - i) The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth.
 - ii) The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.
 - iii) The original soil to be vegetated contains material toxic to plant growth.
 - iv) The soil is so acidic that treatment with limestone is not feasible.
- d) Areas having slopes steeper than 2:1 require special consideration and design.
- e) Topsoil specifications: soil to be used as topsoil must meet the following criteria:
 - i) Topsoil must be a loam, sandy loam, clay loam, silt loam, sandy clay loam, or loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and

- approved by the appropriate approval authority. Topsoil must not be a mixture of contrasting textured subsoils and must contain less than 5 percent by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1½ inches in diameter.
- ii) Topsoil must be free of noxious plants or plant parts such as bermuda grass, quack grass, johnson grass, nut sedge, poison ivy, thistle, or others as specified.
 - iii) Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.
- f) Topsoil application
- i) Erosion and sediment control practices must be maintained when applying topsoil.
 - ii) Uniformly distribute topsoil in a 5 to 8 inch layer and lightly compact to a minimum thickness of 4 inches. Spreading is to be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations must be corrected in order to prevent the formation of depressions or water pockets.
 - iii) Topsoil must not be placed if the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading and seedbed preparation.
4. Soil amendments (fertilizer and lime specifications)
- a) Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas of 5 acres or more. Soil analysis may be performed by a recognized private or commercial laboratory. Soil samples taken for engineering purposes may also be used for chemical analyses.
 - b) Fertilizers must be uniform in composition, free flowing and suitable for accurate application by appropriate equipment. Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers must all be delivered to the site fully labeled according to the applicable laws and must bear the name, trade name or trademark and warranty of the producer.
 - c) Lime materials must be ground limestone (hydrated or burnt lime may be substituted except when hydroseeding) which contains at least 50 percent total oxides (calcium oxide plus magnesium oxide). Limestone must be ground to such fineness that at least 50 percent will pass through a #100 mesh sieve and 98 to 100 percent will pass through a #20 mesh sieve.
 - d) Lime and fertilizer are to be evenly distributed and incorporated into the top 3 to 5 inches of soil by disking or other suitable means.
 - e) Where the subsoil is either highly acidic or composed of heavy clays, spread ground limestone at the rate of 4 to 8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil.

B-4-3 Standards and Specifications for Seeding and Mulching

- 1. Seeding
 - a) Specifications

- i) All seed must meet the requirements of the Maryland state seed law. All seed must be subject to re-testing by a recognized seed laboratory. All seed used must have been tested within the 6 months immediately preceding the date of sowing such material on any project. Refer to table b.4 regarding the quality of seed. Seed tags must be available upon request to the inspector to verify type of seed and seeding rate.
 - ii) Mulch alone may be applied between the fall and spring seeding dates only if the ground is frozen. The appropriate seeding mixture must be applied when the ground thaws.
 - iii) Inoculants: the inoculant for treating legume seed in the seed mixtures must be a pure culture of nitrogen fixing bacteria prepared specifically for the species. Inoculants must not be used later than the date indicated on the container. Add fresh inoculants as directed on the package. Use four times the recommended rate when hydroseeding. Note: it is very important to keep inoculants as cool as possible until used. Temperatures above 75 to 80 degrees Fahrenheit can weaken bacteria and make the inoculants less effective.
 - iv) Sod or seed must not be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed (14 days min.) To permit dissipation of phyto-toxic materials.
- b) Application
- i) Dry seeding: this includes use of conventional drop or broadcast spreaders.
 - (1) Incorporate seed into the subsoil at the rates prescribed on temporary seeding table b.1, permanent seeding table b.3, or site-specific seeding summaries.
 - (2) Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction. Roll the seeded area with a weighted roller to provide good seed to soil contact.
 - ii) Drill or cultipacker seeding: mechanized seeders that apply and cover seed with soil.
 - (1) Cultipacking seeders are required to bury the seed in such a fashion as to provide at least 1/4 inch of soil covering. Seedbed must be firm after planting.
 - (2) Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction.
 - iii) Hydroseeding: apply seed uniformly with hydroseeder (slurry includes seed and fertilizer).
 - (1) If fertilizer is being applied at the time of seeding, the application rates should not exceed the following: nitrogen, 100 pounds per acre total of soluble nitrogen; p2o5 (phosphorous), 200 pounds per acre; k2o (potassium), 200 pounds per acre.
 - (2) Lime: use only ground agricultural limestone (up to 3 tons per acre may be applied by hydroseeding). Normally, not more than 2 tons are applied by hydroseeding at any one time. Do not use burnt or hydrated lime when hydroseeding.
 - (3) Mix seed and fertilizer on site and seed immediately and without interruption.
 - (4) When hydroseeding do not incorporate seed into the soil.

2. Mulching

- a) Mulch materials (in order of preference)
 - i) Straw consisting of thoroughly threshed wheat, rye, oat, or barley and reasonably bright in color. Straw is to be free of noxious weed seeds as specified in the maryland

seed law and not musty, moldy, caked, decayed, or excessively dusty. Note: use only sterile straw mulch in areas where one species of grass is desired.

- ii) Wood cellulose fiber mulch (WCFM) consisting of specially prepared wood cellulose processed into a uniform fibrous physical state.
 - (1) WCFM is to be dyed green or contain a green dye in the package that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry.
 - (2) WCFM, including dye, must contain no germination or growth inhibiting factors.
 - (3) WCFM materials are to be manufactured and processed in such a manner that the wood cellulose fiber mulch will remain in uniform suspension in water under agitation and will blend with seed, fertilizer and other additives to form a homogeneous slurry. The mulch material must form a blotter-like ground cover, on application, having moisture absorption and percolation properties and must cover and hold grass seed in contact with the soil without inhibiting the growth of the grass seedlings.
 - (4) WCFM material must not contain elements or compounds at concentration levels that will be phyto-toxic.
 - (5) WCFM must conform to the following physical requirements: fiber length of approximately 10 millimeters, diameter approximately 1 millimeter, ph range of 4.0 to 8.5, ash content of 1.6 percent maximum and water holding capacity of 90 percent minimum.

b) Application

- i) Apply mulch to all seeded areas immediately after seeding.
- ii) When straw mulch is used, spread it over all seeded areas at the rate of 2 tons per acre to a uniform loose depth of 1 to 2 inches. Apply mulch to achieve a uniform distribution and depth so that the soil surface is not exposed. When using a mulch anchoring tool, increase the application rate to 2.5 tons per acre.
- iii) Wood cellulose fiber used as mulch must be applied at a net dry weight of 1500 pounds per acre. Mix the wood cellulose fiber with water to attain a mixture with a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.

3. Anchoring

- a) Perform mulch anchoring immediately following application of mulch to minimize loss by wind or water. This may be done by one of the following methods (listed by preference), depending upon the size of the area and erosion hazard:
 - i) A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of 2 inches. This practice is most effective on large areas, but is limited to flatter slopes where equipment can operate safely. If used on sloping land, this practice should follow the contour.
 - ii) Wood cellulose fiber may be used for anchoring straw. Apply the fiber binder at a net dry weight of 750 pounds per acre. Mix the wood cellulose fiber with water at a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.
 - iii) Synthetic binders such as acrylic DLR (agro-tack), dca-70, Petroset, Terra Tax II, Terra Tack AR or other approved equal may be used. Follow application rates as specified by the manufacturer. Application of liquid binders needs to be heavier at the edges where wind catches mulch, such as in valleys and on crests of banks. Use of asphalt binders is strictly prohibited.

- iv) Lightweight plastic netting may be stapled over the mulch according to manufacturer recommendations. Netting is usually available in rolls 4 to 15 feet wide and 300 to 3,000 feet long.

STANDARD NOTES FOR TRENCHING

1. Only enough trench should be excavated which can be backfilled daily.
2. Excavated trench materials should be placed on the high side of the trench.
3. Immediately following pipe installation, the trench shall be backfilled, compacted and stabilized at the end of each working day. No more trench shall be opened than can be completed in the same day.
4. Full trench compaction is required.
5. Mulching to MDE SCD specifications of all disturbed areas and daily on backfill will be required.
6. Any sediment control practices which are disturbed during trenching shall be repaired or replaced at the end of each working day.
7. Any ditches or drainage ways disturbed during construction will be restored to original condition.
8. The following notes are taken from the E&S Plan Sheet CE-502.



