PRINCE GEORGE'S SOIL CONSERVATION DISTRICT

SOIL EROSION & SEDIMENT CONTROL – POND SAFETY REFERENCE MANUAL – PRINCE GEORGE'S COUNTY, MARYLAND

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INTRODUCTION

Dependence on the natural resources of Maryland is unending---and so is the need to protect our environment. The soil and water conservation program in Maryland, aimed at protecting soil and water resources, is the result of over 70 years of cooperative effort at the federal, state, and local levels.

Under the State Soil Conservation District's Law, each Board of Supervisors is responsible for carrying out a soil and water conservation program to "provide for the conservation of the soil, water, and related resources of the state and for the control and prevention of soil erosion in order to preserve natural resources, control floods, prevent impairment of dams and reservoirs, assist in maintaining the navigability of rivers and harbors, preserve wildlife, protect the tax base, protect the public lands, protect and promote the health, safety, and general welfare of the people of the state, and otherwise enhance their living environment".

Acceptable erosion and sediment control plans must be designed to mitigate soil erosion, prevent increases in stormwater runoff, and minimize the discharge of pollutants. The Maryland Stormwater Management Act of 2007 and the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control requires the establishment of a comprehensive process for the review and approval of erosion and sediment control and stormwater management plans. A coordinated comprehensive review process includes the submission and review of erosion and sediment control and stormwater management plans for each of the following three phases of plan development: Concept Plan; Site Development Plan; and Final Plan.

This manual is intended to be a reference guide for engineers, developers, reviewers, and inspectors who will be involved with design and implementation of erosion and sediment control practices and dam safety. Existing references have been updated and consolidated into one document. As a service to our customers, we have attempted to simplify and clarify requirements from various sources. This manual will be used by our plan reviewers to ensure consistency in the plan review process and should be the basis for plan preparation and submittal by engineering consultants.

ACKNOWLEDGEMENTS

The latest revisions to the Prince George's Soil Conservation District Soil Erosion and Sediment Control – Pond Safety Manual, January 2013, are the result of the effort of the Erosion and Sediment Control Environmental Site Design Committee. The committee consisted of members representing Prince George's Soil Conservation District (PGSCD), Prince George's County Department of Public Works and Transportation (PGDPW&T), Maryland-National Capital Building Industry Association (BIA) and engineering consultant firms.

Many individuals assisted with the revision to this document by providing review comments, suggestions, reference documents, and participation at committee meetings. We would like to acknowledge the following individuals for their invaluable contributions:

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The Prince George's Soil Conservation District, Board of Supervisors approved and adopted the revised manual. We hope this consolidated and updated information will be helpful and encourage interested persons to contribute their experiences and knowledge in a continuing process of program improvement.

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SECTION I

PRINCE GEORGE'S
SOIL CONSERVATION DISTRICT

CONCEPT

GRADING, EROSION AND SEDIMENT CONTROL PLAN

___ I. **PRINCE GEORGE'S SOIL CONSERVATION DISTRICT (PGSCD) CONCEPT GRADING, EROSION AND SEDIMENT CONTROL PLAN (CSC)**

___A. INTRODUCTION FOR CONCEPT GRADING, EROSION AND SEDIMENT CONTROL PLANS

___1. The following guidelines are to be considered in the preparation of a Concept Grading, Erosion and Sediment Control Plan submitted to PGSCD for review and approval. All Concept Grading, Erosion and Sediment Control plans (CSC's), are to be in conformance with this document, the criteria established in the Code of Maryland Regulation Title 26, Subtitle 17, Chapter 01, the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control, (Standards and Specifications), or later revisions and Chapter 5 Environmental Design of the 2000 Maryland Stormwater Design Manual.

___2. A comprehensive design strategy for maintaining predevelopment runoff characteristics and protecting natural resources is available. This strategy, known as Environmental Site Design or "ESD," relies on integrating site design, natural hydrology, and small controls to capture and treat runoff.

___3. The primary goal is to maintain the natural hydraulic runoff of a site to predevelopment runoff characteristics to the Maximum Extent Practicable (MEP) after development.

___4. Designers must develop plans that are designed to:

____ a. Prevent soil erosion from development projects.
____ b. Prevent increases in nonpoint pollution.
____ c. Minimize pollutants in stormwater runoff from both new development and redevelopment.
____ d. Restore, enhance, and maintain chemical, physical, and biological integrity of receiving waters to protect public health and enhance domestic, municipal, recreational, industrial and other uses of water as specified by MDE.
____ e. Maintain 100% of the average annual predevelopment groundwater recharge volume.
____ f. Capture and treat stormwater runoff to remove pollutants.
____ g. Implement a channel protection strategy to protect receiving streams.
____ h. Prevent increases in the frequency and magnitude of out-of-bank flooding from large, less frequent storms.
____ i. Protect public safety through the proper design of stormwater management facilities.
___ j. Preserve sensitive natural features.

___5. Environmental Site Design (ESD) is defined as "…using small-scale stormwater management practices, nonstructural techniques, and better site planning to mimic natural hydrologic runoff characteristics and minimize the impact of land development on water resources." This definition, includes:

____ a. Optimizing conservation of natural features (e.g., drainage patterns, soil, vegetation, steep slopes and highly erodible soils).
____ b. Minimizing impervious surfaces (e.g., pavement, concrete channels, roofs).
____ c. Slowing down runoff to maintain discharge timing and to increase infiltration and evapotranspiration.
____ d. Using other nonstructural practices or innovative technologies approved by MDE.

___6. The goal of traditional site design strategies has been to maximize development potential by focusing on the layout of buildings, roads, parking, and other features. Conventional development practices tend to maximize site imperviousness and contribute to many undesired impacts. These include the undesired effects of diminished groundwater recharge, increased flows and runoff volumes, pollutant accumulation, and elevated water temperatures.

___7. Stream quality and watershed health diminish when impervious cover exceeds 10% and become severely degraded beyond 25% (Center for Watershed Protection, 2003). Results from the Maryland Biological Stream Survey (MBSS) indicated that in surveyed streams, health was never good when watershed imperviousness exceeded 15% (Boward, 1999). These studies establish a fundamental connection between impervious cover and watershed impairment.

___8. ESD techniques involve protecting natural resources, integrating erosion and sediment controls with stormwater management practices, minimizing site imperviousness, and using natural conveyance and ESD practices throughout the site. Applying these techniques early in the design process will ensure that all available resources have been considered in order to protect streams, waterways, steep slopes and highly erodible soils from the impact of land development activities.

___9. Developing a site plan begins with gathering, mapping, and analyzing information about the physical characteristics of the site. Designers should visit the proposed development site in order to clearly understand its topographic, vegetative, drainage and soil characteristics. Relying exclusively on topographic maps, soils maps, or other materials in the office without field verification is not an acceptable planning technique.

___B. CONCEPT GRADING, EROSION AND SEDIMENT CONTROL PLAN DESIGN CONSIDERATIONS

___1. Site Plan and Resource Mapping

___ a. The Concept Grading, Erosion and Sediment Control plan will include site resource mapping with protection and conservation strategies. Review of the Concept Grading, Erosion and Sediment Control plan will ensure that all important resources have been mapped, protected, and all opportunities to enhance natural areas have been explored early in the design process.

___ b. The resource mapping component will be used as a basis for all subsequent decisions during project design. During this step, the consultant for the developer shall identify significant natural resources and demonstrate how these areas will be protected and preserved. Additionally, options will be evaluated to enhance important hydrologic functions. The District may require that other features be shown depending on site characteristics. This map shall be field verified by the project consultant. The specific areas that shall be mapped are organized by government regulatory authority in Table 1 below.

Table 1 Natural Resources and the Corresponding Regulatory Authorities:

Federal	State	Local
- Wetland - Major Waterways - Floodplains	- Tidal and nontidal wetland - Wetlands of Special State Concern - Wetland buffers - Stream buffers - Perennial streams - Floodplains - Forests - Forest buffers - Critical Areas	- Steep slopes - Highly erodible soils - Enhanced stream buffers - Topography/slopes - Springs - Seeps - Intermittent streams - Vegetative cover - Soils - Bedrock/geology - Existing drainage areas - Ponds

___ c. The mapping process will identify important natural resources as well as areas that are highly susceptible to erosion. Identifying these important resources and high risk locations and then protecting them from disturbance is the first step in the planning process.

___ d. When steep slopes and highly erodible soils are found measures shall be taken to limit disturbance and minimize impacts. For the purpose of project planning, steep slopes are considered to be any mapping unit with a slope class of 15% or greater. While it may not be practicable to eliminate earth disturbing activities exclusively on the basis of soil erodibility or slope alone, constraints are warranted when both steep slopes and highly erodible soils occupy the same area within the development footprint.

___ e. Areas with highly erodible soils (includes K factor >.35 with slopes greater than 5% and slopes equal to or greater than 25%), that are to remain, shall be incorporated into adjacent buffers, remain undisturbed, be protected during the construction process, and/or preserved as open space.

___ f. Topography of the site, mapped at a minimum two-foot contour intervals, will allow the identification of drainage patterns, slopes, and natural resources such as wetlands, seeps, streams, forests, critical areas, and buffers.

___ g. Mapping the flow of water onto, through, and off the site enables the delineation of drainage area and flow patterns. Downstream wetlands, lakes, streams, structures, or other areas particularly sensitive to damage from erosion and sedimentation should also be investigated, mapped, and incorporated into the design to afford additional protection to these areas.

___ h. The design shall never allow sediment to flow through a sensitive area.

___ i. Investigating the on-site soil characteristics and referring to the Prince George's County Soil Survey enables the designer to identify highly erodible soil areas, and designate those that are to remain undisturbed.

___ j. Vegetative buffer strips along water bodies shall be mapped and designate them to remain undisturbed (i.e., buffers).

___2. Strategies to protect steep slopes ad highly erodible soil include:

___ a. Identify and map all highly erodible soils and steep slopes 15% or greater; and

___ b. Protect area(s) with highly erodible soils on slopes equal to or greater than 25% from earth disturbing activities.

___ c. In addition to preserving sensitive areas during disturbance, the environmental benefits of other existing natural resources should be maximized by incorporating protection strategies into the overall goals of the project.

___ d. Protecting these resources up front will allow them to be utilized for infiltration, flow attenuation, groundwater recharge, flood storage, runoff reduction, nutrient cycling, air and water pollution reduction, habitat diversity, and thermal impact reduction.

___ 3. Natural resources protection and enhancement strategies include:

___ a. Protecting large tracts of contiguous open space, forested areas, and other important resources through conservation easements.

___ b. Identifying afforestation opportunities in open space areas and setting aside land for natural regeneration.

___ c. Identifying important resources areas that may be expanded such as stream buffers and floodplains.

___ d. Minimize disturbance to highly permeable soils.

___4. Site Layout

___ a. After conserving and protecting sensitive resources, the next step in the planning process involves determining the approximate location of buildings, roadways, parking lots, and other impervious areas. These site improvements should be placed at a sufficient distance to protect the conservation areas. Protecting these resources will involve enhancing or expanding forested and stream buffers of adequate widths based on site characteristics.

___ b. Minimum buffer widths may be expanded based on receiving stream characteristics, stream order, adjacent land slopes, 100-year floodplain, wetlands, mature forest, vegetative cover, depth of the groundwater table, and the presence of springs, seeps and other sensitive areas. The District may enhance existing buffer requirements depending upon resource protection goals identified.

___ c. After the development footprint has been established, consideration should be given to natural drainage areas and how runoff will travel over and through the site. Sheet flow and existing drainage patterns shall be maintained and discharges from the site shall occur at the natural location wherever possible. New drainage patterns result in concentrated flow that can leave the site at inappropriate or unstable locations, as well as creating erosion, sediment transport, and stream channel stability problems.

___ d. The use of storm drains and engineered conveyance systems should be minimized by using vegetated swales and other natural systems so that forest, buffers and overland flow characteristics remain intact. Planning for on-site and off-site drainage patterns must be done early in the design process to establish a stable outfall for downstream discharges. Some of the strategies listed below can be used to establish nonstructural practices such as sheetflow to natural areas. These protection and enhancement tools, can then double as important strategies for meeting on-site stormwater and erosion and sediment control requirements.

___5. Strategies for site layout and connecting landscape features include:

___ a. Plan the building footprint and layout to protect conservation areas.
___ b. Evaluate opportunities to enhance/expand forested, wetland, and stream buffers.
___ c. Grade the site so that runoff will flow from impervious areas directly to pervious areas or other natural conveyance systems.
___ d. Maintain natural flow paths between the site and upstream and downstream systems.
___ e. Maintain sheet flow and natural overland flow processes wherever feasible.
___ f. Provide stable conveyance of runoff off-site.

___C. CONCEPT GRADING, EROSION AND SEDIMENT CONTROL PLAN PREPARATION

The Concept Grading, Erosion and Sediment Control plans shall be submitted to Prince George's Soil Conservation District and shall include natural resources mapping, ESD location, concept narrative, soil survey and on-site investigation. PGSCD may require additional information at this phase, however at a minimum the Concept Grading, Erosion and Sediment Control plan shall include the following:

___1. Plan location of all site resources shown in Table 1.
___2. Field verification from the project consultant of the natural resource map as needed.
___3. Include appropriate photographs of the natural resources. (i.e. – outfalls and/or slope failures) as needed.
___4. Proposed limits of clearing and grading.
___5. Include percent impervious cover proposed.
___6. Location of proposed impervious areas (buildings, roadways, parking, and sidewalks).
___7. Location of existing and proposed utilities.
___8. Preliminary locations of erosion and sediment control practices. (Optional for Concept).
___9. Preliminary location of ESD practices.
___10. Include stable conveyance of stormwater at potential outfall locations.
___11. A narrative/sequence of construction that supports the concept and describes how the design will achieve the following:
- ___ a. Natural resources protection, enhancement, and preservation.
- ___ b. Maintenance of natural flow patterns.
- ___ c. Reduction of impervious areas through better site design, alternative surfaces, and nonstructural practices.
- ___ d. Integration of erosion and sediment controls into the stormwater strategy.
- ___ e. Implementation of ESD planning techniques and practices to the MEP.
- ___ f. Evaluation of stabilization requirements.

___12. Soil survey and onsite investigation as needed, of site soils to identify highly erodible soils.
___13. Delineation of on-site and off-site drainage patterns.
___14. Delineation of vegetative buffer strips along water bodies.
___15. Delineation of slopes 15% and steeper.
___16. Delineate all highly erodible soils.
___17. Delineate and protect sites in Tier II Watersheds, and/or discharges to impaired waters with an established Total Maximum Daily Load (TMDL) allocation for sediment, with buffers (minimum 100 feet) for all perennial and intermittent streams. When the site requires MDE wetlands permits, a review for antidegradation may result in MDE establishing TIER II buffers and easements.

Buffer Width (feet) for Perennial and Intermittent Streams		
Hydrologic Soil Group	**Slope**	
	0-25%	**>25%**
A/B	100	125
C/D	125	150

Buffer from top of bank on each side on perennial streams and centerline for intermittent streams.

___18. The scope of the Concept Grading, Erosion and Sediment Control plan is to be clearly defined and fully identified in the title block. All Concept, Grading, Erosion and Sediment Control plan sheets are to be numbered chronologically with a CSC#.

___19. Plans are to be legible and shall include: scale (1"=50' maximum), two foot contour intervals, legends, and north arrow. All plan sheets must be the same size with a maximum size of 30"x42". Include a site specific vicinity map to scale. Include road identification, nearest intersections and distance to. Include enough detail on the vicinity map so that someone unfamiliar with the site can quickly locate it in the field.

___20. All Concept Grading, Erosion and Sediment Control plans submitted for review shall contain two sets of folded prints (9" x 12") and one set of accompanying data. **Do not submit mylars/originals until PGSCD plan reviewer indicates the plan is ready for approval.** Four sets of final prints and original/sepia (optional) shall be submitted for approval and signing. Additional plans submitted for approval will be processed at the current fee rate.

___21. If the Concept Grading, Erosion Sediment Control plan is presented on three or more sheets, provide a composite-overall drawing showing how the individual sheets tie together. Match lines and matching sheet numbers are to be included on each sheet.

___22. Plans must include topographic data sufficiently adequate to show existing conditions adjacent to the site and downstream of all concept sediment control. This shall be a **minimum** 100 foot adjacent strip and **minimum** 100 foot downstream, or as otherwise needed to clearly reflect existing conditions. Show all property lines.

___23. **The following certification shall be included on all Concept Grading, Erosion and Sediment Control Plans and shall be signed at time of plan submittal. Include on the first sheet (lower right hand corner) and do not alter the wording.**

CONSULTANTS CERTIFICATION

"I certify that this Concept Grading, Erosion and Sediment Control Plan represents all significant natural resources based on my personal knowledge of the site, and that this plan was prepared in accordance with the requirements of the Prince George's Soil Conservation District and "Standards and Specifications for Soil Erosion and Sediment Control". I have reviewed this Concept Grading, Erosion and Sediment Control Plan with the owner/developer".

Signature_____MD License#_____

Print Name_____ Date_____

(Include seal, company name, address and phone number if not included elsewhere on plan).

___24. Prince George's Soil Conservation District will provide coordinated feedback to the consultant for natural resource protection and erosion and sediment control before a project proceeds to the site development phase. This feedback will accompany the concept plan approval and shall be incorporated into future submissions for site development and final plans.

___25. Any site requiring District grading, erosion and sediment control approval that requires the subdivision review process will need separate approvals for concept, site development and final plans.

___26. Sites not requiring the subdivision process have the option of combining the concept and site development grading, erosion and sediment control plans for review and approval by the District. The combined concept/site development shall be incorporated into future submissions for final plans. Fees will be based on site development for these combined concept/site development reviews.

___27. Lots that are eligible for utilizing the standard grading, erosion and sediment control plan may include all three plan requirements for concept, site development and final on one plan.

___28. Forest harvest erosion and sediment control plans shall use the MDE Standards and Specifications for Forest Harvest Operations 2005 Draft.

___D. PRELIMINARY SOIL REPORT REQUIREMENTS
(For Concept and/or Site Development Plans)

___1. A soils investigation should be required under any of the following conditions:

___ a. The site for development contains soils prone to movement and failure. These include the Christiana soil complexes, Marlboro Clay formations, and Howell soils. These soils have severe limitations for foundation development according to the Prince George's County Soil Survey.

___ b. The ponding of water above the Marlboro Clay formation or other unstable soil is not recommended as this can accelerate slope failure. Traps and basins should be lined with an impervious lining and the drainage pipe outfalling below the Marlboro Clay formation. Septic systems and infiltration devices or ponds are not recommended for placement above the Marlboro Clay formation.

___ c. Presence of sulfidic soils (cat clays) on site.

___ d. Presence of diatomaceous soils on site.

___ e. Placement of fill on existing 4:1 slopes or steeper.

___ f. Construction of a pond. Provide a soils investigation for the pond areas, embankment, core trench and borrow areas. (Optional for Concept).

___ g. A field investigation shows visual signs of slope failure or potential slope failure.

___2. The report should address and include recommendations for:

___ a. Existing and proposed grades.

___ b. Fill being placed on steep slopes.

___ c. Perched water tables.

___ d. Drainage systems.

___ e. A safety factor of 1.3 must be achieved, and engineering recommendations presented to ensure that safety and slope stability can be maintained.

___3. Test borings:

___ a. Provide enough borings to adequately address stability concerns and represent the size of the site.

___ b. All borings shall be numbered and shown on a topographical site plan.

___ c. Show existing grades.

___ d. The borings shall penetrate into and below the unstable material.

___ e. All soil borings shall have a description in accordance with the USDA textural classification.

___ f. Include all geologic information.

___ g. Note the presence of all slickensided joints.

___ h. Note the location and elevation of encountering ground water after 24 hours.

____E. MARYLAND COMAR HIGHLY ERODIBLE SOILS
PRINCE GEORGE'S COUNTY, MARYLAND

SLOPES GREATER THAN 15 PERCENT

NOTES: Table is based on data from NRCS SSURGO data (7/31/2009) exported from the Soil Data Mart. This table lists soils meeting the Maryland COMAR and local SCD definition of Highly Erodible Soils (HES). Percent Composition is only given for major components, not minor components. Highly Erodible Soils (HES) Criteria element: Slopes greater than 15 percent.

Map Unit Sym	Map Unit Name/Component Name(s)	Total Acres	Comp %
AfE	Annapolis fine sandy loam, 15 to 25 percent slope	220	
	Annapolis		80
AfF	Annapolis fine sandy loam, 25 to 40 percent slope	114	
	Annapolis		75
BwD	Brinklow channery loam, 15 to 25 percent slopes	8	
	Brinklow		85
ByD	Brinklow-Blocktown channery loams, 15 to 25 percent slopes	6	
	Brinklow		50
	Blocktown		35
ByF	Brinklow-Blocktown channery loams, 25 to 65 percent slopes	64	
	Brinklow		50
	Blocktown		40
CbE	Chillum-Urban land complex, 15 to 25 percent slopes	62	
	Chillum		50
CcE	Christiana-Downer complex, 15 to 25 percent slopes	851	
	Christiana		45
	Downer		55
CcF	Christiana-Downer complex, 25 to 40 percent slopes	220	
	Christiana		45
	Downer		35
CdE	Christiana-Downer –Urban land complex, 15 to 25 percent slopes	523	
	Christiana		35
	Downer		30
CnE	Collington-Wist complex, 15 to 25 percent slopes	3140	
	Collington		60
	Wist		25
CnF	Collington-Wist complex, 25 to 40 percent slopes	921	
	Collington		60
	Wist		25
CoE	Collington-Wist-Urban land complex, 15 to 25 percent slopes	472	
	Collington		40
	Wist		30

Map Unit Sym	Map Unit Name/Component Name(s)	Total Acres	Comp%
CrE	Croom gravelly sandy loam, 15 to 25 percent slopes	295	
	Croom		75
CsE	Croom-Howell-Collington complex, 15 to 25 percent slopes	869	
	Croom		50
	Howell		25
	Collington		25
CsF	Croom-Howell-Collington complex, 25 to 40 percent slopes	980	
	Croom		50
	Collington		25
	Howell		25
CwE	Croom-Marr complex, 15 to 25 percent slopes	8309	
	Croom		50
	Marr		30
CwG	Croom-Marr complex, 25 to 60 percent slopes	2381	
	Croom		50
	Marr		30
CxE	Croom-Marr-Urban land complex, 15 to 25 percent slopes	810	
	Croom		45
	Marr		30
CzE	Croom-Urban land complex, 15 to 25 percent slopes	499	
	Croom		70
EwE	Evesboro-Downer complex, 15 to 25 percent slopes	191	
	Evesboro		40
	Downer		30
GmF	Grosstown-Marr-Hoghole complex, 15 to 40 percent slopes	3	
	Marr		30
	Grosstown		30
	Hoghole		15
	Dodon		10
HOE	Howell and Annapolis soils, 15 to 25 percent slopes	36	
	Howell		50
	Annapolis		40
HZE	Howell and Dodon soils, 15 to 25 percent soils	94	
	Howell		50
	Dodon		30
HZF	Howell and Dodon soils, 25 to 40 percent slope	40	
	Howell		50
	Dodon		30
McD	Manor loam, 15 to 25 percent slopes	187	
	Manor		90

Map Unit Sym	Map Unit Name/Component Name(s)	Total Acres	Comp%
MfF	Manor-Brinklow complex, 25 to 65 percent slopes, very rocky	417	
	Manor		55
	Brinklow		30
MnE	Marr-Dodon complex, 15 to 25 percent slopes	11947	
	Marr		50
	Dodon		35
PT	Pits, gravel, (on slopes > 15%)	1097	
	Pits, gravel		100
SnE	Sassafras-Urban land complex, 15 to 25 percent slopes	281	
	Sassafras		55
SOE	Sassafras and Croom soils, 15 to 25 percent slopes	1238	
	Sassafras		40
	Croom		35
SOF	Sassafras and Croom soils, 25 to 40 percent slopes	610	
	Sassafras		40
	Croom		35
UdbE	Udorthents, loamy, 15 to 25 percent slopes	114	
	Udorthents		100
UdgE	Udorthents, reclaimed gravel pits, 15 to 25 percent slopes	747	
	Udorthents		100
UdrF	Udorthents, refuse substratum, 0 to 50 percent slopes	1198	
	Udorthents		100
WDF	Westphalia and Dodon soils, 25 to 40 percent slopes	6272	
	Westphalia		45
	Dodon		40
WDG	Westphalia and Dodon soils, 40 to 80 percent slopes	1128	
	Westphalia		45
	Dodon		40

MARYLAND COMAR HIGHLY ERODIBLE SOILS
PRINCE GEORGE'S COUNTY, MARYLAND

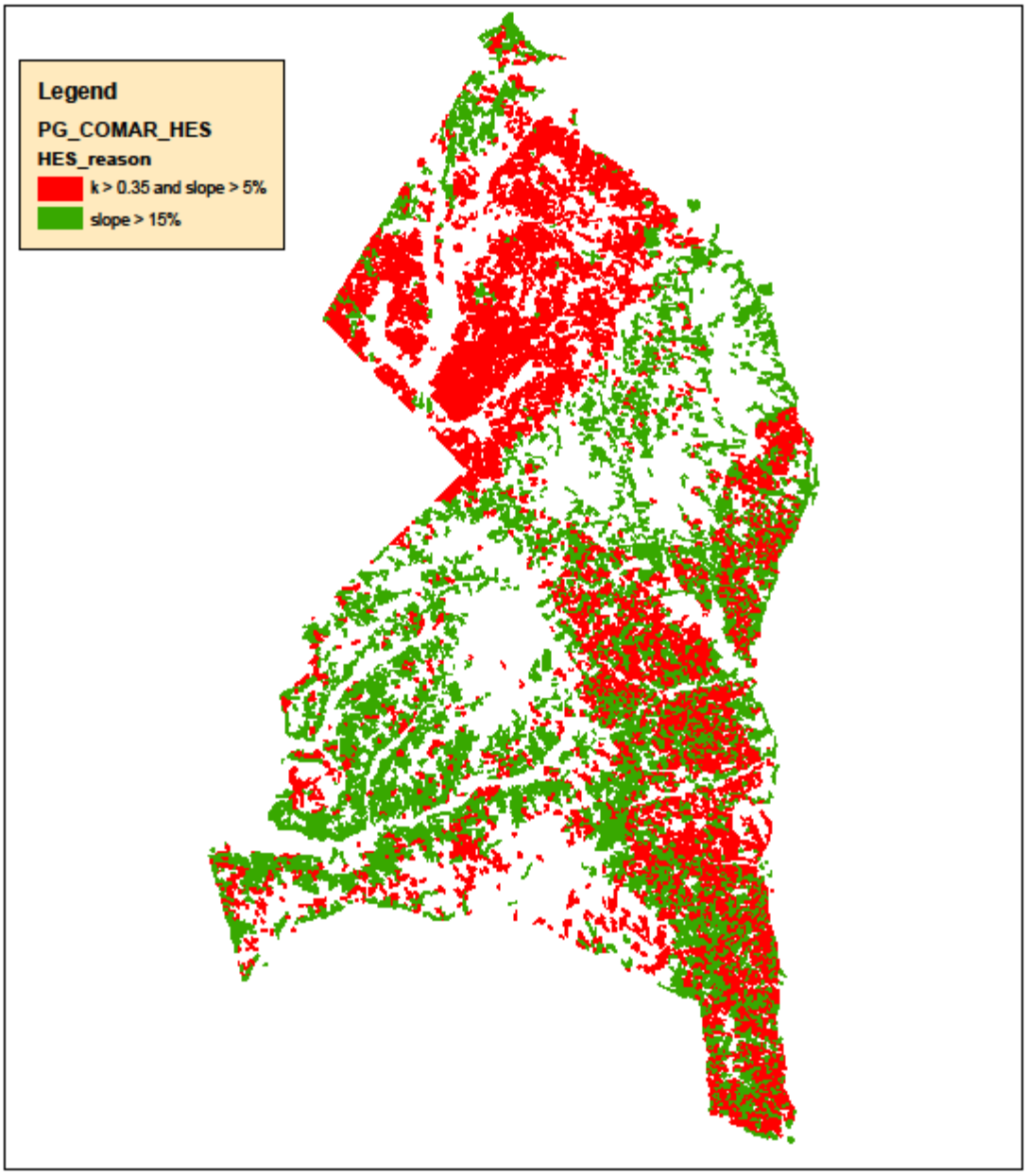
SLOPES GREATER THAN 5 PERCENT WITH A K-FACTOR GREATER THAN 0.35

NOTES: Table is based on data from NRCS SSURGO data (7/31/2009) exported from the Soil Data Mart. This table lists soils meeting the Maryland COMAR and local SCD definition of Highly Erodible Soils (HES). Percent Composition is only given for major components, not minor components. K-Factor is from surface layer. Highly Erodible Soils (HES) Criteria element:
K Factor=K Factor > 0.35 and slopes > 5%

Map Unit Sym	Map Unit Name/Component Name(s)	Total Acres	Comp%	K-Factor
AdC	Adelphia-Holmdel complex, 5 to 10 Percent slopes	519		
	Adelphia		55	.37
BaC	Beltsville silt loam, 5 to 10 percent slopes	3302		
	Beltsville		70	.37
CaC	Chillum silt loam, 5 to 10 percent slopes	82		
	Chillum		75	.37
CaD	Chillum silt loam, 10 to 15 percent slopes	63		
	Chillum		75	.37
CbD	Chillum-Urban land complex, 5 to 15 percent slopes	222		
	Chillum		50	.37
CbE	Chillum-Urban land complex, 15 to 25 percent slopes	62		
	Chillum		50	.37
CcC	Christiana-Downer complex, 5 to 10 percent slopes	4543		
	Christiana		45	.49
CcD	Christiana-Downer complex, 10 to 15 percent slopes	1715		
	Christiana		50	.49
CcE	Christiana-Downer complex, 15 to 25 percent slopes	851		
	Christiana		45	.49
CcF	Christiana-Downer complex, 25 to 40 percent slopes	220		
	Christiana		45	.49
CdD	Christiana-Downer-Urban land complex, 5 to 15 percent slopes	6980		
	Christiana		30	.49
CdE	Christiana-Downer-Urban land complex, 15 to 25 percent slopes	523		
	Christiana		35	.49
GfB	Glenelg-Wheaton-Urban land complex, 0 to 8 percent slopes	336		
	Wheaton		30	.43

Map Unit Sym	Map Unit Name/Component Name(s)	Total Acres	Comp%	K-Factor
GfC	Glenelg-Wheaton-Urban land complex, 8 to 15 percent slopes	5		
	Wheaton		30	.43
GwD	Grosstown-Woodstown-Beltsville complex, 5 to 15 percent slopes	311		
	Beltsville		20	.37
HwC	Howell-Dodon complex, 5 to 10 percent slopes	23		
	Dodon		40	.37
HZD	Howell and Dodon soils, 10 to 15 percent slopes	74		
	Dodon		40	.37
HZE	Howell and Dodon soils, 15 to 25 percent slopes	94		
	Dodon		30	.37
HZF	Howell and Dodon soils, 25 to 40 percent slopes	40		
	Dodon		30	.37
LxD	Liverpool-Piccowaxen complex, 5 to 15 percent slopes	296		
	Liverpool		45	.37
MnD	Marr-Dodon complex, 10 to 15 percent slopes	10473		
	Dodon		40	.37
UrcD	Urban land-Christiana-Downer complex, 5 to 15 percent slopes	3655		
	Christiana		15	.49
WDF	Westphalia and Dodon soils, 25 to 40 percent slopes	6272		
	Dodon		40	.37
WDG	Westphalia and Dodon soils, 40 to 80 percent soils	1128		
	Dodon		40	.37

COMAR HIGHLY ERODIBLE SOILS MAP
PRINCE GEORGE'S COUNTY, MARYLAND



NRCS Natural Resources Conservation Service

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www.md.nrcs.usda.gov

Created 7/19/2010

J. Brewer, CPSS/SC
NRCS Soil Scientist

___F. HIGH QUALITY (TIER II) WATERS IN PRINCE GEORGE'S COUNTY
CODE OF MARYLAND REGULATIONS 26.08.02.04-1

The Clean Water Act requires three components to water quality standards that set goals for and protect each States' waters. The three components are: (1) designated uses that set goals for each water body (e.g., recreational use), (2) criteria that set the minimum conditions to support the use (e.g., bacterial concentrations below certain concentrations) and (3) an antidegradation policy that maintains high quality waters so they are not allowed to degrade to meet only the minimum standards.

Maryland's antidegradation policy has been promulgated regulations: COMAR 26.08.02.04 sets out the policy itself, COMAR 26.08.02.04-1, provides for implementation of Tier II (high quality waters) of the antidegradation policy. An application for proposed discharge to Tier II waters that will result in a new, or an increased, permitted annual discharge of pollutants and a potential impact to water quality, shall evaluate alternatives to eliminate or reduce discharges or impacts. The following is the Tier II stream segments and watersheds for Prince George's County:

County: Prince George's County 2011							**Baseline:**		
Date Listed	**Stream Name**	**12-Digit Watershed**	**From Lat**	**From Long**	**To Lat**	**To Long**	**Fish IBI***	**Benthie IBI***	**Assimilative Capacity Remaining?**
2007	Bald Hill Branch 1	021311030925	38.99228	-76.84371	38.92241	-76.82020	4.00	4.14	YES
2007	Beaverdam Creek 1	021402050823	39.02370	-76.85045	39.02190	-76.85974	4.33	4.43	YES
2007	Beaverdam Creek 2	021402050823	39.02287	-76.86218	39.01585	-76.89775	4.33	4.71	YES
2007	Mataponi Creek UT1	021311020905	38.72979	-76.82511	38.71989	-76.79437	4.00	4.43	YES
2008	Mattawoman Creek 1	021401110786	38.65497	-76.93916	38.65767	-76.98456	5.00	4.43	NO
2009	Patuxent River 1	021311040937	39.01110	-76.73676	39.00709	-76.73319	4.00	4.71	YES
2003	Piscataway Creek 1	021402030803	38.73428	-76.86811	38.73258	-76.87590	4.67	4.43	YES
2007	Piscataway Creek 2	021402030799	38.70638	-76.97208	38.69906	-76.98589	4.33	4.14	YES
2007	Rock Creek 1	021311010904	38.69443	-76.75155	38.69093	-76.72613	4.67	4.71	YES
2003	Swanson Creek 1	021311010893	38.60760	-76.74634	38.58927	-76.74244	4.67	5.00	YES
2007	Swanson Creek 2	021311010890	38.55844	-76.74044	38.55404	-76.72821	4.67	4.14	YES
2007	Swanson Creek 3	021311010893	38.58927	-76.74244	38.55844	-76.74044	4.67	4.43	YES
2009	Turkey Branch 1	021311030921	38.84980	-76.84000	38.85763	-76.78847	4.67	4.14	YES
2003	Wolf Den Branch 1	021401080769	38.63601	-76.82109	38.62192	-76.82043	4.33	4.71	YES
2003	Zekiah Swamp Run 1	021401080769	38.63464	-76.79846	38.62196	-76.82036	4.33	4.14	NO

***IBI=Index of Biotic Integrity**

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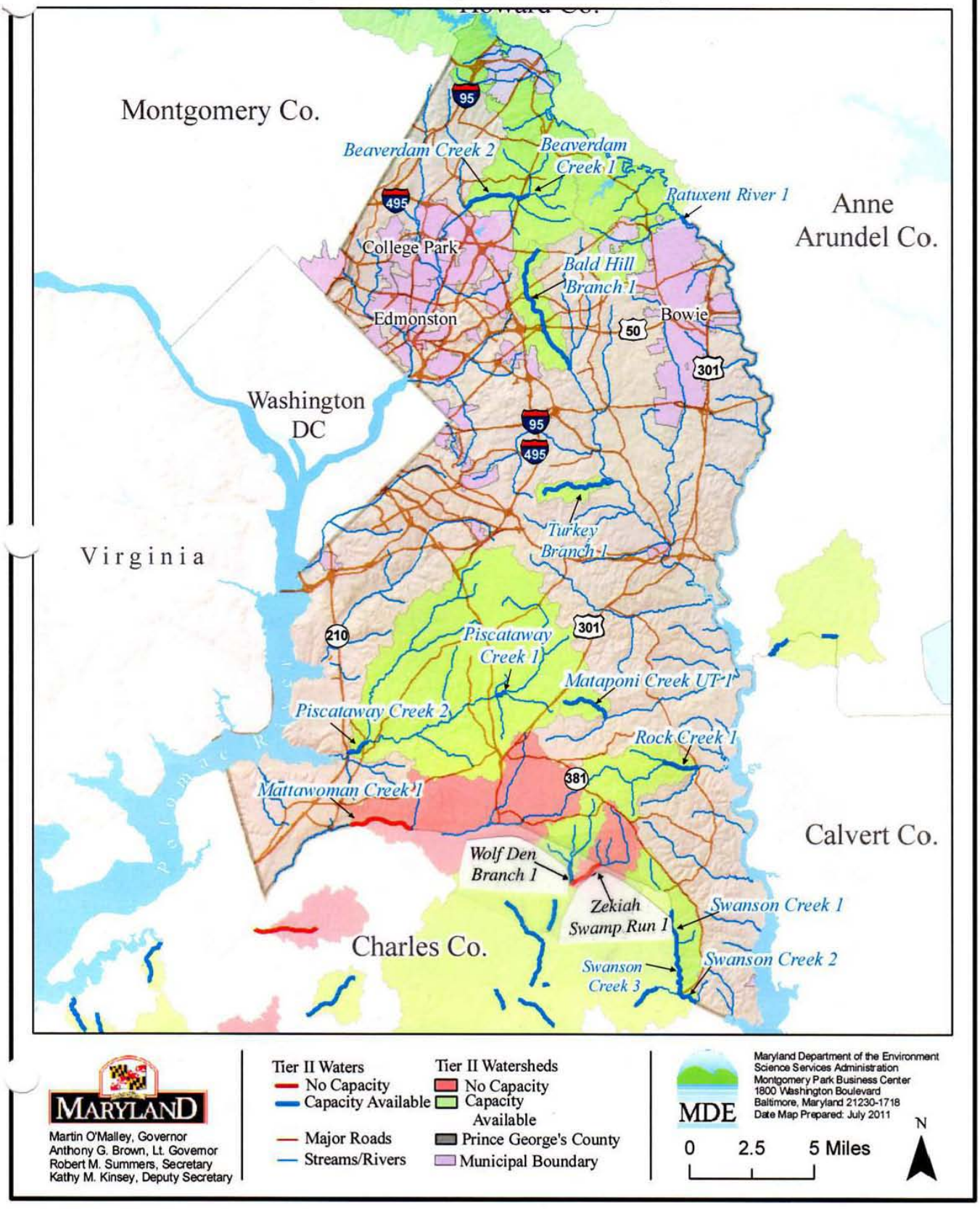
High Quality (Tier II) Waters in Prince George's County

[Code of MD Regulations 26.08.02.04-1]



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___G. PRINCE GEORGE'S COUNTY WATERS IMPAIRED BY SEDIMENTS - 2012 WITH AN ESTABLISHED TOTAL MAXIMUM DAILY LOAD (TMDL)

Impairments are natural drainage areas (watersheds) where required water quality standards are not met. There are numerous standards including dissolved oxygen, nutrients, **sediments**, bacteria, pH, metals, and other toxic contaminants, and biological criteria to meet the requirements to "support aquatic life". The Federal Clean Water Act requires that these impairments be addressed as part of a State water quality management program. The impaired waters list (also known as the Integrated Report) is reviewed and revised, with public comment every two years, on the even year.

Total Maximum Daily Loads (TMDLs) include estimates of pollution loads from all sources and provide allocations to those sources that will reduce pollution loads to the point at which the water quality standards are attained. The part that has been missing for many years is appropriate planning and development guidelines to prevent new development from counteracting the pollution reduction achieved by existing programs and to contribute proportionately to pollution reduction. This new planning requirement will help significantly in meeting water quality goals. The following is the Impaired Waters with TMDLs for Prince George's County:

Cycle First Listed	Basin Code	Basin Name	Water Type	Listing Category*	Cause
1996	02131101	PAXMH-Lower Patuxent River Mesohaline	ESTUARY	4a	Total Suspended Solids (TSS)
1996	02131102	Patuxent River Middle	ESTUARY	4a	Total Suspended Solids (TTS)
1996	02131103	WBRTF-Western Branch Patuxent River Tidal Fresh	ESTUARY	4a	Total Suspended Solids (TSS)
1996	02131104	Patuxent River Upper	RIVER	4a	Total Suspended Solids (TSS)
1996	02140203	PISTF-Piscataway Creek Tidal Fresh	ESTUARY	4a	Total Suspended Solids (TSS)
1996	02140205	Anacostia River	RIVER	4a	Total Suspended Solids (TSS)
1996	02140205	ANATF-Anacostia River Tidal Fresh	ESTUARY	4a	Total Suspended Solids (TSS)

*Category 4a – Some waters impaired, TMDL complete.

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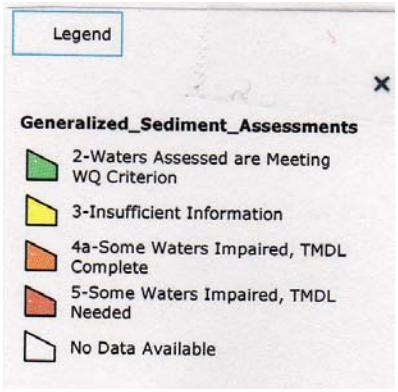
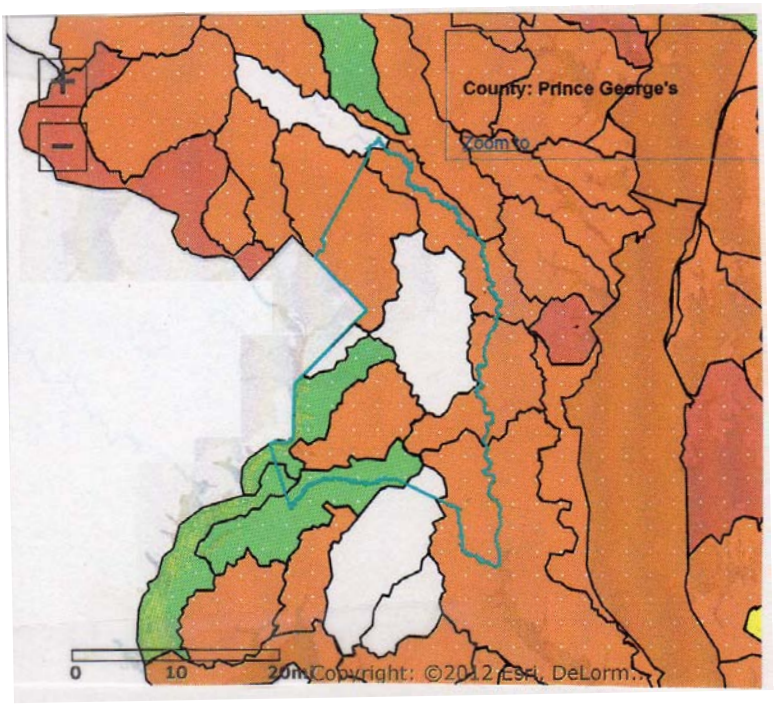
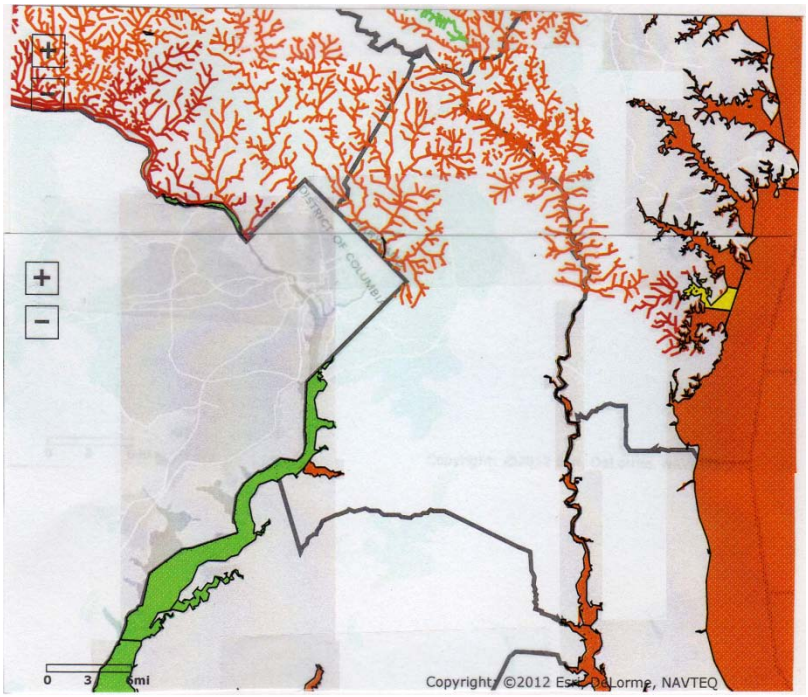
PRINCE GEORGE'S COUNTY WATERS IMPAIRED BY SEDIMENTS – 2012





Water Impaired Watersheds



Water Impaired Stream Segments and Tributaries

For site specific determinations follow instructions below:

1. www.mde.state.md.us (MDE website);
2. On Home Page click on scrolling titles (#3) – titled **Water Quality Mapping Center;**
3. Click on **Integrated Report Maps**;
4. Scroll down and click on **Sediments**;
5. Click on Prince George's County watersheds;
6. See (How to Use) to navigate the maps.

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___H. CONCEPT GRADING, EROSION AND SEDIMENT CONTROL PLAN SUBMITTAL

___1. General

___ a. **Concept Grading, Erosion and Sediment Control plans submitted to PGSCD will not be accepted for a completed review unless the submittal includes:** The PGSCD Concept Grading, Erosion and Sediment Control Transmittal Letter, PGSCD Concept Grading, Erosion and Sediment Control Site Analysis, and Concept Supplementary Information as contained in these guidelines; the required consultant certification has been signed; the review fee has been paid; plan sheets sealed; and two sets of folded review prints included.

___ b. **Concept Fees are payable by check or money order to Prince George's Soil Conservation District**

___ c. All Concept Grading, Erosion and Sediment Control plans submitted for review shall contain **two sets of folded (9" x 12") review prints** and one set of accompanying data.
Do not submit original/sepia until PGSCD indicates the plan is ready for approval.
Four sets of prints and original/sepia (optional) shall be submitted for approval and signing. Additional plans submitted for approval will be processed at the current fee rate.

___ d. Include **signed** and completed consultants certification.

___ e. All Concept Grading, Erosion and Sediment Control plan sheets shall be **sealed** by a registered professional civil engineer, architect, landscape architect, or land surveyor.

___ 2. **Prince George's Soil Conservation District Concept Grading, Erosion and Sediment Control Transmittal Letter** – is required for each submittal. Include project name (same as on plan), contents listed, check reason for submittal and type of submittal (new-resubmittal-revision-update-additional stamped copy).
If a revision to an approved plan, note what has been revised and why in comments section. Include PGSCD Concept Grading, Erosion and Sediment Control number (CSC), once assigned, in any subsequent correspondence or resubmittals.

___3. **Prince George's Soil Conservation District Concept Grading, Erosion and Sediment Control Site Analysis** – is required for each new submittal or revision. Include project name (same as on the plan); complete the plan review fee, map coordinates, area of site, and remaining items.

___4. **Concept Supplementary Information** – all supplementary information shall be adequately and appropriately identified.

___ a. Soils, soil boundaries from Soil Survey, Prince George's County Maryland-December 2009, or later revisions. Provide a photocopy of the appropriate soil survey sheet with the site boundaries clearly outlined. Website for soil survey for Prince George's County is:
http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm

___ b. Drainage map of site, including off-site contributory areas.

___ c. Natural Resource Photographs with location noted for field verification.

___ d. Concept Narrative.

___ e. Preliminary Soils Report as needed.

___I. PRINCE GEORGE'S SOIL CONSERVATION CONCEPT GRADING, EROSION AND SEDIMENT CONTROL FEES

___1. Concept Grading, Erosion and Sediment Control Plan Review

Concept Application Fee	$300.00
Major Revision(s) After Approval	$300.00
Update(s)	$150.00

NOTE: <u>Fees are payable by check or money order ONLY (no cash or credit/debit cards accepted). Make check(s) payable to Prince George's Soil Conservation District.</u>

___2. Unapproved Plans

___ a. If no activity occurs within one year, an unapproved Concept Grading, Erosion and Sediment Control Plan will be considered expired and will be cancelled.

___ b. The engineer/owner may request in writing a six month continuance prior to cancellation.

___3. Plan Expiration

___ a. All Concept Grading, Erosion and Sediment Control plans expire three years after approval.

___ b. Expired plans require a full Concept Application Fee.

___4. Updating or Extending a Plan

___ a. Plans can only be updated on or before the plan expiration date. If the plan has expired, a full fee is required.

___ b. Updates extend the plan approval for another 3 years.

___ c. Fee for concept plan update(s) is $150.00.

___ d. For plan design changes, see revisions. Revision approval dates and revision fees paid have no bearing on update fees or plan expiration.

___5. Revisions (to approved Concept Grading, Erosion and Sediment Control plans)

___ a. Additional stamped copies (must match approved plans exactly with no changes)

___ (1) Additional Copies - $50.00 each.

___ b. Minor revision of $100.00.

___ (1) Owner change;

___ (2) Engineer change.

___ c. Major Revision is $300.00.

___ d. **<u>Revised approval does not extend expiration dates.</u>**

___6. Governmental Fees

___ a. County agencies will no longer charge each other fees. The County agencies include DER, OCS, DPW&T, MNCPPC, PGSCD and Fire/EMS Department.

___ b. For municipalities and Prince George's County School Board the concept fee is $300.00.

___7. Checks Returned for Insufficient Funds

___ a. The engineer/owner/applicant shall be liable for a collection fee of $35.00.

___ b. Fees not satisfied within ten days notice given by PGSCD may result in prosecution under the Maryland criminal code and/or withdrawal of any plan approvals and notification of permitting authorities for stop work orders.

___ c. We accept only **certified checks or money orders** from an engineer/owner applicant for payment of a returned check.

___ d. For a period of six months from the date the insufficient funds are paid, a **certified check or money order** will be required on any additional plans submitted.

___8. District Fee Return Policy

___ a. On occasion a request for a refund of plan review fees is made. The following conditions have resulted in an applicant receiving a refund:

___ (1) The owner or engineer requested a plan be **withdrawn before plan review has started;**

___ (2) During review a plan is found to be exempt from erosion and sediment control plan approval and only an exemption letter is issued;

___ (3) Evidence of overpayment has been provided by the owner or engineer.

___ (4) Transfer of payment from one plan to another by separating a plan. This may only be done when no additional design review or overlapping of plans will occur.

___ b. A letter to the District Manager requesting return of fee and reason is required by the owner/applicant. Also, a copy of the cancelled check is required. For administrative costs $100.00 of the concept fee is not refundable.

____J. CONCEPT GRADING, EROSION AND SEDIMENT CONTROL PLAN APPROVAL

___1. Any changes or modifications (not approved by the PGSCD) to an approved Concept Grading, Erosion and Sediment Control plan, shall invalidate the plan approval.

___2. PGSCD Concept Grading, Erosion and Sediment Control plan approval shall remain valid for a period of three years from the approval date. An expiration date will be shown on all plans.

___3. Four sets of prints and original/sepia (optional) shall be submitted for approval and signing. The copy or copies (prints) of the Concept Grading, Erosion and Sediment Control plan with signed PGSCD approval stamp, will become an official record copy of the approved Concept Grading, Erosion and Sediment Control plan. Copies made from the approved mylars are approved copies as long as no changes to the plans have been made.

___4. Include the PGSCD approval stamp in close proximity to the title block (lower right hand corner) on the first sheet of the Concept Grading, Erosion and Sediment Control plan. **Note: Do not alter approval block.** The approval stamp needs to show on the outside when the plans are folded.

___5. Revisions and updates to previously approved Concept Grading, Erosion and Sediment Control plans will be reviewed in accordance with PGSCD requirements in effect at time of submittal. Include an explanation of what was revised, changed, or added, and why.

___6. PGSCD reserves the right to deny the issuance of an approval where the proposed project would adversely affect the public safety and welfare.(COMAR 26.17.01.08)

___K. PRINCE GEORGE'S SOIL CONSERVATION DISTRICT CONCEPT GRADING, EROSION AND SEDIMENT CONTROL

APPROVAL STAMP

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT **APPROVAL** **CONCEPT GRADING, EROSION AND SEDIMENT CONTROL** **CSC#**
EXPIRATION DATE
DISTRICT SIGNATURE **APPROVAL DATE**

___1. **NOTE:**

INCLUDE THE PGSCD APPROVAL STAMP IN CLOSE PROXIMITY TO THE TITLE BLOCK (LOWER RIGHT HAND CORNER) ON THE FIRST SHEET OF THE CONCEPT GRADING, EROSION AND SEDIMENT CONTROL PLAN ONLY.