Figure 1 – Location Map



Figure 2 – Aerial Photo of Project Area

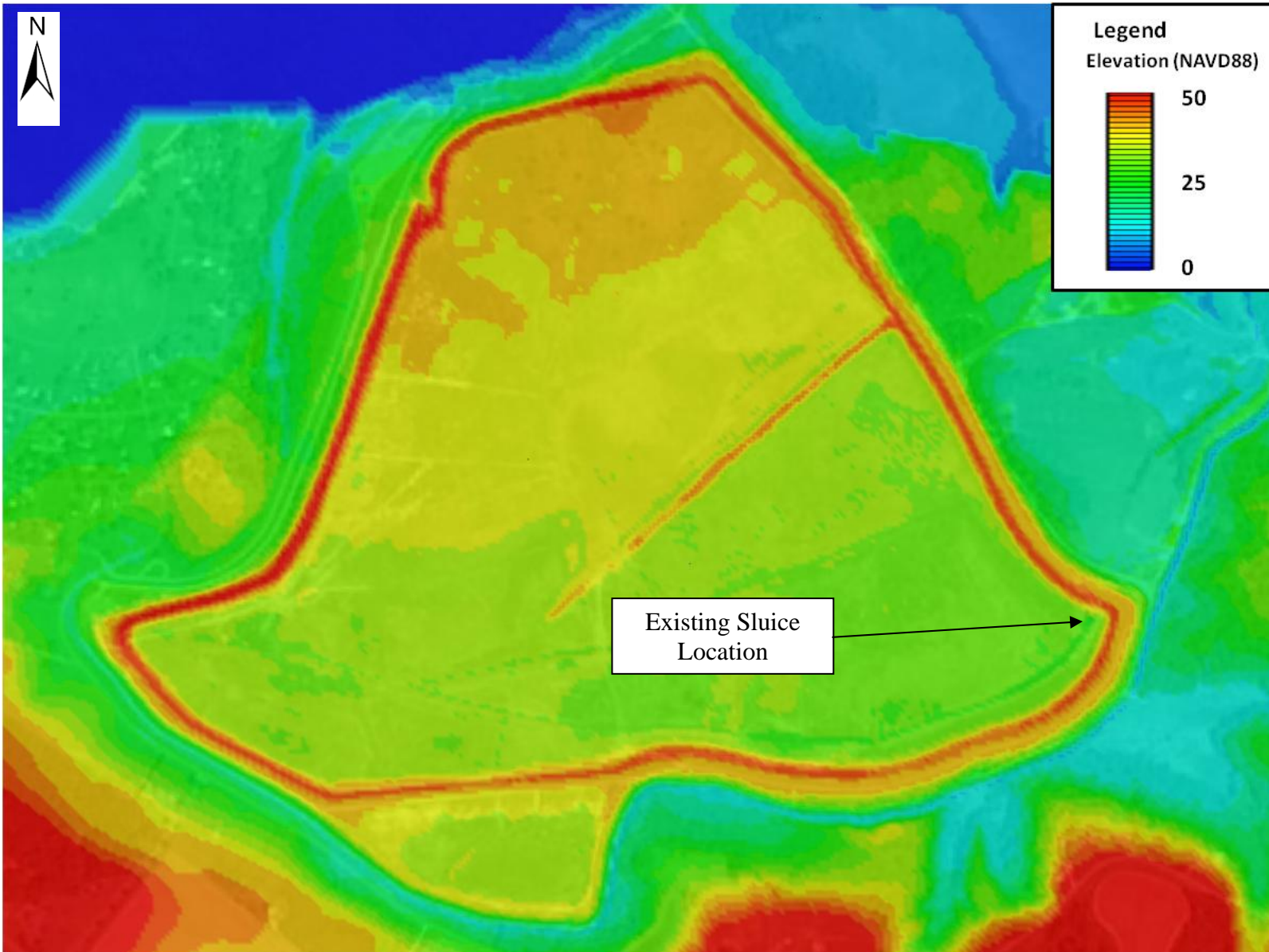


Figure 3 – Pre-Construction Contours

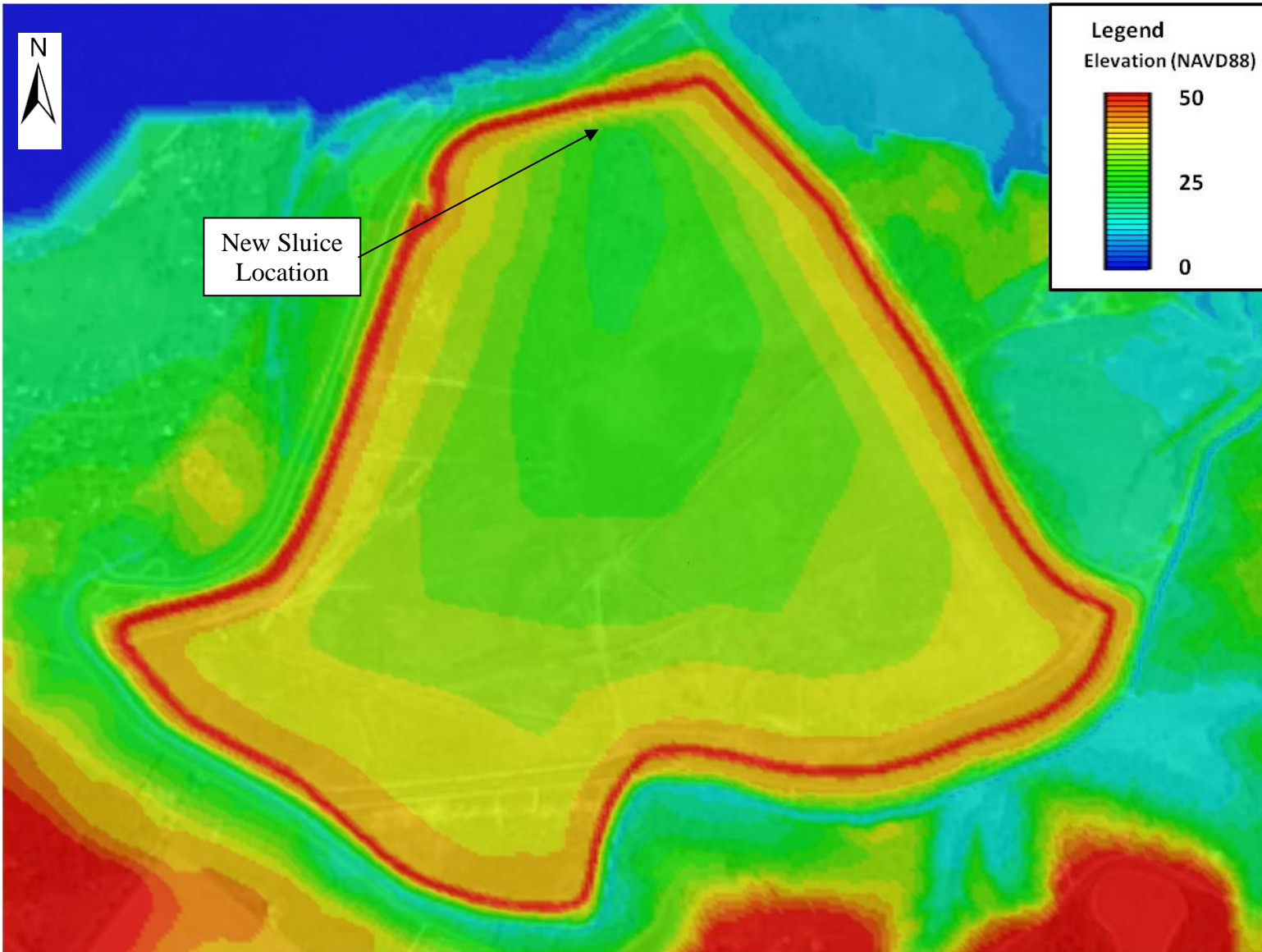
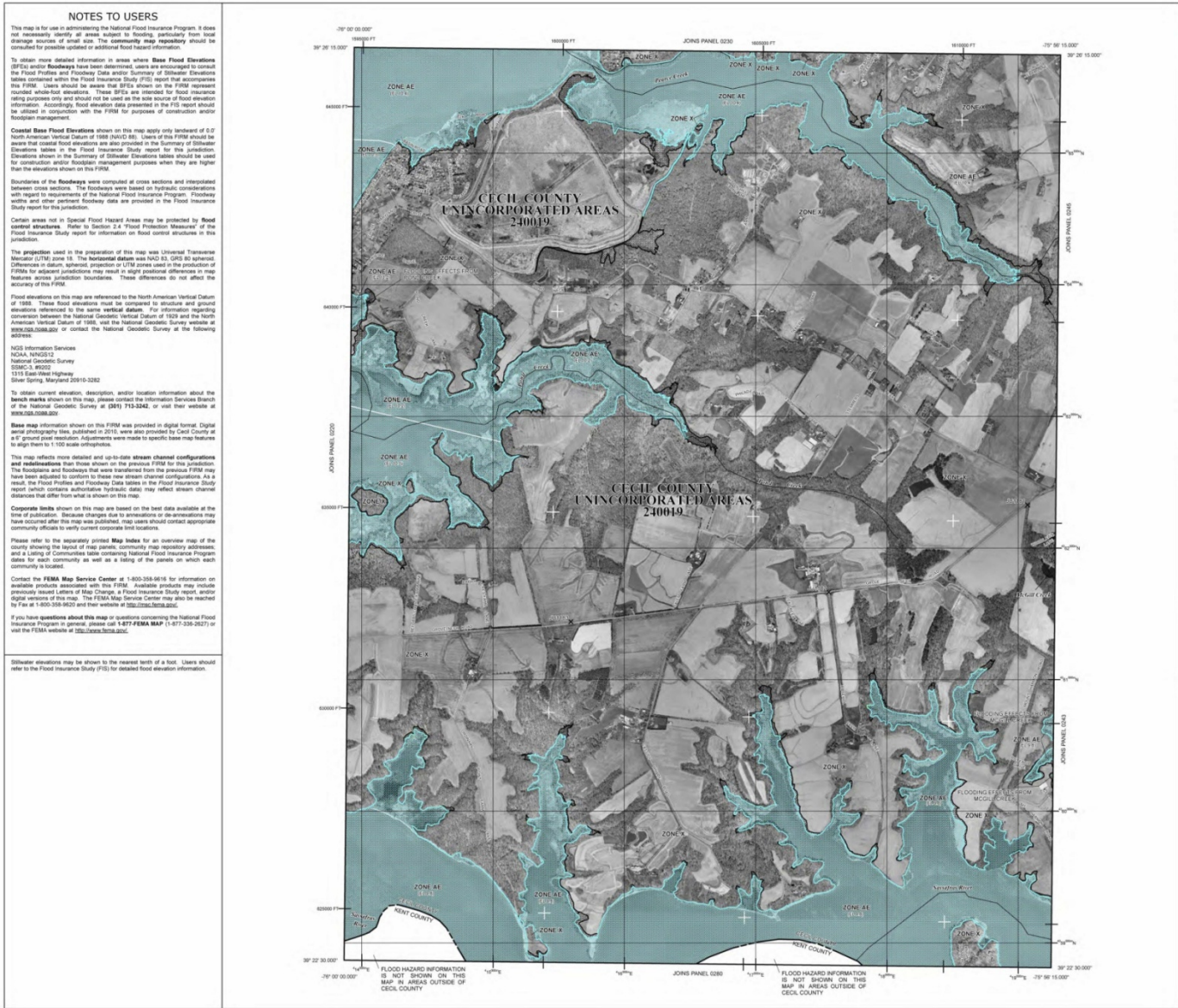


Figure 4 – Post-Construction Contours



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFA) SUBJECT TO SPECIFICATION BY THE 1% ANNUAL CHANCE FLOOD

1% Annual Chance Flood: The 1% annual chance flood is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard are Zone A, AE, AH, AO, AV, X, V, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

NO BASE FLOOD ELEVATIONS DETERMINED

ZONE AE
No Base Flood Elevations determined.
Base Flood Elevation determined.
Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevation determined.