STAMP MUST SHOW ON THE OUTSIDE WHEN CONCEPT GRADING, EROSION AND SEDIMENT CONTROL PLANS ARE FOLDED.

PGSCD WILL SIGN AND/OR INITIAL THE APPROVAL AND INCLUDE APPROVAL AND EXPIRATION DATES ON PLANS AS APPROPRIATE.

DO NOT ALTER THE SIZE (2-7/8" X 3-3/4") OR CONTENT OF THE APPROVAL STAMP.

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FROM:

PRINCE GEORGE'S
SOIL CONSERVATION DISTRICT

CONCEPT
GRADING, EROSION AND SEDIMENT
CONTROL PLAN TRANSMITTAL LETTER
(Required for each submittal)

TO: PRINCE GEORGE'S SOIL
CONSERVATION DISTRICT
5301 MARLBORO RACE TRACK RD.
UPPER MARLBORO, MD 20772
301-574-5162 X 3
301-574-5156 Fax

DATE:
ATTENTION:
CSC#
RE:

SUBMITTED FOR: ___Concept Grading, Erosion and Sediment Control Plan Review (CSC)
(Always submit two sets of prints for review)

TYPE OF SUBMITTAL: ___New ___Resubmission ____Revision ____Update _____ Copies
___Concept Approval (Include originals & four prints) **Do Not Send Until Requested**

COPIES	DESCRIPTION

INFORMATION ENCLOSED: Check appropriate spaces

Concept Grading, Erosion and Sediment Control Plan

___Review Fees
___2 Sets of Prints (folded)
___Signed Certification
___Plans Sealed
___Site Analysis Sheet
___Soil Survey Soil Boundaries
___Drainage Map
___Site Limits/Property Lines
___Natural Resource Photographs
___Concept Narrative
___Preliminary Soils Report

COMMENTS:_____

_____

_____

_____

PRINT
NAME_____PH#_____

EMAIL ADDRESS:_____

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT
CONCEPT
GRADING, EROSION AND SEDIMENT CONTROL PLAN
SITE ANALYSIS
(Required for each new submittal or revision)

NAME OF PROJECT IN
TITLE BLOCK: _____

1. **Concept Grading, Erosion and Sediment Control Plan Review**

			Amount
Concept Application Fee	$300.00		_____
Revision(s) After Approval	$300.00		_____
Update(s)	$150.00		_____
		Total Due	_____

NOTE: Checks or money orders ONLY made payable to Prince George's Soil Conservation District (no cash or credit/debit cards accepted).

2. Location P.G. Co. Street Map Book Coordinates _____

3. Street Address_____

_____

4. Area of Site/Property _____ ac.

Existing Natural Resources:

5. Steep Slopes (acres) >15% _____ >25%_____

6. Highly Erodible Soils _____ Marlboro Clays _____ Sulfidic Soils _____
Diatomaceous Soils _____

7. Vegetative Cover (acres) Grass _____ Cropland _____ Disturbed/Graded _____
Other _____

8. Forests (acres) _____

9. Perennial Stream(s) _____ Intermittent Stream(s)_____

10. Spring(s) _____ Seep(s)_____

11. Pond(s) _____

12. Wetland(s) (acres) _____

13. Floodplain (acres) _____

14. Chesapeake Bay Critical Area (acres) _____

15. Waters of the United States _____

16. Percent impervious cover proposed _____

17. TIER II Waters_____

18. Impaired Waterways with TMDL_____

19. Other _____

SECTION II

PRINCE GEORGE'S
SOIL CONSERVATION DISTRICT

ENVIRONMENTAL SITE DEVELOPMENT

GRADING, EROSION AND SEDIMENT CONTROL PLAN

___ II. PRINCE GEORGE'S SOIL CONSERVATION DISTRICT ENVIRONMENTAL SITE DEVELOPMENT GRADING, EROSION AND SEDIMENT CONTROL PLAN(SSC)

___A. INTRODUCTION FOR ENVIRONMENTAL SITE DEVELOPMENT GRADING, EROSION AND SEDIMENT CONTROL PLANS

Preparation of site development plans will include designs for grading, erosion and sediment control. During this phase the site footprint for the whole site to be developed will be finalized with respect to the layout of buildings, roadways, parking, and other structures in order to then develop more detailed final designs. The following plans (which may be combined) will be required for site development review:

- Grading, erosion and sediment control and,
- an overlay showing stormwater and grading, erosion and sediment control practices.

___1. Environmental Site Development Grading, Erosion and Sediment Control Plans

After Concept Grading, Erosion and Sediment Control Plan approval, the final grading and proposed drainage areas during construction will be established. This is critical to developing the Environmental Site Development Erosion and Sediment Control Plan. The plan prepared at this phase will include measures for:

___ a. Preservation.
___ b. Phasing and construction sequencing during each stage of development maximum grading unit is $\leq$ 20 acres.
___ c. Preliminary design of sediment controls.
___ d. Stabilization strategies.
___ e. Detailed Site Soils Report
___ f. Pond hazard classification.
___ g. Pond soils report and borrow areas.
___ h. Pond Exemptions.

___2. Overlay Plan

Once the ESD practices have been located and sized appropriately, consideration to how these practices will function under proposed conditions is required. An overlay plan shall include the location of all ESD practices to allow for efficient grading, erosion and sediment control design and the protection of locations that will be used to treat stormwater. A separate overlay plan is not required if this information is clearly shown on the Environmental Site Development, Grading, Erosion and Sediment Control Plan.

___3. Pond Review

As part of the coordinated, comprehensive review process of erosion and sediment control and stormwater management integration, the District will provide the review and acceptance of pond hazard classification, pond exemption and pond soil determinations during the site development plan phase. (Preliminary Pond review).

___B. ENVIRONMENTAL SITE DEVELOPMENT GRADING, EROSION AND SEDIMENT CONTROL PLAN DESIGN CONSIDERATIONS

___1. Preservation

Comments received during Environmental Site Development Grading, Erosion and Sediment Control Plan review shall be used as a basis for preparing the Final Grading, Soil Erosion and Sediment Control Plan. Strategies to preserve sensitive resources, ensure soil stability, and prevent erosion begin with protecting those areas during project construction.

___ a. Identify areas to be protected by field marking (flagging or painting) for the limit of disturbance, sensitive areas, buffers, and forested areas that are to be preserved or protected.

___ b. In addition, infiltration and recharge areas that need to be protected from fine sediments and compaction shall be identified for field marking.

___ c. Plans shall also include a note that all protected areas shall be marked in the field prior to any land disturbing activity.

___2. Phasing and Sequences of Construction During Each Stage of Development

___ a. Provide a sequence of construction for each stage of development. These include initial clearing and grubbing, rough grading, site development, and final grading. Because initial and final flow patterns will not apply to all intermediate phases, this sequence shall consider flow pattern changes, drainage areas, and discharge points at transitional phases of the construction process. Phased plans need to ensure that erosion and sediment controls adequately address the changing runoff patterns.

___ b. Proper sequencing of grading operations will minimize site exposure. Sequentially grading and stabilizing the site, rather than grading the entire site as one operation, will minimize the length of time that the land is in a disturbed condition. Maximum grading unit is ≤ 20 acres.

___ c. Environmental Site Development Grading, Erosion and Sediment Control Plan strategies for minimizing erosion during interim grading include:

- ___ (1) Interim plans to address grade changes and flow patterns during clearing and grading, rough grading, site development, and final grading.
- ___ (2) Slope length and steepness reductions.
- ___ (3) Diverting clean water around or through a site and discharging to a stable outlet.
- ___ (4) Additional stabilization strategies.
- ___ (5) Additional grading, erosion and sediment control practices.

___3. Preliminary Design of Sediment Controls

Water handling practices need to provide erosion protection during site grading operations. This may be done by diverting runoff away from highly erodible soils, steep slopes, and disturbed areas by using dikes, swales, or reverse benches. Similarly, runoff can be safely conveyed from the top of slopes to a stable outfall using pipe slope drains or channels. Check dams may be needed to reduce velocities and prevent erosion. A stable outlet shall be provided for runoff from all discharge points. Provide preliminary sediment control and pond computations.

___4. Stabilization Strategies

___ a. When vegetation is removed and soil disturbance occurs, the extent and duration of exposure shall be minimized. All efforts shall be made to delay grading operations until it is certain that final grades can be reached in as little time as possible. The extent and duration of disturbance shall be limited, and enhanced stabilization techniques such as soil stabilization matting or turf reinforcement shall be used on areas with highly erodible soils and slopes greater than 15 %. Soil exposure shall be shortened if warranted by site conditions.

___ b. Perimeter controls, perimeter slopes, and extreme grade modification (e.g., slopes greater than 3:1 or where cuts and fills exceed 15 feet vertical) require stabilization within three days. Mass clearing and grading shall be avoided, with larger projects (e.g. ≥20 acres) being phased so that disturbed areas remain exposed for the shortest time possible. All other areas shall have a good cover of temporary, permanent vegetation and/or mulch.

___ c. Natural vegetation shall be retained in an undisturbed state wherever possible. If it is not possible to retain natural vegetation, the topsoil shall be salvaged, stockpiled on-site, protected from erosion, and replaced at final grade. Topsoil removal, grading, and filling reduce soil quality resulting in detrimental impacts on plant growth and increased runoff. Additionally, the removal of topsoil inhibits biological activity and reduces the supply of organic matter and plant nutrients. Similarly, unrestricted use of construction equipment can result in soil compaction.

___ d. Applicable practices include, but are not limited to, temporary and permanent seeding, sodding, mulching, plastic covering, erosion control fabrics and matting, the early application of gravel base on areas to be paved, and dust control. Soil stabilization measures should be appropriate for the time of year, site conditions, and estimated duration of use. Soil stockpiles must be stabilized, protected with sediment trapping or filtering measures, and be located away from storm drain inlets, waterways, and drainage channels. Linear construction activities, including right-of-way and easement clearing, roadway development, pipelines, and trenching for utilities shall be phased so that soils are stabilized as quickly as possible.

___ e. Strategies to limit the extent and duration that soils are exposed may include:

___ (1) Minimizing disturbed area.

___ (2) Phasing earth disturbing activities so that the smallest area is exposed for the shortest possible time.

___ (3) Salvaging topsoil for later use.

___ (4) Stabilizing as work progresses.

___5. Dam Hazard Classification

The classification of a dam is the responsibility of the designer and subject to review and acceptance of the approving authority.

___ a. Structure classification must take into consideration the anticipated life of the structure as it would impact downstream property.

___ b. Dam classification is determined by the potential hazard from failure, **not** by the criteria.

___ c. Use of breach procedures and results at representative and critical sections provide support of the hazard classification and subsequent pond design criteria used.

___6. Pond Soils Report and Borrow Areas

___ a. A soils investigation by a Maryland registered geotechnical engineer is **required** on all ponds. Off-site borrow must be identified before final approval.

___ b. All investigations shall be logged using the Unified Soil Classification System.

___ c. Fill material for the center of the embankment and cut off trench shall conform to Unified Soil Classification GC, SC, CH, or CL.

___ d. A sufficient quantity of topsoil will be stockpiled in a suitable location for use on the embankment to support vegetation of the quality required.

___ e. Offsite borrow areas must be identified with adequate soil quality and quantities before pond approval.

___7. Preliminary Pond Exemptions

___ a. Exemptions must be applied for in writing.

___ b. Include preliminary computations for proper justification.

___ c. All structures must be hazard class "a".

___ d. Provide design for 100 year storm event (MD NOAA 14 rainfall depth) and include required freeboard.

___ e. Exemption requests shall **not** combine two or more exemption categories.

___8. Overlay Plan

___ a. The location of any ESD practice that requires natural infiltration needs to be identified on the Environmental Site Development Grading, Erosion and Sediment Control Plan. These areas need to be protected during construction.

___ b. An overlay plan shall include:

___ (1) The location of existing and proposed ESD practices.

___ (2) The location of areas that must remain undisturbed, protected, or used for erosion and sediment control.

___ (3) Identifiable areas where construction equipment may compact soil and will need rehabilitation after grading operations.

___ (4) Removal of sediment from the locations of ESD practices.

___ (5) Stabilization measures needed to enhance stormwater functions.

___C. ENVIRONMENTAL SITE DEVELOPMENT GRADING, EROSION AND SEDIMENT CONTROL PLAN PREPARATION

___1. Environmental Site Development Grading, Erosion and Sediment Control plans shall be submitted to Prince George's Soil Conservation District and need to include a stormwater plan, grading, erosion and sediment control plan, an overlay plan, and a narrative to support the design. PGSCD may require additional information at this phase, however, at a minimum the plan shall include the following:

___2. All of the information provided in the concept review.

___3. Conditions issued by review agencies during the concept review shall be addressed on the Environmental Site Development Plan.

___4. Determination of final site layout and acreage of total impervious area on site.

___5. Existing and proposed topography.

___6. Proposed drainage areas at all points of discharge from the site.

___7. Proposed hydrology analysis for all ponds and trapping devices: (as needed)

- ___ a. for runoff rates,
- ___ b. storage volumes,
- ___ c. and discharge velocities.

___8. Discharge calculations demonstrating stable conveyance of runoff from the site.

___9. Preliminary erosion and sediment control plans showing:

- ___ a. grading units, 20 acres maximum contiguous disturbed area at a given time.
  - ___ (1) limits of disturbance, 30 acres maximum cumulatively at a given time
- ___ b. sensitive areas,
- ___ c. buffers,
- ___ d. forests that are to be preserved,
- ___ e. proposed phasing,
- ___ f. construction sequencing, and time frames,
- ___ g. proposed practices and preliminary computations,
  - ___ (1) water conveyance,
  - ___ (2) erosion control,
  - ___ (3) filtering,
  - ___ (4) dewatering,
  - ___ (5) sediment trapping.
- ___ h. designation of stabilization requirements,
  - ___ (1) grading unit size, 20 acre maximum contiguous graded area at a given time.
  - ___ (2) topsoiling and topsoil stockpiles,
  - ___ (3) soil testing and recommended soil amendments,
  - ___ (4) 3 day – sediment controls and slopes steeper than 3:1,
  - ___ (5) 7 day – all other disturbed areas,
  - ___ (6) incremental stabilization – slopes over 15 feet,
  - ___ (7) accelerated – same day on areas of special concern,
  - ___ (8) soil stabilization matting – for channels or slopes,
  - ___ (9) heavy use area protection.

___10. An overlay plan showing the location of stormwater ESD practices and proposed erosion and sediment controls. Ensure that proposed stormwater management features, such as permeable pavement, infiltration areas, and buffers, are not negatively impacted during construction.

___11. Initial, interim, and final plan phases shall be developed to adjust the soil erosion and sediment controls to the changing drainage patterns.

___12. The location and size of ESD to the MEP practices including all nonstructural, alternative surfaces, micro-scale and structural practices used.

___13. A narrative that supports the Environmental Site Development Grading, Erosion and Sediment Control Plan and provides full integration of erosion and sediment control with the County's stormwater management CESD to the MEP. This should include nonstructural techniques and site planning to mimic natural hydrologic runoff characteristic.

___14. The scope of the Environmental Site Development Grading, Erosion and Sediment Control Plan is to be clearly defined and fully identified in the title block. All Environmental Site Development Grading, Erosion and Sediment Control Plan sheets are to be numbered chronologically with a SSC#.

___15. Plans are to be legible and shall include: scale (1"=50' maximum), two foot contour intervals, legends, north arrow. All plan sheets must be the same size with a maximum size of 30"x42". Include a site specific vicinity map to scale. Include road identification, nearest intersections and distance to. Include enough detail on the vicinity map so that someone unfamiliar with the site can quickly locate it in the field.

___16. All Environmental Site Development Grading, Erosion and Sediment Control Plans submitted for review shall contain two sets of folded prints (9" x 12") and one set of accompanying data. **Do not submit mylars/originals until PGSCD plan reviewer indicates the plan is ready for approval.** Four sets of final prints and original/sepia (optional) shall be submitted for approval and signing. Additional or approved plans submitted for additional stamped copies will be processed at the current fee rate.

___17. If Environmental Site Development Grading, Erosion and Sediment Control Plan is presented on three or more sheets, provide a composite-overall drawing showing how the sediment control and existing topography, on individual sheets tie together. Match lines and matching sheet numbers are to be included on each sheet.

___18. Show property lines and names of all adjacent property owners.

___19. Plans must include topographic data sufficiently adequate to show existing conditions adjacent to the site and downstream of all sediment control. This shall be a **minimum** 100 foot adjacent strip and **minimum** 100 foot downstream, or as otherwise needed to clearly reflect existing conditions.

___20. **The following certification shall be included on all Environmental Site Development Grading, Erosion and Sediment Control Plans and shall be signed at time of plan submittal. Include on the first sheet and do not alter the wording.**

CONSULTANTS CERTIFICATION

"I certify that this Environmental Site Development Grading, Erosion and Sediment Control Plan represents all significant natural resources and is a practical and workable plan based on my personal knowledge of the site, and that this plan was prepared in accordance with the requirements of the Prince George's Soil Conservation District and "Standards and Specifications for Soil Erosion and Sediment Control". I have reviewed this Environmental Site Development Grading, Erosion and Sediment Control Plan with the owner/developer".

Signature_____MD License#_____

Print Name_____ Date_____

(Include seal, company name, address and phone number if not included elsewhere on plan).

___21. Prince George's Soil Conservation District will provide coordinated feedback for grading, erosion and sediment control to the designer before a project proceeds to the more detailed final design phase. This feedback will accompany the Environmental Site Development approval and shall be incorporated into future submission.

___22. Any site requiring the subdivision review process will need separate review and approval for concept, site development and final grading, erosion and sediment control plans by the District.

___23. Sites not requiring the subdivision process have the option of combining the concept and site development grading, erosion and sediment control plans for review and approval by the District.

___24. Lots that are eligible for utilizing the standard grading, erosion and sediment control plan may include all three plan requirements for concept, site development and final on one plan.

___25. Forest harvest erosion and sediment control plans shall use the MDE Standards and Specifications for Forest Harvest Operations 2005 Draft.

___D. PGSCD POND SOIL REPORTS AND BORROW AREAS

___1. A soils investigation and report is required on all ponds to include the following:
- ___ a. A Maryland registered geotechnical engineer seal and signature.
- ___ b. Investigations shall be logged using the Unified Soil Classification System.
- ___ c. A soil boring map with boring locations shown.
- ___ d. Soil logs with profiles, elevations, blows counts and depth to groundwater at time of drilling and after 24 hours.
- ___ e. A narrative of findings and recommendations.
- ___ f. Additional engineer requirements geotechnical (i.e., dewatering).

___2. A sufficient number of soil borings is required to provide representative sampling of soils present at the following locations:
- ___ a. Along the centerline of the proposed dam,
- ___ b. In the emergency spillway,
- ___ c. In the pond pool area,
- ___ d. At the control structure,
- ___ e. In the planned borrow area.
- ___ f. And to determine location and depth of impervious foundation material.

___3. Fill material for the embankment shall conform to the following:
- ___ a. The center of the embankment and cut off trench shall use unified classes GC, SC, CH or CL.
- ___ b. Embankment shell material with high piping potential such as unified classes GM, SM, and ML will require the use of filter and drainage diaphragms.
- ___ c. A sufficient quantity of topsoil will be stockpiled in a suitable location for use on the embankment to support vegetation of the quality required to prevent erosion of the embankment.

___4. All embankment fill borrow areas must be identified and delineated.
- ___ a. Verify acceptable quantities of acceptable fill material.
- ___ b. Stockpiled borrow material can only be accepted if it has been tested and certified by the geotechnical engineer that all of the stockpiled material meets the required unified classes.
- ___ c. Offsite borrow areas must be identified and accepted before pond approval. Include a site location map and an approved erosion and sediment control plan number for offsite borrow areas.

___E. PGSCD DAM HAZARD CLASSIFICATION

___1. Introduction

All dams will be reviewed and classified according to factors and procedures outlined in 520.21 of Subchapter C, Subpart C – Dams, SCS National Engineering Manual as supplemented below. The class ("a", "b", and "c") is related to the damage that might result from a sudden major breach of the earth embankment. Structure classification must take into consideration the anticipated changes in land use or **future development** throughout the expected life of the structure as they would impact downstream property. Downstream undeveloped property requires a breach flow of 6" or less (based on USBR, "Downstream Hazard Classification Guidelines", 1988) for a Class "a" designation. The classification of a dam is the responsibility of the engineer and subject to review and acceptance of the approving authority.

___2. Classes of Dams

Dam classification is determined by the potential hazard from failure, **not** by the criteria. Table 1, MD-378 or Table 2-2 and 2-5 of TR-60 are not justification of the hazard, but are criteria. Classification factors in the National Engineering Manual, as supplemented, are given below.

___ a. Class "a" - Structures located in rural, agricultural or urban areas dedicated to remain in flood tolerant usages where failure may damage non-residential buildings, agricultural land, floodplains or county roads.

___ b. Class "b" - Structures located in predominantly rural or agricultural areas where failure may damage isolated homes, main highways or minor railroads, or cause interruption of use or service of relatively important public utilities.

___ c. Class "c" - Structures located where failure may cause loss of life or serious damage to homes, industrial and commercial buildings, important public utilities, main highways or railroads.

___ d. Where breach analysis has indicated that overtopping of downstream roads will occur. The following guidelines will be used:

Class	Depth of Flow
"a"	$d \leq 1.5$ Ft
"b" & "c"	$d > 1.5$ Ft

___3. Justification

___ a. Provide a narrative summary of the information used to evaluate the safety hazard for each dam classification. Use of breach procedures and results at representative and critical sections provide support of the hazard classification and subsequent pond design criteria used. The limits of the breach area are not analogous with the 100 year floodplain. Existing 100 year flooding of downstream homes, roads, railroads and utilities does not reduce hazard, but instead indicates breach damage may occur.

___4. **Peak Breach Discharge Criteria**

___ a. When providing justification for pond classification, the minimum peak discharge of the breach hydrograph is required regardless of the technique used to analyze the downstream inundation area. The breach hydrograph is the outflow hydrograph attributed to the sudden release of water in reservoir storage due to a dam breach.
The conditions at the time of breach are water level at or above the crest elevation of the emergency spillway (100 year elevation when no emergency spillway is used) and "non-storm" conditions downstream of the dam. For dams in series, an evaluation is needed to determine if breach of an upstream dam would endanger a downstream dam.

___ b. The minimum peak discharge is as follows:
$Q_{max} = 3.2\ H_w^{2.5}$
Q_{max} = the peak breach discharge, cfs.
H_W = depth of water at the dam at the time of failure, in feet. This is measured from the lowest point of potential failure at the upstream toe of dam to the crest of the emergency spillway or design high water when no emergency spillway is used.

H_W (FEET)	Q_{MAX} (CFS)	H_W (FEET)	Q_{MAX} (CFS)
1.0	3.2	10.0	1,012.0
2.0	18.1	10.5	1,143.2
3.0	49.9	11.0	1,284.2
4.0	102.4	11.5	1,435.1
4.5	137.5	12.0	1,596.3
5.0	178.9	12.5	1,767.8
5.5	227.0	13.0	1,949.9
6.0	282.2	13.5	2,142.8
6.5	344.7	14.0	2,346.8
7.0	414.9	14.5	2,561.9
7.5	493.0	15.0	2,788.5
8.0	579.3	16.0	3,276.8
8.5	674.1	17.0	3,813.0
9.0	777.6	18.0	4,398.8
9.5	890.1	19.0	5,035.4
		20.0	5,724.3

___ F. TR-66 SIMPLIFIED DAM-BREACH ROUTING PROCEDURE

___1. Minimum information needed for breach analysis:

Given the: Q_{max}, reservoir storage volume (ac.-ft.), no storm inflow (generally), valley cross-section data and roughness coefficients, and reach length distances from the dam.

You find: The peak flood flow (Q) at a predefined location (L) in the path of the floodwave, the associated maximum depth of flow (D), and the time lapse (T) from the breaching.

___2. Procedure: Follow TR-66, third edition.

The simplified dam-breach routing is a manual procedure using a mathematic model or a graphic solution developed from actual dam breach events and physical model studies. It is used for open channel flow where there is uniform shape and storage in the downstream stream valley. When a road embankment or other obstruction stores a significant portion of the flow from the dam, the obstruction controls the flow downstream and TR-66 is not applicable downstream of the obstruction.

___3. Breach routing of Q_{max} can be used to delineate the area potentially impacted by inundation should a dam fail.

TR-66 Estimates

___ a. Peak flood flow at given location.
___ b. The maximum depth of flow, and
___ c. Time lapse between breach and items a and b.

___4. Breach Hydrograph routings are to be based upon topographic data of the downstream area.

The Breach Hydrograph is defined by its,

___ a. Peak discharge Q_{max},
___ b. Total volume and
___ c. Its shape.

___5. The Breach Hydrograph is a continuous decaying function of time of either triangular or curvilinear shape. If the subreach below the dam is super critical, the shape is triangular; otherwise the hydrograph shape is curvilinear.

___G. PRELIMINARY POND EXEMPTIONS

___1. **Exemptions must be applied for in writing**, and include professional engineer's seal. Include preliminary computations and elevations for proper justification. Exemption requests shall **not** combine two or more exemption categories. Any exemption does not relieve the applicant from obtaining other necessary county, state and federal permits. Provide design for 100 year storm event using MD NOAA 14 rainfall depth for exemptions in #3 and #4 below. **Excavated ponds are not exempt from PGSCD small pond approval.**

___2. With proper written justification bioretention structures meeting the following limits are exempt by definition from final small pond review:

___ a. the drainage area to the structure is 1.5 acres or less, the structure is designed for the 10 year storm and the storage depth against an embankment or created embankment is 12" or less, and the structure has a non-erosive outlet.

___3. PGSCD small pond approval does not apply to small urban stormwater management quality or quantity class "a" structures where the following exist:

___ a. ponds or other structures have less than four (4) feet of embankment or

___ b. the storage at emergency spillway design high water elevation according to Table 1, MD-378 (100 year storm on urban sites) does not exceed 40,000 cubic feet, and the height of the embankment is six (6) feet or less. The height of the embankment shall be measured from the top of dam to the lowest point of excavation, (normally bottom of pipe spillway), excluding the cutoff trench along the centerline of the dam. The review and approval of such "a" structures shall be based on sound engineering judgment ensuring a stable outfall for the ten (10) year 24 hour storm event.

___ c. Provide minimum one foot freeboard.

___4. When a facility will not involve any dam safety issues, a small pond approval from PGSCD may not be required. The following exemption categories may be applied for:

___ a. Structures whose primary function is wetlands/water quality outfalls when:

___ (1) normal pool is 18 inches or less and the difference between the lowest point in the pond bottom and the design storm is less than three feet and,

___ (2) provide minimum one foot freeboard,

___ (3) the structure poses no downstream failure hazard (Class "a").

___ b. Excavated structures in the floodplain whose primary function is wetlands/water quality when:

___ (1) the 100-year floodplain storm inundates an excavated storm water management pond and,

___ (2) provide minimum one foot freeboard prior to inundation,

___ (3) the structure poses no downstream hazard (Class "a").

___ c. Structures are considered culverts when:

___ (1) the 100-year design high water is less than or equal to 2 times the diameter of the culvert.

___ (2) provide minimum one foot freeboard,

___ (3) the structure poses no downstream hazard (Class "a").

___ d. Minor alterations, repairs, or retrofits when:

___ (1) the pond was approved (design and as-built) in accordance with Article 5-503(b), Annotated Code of Maryland,

___ (2) the alterations will not change hydraulics or failure hazard and,

___ (3) the existing pond structure is certified by a professional engineer to be in proper functioning condition.

___ e. Alterations, repairs, or retrofits to:

___ (1) ponds approved by agencies other than the Prince George's Soil Conservation District in accordance with Article 5-503, Annotated Code of Maryland, will be referred to the original approval authority for pond alterations or as-builts,

___ (2) the Soil Conservation District approval will be limited to grading, erosion and sediment control approval.

___5. While not required to meet all conditions of MD-378, facilities that meet exempt approval shall conform to the following **minimum** design construction criteria:

___ a. Design for a stable outfall using the ten year storm (or two year design storm if the pond is an off-line structure providing WQv storage only).

___ b. Dams shall meet class "a" dam safety hazard classification,

___ c. Principal spillway/riser shall provide anti-flotation, anti-vortex, and trash-rack designs.

___ d. Material and construction specifications for the principal spillway shall be in accordance with MD-378 code.

___ e. Material and construction specifications for the embankment shall be in accordance with MD-378 code, except that fill material for the embankment shall conform to Unified Soil Classification GC, SC, CH, CL, ML, SM, or GM. No cutoff trench is required, and no drainage diaphragm is required.

___ f. Woody vegetation is prohibited on the embankment and within 15' of the toe of the embankment.

___ H. EXAMPLES OF EMBANKMENT, EXCAVATED AND EXEMPT PONDS

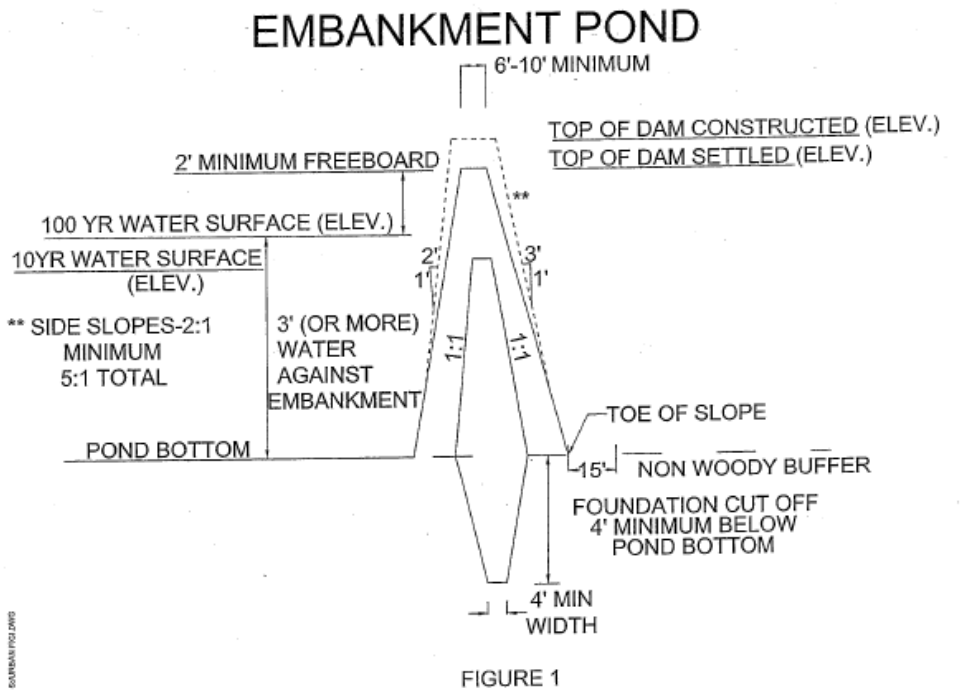


FIGURE 1

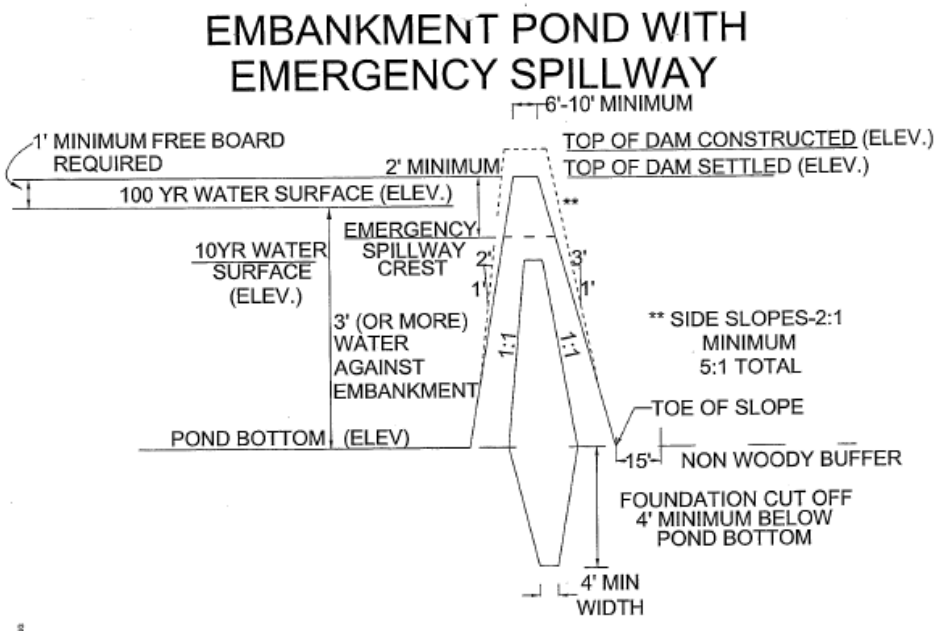


FIGURE 2

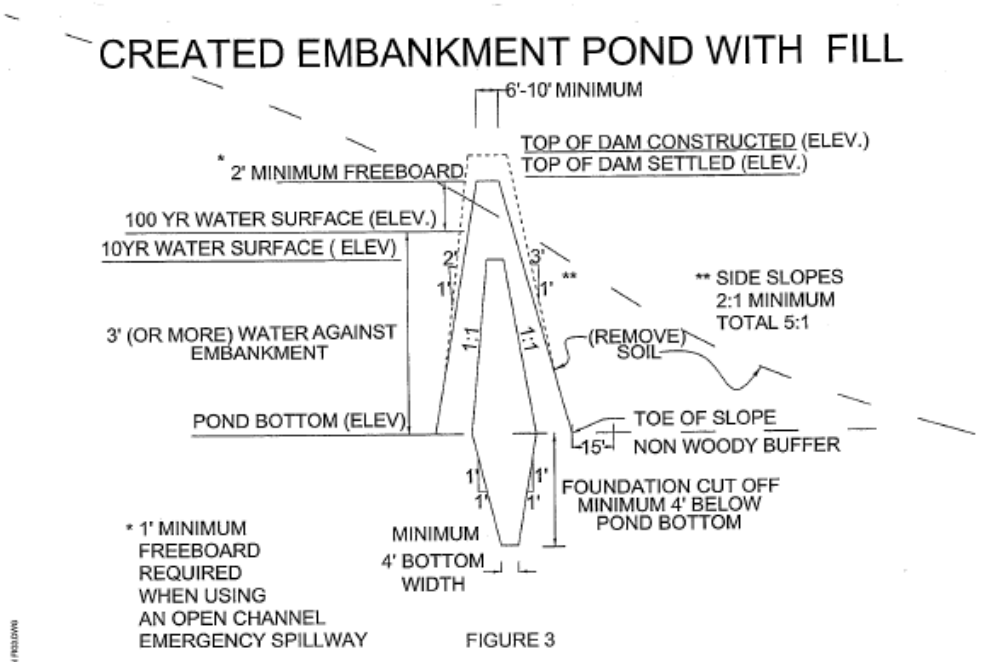


FIGURE 3

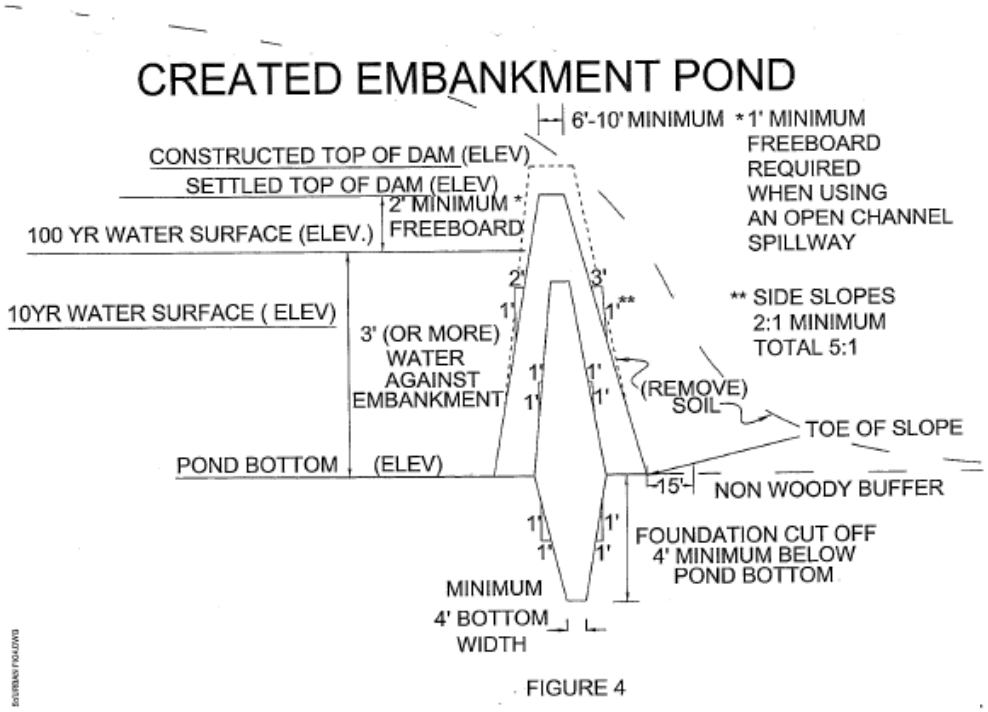


FIGURE 4

EXCAVATED POND WITH SPILLWAY

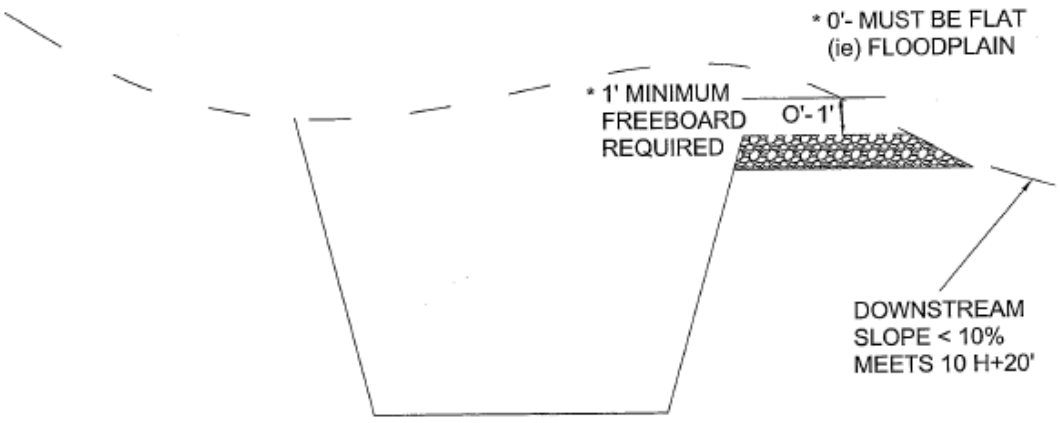


FIGURE 5

EXCAVATED POND WITH BERM

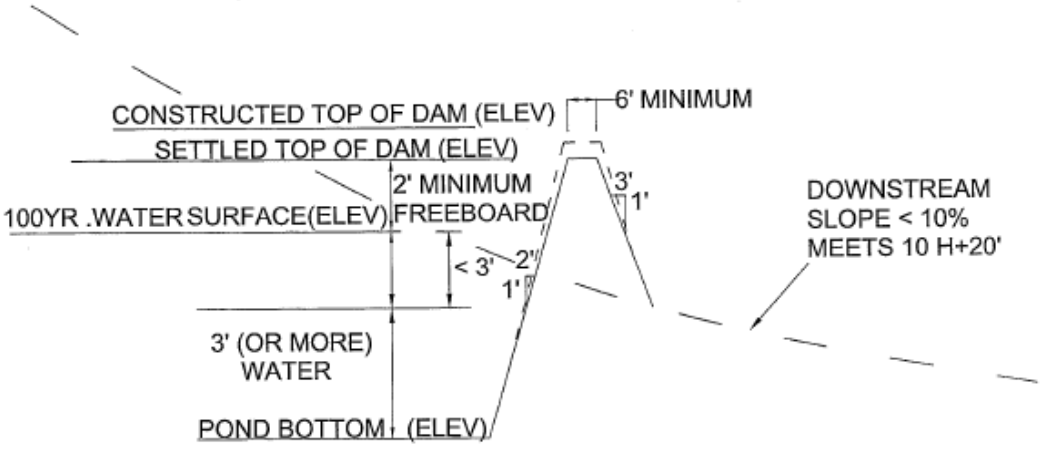


FIGURE 6

COMBINATION POND
(EXCAVATED AND EMBANKMENT)

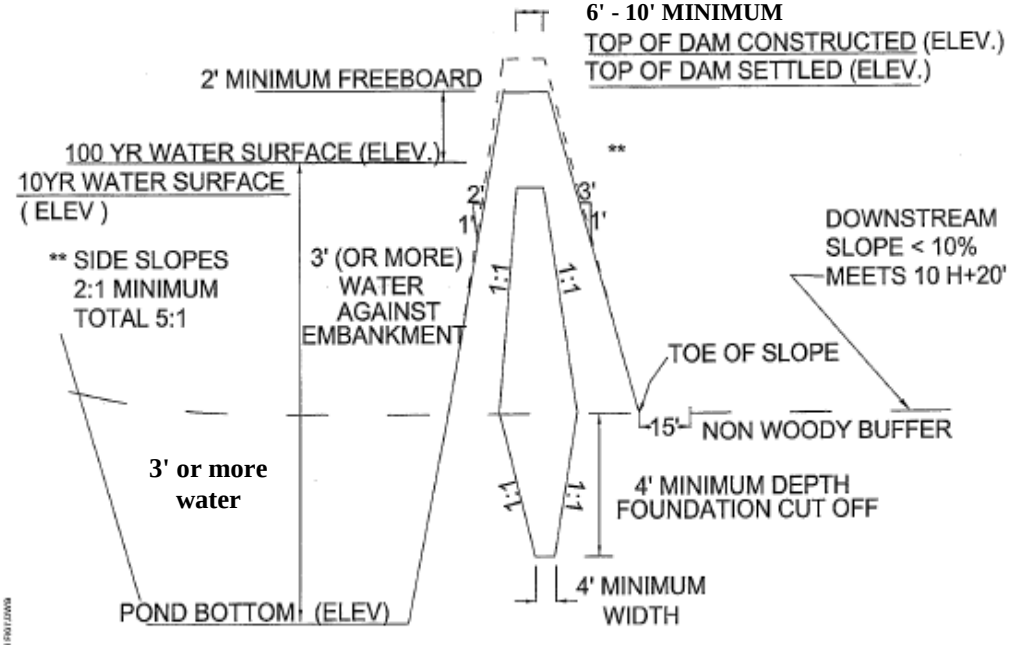
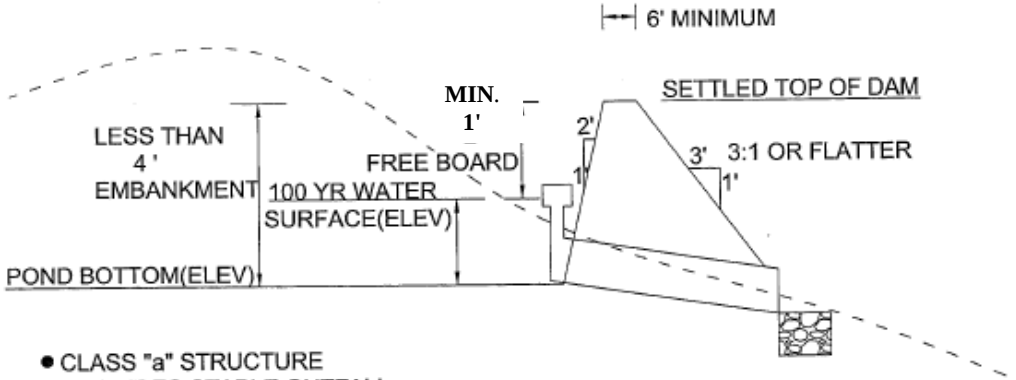


FIGURE 7

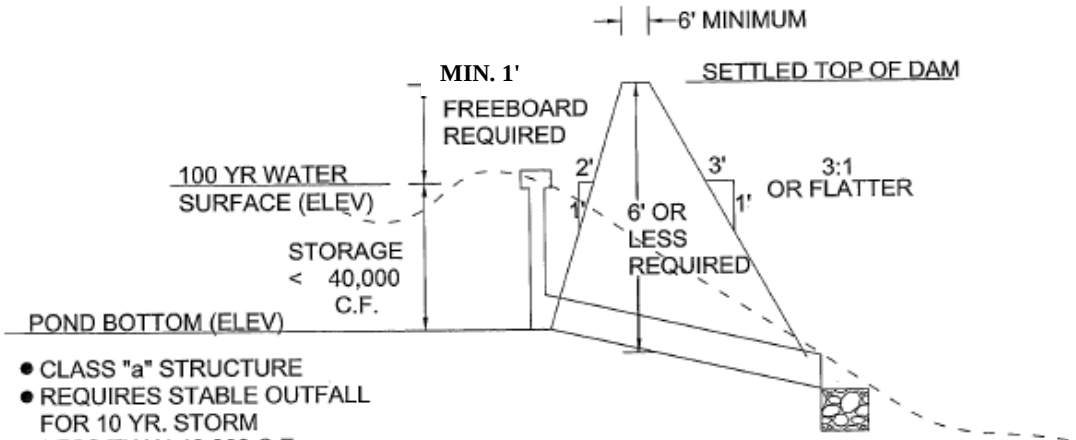
EXEMPT POND WITH
LESS THAN 4' EMBANKMENT



- CLASS "a" STRUCTURE
- REQUIRES STABLE OUTFALL FOR 10 YR. STORM
- 1' MINIMUM FREE BOARD REQUIRED WITH AN OPEN CHANNEL SPILLWAY

FIGURE 8

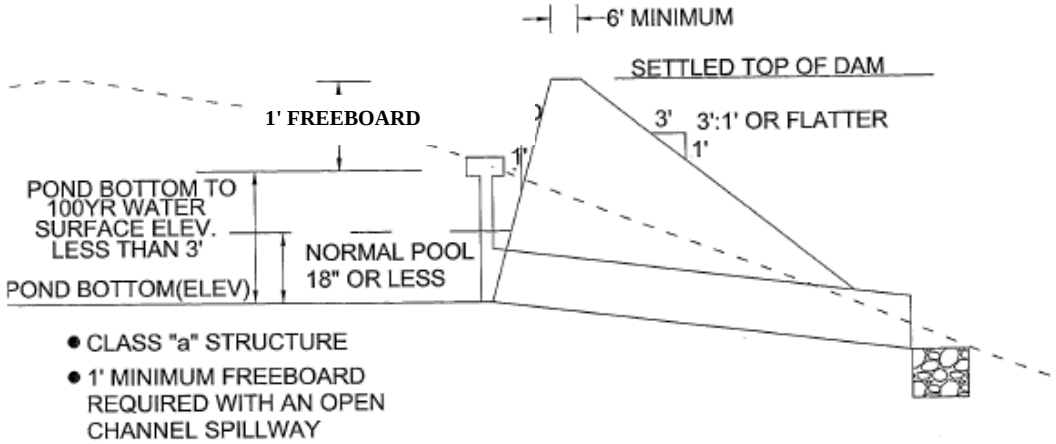
EXEMPT POND WITH EMBANKMENT HEIGHT 6' OR LESS AND LESS THAN 40,000 C.F. OF STORAGE



- CLASS "a" STRUCTURE
- REQUIRES STABLE OUTFALL FOR 10 YR. STORM
- LESS THAN 40,000 C.F. STORAGE AT 100YR.
- 1' MINIMUM FREEBOARD REQUIRED WITH AN OPEN CHANNEL SPILLWAY

FIGURE 9

EXEMPT POND WITH NORMAL POOL 18" OR LESS AND POND BOTTOM TO 100 YR IS LESS THAN 3'



- CLASS "a" STRUCTURE
- 1' MINIMUM FREEBOARD REQUIRED WITH AN OPEN CHANNEL SPILLWAY

FIGURE 10

EXEMPT POND WITH MINOR ALTERATION (RETROFIT FOR WATER QUALITY)

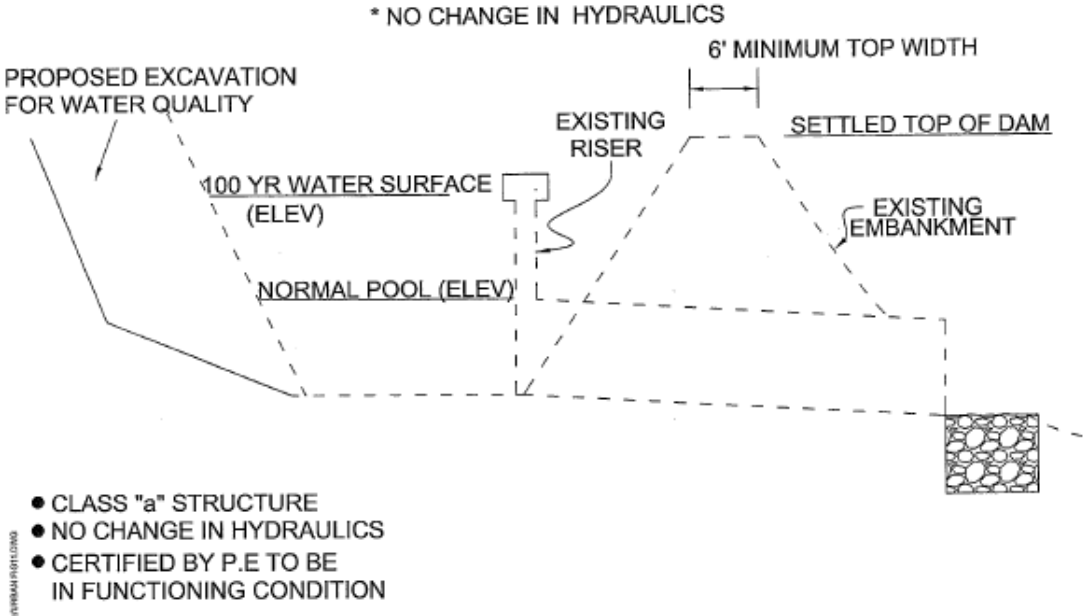


FIGURE 11

EXEMPT POND EXCAVATED POND INUNDATED BY 100 YR FLOODPLAIN

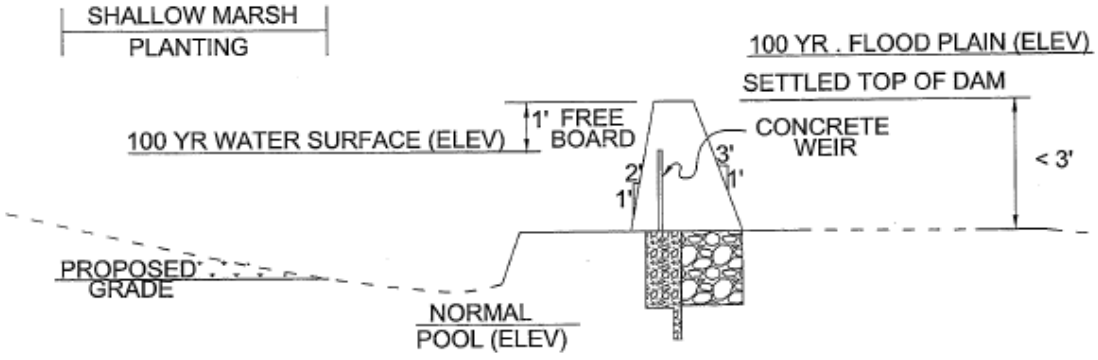


FIGURE 12

___I. MARYLAND AVERAGE RAINFALL FROM NOAA ATLAS 14

County		Rainfall Depth					
		1 yr 24 hr	2 yr 24 hr	10 yr 24 hr	25 yr 24 hr	50 yr 24 hr	100 yr 24 hr
Allegany		2.07	2.47	3.64	4.45	5.16	5.96
Anne Arundel		2.64	3.20	4.94	6.19	7.29	8.53
Baltimore		2.70	3.27	5.01	6.27	7.38	8.65
Calvert		2.73	3.32	5.17	6.48	7.63	8.93
Caroline		2.70	3.29	5.13	6.42	7.56	8.84
Carroll		2.54	3.07	4.69	5.85	6.88	8.06
Cecil		2.66	3.22	4.87	6.01	7.00	8.10
Charles		2.67	3.24	5.04	6.31	7.44	8.70
Dorchester		2.77	3.38	5.27	6.60	7.77	9.08
Frederick	Catoctin	2.54	3.05	4.51	5.54	6.43	7.44
	Frederick	2.54	3.07	4.63	5.77	6.78	7.94
Garrett		2.13	2.55	3.69	4.50	5.20	5.99
Harford		2.70	3.26	5.00	6.24	7.34	8.57
Howard		2.64	3.19	4.91	6.14	7.23	8.47
Kent		2.66	3.23	5.01	6.27	7.38	8.63
Montgomery		2.57	3.10	4.77	5.97	7.03	8.23
Prince George's		2.63	3.19	4.92	6.16	7.26	8.49
Queen Anne's		2.67	3.24	5.06	6.33	7.46	8.72
St. Mary's		2.77	3.37	5.24	6.57	7.73	9.04
Somerset		2.65	3.22	5.01	6.28	7.40	8.64
Talbot		2.74	3.33	5.19	6.51	7.67	8.97
Washington	East	2.52	3.03	4.41	5.40	6.29	7.30
	West	2.37	2.84	4.11	4.94	5.64	6.40
Wicomico		2.81	3.42	5.34	6.69	7.88	9.22
Worcester		2.81	3.42	5.34	6.70	7.89	9.23
Minimum		2.07	2.47	3.64	4.45	5.16	5.96
Median		2.66	3.22	5.00	6.24	7.34	8.57
Maximum		2.81	3.42	5.34	6.70	7.89	9.23
Standard Deviation		0.18	0.24	0.46	0.62	0.77	0.94

This chart can only be used with proper NRCS software programs converted for NOAA 14 rainfall data. See below:

(WinTR-55) Small Watershed Hydrology. WinTR-55 is a tool for urban hydrology for small watersheds. This version includes the NOAA 14 rainfall data and will run in the Windows 7 environment. ftp://ftp-fc.sc.egov.usda.gov/NDCSMC/Software/WinTR-55 installwindows7.exe

__ **J. ENVIRONMENTAL SITE DEVELOPMENT GRADING, EROSION AND SEDIMENT CONTROL PLAN SUBMITTAL**

___1. General

___ a. **Environmental Site Development Grading, Erosion and Sediment Control Plans submitted to PGSCD will not be accepted for a complete review unless the submittal includes:** The PGSCD Environmental Site Development Grading, Erosion and Sediment Control Transmittal Letter, PGSCD Environmental Site Development Grading, Erosion and Sediment Control Site Analysis, Environmental Site Development Supplementary Information as contained in these guidelines; the required consultant certification has been signed; the review fee has been paid; plan sheets sealed; and two sets of folded review prints included.