ZONE AH
Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of sheet flow, floodway velocities and duration that the former flood control system is being retained to provide protection from the 1% annual chance or greater flood.

ZONE AO
Special Flood Hazard Area formerly protected from the 1% annual chance flood by an artificial levee or dike. The Base Flood Elevation is the water surface elevation of the 1% annual chance or greater flood.

ZONE AV
Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; the Base Flood Elevation is determined.

ZONE V
Coastal flood zone with velocity hazard (wave action); no Base Flood Elevation determined.

ZONE VE
Coastal flood zone with velocity hazard (wave action); Base Flood Elevation determined.

FLOODWAY AREAS IN ZONE AE
The floodway is the channel of a stream plus any adjacent floodway areas that must be kept free of encroachment so the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X
Areas of 1% annual chance flood, areas of 1% annual chance flood with average depths of less than 1 foot, or with average areas less than 1 hectare (2.5 acres), and areas controlled by levees from 1% annual chance flood.

OTHER AREAS

ZONE A
Areas determined to be outside the 0.2% annual chance floodway.

ZONE B
Areas in which floodwaters are unretained, but position.

CENTRAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

CENTINEL PROTECTED AREAS (CPAs)
CPAs are areas normally located within or adjacent to Special Flood Hazard Areas.

BOUNDARIES
1% annual chance floodway boundary
0.2% annual chance floodway boundary
Floodway boundary
Area B boundary
CPAs and CPA boundary

BOUNDARIES
Special Flood Hazard Area Zones and boundary (showing Special Flood Hazard Area Zones and boundary) showing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities

BASE FLOOD ELEVATION LINE AND VELOCITY OBSERVATION POINT (V.O.)
Base Flood Elevation line and velocity observation point

VELOCITY OBSERVATION POINT (V.O.)
Base Flood Elevation value where velocity within zone, elevation in feet

REFERENCES TO THE NORTH AMERICAN VERTICAL DATUM OF 1988
Cross section line
Stream line
Bridge
Roadway
Culvert

SPHERICAL COORDINATES REFERENCED TO THE NORTH AMERICAN DATUM (NAD 83)
UTM Zone
1000-meter Universal Transverse Mercator grid (UTM) zone 18
8000-foot grid system: Maryland State Plane coordinate system (NAD 83), Lambert Conformal Conic
Reach (see explanation in Notes to Users section of this FIS report)

MAP REPOSITORY
Refer to Index of Map Repositories on Map Index.

EFFECTIVE DATE OF COUNTY FLOOD INSURANCE RATE MAP
JULY 6, 2013

EFFECTIVE DATE OF REVISIONS TO THIS PANEL

MAP SCALE 1" = 100'
0 500 1000 2000 FEET
0 500 1000 METERS

FIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0240D

FIRM FLOOD INSURANCE RATE MAP

CECIL COUNTY, MARYLAND AND INCORPORATED AREAS

PANEL 240 OF 305
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

COMMUNITY
NUMBER PANEL SUFFIX
COUNTY SHEET

MAP NUMBER 240150240D
EFFECTIVE DATE JULY 6, 2013

Federal Emergency Management Agency

Revised 10/2012: The Map Repository pages herein should be used for printing and distribution purposes only. The Community Map Index and Map Repository pages should be used for distribution applications for the National Flood Insurance Program.

Figure 5 – 100-year Floodplain

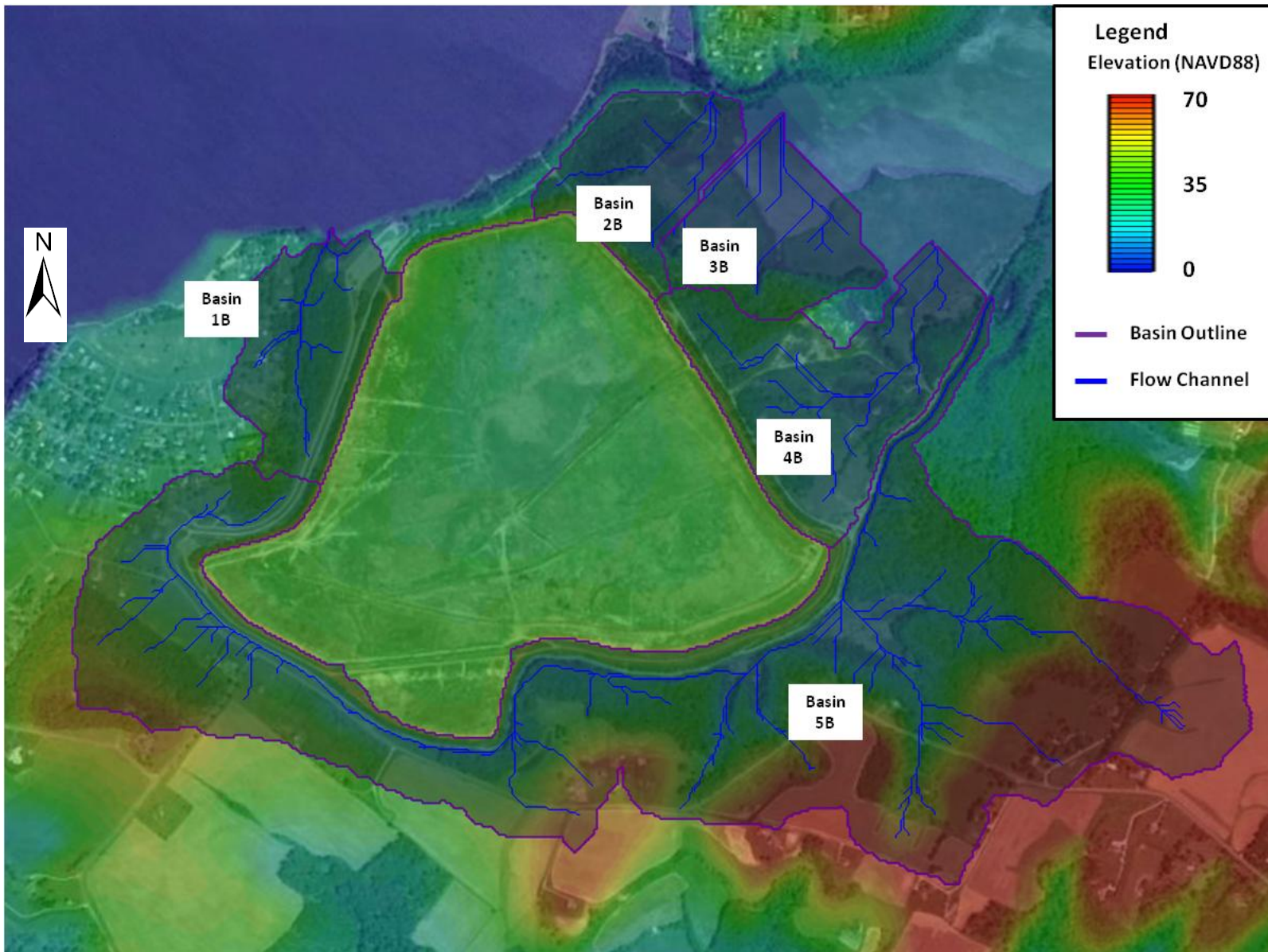
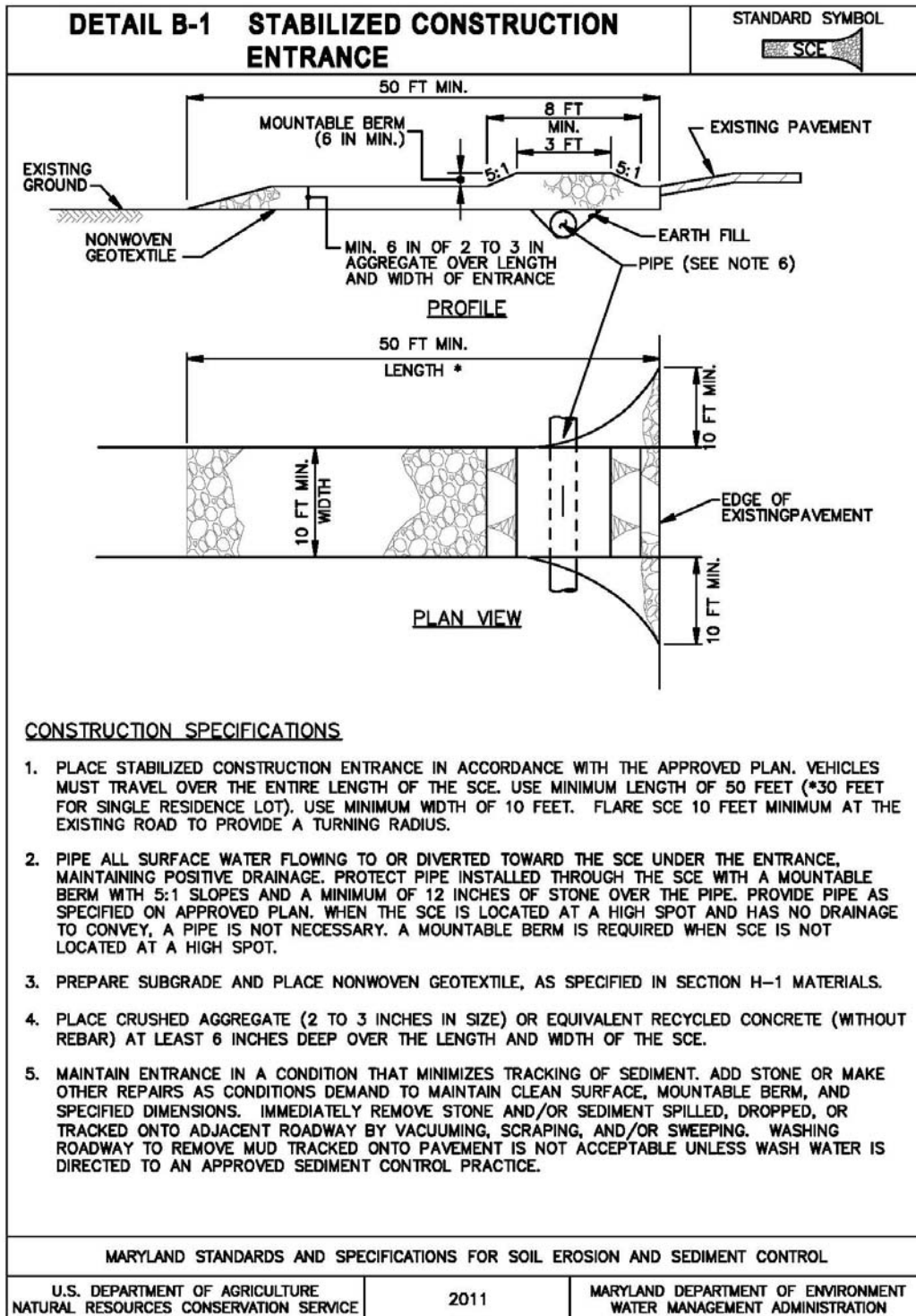