___ b. **Environmental Site Development Grading, Erosion and Sediment Control Plan fees are payable by check or money order to Prince George's Soil Conservation District**

___ c. All environmental site development grading, erosion and sediment control plans submitted for review shall contain **two sets of folded (9" x 12") review prints** and one set of accompanying data. **Do not submit original/sepia until PGSCD indicates the plan is ready for approval**. Four sets of final prints and original/sepia shall be submitted for approval and signing. Additional or approved plans submitted for additional stamped copies will be processed at the current fee rate.

___ d. Include **signed** and completed consultants certification.

___ e. All Environmental Site Development Grading, Erosion and Sediment Control Plan sheets shall be **sealed** by a Maryland registered professional engineer, architect, landscape architect, or land surveyor (ponds require engineer seal).

___ **2. Prince George's Soil Conservation District Environmental Site Development Grading, Erosion and Sediment Control Transmittal Letter** - is required for each submittal. Include project name (same as on plan), contents listed, check reason for submittal and type of submittal (new-resubmittal-revision-update-additional stamped copy). If a revision, note what has been revised and why in comments section. Include PGSCD, Environmental Site Development Grading, Erosion and Sediment Control Plan number(SSC), once assigned, in any subsequent correspondence or resubmittals.

___**3. Prince George's Soil Conservation District Environmental Site Development Grading, Erosion and Sediment Control Site Analysis** – is required for each new submittal or revision. Include project name (same as on the plan); complete the plan review fee, map coordinates, area of site, and remaining items.

___**4. Environmental Site Development Supplementary Information** - all supplementary information shall be adequately and appropriately identified.

___ a. Drainage Area Map
___ b. Environmental Site Design Overlay
___ c. Environmental Site Design Narrative.
___ d. Preliminary Sediment Control and Pond Computations
___ e. Soils Report
___ f. Dam Hazard Classification
___ g. Offsite Soil Borrow Areas as needed.
___ h. Preliminary Small Pond Exemption(s).

___K. PRINCE GEORGE'S SOIL CONSERVATION ENVIRONMENTAL SITE DEVELOPMENT GRADING, EROSION AND SEDIMENT CONTROL FEES

___1. <u>Environmental Site Development Grading, Erosion and Sediment Control Plan Review</u>

Application Fee	$100.00
5000 sq. ft. – 1.0 Disturbed Acre =	$200.00 (minimum one acre)
>1.0 – 5.0 Disturbed Acres	$50.00 per acre
>5.0 Disturbed Acres	$25.00 per acre
Preliminary Pond(s)	$50.00
Preliminary Pond Exemption(s)	$25.00 (maximum $300.00)

<u>Fees are based on an application fee and the number of acres disturbed.</u>

Compute fees above one acre to the nearest 1/10th acre.

Maximum Fee: 150 disturbed acres per plan;
250 disturbed acres on mining and landfill plans

___2. Unapproved Plans

___ a. If no activity occurs within one year, Environmental Site Development Grading, Erosion and Sediment Control plans will be considered expired and will be cancelled.

___ b. The engineer/owner may request a six month continuance in writing prior to cancellation.

___3. Plan Expiration

___ a. All Environmental Site Development Grading, Erosion and Sediment Control plans expire three years after approval.

___ b. Expired plans require a complete fee starting at the beginning of the pay scale.

___4. Updating or Extending a Plan

___ a. Plans can only be updated on or before the plan expiration date. If the plan has expired, a full fee is required.

___ b. Updates extend the plan approval for another 3 years.

___ c. Fee for the first update is $300.00 (plans not requiring design or plan concept changes). If a second update is needed, a full fee is required at that time. You are only allowed one update after a full fee is paid.

For example:	Original plan submission	=	Full Fee
	First Update	=	$300.00
	Second Update	=	Full Fee
	Third Update	=	$300.00
	Fourth Update	=	Full Fee

___ d. For plan view or design changes, see revisions. Revision approval dates and revision fees paid have no bearing on update fees or plan expiration.

___ 5. Revisions to approved Environmental Site Development Grading, Erosion and Sediment Control Plans

___ a. Stamped copies (must match approved plans exactly with no changes)

___ (1) Additional copies - $50.00 each.

___ b. Minor revision of $100.00

___ (1) Owner change;

___ (2) Engineer change.

___ c. Minor revision of $300.00

___ (1) Plan or design changes affecting up to one acre;

___ d. Partial revision ≥ to $300.00

___ (1) Fee starting at the beginning of the pay scale for the disturbed acreage/affected drainage area (minimum $300.00);

___ e. Major revision

___ (1) Once you exceed 50% of the original plan disturbed acreage/affected drainage area, pay complete fee starting at the beginning of the pay scale.

___ f. **<u>Revised approval does not extend expiration dates.</u>**

___6. Governmental Fees

___ a. County agencies will no longer charge each other fees. The County agencies include DER, OCS, DPW&T, MNCPPC, PGSCD and Fire/EMS Department.

___ b. Prince George's County School Board fees for ESD Plans, after the one acre minimum ($300.00), will be reduced by 50%.

___ c. Complete fees will be required for municipalities.

___7. Dam Safety Preliminary Pond Plans

___ a. Preliminary Pond Review $50.00 each.

___ (1) Dam Hazard Classification

___ (2) Soils and Borrow areas

___ b. Preliminary Pond Exemptions Review $25.00 each (maximum $300.00)

___ (1) Pond approval does not apply to certain small urban stormwater management quality or quantity low hazard structures that meet any of the eight exemption categories.

___8. Checks Returned for Insufficient Funds

___ a. The engineer/owner shall be liable for a collection fee of $35.00.

___ b. Fees not satisfied within ten days notice given by PGSCD may result in prosecution under the Maryland criminal code and/or withdrawal of any plan approvals and notification of permitting authorities for stop work orders.

__ c. We accept only **certified checks or money orders** from an engineer/owner/ applicant for payment of a returned check.

___ d. For a period of six months from the date the insufficient funds are paid, a **certified check or money order** will be required on any additional plans submitted.

___ 9. District Fee Return Policy

___ a. On occasion a request for a refund of plan review fees is made. The following conditions have resulted in an applicant receiving a refund:

___ (1) The owner or engineer requested a plan be **withdrawn before plan review has started;**

___ (2) During review a plan is found to be exempt from erosion and sediment control approval and only an exemption letter is issued;

___ (3) Evidence of overpayment has been provided by the owner or engineer;

___ (4) Transfer of payment from one plan to another by separating a plan. This can only be done when no additional design review or overlapping of plans will occur.

___ b. A letter to the District Manager requesting return of fee and reason is required by the owner/applicant. Also, a copy of the cancelled check is required. The $100.00 application fee on all projects is not refundable.

___L. ENVIRONMENTAL SITE DEVELOPMENT GRADING, EROSION AND SEDIMENT CONTROL PLAN APPROVAL

___1. Any changes or modifications to an approved Environmental Site Development Grading, Erosion and Sediment Control Plan, not approved by the PGSCD, shall invalidate the plan approval.

___2. PGSCD Environmental Site Development Grading, Erosion and Sediment Control Plan approval shall remain valid for a period of three years from the approval date. An expiration date will be shown on all plans.

___3. Four sets of prints and original/sepia(optional) shall be submitted for approval and signing. The copy or copies (prints) of the Environmental Site Development Grading, Erosion and Sediment Control Plan as stamped, along with signed PGSCD approval stamp, will become an official record copy of the approved Environmental Site Development Grading, Erosion and Sediment Control Plan. Copies made from the approved mylars are approved copies as long as no changes to the plans have been made.

___4. Include the PGSCD approval stamp in close proximity to the title block (lower right hand corner) on the first sheet of the Environmental Site Development Grading, Erosion and Sediment Control Plan. **Note: Do not alter approval block.** The approval stamp needs to show on the outside when the plans are folded.

___5. Revisions and updates to previously approved Environmental Site Development Grading, Erosion Sediment Control Plans will be reviewed in accordance with PGSCD requirements in effect at time of submittal. Include an explanation of what was revised, changed, or added, and why.

___6. PGSCD reserves the right to deny the issuance of an approval where the proposed project would adversely affect the public safety and welfare.(COMAR 26.17.01.08)

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___M. PRINCE GEORGE'S SOIL CONSERVATION DISTRICT ENVIRONMENTAL SITE DEVELOPMENT GRADING, EROSION AND SEDIMENT CONTROL

APPROVAL STAMP

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT **ENVIRONMENTAL SITE DEVELOPMENT APPROVAL** **GRADING, EROSION AND SEDIMENT CONTROL**
SSC# **EXPIRATION DATE**
PRELIMINARY POND (PP#)
DISTRICT SIGNATURE **APPROVAL DATE**

___1. **NOTE:**

INCLUDE THE PGSCD APPROVAL STAMP IN CLOSE PROXIMITY TO THE TITLE BLOCK (LOWER RIGHT HAND CORNER) ON THE FIRST SHEET OF THE ENVIRONMENTAL SITE DEVELOPMENT GRADING, EROSION AND SEDIMENT CONTROL PLAN ONLY.

STAMP MUST SHOW ON THE OUTSIDE WHEN ENVIRONMENTAL SITE DEVELOPMENT GRADING, EROSION AND SEDIMENT CONTROL PLANS ARE FOLDED

PGSCD WILL SIGN AND/OR INITIAL THE APPROVAL AND INCLUDE APPROVAL AND EXPIRATION DATES ON PLANS AS APPROPRIATE.

DO NOT ALTER THE SIZE (2-7/8" X 3-3/4") OR CONTENT OF THE APPROVAL STAMP.

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PRINCE GEORGE'S SOIL CONSERVATION DISTRICT
ENVIRONMENTAL SITE DEVELOPMENT
GRADING, EROSION AND SEDIMENT CONTROL PLAN
APPROVAL STAMP
(EXAMPLES)

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT **ENVIRONMENTAL SITE DEVELOPMENT APPROVAL** **GRADING, EROSION AND SEDIMENT CONTROL** **SSC#** 44-13-00
EXPIRATION DATE **PRELIMINARY** **POND** **PP#** X
DISTRICT SIGNATURE **APPROVAL DATE**

_____ 2. ENGINEER IS TO INCLUDE THE APPROVAL STAMP IN THE LOWER RIGHT HAND CORNER OF THE FIRST SHEET OF THE GRADING, EROSION AND SEDIMENT PLAN.

ADD ENVIRONMENTAL SITE DEVELOPMENT GRADING, EROSION AND SEDIMENT CONTROL PLAN NUMBER SSC# WHEN ASSIGNED BY THE DISTRICT. CONCEPT, ENVIRONMENTAL SITE DEVELOPMENT AND FINAL WILL USE THE SAME NUMBER WITH A DIFFERENT PREFIX.

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT **ENVIRONMENTAL SITE DEVELOPMENT APPROVAL** **GRADING, EROSION AND SEDIMENT CONTROL** **SSC#** 98-13-00
EXPIRATION DATE **PRELIMINARY** **POND** **(Pond #1)** **(Pond #2)** **PP#** 10-13-00 11-13-00
DISTRICT SIGNATURE **APPROVAL DATE**

_____ 3. GRADING, EROSION AND SEDIMENT CONTROL APPROVAL AND PRELIMINARY POND APPROVAL. ADD POND NUMBER P**P#** WHEN ASSIGNED BY THE DISTRICT.

YOU MAY HAVE MULTIPLE POND NUMBERS, ONE FOR EACH POND APPROVAL. IDENTIFY EACH POND WITH A **POND #** i.e.:
(Pond #1) 10-13-00
(Pond #2) 11-13-00

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT **ENVIRONMENTAL SITE DEVELOPMENT APPROVAL** **GRADING, EROSION AND SEDIMENT CONTROL** **SSC#** 156-13-00
EXPIRATION DATE **PRELIMINARY** **POND** **PP#** 12-13-00 EXEMPT
DISTRICT SIGNATURE **APPROVAL DATE**
CSC# 156-13-00

_____ 4. GRADING, EROSION AND SEDIMENT CONTROL APPROVAL AND A PRELIMINARY POND STRUCTURE REVIEWED AND MET EXEMPTION CRITERIA.

ADD POND NUMBER
P**P# EXEMPT**

COMBINED CONCEPT AND ENVIRONMENTAL SITE DEVELOPMENT APPROVAL

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SOIL CONSERVATION DISTRICT

ENVIRONMENTAL SITE DEVELOPMENT
GRADING EROSION AND SEDIMENT CONTROL PLAN
TRANSMITTAL LETTER
(Required for each submittal)

TO: PRINCE GEORGE'S SOIL
CONSERVATION DISTRICT
5301 MARLBORO RACE TRACK RD.
UPPER MARLBORO, MD 20772
301-574-5162 X 3
301-574-5156 Fax

DATE:
ATTENTION:
SSC# PP#
RE:
REFERENCE CSC#

SUBMITTED FOR: ____Environmental Site Development Grading, Erosion and Sediment Control Plan Review (SSC)
____Preliminary Pond Plan Review (PP)
(Always submit two sets of prints for review)

TYPE OF SUBMITTAL: ___New ___Resubmission ____Revision ____Update _____ Stamped Copies
___Environmental Site Development Approval (Include originals & four prints) **Do Not Send Until Requested**

COPIES	DESCRIPTION

INFORMATION ENCLOSED: Check appropriate spaces

Environmental Site Development
Grading, Erosion and Sediment Control Plan
___Review Fees
___2 Sets of Prints (folded)
___Signed Certification
___Plans Sealed
___Site Analysis Sheet
___Soil Boundaries
___Drainage Area Map
___ESD Overlay
___ESD Narrative

Preliminary Pond Plan
___2 Sets of Prints (folded)
___Preliminary Computations
___Soils Report
___Preliminary Small Pond Exemption(s)
___Dam Hazard Classification
___Drainage Area Map
___Soil Borrow Area

COMMENTS:_____

_____

_____

PRINT NAME_____PH#_____

EMAIL ADDRESS_____

ENVIRONMENTAL SITE DEVELOPMENT
GRADING EROSION AND SEDIMENT CONTROL PLAN
SITE ANALYSIS
(Required for each new submittal or revision)

NAME OF PROJECT IN
TITLE BLOCK: _____

1. **Environmental Site Development Grading, Erosion and Sediment Control Plan Review**

		Amount
Application Fee	$100.00	_____
_____5,000 sq. ft. – 1.0 Disturbed Acre =	$200.00 (minimum 1 acre)	_____
_____>1.0 – 5.0 Disturbed Acres =	$ 50.00 per acre	_____
_____>5.0 Disturbed Acres =	$ 25.00 per acre	_____
_____Preliminary Pond(s) Review	$ 50.00 each	_____
_____Preliminary Pond Exemption(s) Review	$ 25.00 each (maximum $300.00)	_____
	Total Due	_____

Compute fees above one acre to the nearest 1/10th acres.

NOTE: Checks or money orders ONLY made payable to Prince George's Soil Conservation District (no cash or credit/debit cards accepted).

2. Location P.G. Co. Street Map Book Coordinates _____
3. Street Address_____
   _____
4. Area of Site/Property _____ ac.
5. Area to be Disturbed _____ ac.
6. Preservation: Limits of Disturbance _____ Sensitive Areas_____ Buffers _____
   Infiltration and Recharge Areas _____
7. Phasing and Sequences: Initial _____ Interim _____ Final_____
8. Preliminary Sediment Controls: Stable Outlets/Outfalls _____
   Diverting Runoff From- Highly Erodible Soils ____ Steep Slopes ____ Disturbed Areas____
9. Stabilization Strategies Include: 3 or 7 day _____ 24 to 72 Hour _____ Same Day _____
   Minimized Disturbed Areas ≤20 acres _____ ≤10acres_____ ≤5 acres _____
   Soil Stabilization Matting _____ Reinforced Turf _____ Topsoil Stockpiling _____
10. Overlay Plan: Location of all ESD's _____ Protection Areas _____
    Undisturbed Areas _____ Erosion and Sediment Control Areas _____
11. Narrative: ESD to the MEP _____ Structural Practices _____
12. Ponds: Hazard Justification _____ Dam Breach Analysis _____
13. Pond Exemptions: Preliminary Design _____ Category _____
14. Soils Report: Highly Erodible Soils _____ Pond Borings _____ Borrow Areas _____

REFERENCE CSC#_____

SECTION III

PRINCE GEORGE'S
SOIL CONSERVATION DISTRICT

FINAL

GRADING, EROSION AND SEDIMENT CONTROL PLAN

___ **III. <u>PRINCE GEORGE'S SOIL CONSERVATION DISTRICT (PGSCD) FINAL GRADING, EROSION AND SEDIMENT CONTROL PLAN (FSC)</u>**

___ **A. INTRODUCTION FOR FINAL GRADING, EROSION AND SEDIMENT CONTROL PLANS**

___ 1. The following guidelines are to be considered in the preparation of a Final Grading, Erosion and Sediment Control Plan submitted to Prince George's Soil Conservation District (PGSCD) for review and approval. All Final Grading, Erosion and Sediment Control Plans (FSC's), designs, and computations are to be in conformance with this document, the criteria established in the Code of Maryland Regulations Title 26, Subtitle 17, Chapter 01, and the publication "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control", (Standards and Specifications), dated December 2011 or later revisions and Chapter 5, Environmental Design of the 2000 Maryland Stormwater Design Manual. **<u>Erosion and Sediment Control Plans submitted to PGSCD will not be accepted for a completed design review unless the submittal includes</u> <u>the</u>** "PGSCD Final Grading, Erosion and Sediment Control Plan Transmittal Letter", "PGSCD Final Grading, Erosion and Sediment Control Plan Site Analysis", "Supplementary information" as contained in these guidelines; the required certifications have been signed; the review fee has been paid; plan sheets sealed; and two sets of folded review prints included.

___ 2. The "Stormwater Management Act of 2007" and COMAR 26.17.02 regulations require concept, site development and final plans. It is essential that the erosion and sediment control plan be integrated with the stormwater management plan to address these different stages of plan development and attain effective resource protection. The final plans shall include all the information approved in the Concept and Environmental Site Development Plans.

___ 3. Acceptable erosion and sediment control plans must be designed to mitigate soil erosion, prevent increases in stormwater runoff, and minimize the discharge of pollutants. Planning for erosion and sediment control needs to start early and be integrated with stormwater management practices.

___ 4. Consultants are responsible for submitting an erosion and sediment control plan that meets the requirements established by these guidelines. The plan must include sufficient information to evaluate the site conditions, environmental characteristics of the affected areas, potential impacts of the proposed grading on water resources, and effectiveness and acceptability of measures proposed to **prevent soil erosion and off-site sedimentation.**

___ 5. Exemptions to the state sediment control law include construction of a single family home on a lot of two acres or more when the disturbed area is less than one half acre, and grading that involves less than 5,000 square feet and/or 100 cubic yards of earth.

___ 6. Waiver from the requirements of the Standards and Specifications may be granted if strict adherence to the specifications will result in unnecessary hardship and not fulfill the intent of the Standards and Specifications. The developer shall submit a written request for a waiver to Prince George's Soil Conservation District. The request shall state the specific waiver sought and reasons for requesting the waiver. The Prince George's Soil Conservation District shall not grant a waiver unless and until sufficient specific technical reasons justifying the waiver are provided by the developer.

___ 7. If requested the PGSCD will, by appointment, provide sediment control conceptual planning and technical assistance on specific sediment control problems. Detailed, overall sediment control plan review will not be undertaken during these meetings. Conceptual planning advice prior to plan submittal can be provided on an hourly fee basis.

___ B. **FINAL GRADING, EROSION AND SEDIMENT CONTROL PLAN DESIGN CONSIDERATIONS**

___ 1. **Development of Plan**

___ a. Plan the development to fit the particular topography or slope, soil types, natural drainage, and natural vegetation at a site.

___ (1) Develop during subdivision processing the soil delineation and limitations, a grading and sediment control concept, and include on-site soils investigation when limitations warrant.

___ b. Expose the smallest practical area of land for the shortest possible time.

___ (1) Minimize grading or exposure of large or critical areas during the season of maximum erosion potential (May 1 – September 30).

___ c. Apply practices that control erosion against on-site damage and reduce soil movement.

___ (1) Provide aggressive stabilization schedules and sequences to meet the 3/7 day State requirements.

___ (2) Include staged seeding for major cut slopes, fill slopes and mass graded areas.

___ d. Apply sediment control practices to prevent off-site damage.

___ (1) Planning for sediment control should begin with first-hand knowledge of the site by the designer. Verify the accuracy of existing topography and any adjacent off-site areas affecting the site.

___ (2) Choose the best selection of sediment trapping devices in conjunction with an appropriate schedule of construction. Particular attention must be given to concentrated flows of water, to prevent "major" or "gross" types of erosion. The use of standardized approved sediment control devices makes review and approval of plans easier. These practices should be located to obtain the maximum benefit from the terrain and within the given drainage limitations. Practices must be sized to accommodate the maximum drainage that could occur at any phase of the development. Each plan must include permanent structures for conveying storm runoff, final site stabilization, and removal of temporary sediment control features with stabilization of the areas where temporary features were removed.

___ (3) Utilize the standard practice for temporary storm drain diversion to prevent sediment laden water conveyed by the storm drain system from reaching a watercourse or off-site property. This is done by redirecting a storm drain system or outfall channel to discharge into a sediment trap or basin.

___ 2. **Plan Concepts**

___ a. Subdivision or Whole Site Approach

___ (1) Sediment control must be provided for all phases of land disturbance from initial clearing to final stabilization. Sediment controls should be placed to be functional for as long as possible.

___ (2) Initial or primary sediment controls need to allow for installation, then clearing, and any rough grading. Secondary sediment controls may become necessary for utilities or road infrastructure if not adequately covered by the primary controls. Final sediment controls for buildings or lot development should become necessary as controls for primary or secondary work usually do not remain adequate as lots are sold.

___ (3) The initial concept must consider all future development of the whole site and how it will be coordinated with future approval of utilities, roads, buildings and their phasing.

___ b. Utilizing the Maximum Drainage Area

___ (1) Divide the site into the maximum before, interim or after development drainage areas. Provide the necessary controls based on their drainage area limitations and the topography. Maintain the initial sediment controls as long as possible with approved practices. When development or phasing alters the initial drainage, provide additional controls to cover the new drainage areas.

___ (2) Beware of utility construction, street curbing and residential lot development that will alter maximum drainage areas as an interim or final condition.

___ c. Phasing and Sequencing

___ (1) The sediment controls must be consistent with the phasing and sequencing. Sediment control phasing needs to consider the permitting to be done so that what is permitted is actually covered under the approval.

___ (2) When sediment control plans require specific sequencing to work, ensure that chronology and all phases are adequately denoted.

___ (3) Individual phases of a complete site, if on separate approvals, need to adequately cover grading, erosion and sediment control coordination between the phases.

___ (4) Sequencing of operations need to be detailed to include all pertinent aspects and timing of construction. Time frames should provide a sliding range to include the total time an activity will occur. This is most often done with a range of days or a bar graph. This type of sequence is easy to follow as to when an activity should start or be finished relative to other activities.

___ 3. **Plan Format**

___ a. Rough Grading Plans – are to show true rough grades only, with any necessary permanent structural practices to prevent erosion. Rough grading plans may include sewer, water and storm drains. No final grading, streets, houses, or planned improvements should show on the plan.

___ b. Streets and Utility Construction – show all street improvements to Include all pertinent improvements. Include any road widening to existing pavement. When storm drain diversions require alterations to the approved County design plans, then a revised design plan should be obtained to agree with the sediment control plan. Street grading must tie off to the existing grades at that phase of approval. Often a precede of the storm drains will be necessary to convey off-site controls for the storm drain construction only.

___ c. House Construction Only – when grading, roads and utilities are completed then individual lot sediment controls, or groups of 1 acre or less with sediment controls, should be utilized. Consider the whole lot is disturbed on lots of 1/2 acre or less. Clarify limits of disturbance along the street right of way if sidewalk area is to be included.

___ d. Total Development Plans – these are the **preferred types of plans** that provide all phases of development with coordinated sequencing. These should usually be developed along the plan concept of subdivision or whole site approach previously mentioned. This type of plan should show the final design considerations of all other agencies for permanently designed facilities so that the temporary sediment controls can be developed to best fit the site.

___ e. Mining and Fill Sites – in most cases, these plans will last for more than 36 months, and basins shall be designed as permanent ponds to meet MD 378 specifications. Provide for adequate conveyance of water to trapping devices during mining or fill operations. Include adequate benching and designed slope drains to handle the permanent runoff. Provide adequate access for initial sediment control construction, mining or fill operations and final sediment control removal.

___ f. Supplemental Information – all information necessary for the construction and maintenance of sediment controls needs to be shown on the plans. Any drainage areas or other information necessary for the proposed phasing or concept to function should be shown on the plans. Off-site drainage areas that are not subject to change can be shown on separate sheets. One copy of soils information, County approvals, Subdivision plans, approved street grade plans, site plans, floodplains approvals, etc., should accompany initial submittal.