Figure 6 – Exterior Drainage Basins



Figure 7 – Soil Delineations



B.2

Figure 8 – SCE Detail

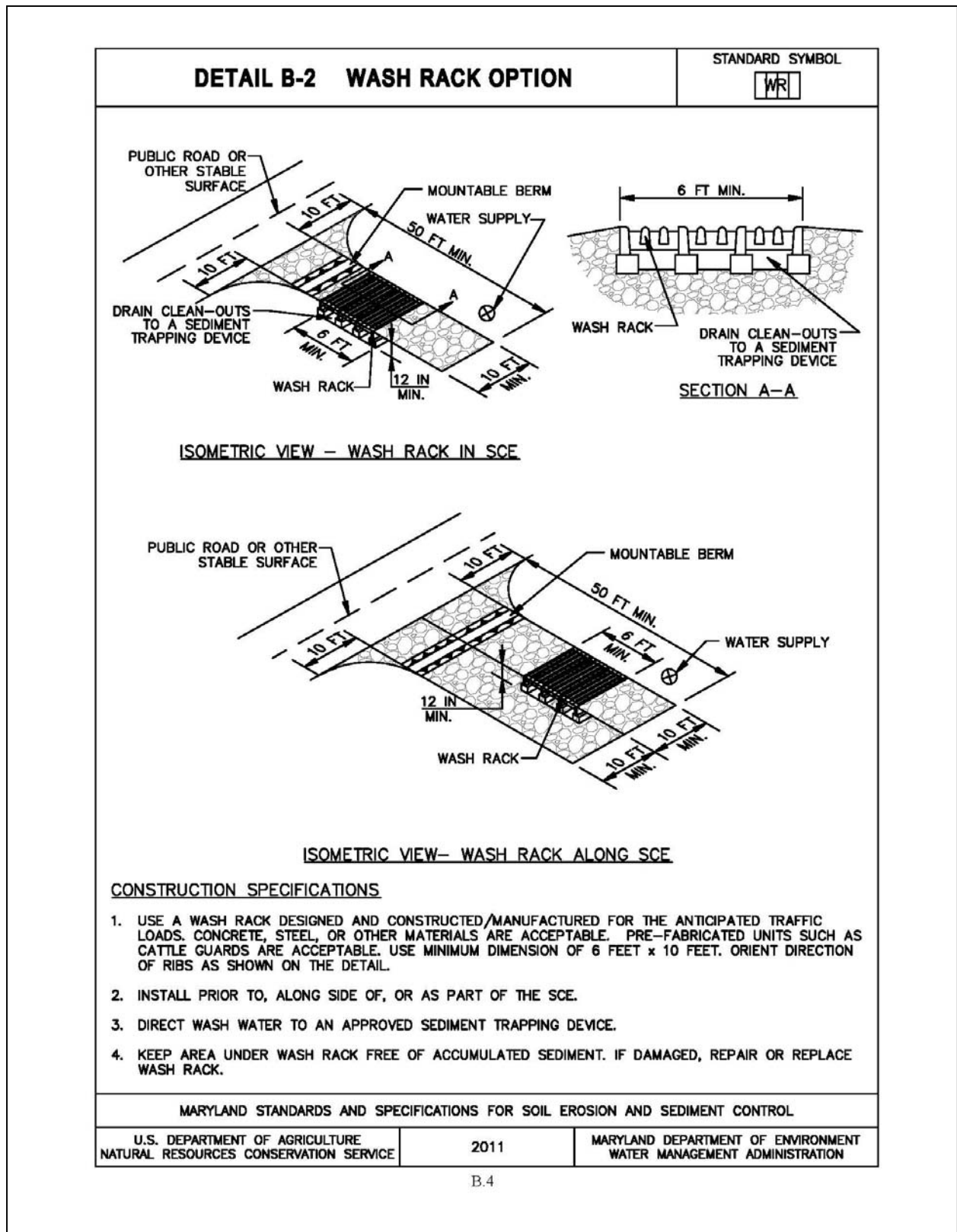


Figure 9 – Wash Rack Detail

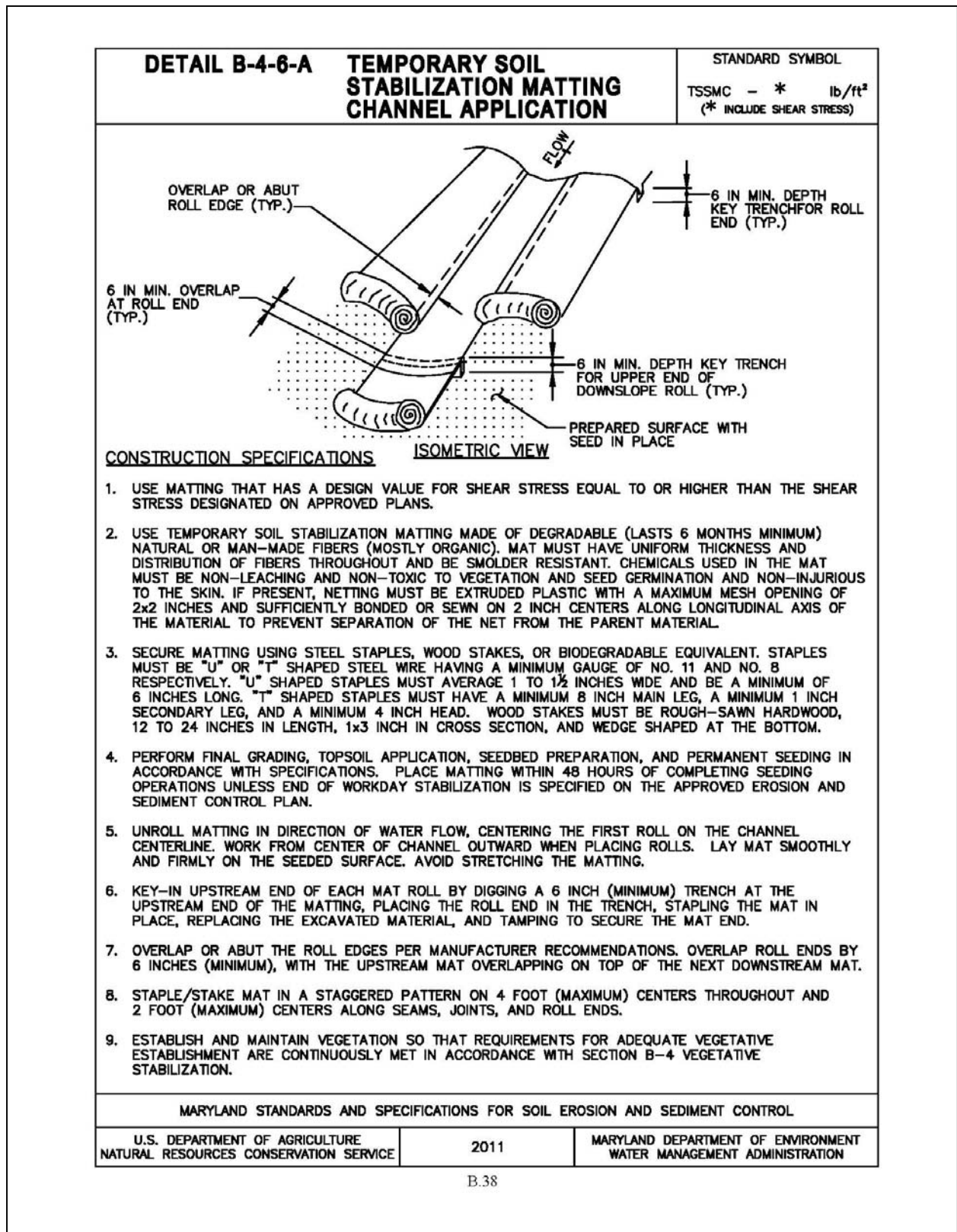


Figure 10 – Temporary ECM Detail

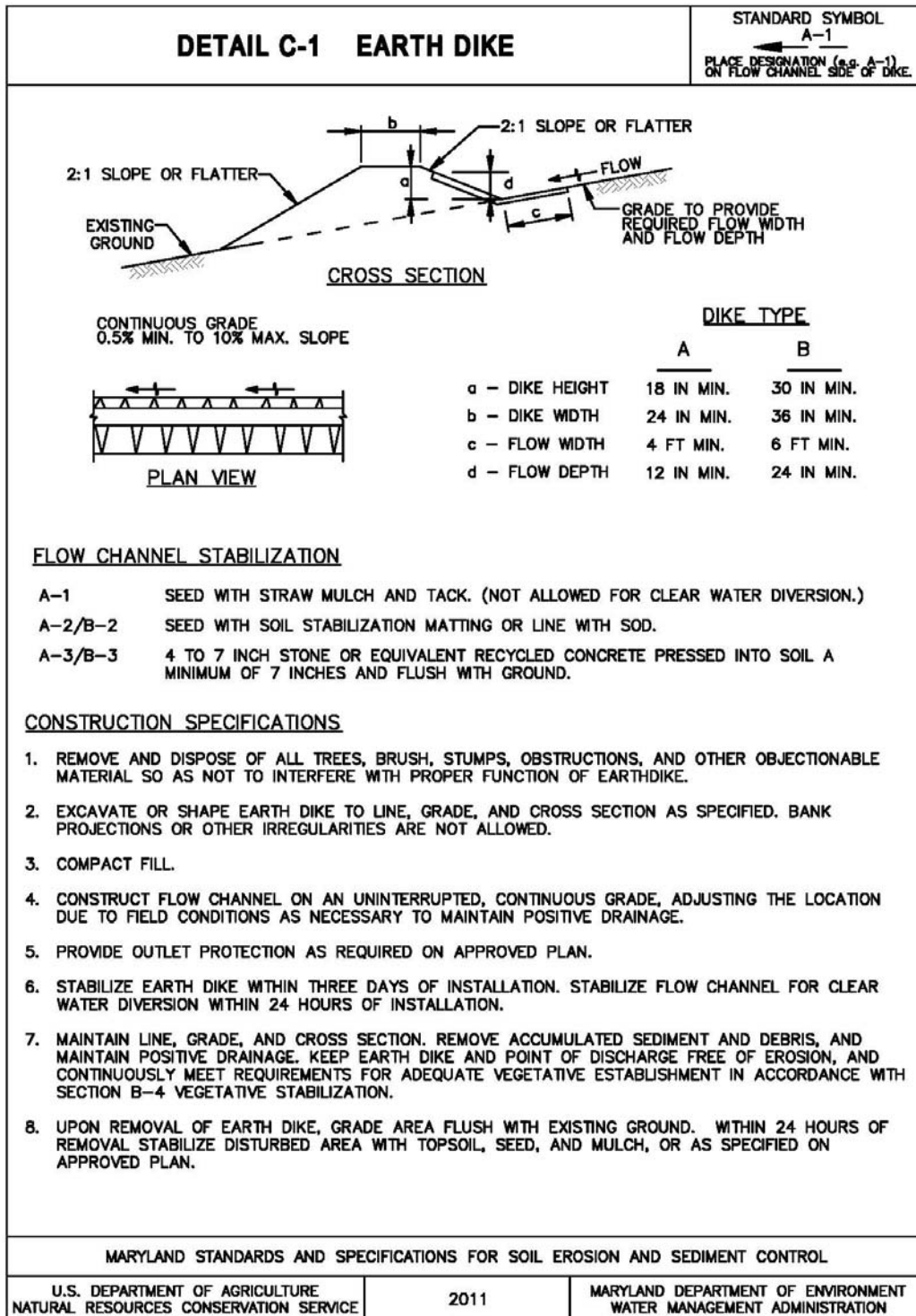


Figure 11 – Earth Dike Detail

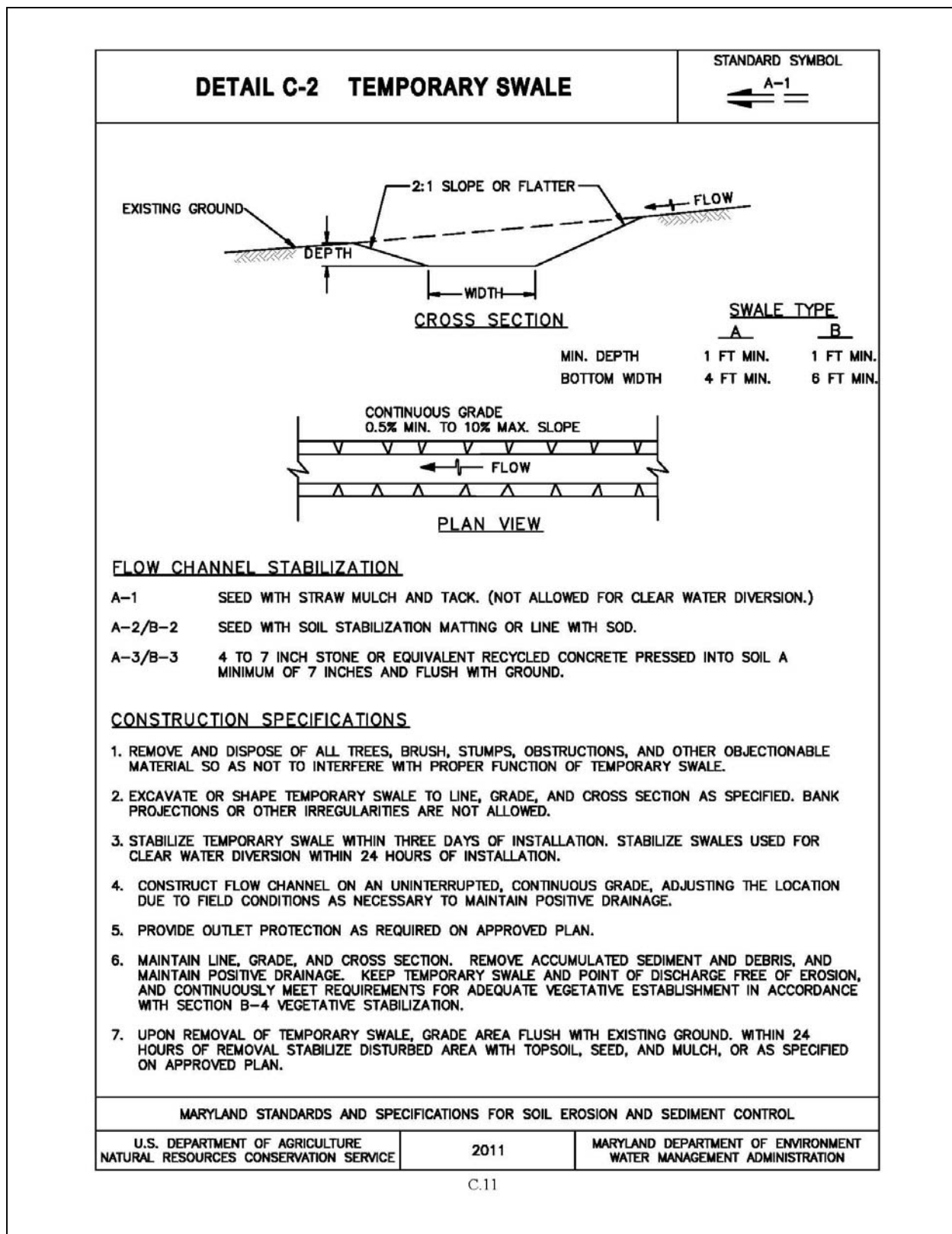


Figure 12 – Temporary Swale Detail

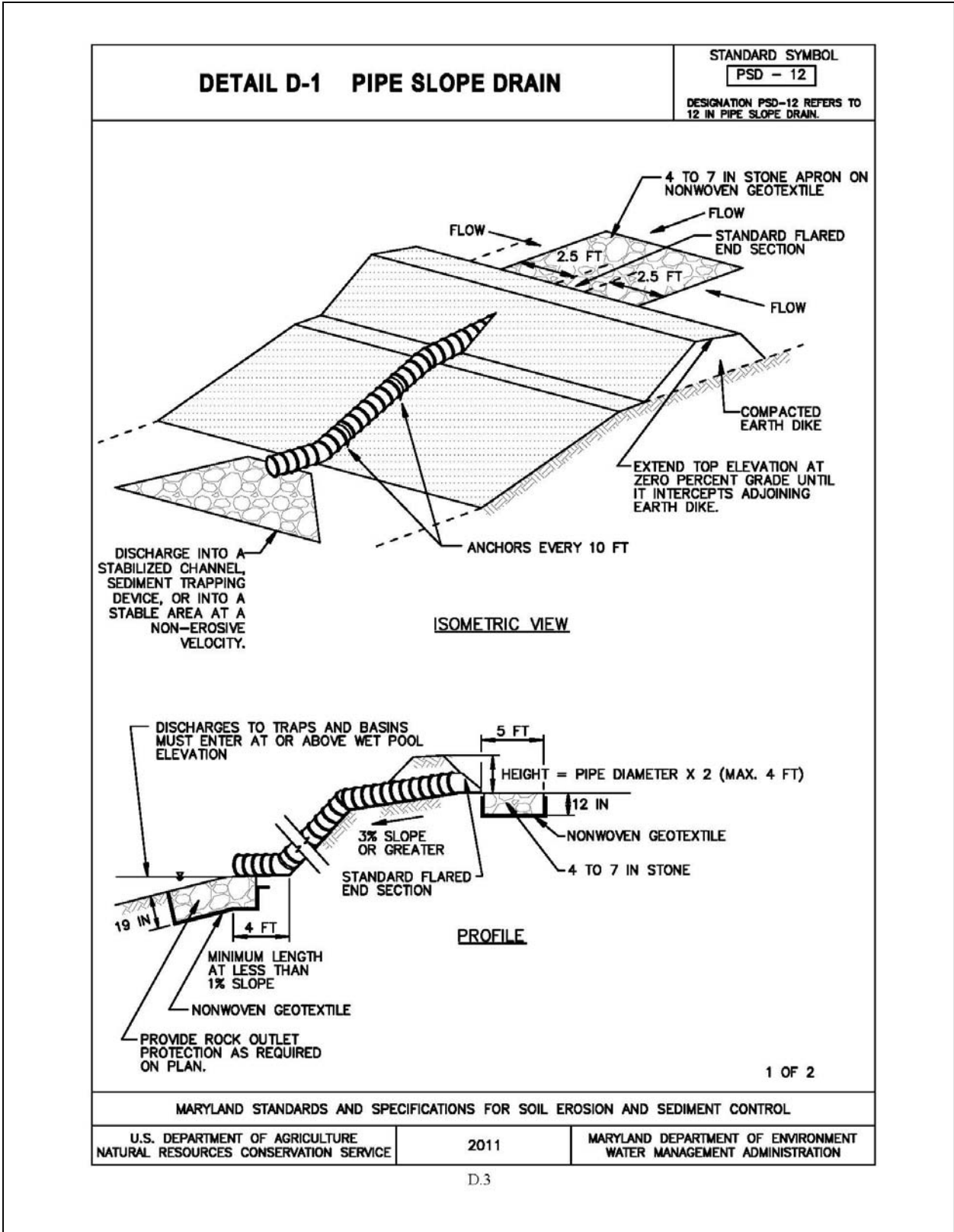
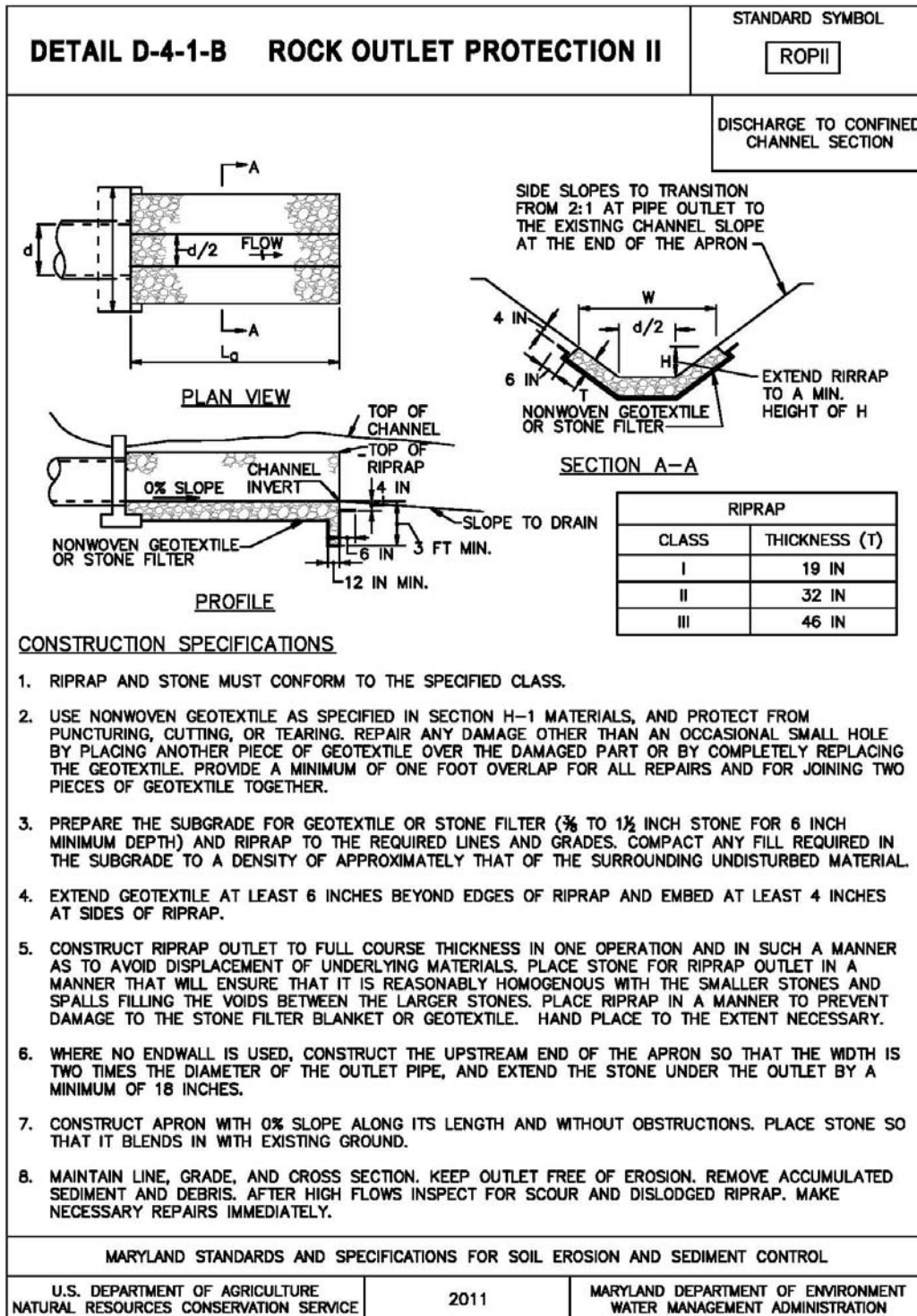


Figure 13 – Pipe Slope Drain Detail

DETAIL D-1 PIPE SLOPE DRAIN		STANDARD SYMBOL PSD - 12
		DESIGNATION PSD-12 REFERS TO 12 IN PIPE SLOPE DRAIN.
<u>CONSTRUCTION SPECIFICATIONS</u>		