___ g. Guidelines – include all general format requirements.

___ 4. **Plan Coordination**

___ a. If the plan being submitted in any way interacts with another plan, show and provide status of all existing conditions and include the adjacent sediment controls. Pay attention so that the outfall areas of the one plan are not disturbed on the adjacent plan. **Sediment controls cannot outlet to a disturbed area.**

___ b. Every erosion and sediment control plan must be complete with provisions for permanent stabilization and safe conveyance of surface water. This is especially important on rough grading plans where road or other grading will not include the final storm drain. Where needed designed channels or pipe drain systems will have to be provided to a non-erosive outlet.

___ c. When one plan is conditioned on having some phase of development completed on a previously approved plan, then show what the existing condition should be on the plan being submitted and clearly indicate in the sequence.

___ d. Plan coordination can be utilized for SWM permanent ponds. The embankment and control structure is built under the pond plan and shown as existing on the development erosion and sediment control plan. All required information to function for sediment control is shown in the development plan. After the sediment control phase, the pond plan is implemented to complete the SWM pond. This coordination of plan SCD numbers and timing is shown in the sequence of both plans.

___ e. Temporary sediment traps and basins on rough grading or fine grading plans are not to be located where they would interfere with the construction of SWM structures or permanent ponds. Traps and basins may be utilized upstream of SWM ponds when diversion of water around the pond can easily be accomplished. When this is not possible, the permanent SWM structures or ponds must be designed, and approved to be used for sediment control. SWM ponds with a pipe outlet system shall be designed as a sediment basin not as a sediment trap.

___ 5. **Plan Superseding (Rough Grading to Final Development)**

___ a. Where an approved rough grading (and utility plan) is in progress and a final grading and site development plan is submitted for review and approval, before the rough grading will be completed and stabilized, then the final plan will need to supersede the rough grading plan. This is needed to prevent multiple sediment control approvals on one area at the same time.

___ b. The rough grading plan and sequence is to be combined into the final plan. This is best done by providing phasing of the rough grading sheets and fine grading sheets.

___ 6. **Temporary Construction In A Stream Channel Or Floodplain**

___ a. A person who proposes to change in any manner the course, current, or cross section of a stream or body of water within the State except tidal waters, including any changes to the 100-year frequency floodplain of free flowing streams shall obtain a permit from WRA before commencing any work. On 50 acres or greater drainage areas, or any area of County concern, County floodplain approvals are required. Also, obtain approval for fill in County floodplains.

___ b. **Sediment controls need to be designed to cover work in the floodplain separate from work outside the floodplain.** PGSCD procedures are designed to prevent sediment already trapped from being totally inundated by the 100 year flood. Generally, this is only waived for temporary sediment basins between 50 acres and 100 acres that capture a floodplain.

___ c. Upstream areas shall be adequately diverted around or through the floodplain work. Floodplain work will normally precede other site work.

___ d. Additional sediment controls for work in the floodplain have included diversion pipe, sandbag diversion, and gabions as accepted by our office.

___ e. Include WRA in-stream closure period(s) in the sequence of construction.

___ f. Temporary Sediment Trapping Devices. The following special requirements shall apply to plans submitted with temporary sediment trapping devices within the waters of the State during construction operations:

___ (1) Temporary sediment trapping devices shall conform to the technical requirements in the "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control";

___ (2) Earth embankments greater than 3 feet high may not be permitted;

___ (3) Temporary sediment control trapping devices may be constructed within the 100-year frequency floodplain if all of the following conditions are met:

___ (a) Fill material may not be placed any closer to the stream than 50 percent of the distance between the 100-year frequency flood plain limit and the top of the stream bank closest to the trapping device,

___ (b) Fill material may not be placed within 25 feet of the top of the stream bank,

___ (c) Upon completion of the sediment control device, the exposed soil areas shall be stabilized within 3 days following initial disturbance,

___ (d) Care shall be taken during construction, maintenance, and removal of temporary sediment control devices to prevent unnecessary removal or damage to trees and other natural features,

___ (e) Sediment removed during maintenance of the trapping device shall be placed outside the limits of the 100-year floodplain and stabilized within 7 days,

___ (f) Upon stabilization of all areas that drain to the control device, the device shall be removed and all remaining disturbed areas returned to their original contour and permanently stabilized within 7 days.

___ g. Temporary Access Crossings. The following special requirements shall apply to applications for temporary access crossings.

___ (1) Temporary access crossing shall conform to the technical requirements in the "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control".

___ (2) Earth embankments for an access road greater than 3 feet high shall not be permitted.

___ (3) Include cross section of presently existing stream channel.

___ h. Temporary Utility Crossings. The following special requirements shall apply to applications for utility crossings that cross streams or floodplains and are buried below the existing ground, so that they do not cause any permanent damage to the watercourse, current, or cross section of a stream or body of water, including the floodplain.

___ (1) Temporary access for utility crossing shall conform to the technical requirements in the "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control".

___ (2) For stream crossings, the pipe or cable and any protective encasement shall be buried a minimum of 3 feet below the stream bed.

___ (3) Buried utilities and their appurtenances, except at stream crossings, shall be located such that a 25-foot wide buffer zone is maintained between the limits of construction and the nearest top of the stream bank.

___ (4) Include cross section of existing stream channel.

___ i. Storm Drain Outfalls. The following requirements apply to applications for temporary construction in the floodplain for outfall pipes, flumes, and ditches, providing there are no permanent alterations to the course, current, or cross section of a stream or body of water.

___ (1) Construction shall conform to the technical requirements of the "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control".

___ (2) Permanent floodplain obstructions to flow will not be permitted.

___ (3) Include cross section of existing stream channel and proposed drainage outfall.

___ (4) Include data on the velocities of flow at outfalls and site conditions at points of discharge.

___ C. **FINAL GRADING, EROSION AND SEDIMENT CONTROL PLAN PREPARATION**

___ 1. The scope of the grading, erosion and sediment plan is to be clearly defined and fully identified in the title block. Use phase, sections, block and lot numbers. Also, note if plan is for clearing, grading only, etc. Where appropriate, note exclusions. Houses or crowned streets shall not be shown on rough grading plans. All grading, erosion and sediment control plan sheets are to be numbered chronologically with a SC#. Include grading, erosion and sediment control in the title block.

___ 2. Plans are to be legible and shall include: scale (1"=50' maximum), two foot contour intervals, legends, and north arrow. All plan sheets must be the same size with a maximum size no larger than 30"x42". County permitted projects may require a maximum size of 24"x36". Include a site specific vicinity map to scale. Include road identification, nearest intersections and distance to site. Include enough detail on the vicinity map so that someone unfamiliar with the site can quickly locate it in the field.

___ 3. All grading, erosion and sediment control plans submitted for review shall contain two sets of folded prints (9" x 12") and one set of accompanying data. **Do not submit mylars/originals until SCD plan reviewer indicates the plan is ready for approval.** Four sets of final prints and original/sepia shall be submitted for approval and signing. Additional or approved plans submitted for green stamps will be processed at the current fee rate.

___ 4. If grading or sediment control is presented on three or more sheets, provide a composite-overall drawing showing how the sediment control practices and topography, planned on individual sheets tie together. Match lines and matching sheet numbers are to be included on each sheet.

___ 5. Show property lines and names of all adjacent property owners.

___ 6. Existing features, and existing and proposed contour lines based on all grading changes are to be shown. Contours are to be adequately labeled, for ease of review and spot elevations are to be shown. All topography, existing and proposed, shall be legible and shall tie off properly.

___ 7. Plans must include topographic data sufficiently adequate to show existing conditions adjacent to the site and downstream of all sediment control practices. This shall be a **minimum** 100 foot adjacent strip and **minimum** 100 foot downstream, or as otherwise needed to clearly reflect existing conditions.

___ 8. Provide delineation and note limits of disturbance to encompass all work including sediment controls.

___ 9. Clearly show and identify location of all existing and proposed improvements or site work (buildings, walls, parking lots, streets, storm drains, utilities, etc.).

___ 10. Show and identify existing and proposed permanent ponds.

___ 11. Delineate the 100-year floodplain. Submit appropriate approvals from County or State required for any work in the floodplain. Delineate critical areas, buffer areas and tree save areas. MDE waterway construction permit or notice of intent to issue is required for disturbance of waterways, for special flood hazard areas, and for trout streams 100 acres or greater. Place appropriate WRA stream closure dates in the Sequence of Construction.

___ 12. Show onsite stockpile, borrow or spoil areas on plan. Include side slopes and maximum height of stockpile. **Note:** Offsite borrow or spoil areas must have an approved and active erosion and sediment control plan.

___ 13. Grading must be in conformance with both the minimum criteria established by the Standards and Specifications for Land Grading and Prince George's County Grading Ordinance Subtitle 32, **whichever is the most restrictive**. Place the grading specification on the plan. See 2011 Maryland Standards and Specification pages B. 5 thru B. 7.

___ 14. Show storm drainage provisions;

___ a. Velocities and quantities of flow at outfalls.

___ b. Site conditions around points of all surface water discharge from the site. (topography or profile sufficient to document a nonerosive outfall)

___ c. Include SHA riprap classification, Q_{10}, v_{10}, d_{50}, d_{max}, length, width, depth and filter cloth.

___ d. Outlet protection **must be at zero percent** slope for the required distance from pipe outfall.

___ e. Outfalls over 10 percent are considered erosive due to reconcentration of flows and high velocities encountered after the flow leaves the outlet protection and are not acceptable.

___ f. Plunge pools still require rock outlet protection and a non erosive outfall.

___ g. Areas below the outfall shall have a non-erosive velocity until flow reaches a stable water course or stable channel.

___ 15. Show provisions to preserve topsoil and place the soil preparation, topsoiling, and soil amendments specification on the plan. See the Standards and Specification pages (B. 12 through B. 14).

___ 16. Fencing of sediment basins and traps is required by County ordinance, Subtitle 32, 136 (a) 4. Show the location and type of fence (42" high) on the plan with a detail.

___ 17. Show and properly identify all planned sediment control measures (temporary or permanent) on a plan view of the site. All aspects of the erosion and sediment control plan are to be consistent and shall **clearly** depict all phases of the project including initial clearing, grading, storm drain installation, curb and gutter installation, street paving, building construction, removal of all sediment controls and final stabilization of all disturbed areas. Any plan that provides for phased development and sediment control shall also contain a separate sheet that will **only** show (with proper documentation): existing topography, property lines and initial measures that will provide sediment control at the start of clearing/ grubbing/grading, sediment control measures, drainage areas delineated and acres noted.

___ 18. **Every grading, erosion and sediment control plan must stand on its own and not be subject to some plan/action to be submitted/carried out at some future time and must contain all required information.** If the erosion and sediment control plan submittal is to be coordinated with, a previously approved plan, show specifics of how this coordination will take place **on the plan being submitted**. Show and provide status of existing conditions for the previously approved site and present adequacy of its sediment control measures.

___ 19. Erosion and sediment control plans for clearing only, rough grading, street grading only, etc. **shall** include adequate provisions for handling surface water and permanent stabilization of the site through the stage of development presented.

___ 20. Standard symbols can be used to indicate planned temporary sediment control practices as appropriate. These symbols shall not block out other pertinent information and **shall** include flow arrows. Additional information may be required to show that a planned practice can be built and will be functional.

___ 21. Symbols are not acceptable for permanent practices (those that require a design) nor for sediment traps and sediment basins.

___ 22. Provide design considerations and computations for all erosion and sediment control practices to verify their acceptability. The **minimum** data is that specified in the Standards and Specifications.

___ 23. Delineate maximum existing, interim and proposed drainage areas for all permanent and temporary sediment control structures and note acreage.

___ 24. Use full size typical drawings and/or specific detail drawings, Including construction specifications, for all sediment control practices.

___ a. Include from the Standard and Specifications Table H. 1 Geotextile Fabrics, Table H.2 Stone Size and Table H. 3 Compost on all plans.

___ 25. Show provisions for access to and maintenance of sediment control measures.

___ 26. Temporary and/or permanent vegetative stabilization shall be provided for all disturbed areas (including sediment controls) and included in the sequence of construction.

___ 27. The owner/developer is responsible for conducting routine inspection and required maintenance of all erosion and sediment control. The controls are to be inspected weekly and the next day after each rain event with a written inspection report being part of each inspection. On all plan revisions or updates include the latest month's inspection reports per the "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control".

___ 28. All plans shall note in the Sequence of Construction that prior to any clearing and grubbing the limits of clearing must be clearly marked in the field.

___ 29. Provide site specific construction schedule, sequence of operations or schedule of activities, including timing, on all plans. This schedule is to detail how and where sediment control activities or installations are to take place chronologically with respect to all phases of construction such as clearing, rough grading, storm drain installation, curb and street installation, building construction, paving, final grading, removal of all sediment controls and stabilization. The schedule must be consistent with all other plan aspects. Include timing for all activities to clearly delineate chronology or concurrency by utilizing a range of days or bar graph.

The sequence of construction, at a minimum, must include the following:

___ a. Request for a pre-construction meeting with the appropriate enforcement authority;
___ b. Clearing and grubbing as necessary for the installation of perimeter controls;
___ c. Construction and stabilization of perimeter controls;
___ d. Remaining clearing and grubbing within installed perimeter controls;
___ e. Road grading;
___ f. Grading for the remainder of the site;
___ g. Utility installation and connections to existing structure;
___ h. Construction of buildings, roads and other construction;
___ i. Final grading, landscaping and stabilization;
___ j. Installation of stormwater management measures;
___ k. Approval of the appropriate enforcement authority prior to removal of sediment controls; and
___ l. Removal of controls and stabilization of areas that are disturbed by removal of sediment controls.

___ 30. Provide the Applicant Information, when different from the owner/developer, in the following format on the plans.

Name_____
Address_____
Applicant _____Phone#_____

___ 31. **All erosion and sediment control plans shall include the following general notes:**

___ a. The developer is responsible for the acquisition of all required easement, right and/or rights-of-way pursuant to the discharge from the erosion and sediment control practices, stormwater management practices and the discharge of stormwater onto or across and grading or other work to be performed on adjacent or downstream properties affected by this plan.
___ b. Following initial soil disturbance or redisturbance, 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 greater than three horizontal to one vertical (3:1) and b) seven (7) calendar days for all other disturbed or graded areas on the project site, The in-place sediment control measures will be maintained on a continuing basis until the site is permanently stabilized and all permit requirements are met.

___ c. The owner/developer or representative shall request that the inspection authority approve work completed in accordance with the approved erosion and sediment control plan, the grading or building permit and shall obtain written inspection approvals by the Inspector at the following stages in the development of the site:

___ (1) Prior to the start of earth disturbance;

___ (2) Upon completion of installation of tree protection devices, followed by the installation of perimeter erosion and sediment controls, prior to proceeding with any other earth disturbance or grading. Other building or grading inspection approvals may not be authorized until initial approval by the Inspector is made;

___ (3) Upon completion of stripping, the stockpiling of topsoil, the construction of temporary sediment and erosion control facilities, disposal of all waste material and preparation of the ground;

___ (4) Upon completion of rough grading, but prior to placing topsoil, permanent drainage or other site development improvements and ground covers;

___ (5) Prior to the start of another phase of construction or opening of another grading unit;

___ (6) Prior to the removal of sediment control practices; and

___ (7) Upon completion of final grading, reforesting, permanent drainage and erosion control facilities including established ground covers and planting, and all other work of the building permits.

Reference 29 c. in all sequence of construction.

___ d. Approval shall be requested upon final stabilization of all sites with disturbed areas in excess of two acres before removal of controls.

___ e. **All permits under an erosion and sediment control plan must and can only be issued to the owner/developer that signs the certification on the plan**. The owner/developer that signs the certification on an erosion and sediment control plan is the responsible party regardless of any sale of the property or work of subcontractors. Erosion and sediment control plans are approved for **one owner/developer only.**

___ f. PGSCD approval of a erosion and sediment control plan, pursuant to meeting local permit requirements for grading, building or street permits, etc., is valid only when the work to be performed under the permit is the same as (no more/no less than) that contained in the plan as approved by the PGSCD.

___ g. Any changes or modifications to an approved erosion and sediment control plan, not approved by the PGSCD, shall invalidate the plan approval.

___ h. Offsite borrow or spoil areas must have an approved and active erosion and sediment control plan.

___ i. Temporary designed sediment basins shall be removed within 36 months after the beginning of construction of the basin.

___ j. On small pond approvals:

___ (1) The owner or engineer will notify PGSCD promptly in writing when construction is begun and when construction is completed.

___ (2) The project shall be constructed under the supervision of the engineer-in-charge. Within 30 days of the completion of construction, the engineer-in-charge that designed the structure shall provide PGSCD with an As-Built plan and shall certify, with the engineer's seal, that the MD378 pond was constructed as shown on the As-Built plans.

___ (3) The approval is valid only for use by the applicant and may not be transferred to another unless written approval for such transfer is obtained from PGSCD.

___ k. Disturbed surface area_____
Vegetatively stabilized area_____
Volume of spoil material_____
Volume of cut _____
Volume of borrow material_____
Volume of fill_____

___ l. List Predominant soil types and general description per PGSCD soil survey:

_____
_____

___ 32. **All certifications shall be signed at time of plan submittal. The following certifications shall be used on all plans. Include on the first sheet and do not alter the wording.**

OWNER'S/DEVELOPER'S CERTIFICATION

"I/We hereby certify that I/we have reviewed this erosion and sediment control plan and that any clearing, grading, drainage, construction and/or development will be done pursuant to this approved plan, including inspecting and maintaining controls and that any responsible personnel involved in the construction project will have a Certificate of Training at a Maryland Department of the Environment approved training program for the control of erosion and sediment before beginning the project. Prince George's Soil Conservation District and the enforcement authority shall have the right of entry for periodic on-site evaluations."

Signature_____Date_____
Name(printed)_____Title_____
Ph#_____Firm_____
Complete address_____

CONSULTANT'S CERTIFICATION

"I certify that this plan of erosion and sediment control represents a practicable and workable plan based on my personal knowledge of the site, and that this plan was designed and prepared in accordance with the requirements of the Prince George's Soil Conservation District and "Standards and Specifications for Soil Erosion and Sediment Control". I have reviewed this erosion and sediment control plan with the owner/developer".

Signature_____MD License#_____Date____

Name_____(printed)_____

(Include seal, company name, address and phone number if not included elsewhere on plan).

___ 33. **All** plan resubmittals shall include a point-by-point response (narrative) to PGSCD's previous erosion and sediment control plan review comments. The point-by-point response needs to include the item number being addressed, the action taken (example: "note added to general notes, additional information submitted", etc.) and the location of the change, addition or deletion (example: "see plan sheet 2 of 2 - general notes," "see comps sheet 3 of 6," etc.). **Plans submitted without a point-by-point response to previous PGCSD comments will be returned unreviewed.**

___ 34. After initial approvals, note all erosion and sediment control plan revisions in revision block on subsequent plan resubmittals.

___ 35. USDA-NRCS runoff methodology for all runoff computations shall be used.

___ 36. The Prince George's Soil Conservation District may grant a written waiver from the requirements of the 2011 Maryland Standards and Specifications if strict adherence to the specifications will result in unnecessary hardship and not fulfill the intent of the COMAR. The applicant shall submit a written request for a waiver to the Prince George's Soil Conservation District. The request shall state the specific waiver sought and reasons for requesting the variance. The Prince George's Soil Conservation District shall not grant a waiver unless and until sufficient specific technical reasons justifying the waiver are provided by the applicant.

___ D. **FINAL SOIL REPORT REQUIREMENTS**

___ 1. **A soils investigation should be required under any of the following conditions:**

___ a. The site for development contains soils prone to movement and failure. These include the Christiana soil complexes, Marlboro Clay formations, and Howell soils. These soils have severe limitations for foundation development according to the Prince George's County Soil Survey.

___ b. The ponding of water above the Marlboro Clay formation or other unstable soil is not recommended as this can accelerate slope failure. Traps and basins should be lined with an impervious lining and the drainage pipe outfalling below the Marlboro Clay formation. Septic systems and infiltration devices or ponds are not recommended for placement above the Marlboro Clay formation.

___ c. Presence of sulfidic soils (cat clays) on site.

___ d. Presence of diatomaceous soils on site.

___ e. Placement of fill on existing 4:1 slopes or steeper.

___ f. Construction of a pond. Provide a final soils investigation for the pond areas, embankment, core trench and borrow areas.

___ g. A field investigation shows visual signs of slope failure or potential slope failure.

___ 2. **The report needs to address and include recommendations for:**

___ a. Existing and proposed grades.

___ b. Fill being placed on steep slopes.

___ c. The impact of sediment controls.

___ d. Type of sediment controls used.

___ e. Location of traps or basins and types of outfalls.

___ f. Foundations development.

___ g. Perched water tables.

___ h. Drainage systems.

___ i. Streets.

___ j. A safety factor of l.3 or more must be achieved, and engineering recommendations presented to ensure that safety and slope stability can be maintained.

___ 3. **Test borings:**

___ a. Provide enough borings to adequately address stability concerns and represent the size of the site.

___ b. All borings shall be numbered and shown on a topographical site plan.

___ c. Show existing and proposed grades.

___ d. The borings shall penetrate into and below the unstable material.

___ e. All soil borings shall have a description in accordance with the unified soil system.

___ f. Include all geologic information.

___ g. Note the presence of all slickensided joints.

___ h. Note the location and time of encountering ground water.

___ 4. **Laboratory analysis (as appropriate)**

All tests should be done in accordance with ASTM (American Society of Testing and Material) criteria.

___ a. Particle size determination
___ b. Natural water content
___ c. Sensitivity
___ d. Atterberg Limits
    ___ (1) Shrinkage Limit
    ___ (2) Plastic Limit
    ___ (3) Liquid Limit
    ___ (4) Plasticity Index
___ e, Residual shear angle and shear strength
___ f. Residual Cohesion – pfs
___ g. Compressibility
___ h. Triazial shear test
___ i. Compaction
___ j. Permeability
___ k. Standard penetration test
___ l. Bearing capacity

___E. **FINAL GRADING, EROSION AND SEDIMENT CONTROL PRACTICES REVIEW CHECKLIST**

___ 1. **Stabilized Construction Entrance B-1**

___ a. Practice meets purpose and design criteria.
___ b. Must be located at all points of construction ingress and egress.
___ c. Stabilized construction entrances cannot be installed over pavement.
___ d. Minimum length is 50 feet and minimum width is 10 feet.
___ e. All surface water flowing to SCE must be piped under the entrance.

___ 2. **Land Grading B-3**

___ a. Practice meets purpose and design criteria.
___ b. Maximum slope of 2:1 (area requiring regular maintenance – 3:1 maximum).
___ c. Provisions for protecting cut/fill slopes from surface runoff (swale or diversion).
___ d. Cut and fill slope reverse bench interval as required (divide slope face equally).
___ e. Benches six feet minimum width, 6:1 or flatter reverse slope, minimum one foot depth, 2-3 percent gradient, and 800' maximum length (show proper grading on plan).
___ f. Stable bench outlet condition – adequacy, documented (use designed pipe structures or gabions where needed).
___ g. Fill material and compaction specification.
__ h. Provisions for excess cut or required borrow material (Noted on plan).
___ i. Detail and construction specifications provided.

___ 3. **Vegetative Stabilization B-4**

___ a. Practice meets purpose and conditions.
___ b. Site preparation.
___ c. Soil amendments (fertilizer and lime specifications).
___ d. Seedbed preparation.
___ e. Seed preparations.
___ f. Methods of seeding.
___ g. Mulch specifications.
___ h. Mulching seeded areas (include anchoring method).
___ i. Securing straw mulch (mulch anchoring).
___ j. Incremental stabilization – cut slopes.
___ k. Incremental stabilization of embankments – fill slopes.
___ l. Temporary seeding (mix and rate) – include method of application – include completed chart.
___ m. Permanent seeding (mix and rate) – include method of application – include completed chart.
___ n. Sod – specifications, installation and maintenance.
___ o. Turfgrass establishment – mixture, seeding times, irrigation, repairs and maintenance.

___ 4. **Topsoil B-4-2**

___ a. Practice meets purpose, conditions and design criteria.
___ b. Provisions to preserve topsoil.
___ c. Topsoil specifications.
___ d. Soil amendments (per soil test).
___ e. Topsoil application.

___ 5. **Earth Dike C-1**

___ a. Practice meets purpose, conditions, and design criteria.

___ b. Maximum drainage area delineated - acres noted (See table C.2)*****.

___ c. Slope of dike (See table C.2) 1 – 10 percent only.

___ d. Positive drainage is maintained (existing through final grades).

___ e. Required cross-section can be installed (not across steep slopes).

___ f. Flow area of dike properly stabilized and delineated (See table C.2) - provide dike type and lining along the flow area for each reach (both sides if appropriate).

___ g. Outlet to sediment trapping device (non-erosive velocity) or onto stable outlet, documented by labeling the field conditions.

___ h. Provisions for traffic crossings shown and stabilized.

___ i. Stabilization (See table C.2).

___ j. Detail and construction specifications provided.

___ 6. **Temporary Swale C-2**

___ a. Practice meets purpose, conditions, and design criteria.

___ b. Maximum drainage area delineated, on the plan with acreage noted (See tables C.4 & C.5).

___ c. Slope of swale (See tables C.4 & C.5) 1 -10 percent only.

___ d. Positive drainage is maintained. Show spot elevations.

___ e. Required cross-section can be installed (not across steep slopes).

___ f. Flow area of swale properly stabilized and delineated (See tables C.4 & C.5) - provide swale type and lining along the flow area for each reach.

___ g. Outlet to sediment trapping device (non-erosive velocity) or onto stable outlet, documented by labeling the field conditions.

___ h. Provisions for traffic crossing shown and stabilized.

___ i. Stabilization (See tables C.4 & C.5).

___ j. Detail and construction specifications provided.

___ 7. **Perimeter Dike/Swale C-3**

___ a. Practice meets purpose, conditions, and design criteria.

___ b. Maximum drainage area of two acres not exceeded (delineate on plan with acreage noted).

___ c. Slope of dike/swale not to exceed 10 percent.

___ d. Positive drainage is maintained. Show spot elevations.

___ e. Required cross-section can be installed (not across steep slopes).

___ f. Flow area of dike/swale properly stabilized and delineated – provide dike/swale type along the flow area for each reach.

___ g. Outlet to sediment trapping device (non-erosive velocity) or onto stable outlet, documented by labeling the field conditions.

___ h. Provisions for traffic crossing shown and stabilized.

___ i. Stabilization (See design criteria).

___ j. Detail and construction specifications provided.

___ 8. **Temporary Asphalt Berm C-5**

___ a. Practice meets purpose and design criteria.

___ b. To be used across paved areas to divert clear water or divert sediment laden water to a sediment control device.

___ c. The maximum contributory slope is 10 percent.

___ d. The maximum berm slope is 10 percent.

___ e. Minimum height is 8 inches and 3½ foot width.

___ 9. **Clear Water Diversion Pipe C-6**

___ a. Practice meets purpose and design criteria.

___ b. The diversion pipe must outlet on a stable outlet at a non-erosive velocity.

___ c. The height of the sandbag dike must be a minimum of twice the diameter of the diversion pipe.

___ d. Dewater work area with a sump pit or filter bag and specify on the plan.

___ e. Make a pipe joints watertight.

___ 10. **Mountable Berm C-8**

___ a. Practice meets purpose and design criteria.

___ b. To be used on the interior areas of a site where earth dikes need to be crossed by vehicles.

___ c. When an earth dike is conveying clear water the flow must be piped under the mountable berm.

___ d. Use minimum 10 foot width for vehicular passage.

___ e. Use minimum length of 25 foot for A-dikes and 35 foot for B-dikes.

___ 11. **Diversion Fence C-9**

___ a. Practice meets purpose and design criteria.

___ b. The maximum drainage area is 2 acres.

___ c. Maintain positive drainage along the entire length of the diversion fence.

___ d. Silt fence and super silt fence are unacceptable for receiving discharges from diversion fence.

___ e. The flow surface along the diversion fence and at the point of discharge must be kept free of erosion. Use appropriate seed and mulch, soil stabilization matting and stone (See table C.2) for earth dikes.

___ 12. **Pipe Slope Drain D-1**

___ a. Practice meets purpose, conditions and design criteria.

___ b. Maximum drainage area delineated on plan with acreage noted (See table D.1).

___ c. Required detail can be installed (pipe slope 3 percent or greater).

___ d. Pipe sizes noted (See table D.1) - maximum pipe diameter 24 inches.

___ e. Inlet - (height of earth dike two times pipe diameter) shown on the plan.

___ f. Outlet to basin or trap for disturbed areas. For directing undisturbed areas to a stable outlet (non-erosive velocity) provide rock outlet protection and label the field conditions.

___ g. Detail and construction specifications provided.

___ 13. **Inflow Protection D-3**

___ a. Practice meets purpose, conditions and design criteria.

___ b. For inflow channels steeper than 10:1 but flatter than 4:1.

___ c. The points of inflow and outflow must be kept free of erosion.

___ d. Runoff may be directed to the inflow channel by means of dikes or swales.

___ 14. **Outlet Protection D-4**
- ___ a. Practice meets purpose, conditions and design criteria.
- ___ b. Tailwater (verify condition).
- ___ c. Apron size.
- ___ d. Bottom grade (0%).
- ___ e. Alignment (no bends).
- ___ f. Alignment (minimum $^{d}50$=9 inches).
- ___ g. Thickness – SHA class (See table D.2).
- ___ h. Stone quality.
- ___ i. Filter
- ___ j. Gabions (specifications) if utilized.
- ___ k. Detail and construction specifications provided.
- ___ l. Downstream outfall slope not > 10 percent.

___ 15. **Silt Fence E-1**
- ___ a. Practice meets purpose, conditions and design criteria.
- ___ b. Maximum drainage area delineated – note maximum slope length and silt fence length (See table E.1).
- ___ c. Used to intercept sheet flow only.
- ___ d. Outlet conditions (non-erosive) documented by labeling the field conditions.
- ___ e. Silt fence shall be placed on the contour.
- ___ f. No concentration of surface flows directed to silt fence.
- ___ g. Areas less than 2 percent, specify soil type.
- ___ h. Detail and construction specifications provided.

___ 16. **Super Silt Fence E-3**
- ___ a. Practice meets purpose, conditions and design criteria.
- ___ b. Maximum drainage area delineated – note maximum slope length and silt fence length (See table E.3).
- ___ c. Maximum 5 percent grade for 50 feet.
- ___ d. Detail and construction specifications provided.

___ 17. **Filter Berm E-5**
- ___ a. Practice meets purpose, conditions and design criteria.
- ___ b. Filter berms are to be placed on the contour and be used in a sheet flow condition.
- ___ c. Filter berms are not a substitute for earth dikes.
- ___ d. Use where penetration of the ground is not desirable.
- ___ e. The berm of wood chips may contain up to 50 percent compost material core.

___ 18. **Filter Log E-6**
- ___ a. Practice meets purpose, conditions and design criteria.
- ___ b. Filter logs must be placed on the contour with the ends turned upgrade.
- ___ c. Filter logs can only be used with sheet flow.
- ___ d. Filter logs can be used on frozen ground and pavement, and near tree roots.
- ___ e. For untrenched logs use mulch or compost, on upstream side, ½ height of log.

___ 19. **Temporary Stone Outlet Structure E-7**
- ___ a. Practice meets purpose, conditions, and design criteria.
- ___ b. Maximum drainage area of ½ acre not exceeded.
- ___ c. Earth dike on both sides minimum, shown and properly labeled.
- ___ d. Outlet conditions (non-erosive) documented by labeling the field conditions.
- ___ e. Detail and construction specifications provided.
- ___ f. Stone outlet structures cannot be used in series.

___ 20. **Storm Drain Inlet Protection E-9**

___ a. Practice meets purpose, conditions, and design criteria.
___ b. Maximum drainage area delineated, on the plan with acreage noted.
___ c. Curb inlets (maximum drainage area = ¼ acre).
___ d. Yard inlets (total in series must be 1 acre or less with the drainage area slope flatter than 5 percent).
___ e. No other practice feasible.
___ f. Detail and construction specifications provided.

___ 21. **Removable Pumping Station F-1 or Sump Pit F-2**

___ a. Practice meets purpose, conditions, and design criteria.
___ b. Dewatering for traps and basins.
___ c. Standpipe minimum 12 inches above wet storage elevation.
___ d. Discharge hose to stabilized downslope area (non-erosive).
___ e. Detail and construction specifications provided.

___ 22. **Filter Bag F-4**

___ a. Practice meets purpose, conditions and design criteria.
___ b. Use for dewatering of sediment laden waters from excavations, trenches, cofferdams, sediment traps or basins.
___ c. Properly dispose filter bag and sediments upon completion of use.
___ d. Place filter bag on suitable base and located on less than 5 percent slope.

___ 23. **Sediment Trap G-1**

___ a. Practice meets purpose, conditions, and design criteria.
___ b. Maximum drainage area delineated on plan with acreage noted.
___ c. Plan view of trap and storage area (top and bottom area and side slopes), drawn to scale (worst case existing through final). Trap must show on one plan sheet.
___ d. Minimum length and width bottom dimensions, elevations for top of embankment, clean-out and outlet elevations, crest elevation, weir length, shown on the plan view.
___ e. Outlet conditions (non-erosive) documented by labeling the field conditions.
___ f. Summary schedule/table provided (on same sheet as trap).
___ (1) Trap number(s).
___ (2) Type of trap (ST-I, ST-II, or ST-III).
___ (3) Drainage area (initial, interim and final).
___ (4) Storage volume required (wet, dry and total).
___ (5) Storage volume provided (wet, dry and total).
___ (6) Elevations (bottom, wet storage, dry storage, outlet and cleanout).
___ (7) ST-I: riser and barrel diameters and outlet protection dimensions.
___ (8) ST-II: weir length, existing elevation at end of outlet.
___ (9) ST-III: outlet depth (a) and width (b).
___ (10) Embankment height, width, and elevation.
___ (11) Bottom dimensions.
___ g. Points of surface water entry protected (for trap slopes >4:1 use pipe slope drain). Use top of slope diversion.
___ h. Elevation of any dike to trap ≥ top of trap embankment.
___ i. Required length to width ratio of 2:1. Use baffles as needed.
___ j. Include location of sump pit for dewatering.
___ k Maximum embankment height is 4 feet. (ST-II and ST-III).
___ l. Sediment disposal area.
___ m. Show final grades for trap removal.
___ n. Vegetative stabilization.
___ o. All needed detail(s), trap data sheet(s) and construction specifications provided.
___ p. For any trap design criteria that cannot be met see sediment basin requirements.

___ 24. **Sediment Basin G-2**

___ a. Practice meets purpose, conditions, and design criteria.

___ (1) Failure would not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities. **Provide documentation** (such as breach analysis, adjacent floodplains, wetlands, PMA's, etc.).

___ (2) The drainage area does not exceed 100 acres.

___ (3) The maximum embankment height does not exceed 15 feet.

___ (4) The basin is to be removed within 36 months after beginning of construction of the basin. **(Note in the Sequence)**.

___ (5) Where these criteria cannot be met, design to NRCS MD378 Ponds.

___ b Maximum drainage area delineated on plan with acreage noted.

___ c. Plan view of basin, constructed height of embankment, storage area, and emergency spillway showing existing and proposed contours. Bottom dimensions necessary to obtain basin volume. Basin must show on one plan sheet.

___ d. Profile along centerline of embankment and a profile along centerline of emergency spillway.

___ e. Cross-section of embankment, including elevations for constructed and settled heights, principal spillway and emergency spillway.

___ f. NRCS TR55 Urban Hydrology runoff calculations and documentation for the 10 year frequency storm assuming the worst case conditions.

___ g. Calculations showing design of pipe and emergency spillway.

___ h. Design data sheet properly completed (Table G. 6) and included on same sheet as basin with basin(s) numbered.

___ i. SWM ponds used as sediment basins must meet the minimum requirements for basins. Include all designs and details necessary to meet basin criteria. (Add details for watertight blocking of SWM low flow openings).

___ j. Provisions for sediment control during basin construction, removal, final grading and stabilization. Include upstream diversion and toe of slope protection. Include sediment disposal site.

___ k. Details (with dimensions and elevations) of barrel, riser, rise base, riser to pipe connections, pipe connections, anti-seep collar(s), trash rack, antivortex device, draw-down device, baffle boards, precast riser connector, projection collar and cleanout elevation clearly marked on riser.

___ l. Required length to width ratio of 2:1 (use baffles as needed), side slopes combined maximum 5:1, embankment minimum 8 foot width, minimum constructed height 10 percent above design height, minimum barrel 8 inches, and minimum riser crest elevation one foot below emergency spillway. Freeboard shall be at least one foot for temporary basin designs and two feet for permanent designs.

___ m. Points of surface water entry protected (for basin slopes >4:1 use pipe slope drains). Use top of slope diversion.

___ n. Access for construction and maintenance equipment shown on plan.

___ o. Outlet protection, design and details, with downstream outfall conditions (non-erosive) documented by labeling the field conditions.

___ p. Include location of sump pit(s) for dewatering and include a sediment disposal area on the plans.

___ q. Surface area is to be based on the worst case condition from the inflow Q of a 10 year storm.

___ r. Risers over 10 feet in height require anti-flotation calculations.

___ s. Emergency spillway must be in cut (existing ground) for the full flow depth, 25 foot minimum level section, and a straight exit channel.

___ t. Anti-seep collars shall be a minimum 2 feet from pipe joints and have a 2 foot minimum projection.

___ u. Cutoff trench minimum depth of 4 feet below existing ground. For created embankment the 4 feet is below the pond bottom.

___ v. Vegetative stabilization – use NRCS MD-342 for a temporary basin and for permanent designs.

___ w. All needed details and construction specifications provided.

___ x. Embankment fill material for impervious core and cut off trench must conform to Unified Soil Classes GC, SC, CH or CL.

___ 25. **Temporary Access Waterway Crossing H-4**

___ a. Access Bridge – preferred method (include restriction dates).

___ b. Culvert – must carry normal stream flows (2 year storm) (include restriction dates).

*****See "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control for Figures and Tables".

___ F. **B-4 VEGETATIVE STABILIZATION**

___ 1. Sediment control practices must remain in place during grading, seedbed preparation, seeding, mulching, and vegetative establishment.

___ 2. Inspect seeded areas for vegetative establishment and make necessary repairs, replacements and reseeding within the planting season.

___ a. Adequate vegetative stabilization requires 95 percent groundcover.

___ b. If an area has less than 40 percent groundcover, restabilize following the original recommendations for lime, fertilizer, seedbed preparation and seeding.

___ c. If an area has between 40 and 94 percent groundcover, over-seed and fertilize using half of the rates originally specified.

___ d. Maintenance fertilizer rates for permanent seeding are shown below in Table B.6.

Table B.6: Maintenance Fertilization for Permanent Seeding

Seeding Mixture	Type	lb/ac	lb/100	Time	Mowing
Tall fescue makes up 70 percent or more of cover	10-10-10- Or 30-10-10	500 400	11.5 9.2	Yearly as needed. Fall	No closer than 3 inches, if occasional mowing is desired.
Red & chewing fescue, Kentucky Bluegrass, hard Fescue mixtures.	 20-10-10	250 100	5.8 2.3	September, 30 days later. December, May 20, June 30, if needed.	Mow no closer than 2 inches for red fescue and Kentucky bluegrass, 3 inches for fescue.

___ 3. **B-4-1 Incremental Stabilization**

____ a. Cut Slopes

___ (1) Excavate and stabilize cut slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all cut slopes as the work progresses.

___ (2) **Note: Once excavation has begun the operation shall be continuous from grubbing through completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or (completing the operation out of the seeding season) will necessitate the application of temporary stabilization.**

___ b. Fill Slopes

___ (1) Construct and stabilize fill slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all slopes as the work progresses.

___ (2) Stabilize slopes immediately when the vertical height of a lift reaches 15 feet, or when the grading operation ceases as prescribed in the plans.

___ (3) At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.

___ (4) **Note: Once the placement of fill has begun the operation shall be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.**

___ 4. **B-4-2 Soil Preparation, Topsoiling and Soil Amendments**

___ a. Soil Preparation

___ (1) Temporary Stabilization

___ (a) 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.

___ (b) Apply fertilizer and lime as prescribed on these plans.

___ (c) Incorporate lime and fertilizer into the top 3 to 5 inches of soil by discing 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 loosen and friable. Seedbed loosening may be unnecessary on newly disturbed areas.

___ b. Topsoiling

___ (1) 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.

___ (2) 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.

___ (3) Topsoiling is limited to areas having 2:1 for flatter slopes where:

___ (a) The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth.

___ (b) 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.

___ (c) The original soil to be vegetated contains material toxic to plants growth.

___ (d) The soil is so acidic that treatment with limestone is not feasible.

___ (4) Areas having slopes steeper than 2:1 require special consideration and design.

___ (5) Topsoil Specifications: Soil to be used as topsoil must meet the following criteria:

___ (a) 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.

___ (b) Topsoil must be free of noxious plants or plant parts such as Bermuda grass, quack grass, Johnson grass, nut sledge, poison ivy, thistle, or others as specified.

___ (c) 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.

___ (6) Topsoil Application

___ (a) Erosion and sediment control practices must be maintained when applying topsoil.

___ (b) Uniformly distribute topsoil in a 5 to 8 inch layer and lightly compacted 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.

___ (c) 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.

___ c. Soil Amendments (Fertilizer and Lime Specifications)

___ (1) **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 analysis.

___ (2) 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.

___ (3) 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.

___ (4) 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.

___ (5) 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.

___ 5. **B-4-3 Seeding and Mulching**

___ a. Seeding Specifications

___ (1) All seed must 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.

___ (2) Mulch alone may be applied between the fall and spring dates only if the ground is frozen. The appropriate seeding mixture must be applied when the ground thaws.

___ (3) Inoculants: The inoculants 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.**

___ (4) 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. Seeding Application

___ (1) Dry Seeding: This includes use of conventional drop or broadcast spreader.

___ (a) 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.

___ (b) 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.

___ (2) Drill or Cultipacker Seeding: Mechanized seeders that apply and cover seed with soil.

___ (a) Cultipacking seeders are required to bury the seed in such a fashion as to provide at least ¼ inch of soil covering. Seedbed must be firm after planting.

___ (b) Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction.

___ (3) Hydroseeding: Apply seed uniformly with hydroseeder (slurry includes seed fertilizer).

___ (a) 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; P_20_2 (phosphorous), 200 pounds per acre; K_20 (potassium), 200 pounds per acre.

___ (b) 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.

___ (c) Mix seed and fertilizer on site and seed immediately and without interruption.

___ (d) When hydroseeding do not incorporate seed into the soil.

___ c. Mulch Materials (in order of preference)

___ (1) 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.**

___ (2) Wood Cellulose Fiber Mulch (WCFM) consisting of specially prepared wood cellulose processed into a uniform fibrous physical state.

___ (a) 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.

___ (b) WCFM , including dye, must contain no germination or growth inhibiting factors.

___ (c) 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 seedings.

___ (d) WCFM material must not contain elements or compounds at concentration levels that will be phyto-toxic.

___ (e) 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.

___ d. Mulch Application

___ (1) Apply mulch to all seeded areas immediately after seeding.

___ (2) 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.

___ (3) Wood cellulose fiber used as mulch must be applied at a net dry weight of 1,500 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.

___ e. Mulch Anchoring

___ (1) 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 size of the area and erosion hazard:

___ (a) 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.

___ (b) 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.

___ (c) 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.**

___ (d) 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.

___ 6. **B-4-4 Temporary Stabilization**

___ a. Exposed soils where ground cover is needed for a period of 6 months or less. For longer duration of time, permanent stabilization practices are required.

___ (1) Select one or more of the species or seed mixtures listed in Table B.1 for the appropriate Plant Hardiness Zone (from Figure B.3), and enter them in the Temporary Seeding Summary below along with application rates, seeding dates and seeding depths. If this Summary is not put on the plan and completed, then Table B.1 plus fertilizer and lime rates must be put on the plan.

___ (2) For sites having soil tests performed, use and show the recommended rates by the testing agency. Soil tests are not required for Temporary Seeding.

___ (3) When stabilization is required outside of a seeding season, apply seed and mulch or straw mulch alone and maintain until the next seeding season.

Temporary Seeding Summary

Hardiness Zone (from Figure B.3):_____ Seed Mixture (from Table B.1):_____					Fertilizer Rate (10-20-20)	Lime Rate
No.	**Species**	**Application Rate (lb/ac)**	**Seeding Dates**	**Seeding Depths**		
					436 lb/ac (10 lb/1,000 sf)	2 tons/ac (90 lb/1,000 sf)

___ 7. **B-4-5 Permanent Stabilization**

___ a. Exposed soils where ground cover is needed for 6 months or more.

___ b. Seed Mixtures

___ (1) General Use

___ (a) Select one or more of the species or mixtures listed in Table B.3 for the appropriate Plant Hardiness Zone (from Figure B.3) and based on site condition or purpose found on Table B.2. Enter selected mixture(s), application rates and seeding dates in the Permanent Seeding Summary. The summary is to be placed on the plan.

___ (b) Additional planting specifications for exceptional sites such as shorelines, stream banks, or dunes or for special purposes such as wildlife or aesthetic treatment may be found in USDA-NRCS Technical Field Office Guide, Section 342-Critical Area Planting.

___ (c) For sites having disturbed area over 5 acres, use and show the rates recommended by the soil testing agency.

___ (d) For areas receiving low maintenance, apply urea form fertilizer (46-0-0)at 3½ pounds per 1,000 square feet (150 pounds per acre) at the time of seeding in addition to the soil amendments shown in the Permanent Seeding Summary.

___ (2) Turfgrass Mixtures

___ (a) Areas where turfgrass may be desired include lawns, parks, playgrounds and commercial sites which will receive a medium to high level of maintenance.

___ (b) Select one or more of the species or mixtures listed below based on the site conditions or purpose. Enter selected mixture(s), application rates and seeding dates in the Permanent Seeding Summary. The summary is to be placed on the plan.

___ (i) Kentucky Bluegrass: Full Sun Mixture: For use in areas that receive intensive management. Irrigation required in the areas of central Maryland and Eastern Shore. Recommended Certified Kentucky Bluegrass Cultivars Seeding Rate: 1.5 to 2.0 pounds per 1,000 square feet. Choose a minimum of three Kentucky bluegrass cultivars with each ranging from 10 to 25 percent of the total mixture by weight.

___ (ii) Kentucky Bluegrass/Perennial Rye: Full Sun Mixture: For use in full sun areas where rapid establishment is necessary and when turf will receive medium to intensive management. Certified Perennial Ryegrass Cultivars/Certified Kentucky Bluegrass Seeding Rate: 2 pounds mixture per 1,000 square feet. Choose a minimum of three Kentucky bluegrass cultivars with each ranging from 10 to 35 percent of the total mixture by weight.

___ (iii) Tall Fescue/Kentucky Bluegrass: Full Sun Mixture: For use in drought prone areas and/or for areas receiving low to medium management in full sun to medium shade. Recommended mixture includes: Certified Tall Fescue Cultivars 95 to 100 percent, Certified Kentucky Bluegrass Cultivars 0 to 5 percent. Seeding Rate: 5 to 8 pounds per 1,000 square feet. One or more cultivars may be blended.

___ (iv) Kentucky Bluegrass/Fine Fescue: Shade Mixture: For use in areas with shade in Bluegrass lawns. For establishment in high quality, intensively managed turf area. Mixture includes; Certified Kentucky Bluegrass Cultivars 30 to 40 percent and Certified Fine Fescue and 60 to 70 percent. Seeding Rate: 1½ to 3 pounds per 1,000 square feet.

Notes:

Select turfgrass varieties from those listed in the most current University of Maryland Publication, Agronomy Memo #77, "Turfgrass Cultivar Recommendation for Maryland".

Choose certified material. Certified material is the best guarantee of cultivar purity. The certification program of the Maryland Department of Agriculture, Turf and Seed Section, provides a reliable means of consumer protection and assures a pure genetic line.

___ (c) Ideal Times of Seeding for Turf Grass Mixtures
Central MD: March 1 to May 15, August 15 to October 15 (Hardiness Zone: 6b)
Southern MD, Eastern Shore: March 1 to May 15, August 15 to October 15 (Hardiness Zones: 7a)

___ (d) Till areas to receive seed by discing or other approved methods to a depth of 2 to 4 inches, level and rake the areas to prepare a proper seedbed. Remove stones and debris over 1½ inches in diameter. The resulting seedbed must be in such condition that future mowing of grasses will pose no difficulty.

___ (e) If soil moisture is deficient, supply new seedings with adequate water for plant growth (½ to 1 inch every 3 to 4 days depending on soil texture) until they are firmly established. This is especially true when seedings are made late in the planting season, in abnormally dry or hot seasons, or on adverse sites.

Permanent Seeding Summary

Hardiness Zone (from Figure B.3):_____ Seed Mixture (from Table B.3):_____					Fertilizer Rate (10-20-20)			Lime Rate
No.	**Species**	**Application Rate (lb/ac)**	**Seeding Dates**	**Seeding Depths**	**N**	**P_20_2**	**K_20**	
					45 lb/ac (1.0 lb/ 1,000 sf)	90 lb/ac (2 lb/ 1,000 sf)	90 lb/ac (2 lb/ 1,000 sf)	2 tons/ac (90 lb/ 1,000 sf)

___ c. Sod: To provide quick cover on disturbed areas (2:1 grade or flatter).

___ (1) General Specifications

___ (a) Class of turfgrass sod must be Maryland Certified. Sod labels must be made available to the job foreman and inspector.

___ (b) Sod must be machine cut at a uniform soil thickness of ¾ inch, plus or minus ¼ inch, at the time of cutting. Measurement for thickness must exclude top growth and thatch. Broken pads and torn or uneven ends will not be acceptable.

___ (c) Standard size sections of sod must be strong enough to support their own weight and retain their size and shape when suspended vertically with a firm grasp on the upper 10 percent of the section.

___ (d) Sod must not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect its survival.

___ (e) Sod must be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period must be approved by an agronomist or soil scientist prior to its installation.

___ (2) Sod Installation:

___ (a) During periods of excessively high temperature or in areas having dry subsoil, lightly irrigate the subsoil immediately prior to laying the sod.

___ (b) Lay the first row of sod in a straight line with subsequent rows placed parallel to it and tightly wedged against each other. Stagger lateral joints to promote more uniform growth and strength. Ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause air drying of the roots.

___ (c) Wherever possible, lay sod with the long edges parallel to the contour and with staggering joints. Roll and tamp, peg or otherwise secure the sod to prevent slippage on slopes. Ensure solid contact exists between sod root sand the underlying soil surface.

___ (d) Water the sod immediately following rolling and tamping until the underside of the new sod pad and soil surface below the sod are thoroughly wet. Complete the operations of laying, tamping and irrigating for any piece of sod within eight hours.

___ (3) Sod Maintenance

___ (a) In the absence of adequate rainfall, water daily during the first week or as often and sufficiently as necessary to maintain moist soil to a depth of 4 inches. Water sod during the heat of the day to prevent wilting.

___ (b) After the first week, sod watering is required as necessary to maintain adequate moisture content.

___ (c) Do not mow until the sod is firmly rooted. No more than 1/3 of the grass leaf must be removed by the initial cutting or subsequent cuttings. Maintain a grass height of at least 3 inches unless otherwise specified.

___ d. **Note: Use of this information does not preclude meeting all of the requirements of the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control – B-4 Vegetative Stabilization.**

USDA
NATURAL RESOURCES
CONSERVATION SERVICE

MARYLAND CONSERVATION
PRACTICE STANDARD

CRITICAL AREA PLANTING

CODE 342
(Reported by Acre)

DEFINITION

Planting vegetation, such as trees, shrubs, vines, grasses, or legumes on highly erodible or critically eroding areas.

PURPOSES

This practice may be applied for one or more of the following purposes:

1. To reduce soil erosion by wind and water;
2. To improve water quality by reducing off-site sediment movement;
3. To improve wildlife habitat and visual resources.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where soil stabilization requires using specialized plant species and establishment methods.

Examples of applicable areas include conservation structures, embankments, cuts, fills, mined areas, roadsides, landfills, spoilbanks, filter strips, and recreation areas.

This practice does not apply to tree planting that is primarily intended for production of timber and other forest products. (Refer to the conservation practice standard for Tree/Shrub Establishment, Code 612.)

CONSIDERATIONS

Assess site conditions including surrounding land uses, soils, available moisture during the growing season, and existing vegetation on the site and in adjacent areas, including any noxious weeds that may be present.

Take note of other constraints such as economic feasibility, access, regulatory or program requirements, social effects, and visual aspects.

Consider the need for structural practices, in addition to this vegetative practice, to stabilize a critically eroding site.

Consider the time of year for installation of this practice. Avoid periods of high runoff velocities, or temporarily divert runoff from the planted area. This will allow the vegetation to become well established before it is subjected to storm flows.

Consider long-term maintenance requirements of the established vegetation.