<ol style="list-style-type: none"> 1. THE HEIGHT OF THE EARTH DIKE MUST BE AT LEAST 2 TIMES THE PIPE DIAMETER MEASURED FROM THE INVERT OF THE PIPE. EXTEND THE TOP ELEVATION OF DIKE AT ZERO PERCENT GRADE UNTIL IT INTERCEPTS THE TOP OF THE ADJOINING EARTH DIKE. 2. FLEXIBLE PIPE IS PREFERRED. HOWEVER, CORRUGATED METAL PIPE OR EQUIVALENT PVC PIPE CAN BE USED. ALL CONNECTIONS MUST BE WATERTIGHT. 3. ATTACH A FLARED END SECTION TO THE INLET END OF PIPE WITH A WATERTIGHT CONNECTION. AT THE INLET OF THE PIPE SLOPE DRAIN, INSTALL 4 TO 7 INCH STONE OR EQUIVALENT RECYCLED CONCRETE PLACED 12 INCHES IN DEPTH ON NONWOVEN GEOTEXTILE AND EXTEND OUT 5 FEET FROM THE INLET IN ALL DIRECTIONS. 4. PROVIDE NONWOVEN GEOTEXTILE, AS SPECIFIED IN SECTION H-1 MATERIALS, UNDER THE BOTTOM AND ALONG SIDES OF ALL RIPRAP. 5. SECURELY ANCHOR THE PIPE SLOPE DRAIN (PSD) TO THE SLOPE. SPACE THE ANCHORS EVERY 10 FEET. 6. HAND TAMP THE SOIL AROUND AND UNDER THE PIPE AND END SECTION IN 4 INCH LIFTS TO THE TOP OF THE EARTH DIKE. 7. UPON COMPLETING INSTALLATION OF THE PSD, STABILIZE ASSOCIATED DISTURBANCES WITH SEED, MULCH, AND TACK. 8. INSTALL OUTLET PROTECTION AS SPECIFIED ON APPROVED PLAN. 9. KEEP POINTS OF INFLOW AND OUTFLOW FREE OF EROSION. MAINTAIN WATER TIGHT CONNECTIONS AND POSITIVE DRAINAGE. REMOVE ACCUMULATED SEDIMENT AND DEBRIS. 		
2 OF 2		
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
D.4		

Figure 13 (Continued) – Pipe Slope Drain Detail



D.21

Figure 14 – Rock Outlet Protection Detail

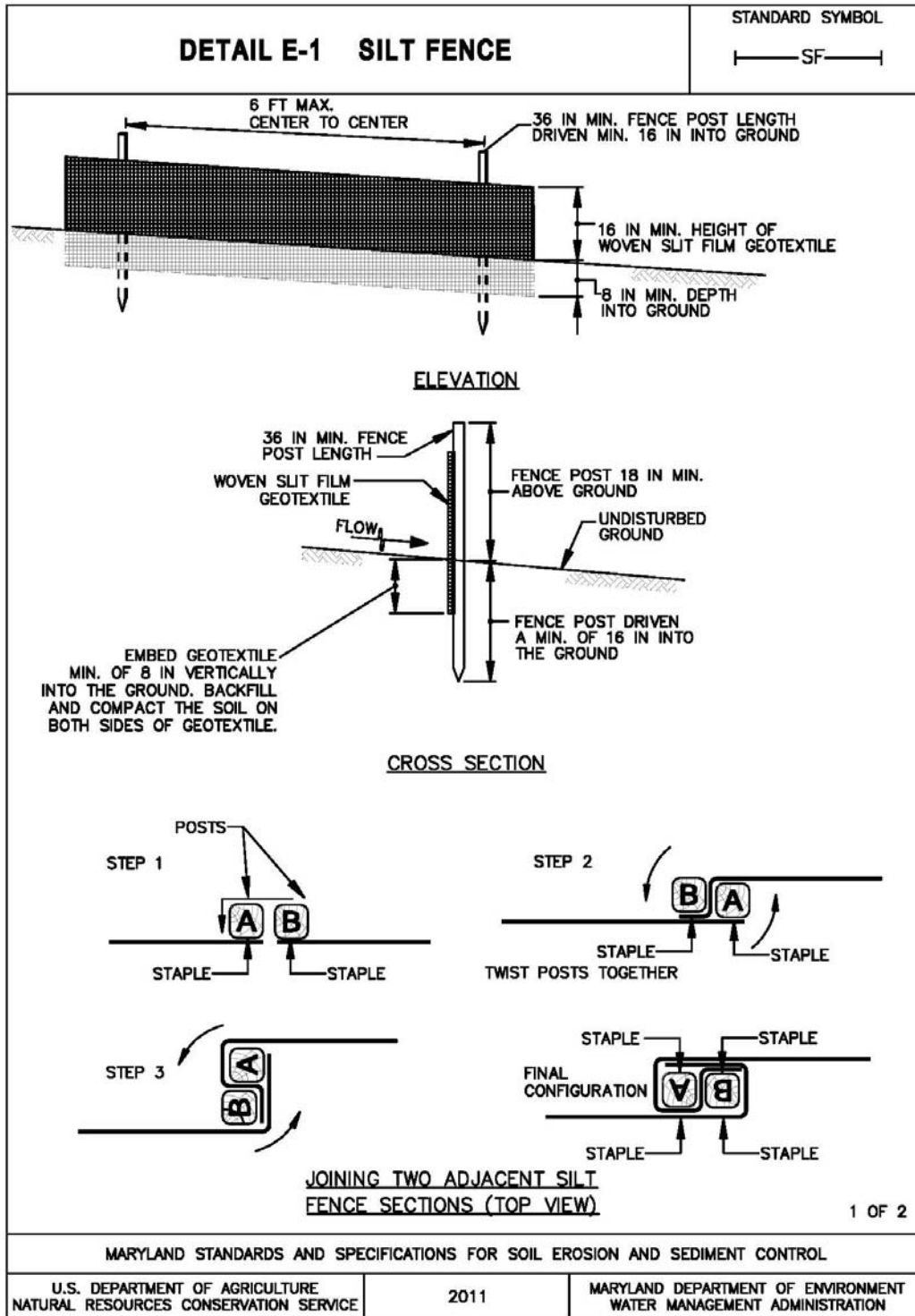


Figure 15 – Silt Fence Detail

DETAIL E-1 SILT FENCE		STANDARD SYMBOL ——SF——
<p>CONSTRUCTION SPECIFICATIONS</p> <ol style="list-style-type: none"> 1. USE WOOD POSTS $1\frac{3}{4} \times 1\frac{3}{4} \pm \frac{1}{8}$ INCH (MINIMUM) SQUARE CUT OF SOUND QUALITY HARDWOOD. AS AN ALTERNATIVE TO WOODEN POST USE STANDARD "T" OR "U" SECTION STEEL POSTS WEIGHING NOT LESS THAN 1 POUND PER LINEAR FOOT. 2. USE 36 INCH MINIMUM POSTS DRIVEN 16 INCH MINIMUM INTO GROUND NO MORE THAN 6 FEET APART. 3. USE WOVEN SLIT FILM GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS AND FASTEN GEOTEXTILE SECURELY TO UPSLOPE SIDE OF FENCE POSTS WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION. 4. PROVIDE MANUFACTURER CERTIFICATION TO THE AUTHORIZED REPRESENTATIVE OF THE INSPECTION/ENFORCEMENT AUTHORITY SHOWING THAT THE GEOTEXTILE USED MEETS THE REQUIREMENTS IN SECTION H-1 MATERIALS. 5. EMBED GEOTEXTILE A MINIMUM OF 8 INCHES VERTICALLY INTO THE GROUND. BACKFILL AND COMPACT THE SOIL ON BOTH SIDES OF FABRIC. 6. WHERE TWO SECTIONS OF GEOTEXTILE ADJOIN: OVERLAP, TWIST, AND STAPLE TO POST IN ACCORDANCE WITH THIS DETAIL. 7. EXTEND BOTH ENDS OF THE SILT FENCE A MINIMUM OF FIVE HORIZONTAL FEET UPSLOPE AT 45 DEGREES TO THE MAIN FENCE ALIGNMENT TO PREVENT RUNOFF FROM GOING AROUND THE ENDS OF THE SILT FENCE. 8. REMOVE ACCUMULATED SEDIMENT AND DEBRIS WHEN BULGES DEVELOP IN SILT FENCE OR WHEN SEDIMENT REACHES 25% OF FENCE HEIGHT. REPLACE GEOTEXTILE IF TORN. IF UNDERMINING OCCURS, REINSTALL FENCE. 		
2 OF 2		
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL		
U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION
E.3		

Figure 15 (Continued) – Silt Fence Detail

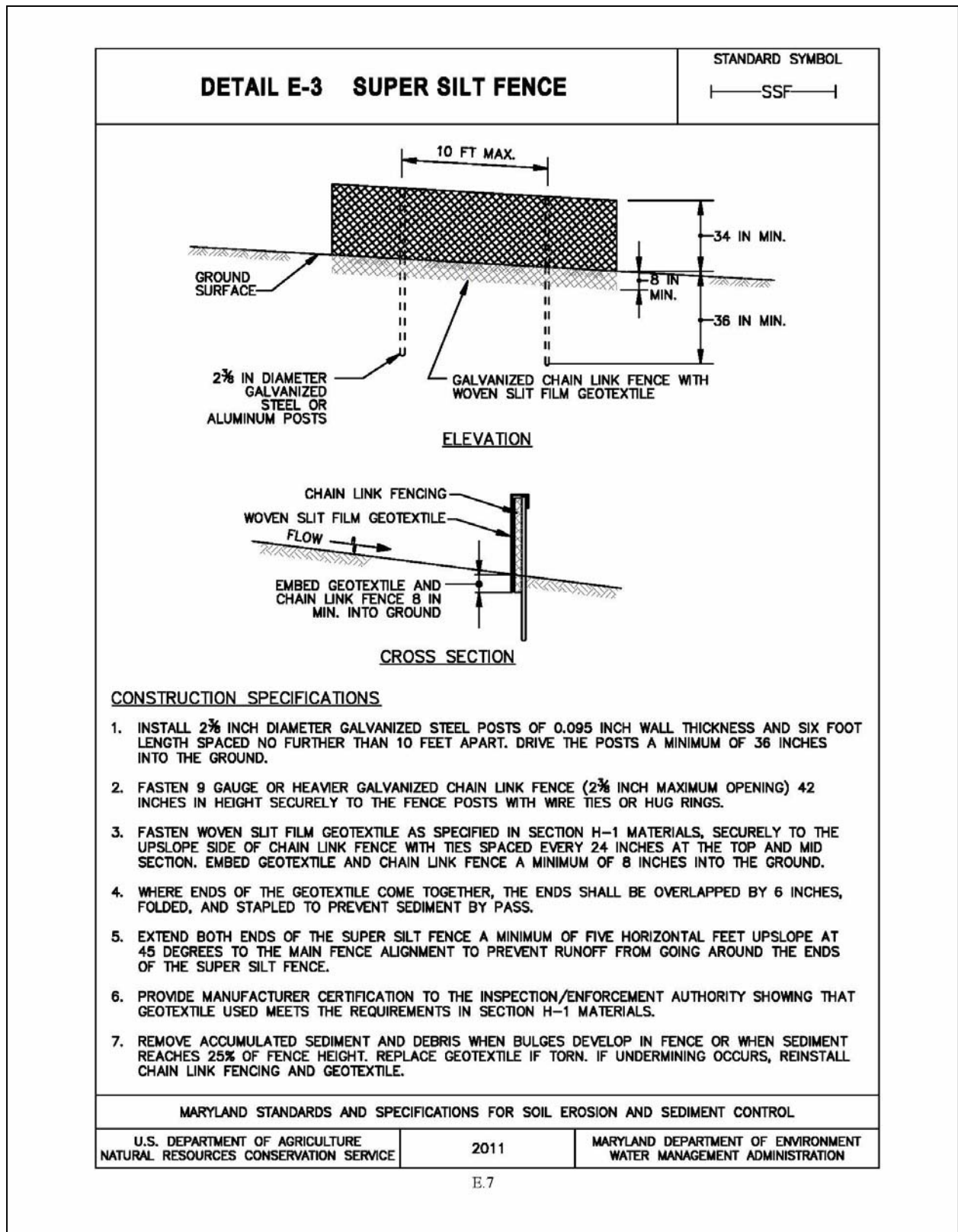


Figure 16 – Super Silt Fence Detail

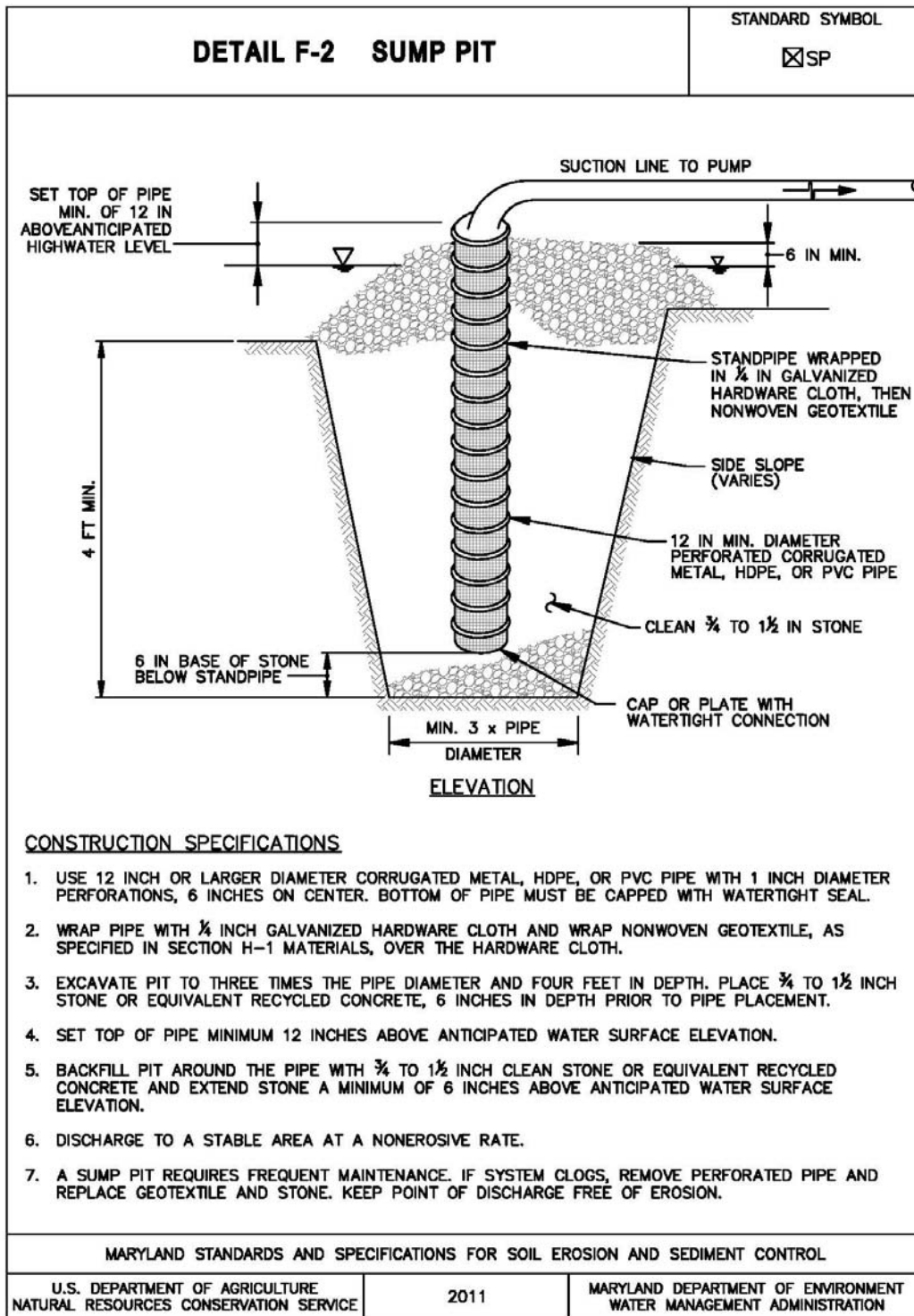
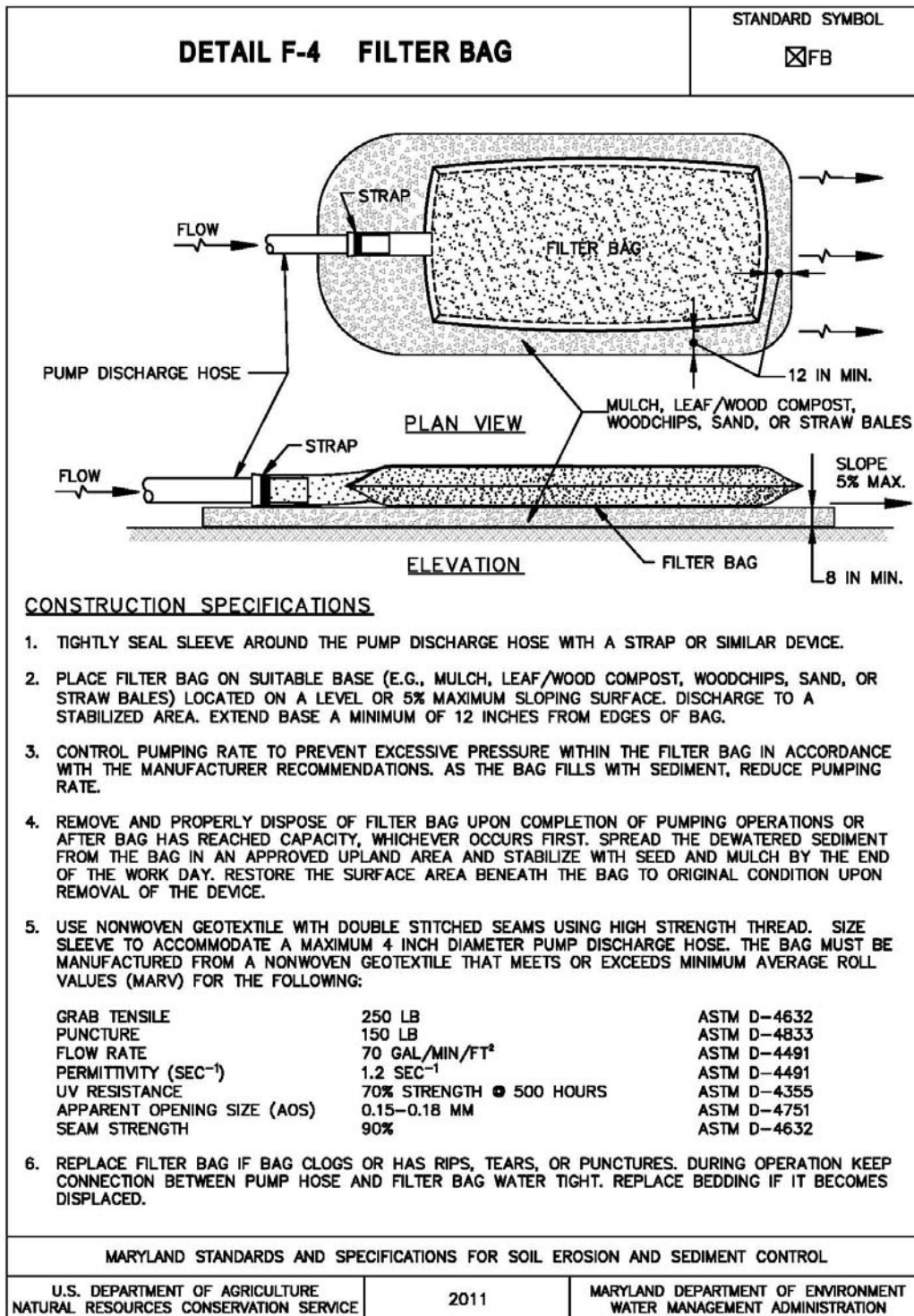


Figure 17 – Sump Pit Detail

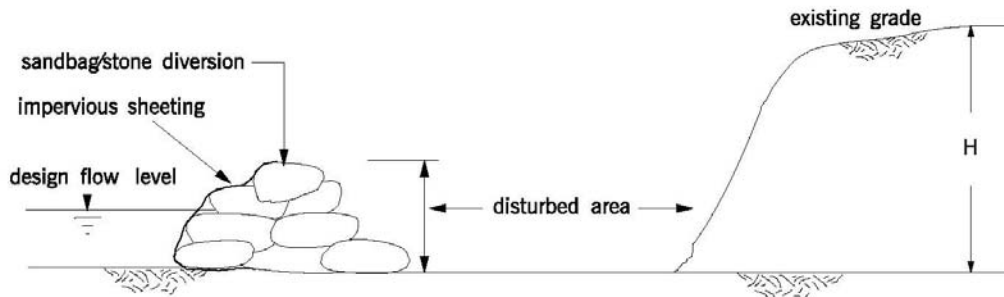


F.9

Figure 18 –Filter Bag Detail

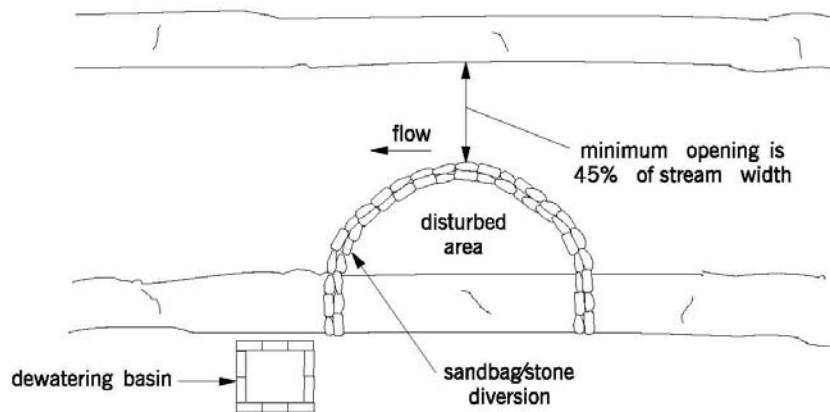
Maryland's Guidelines To Waterway Construction DETAIL 1.5: SANDBAG/STONE DIVERSION

TRANSVERSE SECTION VIEW



H/2+1 ft (0.3 m) for projects of duration < 2 weeks;
2-year flood elevation for projects of longer duration

PLAN VIEW



TEMPORARY INSTREAM
CONSTRUCTION MEASURES

REVISED NOVEMBER 2000
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MARYLAND DEPARTMENT OF THE ENVIRONMENT
WATER MANAGEMENT ADMINISTRATION

Figure 19 – Sandbag/Stone Detail