CRITERIA

General Criteria

Grading Plan - The grading plan and practice installation shall be based upon adequate topographic surveys and investigations. The plan shall show the location, slope, cut, fill, and finish elevation of the surfaces to be graded. The plan shall also include auxiliary practices for safe disposal of runoff water, slope stabilization, erosion control, and drainage. Practices such as waterways, ditches, diversions, grade stabilization structures, retaining walls and subsurface drains shall be included where necessary.

Site Preparation - Timber, logs, brush, rocks, stumps and vegetative matter that will interfere with the grading operation or affect the planned stability of fill areas shall be removed and disposed of according to the plan.

Strip and stockpile topsoil in amounts necessary to complete finish grading of all exposed areas requiring topsoil. A minimum 4-inch stripping

depth shall be used, depending on the particular soil.

Fill material shall be free of brush, rubbish, timber, logs, stumps, and other vegetative matter in amounts that is detrimental to constructing stable fills.

All disturbed areas shall be left with a generally smooth finish and shall be protected from erosion.

Include provisions to safely conduct surface water to storm drains or suitable watercourses and to prevent surface runoff from damaging cut faces and fill slopes. In areas having a high water table, provide subsurface drainage to intercept seepage that would adversely affect slope stability, building foundations, or create undesirable wetness.

Protect adjoining properties from sedimentation associated with excavation and filling operations.

Do not place fill material adjacent to the bank of a stream or channel, unless provisions are made to protect the hydraulic, biological, aesthetic and other environmental functions of the stream.

Plant Materials - Select plant species based on their adaptability to the environmental conditions present and to the planned land use. Herbaceous and/or woody plants may be appropriate. For best results, use species and varieties with proven conservation traits.

Species shall be selected based on:

1. Climatic conditions, such as annual and seasonal rainfall, growing season length, humidity, and USDA Plant Hardiness Zones (see Figure 1);

2. Soil and site conditions such as drainage class, pH, available water holding capacity, slope, aspect, shade, inherent fertility, salinity or alkalinity, flooding or ponding, and levels of toxic elements such as aluminum and heavy metals;

3. Plant characteristics, such as:

    a. Ease of establishment, persistence, and time needed for full stand establishment;

    b. Growth habit (e.g., sod or bunch) as it relates to surface cover;

    c. Rooting depth and spread as it relates to slope stability;

    d. Resistance to dislodgment by flowing water or wave action at various velocities and depths;

    e. Season of growth (warm or cool) and life cycle (annual, perennial, or biennial);

    f. Fertility and management requirements;

    g. Visual appeal;

    h. Suitability as wildlife food and/or cover.

Plant materials shall either be native to Maryland, or introduced and non-invasive (i.e., not likely to spread beyond the planted area and displace native species). When feasible, select locally native plant species and/or species that are beneficial to wildlife.

Site preparation and planting to establish vegetative cover shall be done at a time and manner to insure survival and growth of selected species. Provide supplemental moisture if and when necessary to assure early survival and establishment of selected species.

Only viable, high quality seed and planting stock shall be used. The method of planting shall include hand or machine planting techniques, suited to achieving proper depths and placement for the selected plant species.

Vegetation may be established by using seed, bare-root seedlings, containerized stock, or balled-and-burlapped stock. Younger planting stock is generally preferred to older stock because younger plants adapt more readily to new conditions.

Protect the planting from unacceptable impacts due to pests, wildlife, livestock, or fire. Exclude livestock as needed to establish the planting.

Control noxious weeds as required by state law.

Additional Criteria for Soil Amendments

Use soil tests to determine the optimum recommendations for both lime and fertilizer. Soil analysis shall be performed by a soil testing laboratory that has been accredited by the North American Proficiency Testing Program, preferably the University of Maryland Soil Testing Laboratory. At a minimum, soil samples taken for nutrient and pH analysis shall be from the soil layer that will be used as the surface layer (top 4 to 6 inches) for seeding. Follow sampling procedures recommended by the laboratory.

Lime - Apply lime to achieve a soil pH of 6.0 if legumes are included in a planting, and 5.5 if only grasses or woody plants are used. Lime materials shall be ground agricultural limestone that contains at least 50% total oxides (calcium plus magnesium oxide). Hydrated lime may be substituted for agricultural lime, except in hydroseeding applications. Do not use burnt lime as a soil amendment.

Pulverized limestone shall be ground to such fineness that at least 50% will pass through a 100-mesh sieve and at least 98% will pass through a 20-mesh sieve. Apply pulverized limestone with a drop spreader when high winds will not interfere with uniform distribution of the material or cause nuisance dust. Pulverized limestone may also be used in a hydroseeding slurry.

Granular limestone shall be of such fineness that at least 30% will pass through a 100-mesh sieve, at least 50% through a 60-mesh sieve, and at least 98% through a 20-mesh sieve. Apply granular limestone with a drop or rotary spreader, but do not use it in a hydroseeding slurry.

Pelletized limestone, a product composed of pellets of pulverized limestone, shall be of a pellet type and size that is recommended by the manufacturer for use with turfgrass. The limestone used in the manufacture of the pelletized limestone product shall meet the minimum fineness requirements for pulverized limestone. Apply pelletized limestone with a drop or rotary spreader, or include it in a hydroseeding slurry.

When a soil test is not feasible, apply lime according to the rates specified as follows:

Soil Texture	Limestone Application Rate	
	Tons/Acre	Lbs./1,000 SF
Clay, clay loam, and highly organic soil	3	135
Sandy loam, loam, silt loam	2	90
Loamy sand, sand	1	45

Limestone applied at rates greater than 50 pounds per 1,000 square feet (or greater than 1 ton per acre) shall be incorporated into the upper 4 to 6 inches of the soil. Limestone applied at lower rates may be incorporated or left on the soil surface.

Fertilizer - The use of commercial fertilizer and other forms of plant nutrients must be in compliance with Maryland nutrient management regulations, as applicable. Apply fertilizer to prepared seedbeds, as needed based on soil test results. Fertilizer applied without a soil test may result in an inefficient quantity of nutrients for plant establishment, or could result in overapplication of nutrients leading to potential water quality problems and excessive weed growth. However, in circumstances when obtaining a soil test is not feasible, and a site is likely to have low nutrient levels, use the following rates for fertilizer applications:

1. Cool-season grass: 500 pounds per acre (or 10 pounds per 1,000 square feet) of 10-20-20 or equivalent;

2. Cool-season grass + legume: 500 pounds per acre (or 10 pounds per 1,000 square feet) of 5-20-20 or equivalent;

3. Warm-season grass or warm-season/ cool-season grass mixes: 500 pounds per acre (or 10 pounds per 1,000 square feet) of 0-10-10 or equivalent. Nitrogen is generally not recommended for use during the establishment of warm-season grass because it encourages increased weed competition. However, on sites with very low fertility and

minimal likelihood of weed competition, 30 pounds per acre (0.7 pound per 1,000 square feet) of slow-release N may be applied at the time of planting, or 40 pounds per acre (1 pound per 1,000 square feet) of soluble N after grass emergence.

4. Warm-season grass + legume, or warm-season/cool-season grass mixes + legumes: 500 pounds per acre (or 10 pounds per 1,000 square feet) of 0-10-10 or equivalent. On very low fertility sites where there is minimal weed competition, apply 20 pounds per acre (0.5 pound per 1,000 square feet) of N after emergence.

All fertilizer shall be uniform in composition, free-flowing, and suitable for application by approved equipment. Fertilizers shall be delivered to the site fully labelled according to applicable state fertilizer laws, and shall bear the name, trade name, or trademark and warranty of the producer. When feasible, use slow-release forms of nitrogen to provide nitrogen over a longer period of time, and to reduce nitrogen leaching and runoff.

Organic Amendments - Apply manure and compost at a rate based on a nutrient analysis of that material. Organic amendments to sites shall be recommended only after an evaluation of any potential water quality hazards. To the extent practical, incorporate organic amendments into the upper 4 to 6 inches of the soil with a disk, springtooth harrow, or other suitable equipment.

Additional Criteria for Topsoil

Topsoil shall be added to a site when needed to improve the soil medium for plant establishment and growth. The use of topsoil shall be limited to slopes that are 2:1 or flatter.

Exposed soils shall be topsoiled if they have one or more of the following limiting factors:

1. Very shallow to bedrock or other restrictive layer (e.g., the subsoil is less than 6 inches deep);

2. Extremely acidic (pH less than 5.0); or,

3. Extremely salty (conductivity greater than 500 parts per million, or 4.0 millisiemens per centimeter).

Topsoil may also be used when assurance of improved vegetative growth is desired.

Topsoil Quality - Topsoil shall be friable and loamy, free of debris, stones, or other materials larger than 1.5 inches in diameter. It shall be free of any known viable seeds or plant parts of objectionable weeds such as Johnsongrass, shattercane, thistle, multiflora rose, or others as specified.

Topsoil shall contain no toxic substance that may be harmful to plant growth. Soluble salts shall not be excessive (concentration greater than 500 parts per million). A pH range of 5.5 to 7.5 is required. If pH is less than 5.5, lime shall be applied and incorporated with the topsoil to adjust the pH to between 5.5 and 7.5. A pH of 6.5 is ideal. Topsoil hauled in from off-site shall have a minimum organic matter content of 1% by weight, based on soil test results.

Topsoil Application - Before topsoiling, test the pH of the exposed subsoil. If the subsoil is highly acidic, add ground agricultural limestone at the rate of 4 to 8 tons per acre (200 to 400 pounds per 1,000 square feet). Distribute the lime uniformly, and work it into the subsoil as previously described in the section concerning Soil Amendments.

Immediately before spreading topsoil, the subsoil shall be loosened by disking or scarifying to provide a good bond for the topsoil. Where the slope of the site is flatter than 3:1, loosen the subsoil to a minimum average depth of 2 inches. On steeper slopes (up to 2:1), loosen the subsoil to a depth of 0.5 to 1 inch, or use a bulldozer to track up and down slope to create horizontal check slots that will prevent topsoil from sliding down the slope.

Topsoil shall only be handled when it is dry enough to work (less than field capacity) without damaging soil structure. Do not spread topsoil when it is partly frozen or muddy, or on frozen slopes covered with ice or snow.

Topsoil shall be uniformly applied in a 5 to 8 inch layer, and lightly compacted to a minimum thickness of 4 inches. Subsoil with a pH of 4.0 or less, or containing iron sulfide, shall be covered with a minimum depth of 12 inches of topsoil.

Topsoil placed on slopes greater than 5% shall be promptly limed and fertilized (if needed), seeded, mulched, and tracked with suitable equipment.

Additional Criteria for Seedbed Preparation

Seedbed preparation shall be done when the soil is moist, but not wet. Lime, fertilizer, and other soil amendments shall be evenly applied where needed on the site, as described in previous sections of this standard. Either dry or wet application methods may be suitable.

Slopes flatter than 3:1 - Seedbed preparation shall consist of working the soil to a depth of 3 to 5 inches with a disk or similar equipment. Continue tillage until a reasonably uniform seedbed is prepared.

Slopes 3:1 or steeper - Scarify the soil surface with a bulldozer, heavy chain, hand tools or other equipment that will loosen the soil 0.5 to 1 inch deep. After the soil is loosened, do not work it completely smooth, but leave it in a somewhat roughened condition. Follow the general contour when making the final surface preparation.

Additional Criteria for Seed Quality and Treatment

All seed shall be labeled and meet the requirements of the Maryland State Seed Law. Refer to Table 5 for minimum germination and purity requirements. Seed shall have had a germination test within 12 months prior to the date of sowing. Use of certified seed is preferred. Keep seed cool and dry until planting.

Species with seed lots greater than 50% hard seed shall be dehulled and/or scarified and planted no later than 60 days after scarification.

Grasses that have fluffy seeds shall be planted using specially designed native seed drills. Alternatively, mechanically remove beards or awns from such seeds to facilitate movement through conventional seeding equipment.

Legume seeds shall be inoculated with the proper, viable *Rhizobium* bacteria before planting. Keep inoculant as cool as possible until use, and do not use it later than the date indicated on the package. When hydroseeding, use four times the recommended inoculant rate.

Additional Criteria for Seeding Operations

Seed shall be applied uniformly by hand, cyclone seeder, drill, cultipacker-seeder, or hydroseeder. The preferred method of seeding is by drilling or cultipacker-seeder method because these methods optimize seed to soil contact.

Seeding operations shall be done on the contour to the extent feasible. When a uniform distribution of seed is especially important (e.g., on lawns and athletic fields) and slopes are not extremely steep, apply seed in two directions, each perpendicular to one another. Apply one-half the seeding rate in each direction.

Drill - Seed shall be planted by using a grass drill or cultipacker-type seeder. A grain drill may also be used if it can be calibrated to plant small seeds at the recommended planting rates. As noted above, plant grasses with fluffy seeds by using a specially designed native seed drill. All drills shall have packer wheels, chains, or similar devices to close the seed slot and provide good seed to soil contact. Do not plant small-seeded grasses more than 1/4 to 1/2-inch deep.

Broadcast - Seed may be broadcast by using a cyclone or whirlwind seeder, or by hand. If spread by hand, small or light-seeded species such as redtop or bluestem may be mixed with filler (e.g., sawdust, finely ground corn, or slightly moistened peat moss) to achieve an even distribution. Incorporate seed into the soil 1/8 to 1/4-inch deep by raking or dragging, cultipacking, or tracking with heavy machinery. Raked areas shall be rolled with a weighted roller to provide good seed to soil contact. Do not use broadcast seeding methods during windy conditions.

Hydroseeding - This method is best suited for steep, inaccessible areas where use of a drill or other mechanized equipment is not feasible. Hydroseeding shall be done in two separate operations with seed and fertilizer applied in the first pass, and mulch applied in the second pass. Do not use burnt or hydrated lime when hydroseeding. If legume inoculant is used, complete the seeding within 3 to 4 hours after slurry is mixed, or add a fresh supply of inoculant to the mix. If possible after seeding, track the area up and down slope with heavy machinery such as a bulldozer to improve seed to soil contact.

Additional Criteria for Temporary Seeding and Nurse Crops

When the period of soil exposure is more than two months but less than twelve months, a temporary seeding (usually an annual grass) shall be used to provide short-term cover on disturbed areas. See Table 1 for recommended plant species and planting rates.

Temporary seedings shall be planted as a nurse crop with a permanent seeding mixture when rapidly growing cover is needed. When seeding toward the end of the listed planting dates for permanent seedings, or when conditions are expected to be less than optimal, select an appropriate nurse crop from Table 1 and plant with the permanent seeding mix. Companion seedings of small-seeded grasses shall not exceed 5% (by weight) of the overall permanent seeding mixture. Companion seedings of small grains such as barley, wheat, or oats shall be sown at one-third the rates listed in Table 1. Cereal rye generally should not be used as a nurse crop, unless planting will occur in very late fall beyond the seeding dates for other temporary seedings. Cereal rye has allelopathic properties that inhibit the germination and growth of other plants.

Oats are the recommended nurse crop for warm-season grasses.

When a temporary or permanent seeding cannot be completed because of weather conditions or time of year, apply mulch only (no seeding) as a temporary cover when soil stabilization is needed. Refer to the Mulching section of this standard for application rates and methods.

Additional Criteria for Permanent Seeding

Permanent herbaceous vegetation shall be designed to achieve a minimum stand density of 85 percent ground cover within one year.

Seed Mixes - To establish permanent cover, select grass and legume mixes according to the guidelines listed in Tables 3 and 4.

Planting Dates - Use Figure 1 and Table 2 to determine the recommended planting dates for selected mixes.

Supplemental Watering - If soil moisture is deficient, supply new seedings with adequate water (a minimum of 1/4-inch twice a day) until vegetation is well established. This is especially necessary when seedings are made in abnormally dry or hot weather or on droughty soils.

Additional Criteria for Mulching

Mulch shall consist of natural and/or artificial non-toxic materials, such as coconut fibers, wood shavings, straw, hay, bark chips, plastic, or fabric of sufficient thickness and durability to achieve the intended effect for the required time period. Tackifiers, emulsions, netting, pinning, or other methods of anchoring mulch shall be sufficiently durable to maintain mulch in place until it is no longer needed.

Mulching is required for critical area plantings on structural measures (e.g., grassed waterways, diversions, embankments, etc.), and shall be applied elsewhere as needed to accomplish one or more of the following purposes:

1. To provide temporary erosion control when planting must be delayed until the proper planting dates, or until plantings become well established;

2. To conserve soil moisture and to aid seed germination and plant survival;

3. To reduce soil temperature fluctuations and frost heaving;

4. To reduce weed growth in planted areas;

5. To reduce surface compaction or crusting, and improve water infiltration.

Mulching may not be needed when critical area plantings are used on field borders, filter strips, highly erodible cropland, and similar areas where crop residue and/or nurse crops will provide sufficient cover after planting.

Soil Stabilization Matting - Biodegradable matting shall be used as needed to provide temporary erosion control until seedlings or other plantings become well established. These materials are especially applicable where high water velocities are expected.

Matting shall have a uniform thickness and distribution of natural or other biodegradable synthetic fibers or cords that freely allow

penetration by water and plant seedlings. The materials shall resist decay for a minimum of 6 months, and shall not contain any harmful chemicals or other materials that may leach into the soil, or reduce the germination and establishment of seedlings.

Biodegradable matting shall be applied on seeded areas and shall be secured to the soil surface according to the manufacturer's instructions.

Permanent geotextiles (non-biodegradable) may also be used where long-term erosion control is needed. These materials shall also be installed according to the manufacturer's instructions.

Straw or Hay Mulch - Straw or hay shall be applied at the rate of 2 tons per acre (90 pounds per 1,000 square feet) immediately following seeding. Straw and hay shall be unweathered and free of any known viable seeds of objectionable weeds such as Johnsongrass, shattercane, thistle, or others as specified.

Spread mulch uniformly by hand or by mechanical methods so that approximately 85% of the soil surface is covered. This will provide erosion protection and allow adequate light penetration for seedling germination. Straw or hay shall not be chopped or finely broken during application.

On sites where mulch is exposed to displacement by wind and water, it shall be anchored immediately after placement. Use one of the following methods, depending on the size of the area, steepness of slope, and costs:

1. Mulch Netting. Cover mulch with degradable plastic, jute, or cotton netting. Staple the netting in place using wire staples;

2. Crimper. Use a tractor-drawn mulch anchoring coulter (crimper) to cut mulch into the soil surface, so as to anchor part of the mulch and leave part standing upright. Follow the general contours of the site when crimping mulch. Crimping operations are limited to areas accessible by tractor;

3. Liquid Mulch-Binders. Use one of the following:

   a. Organic and Vegetable-Based Binders. Mix with water and apply to mulch to form an insoluble polymer gel binder. Use at rates and under weather conditions as recommended by the manufacturer. These mulch binders shall be physiologically harmless and not impede the germination and growth of desired vegetation;

   b. Synthetic Binders. Mix with water and apply to mulch to form an insoluble high polymer synthetic binder. Use at rates and under weather conditions as recommended by the manufacturer.

Wood Fiber or Paper Fiber Mulch - Mulch made from wood, paper, or plant fibers shall be applied at the rate of 2,000 pounds per acre, or as recommended by the product manufacturer. Mulch shall not contain any germination or growth inhibiting materials. It may be applied by hydroseeder, but shall not be mixed in the tank with seed. Use shall be limited to flatter slopes and during optimum seeding periods in the spring and fall. Do not use on steep slopes or in concentrated flow areas.

Pelletized Mulch - Dry pellets of compressed and extruded paper and/or wood fiber products shall be applied by hand or mechanical spreader at the rate of 60 to 75 pounds per 1,000 square feet, in accordance with the manufacturer's recommendations. Pelletized mulch may contain co-polymers, tackifiers, fertilizers, and coloring agents. Apply 1/4 to 1/2-inch of water after spreading pelletized mulch to activate and expand the mulch and to provide sufficient soil coverage. This mulch material is especially applicable for small lawns or renovation areas where weed-free mulch is desirable, or straw mulch and tackifiers are not practical.

Bark Mulch - Shredded or chipped hardwood bark or pine bark mulch shall be applied to a depth of 2 to 3 inches around plantings of trees, shrubs, groundcovers, and vines. Pine bank mulch generally decomposes more slowly and is less toxic to plants than hardwood bark mulch.

Shredded bark and bark chips ("nuggets") shall be well-aged, and applied to provide at least 85% ground cover. A minimum 3-foot diameter circle of mulch is recommended around each tree or shrub. Do not mulch within 3 inches of the trunk. On steep slopes, use shredded bark mulch, rather than chips, because it is less subject to movement by water.

Additional Criteria for Sod

Sod Quality and Treatment - Sod used shall be state certified sod which is at least one year old but not older than 3 years. Commonly available sod types include Kentucky Bluegrass blends, and Tall Fescue/Kentucky Bluegrass mixes.

Sod shall be machine cut to uniform thickness of 3/4-inch, plus or minus 1/4-inch, at the time of cutting. Measurement of thickness shall exclude top growth or thatch.

Standard size sections of sod shall be strong enough to support their own weight and retain their shape when suspended vertically with a firm grasp of the upper 10% of the section.

Individual pieces of sod shall be cut to the supplier's width and length. Maximum allowable deviation from standard widths and lengths shall be no more than 5%.

Sod shall be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period shall be inspected and approved prior to its installation.

Do not harvest or transplant sod when the moisture content (excessively wet or dry) may adversely affect its survival.

Planting Dates - Use Figure 1 and Table 2 to determine the appropriate planting dates for sod.

The optimum planting period is in early fall, followed by the spring planting period. Sod may be planted during the summer if supplemental watering will be provided until the sod is well established. The fall planting season is limited by the amount of time the sod has to develop roots before the ground freezes. Newly sodded areas usually need 4 to 6 weeks before the sod is sufficiently rooted. Similarly, the spring planting season is limited by the high temperatures and drought of summer, unless supplemental water will be provided.

Installation - Prior to sodding, the soil surface shall be cleared of roots, brush, trash, debris, and other objects that would interfere with planting. Based on a soil test, apply lime and fertilizer as needed, and mix into the top 3 inches of soil. Then rake the site smooth in preparation for laying the sod.

During periods of high temperature, lightly water the soil surface immediately before laying the sod. Lay sod strips lengthwise on the contour, never up and down the slope, starting at the bottom of the slope and working up. On steep slopes, use ladders to facilitate the work and prevent damage to the sod.

Lay sod strips in staggered rows, with joints butted tightly together to prevent voids. Roll or tamp the sod immediately following placement to insure solid contact of root mat and soil surface. Do not overlap the sod strips.

On slopes greater than 3:1, secure sod to the soil surface with wooden pegs or wire staples.

Where surface water cannot be diverted from flowing over the face of a sodded slope, install a capping strip of heavy jute or plastic netting, properly secured, along the crown of the slope and edges to provide extra protection against lifting and undercutting of sod. Use the same technique to anchor sod in water-carrying channels and other critical areas. Use wire staples to anchor netting in channel work.

Supplemental Watering - Immediately following installation, sod shall be watered until moisture penetrates the soil layer beneath the sod to a depth of 4 inches. Maintain optimum moisture for at least 2 weeks by lightly watering the sod on a regular (usually daily) basis, unless sufficient rainfall has occurred. Do not allow the sod to dry out completely. After the sod begins to take root, reduce the frequency of watering and increase the amount of water applied per watering. This encourages the development of a deep root system and ultimately reduces the amount of water needed.

Additional Criteria for Groundcovers

On sites where grass is difficult to grow or maintain, other perennial groundcovers may be used to control erosion. Groundcovers are low-growing herbaceous plants, vines, and creeping shrubs that spread quickly to form a dense cover. These plants should not be expected to provide erosion control or prevent soil slippage on sites that are inherently unstable due to soil texture, structure, water movement, or excessive slope.

Selection of Plant Species - Low-maintenance groundcovers are available to suit a variety of

conditions, especially for small areas around homes and commercial buildings. These plants generally require more care than turf during the initial establishment period, but may require less care after establishment.

Species recommendations may be found by consulting publications in the "References" section of this standard. Be cautious of using species that have aggressive growth habits and may spread beyond the planted area, especially if the planting is near a neighboring property or a natural area such as a shoreline or woodland. Species such as English Ivy (*Hedera helix*) and Periwinkle (*Vinca minor*) tend to grow rapidly once established, and should not be used except under well-contained conditions.

Planting Dates - Use Figure 1 and Table 2 to determine the appropriate planting dates for the different types of plant materials.

Installation - Soil shall be prepared by incorporating 2 inches of compost into the upper 8 inches of soil. If needed based on a soil test, incorporate lime and fertilizer into the soil. In the absence of a soil test for very small sites (e.g., in home landscaping areas), fertilizer may be added at the rate of 2 pounds of 5-10-10 grade fertilizer (or equivalent) per 100 square feet.

Install the plants at a spacing that is based on their present size, expected rate of growth and size at maturity, and how quickly a complete cover is desired. In general, use a spacing of one plant for every 1 to 4 square feet, and stagger the spacing of plants between rows.

Cover the entire planted slope with a mulch that will provide sufficient erosion control during the establishment period. Refer to the Mulching section of this standard for application rates and methods.

Additional Criteria for Trees and Shrubs

If trees and shrubs will be used on a critical area, the soil surface shall be stabilized with mulch or with a low-growing herbaceous planting (e.g., creeping red fescue) to control erosion until the woody plants are large enough to serve that purpose.

Refer to the Conservation Practice Standard for Conservation Cover (Code 327) for a selected list of native tree and shrub species that may be used. Other trees and shrubs that are native to Maryland, or are introduced and are non-invasive (i.e., not likely to spread beyond the planted area and displace native species), may also be suitable. Follow the establishment recommendations in the Maryland Job Sheet for Trees and Shrubs.

For selection and use of trees and shrubs as part of a soil bioengineering system for upland slopes, refer to Chapter 18 of the Engineering Field Handbook.

SPECIFICATIONS

Plans and specifications for establishment and maintenance of a critical area planting shall be prepared for each site or management unit according to the Considerations, Criteria, and Operation and Maintenance described in this standard. They shall be recorded on specification sheets, job sheets, narrative statements in conservation plans, or other acceptable documentation.

When this practice is used to specify the vegetative component of another practice (e.g., grassed waterway, filter strip, pond, etc.), plans and specifications shall meet the requirements of this standard and the other applicable standard to achieve the intended purpose of the practice. The completed work shall be checked and documented to verify that the practice was completed according to the drawings and specifications of both standards. Documentation shall be in accordance with the section "Supporting Data and Documentation" in both standards.

OPERATION AND MAINTENANCE

General Requirements for All Plantings

Take corrective actions as needed to replace destroyed plant material or dislodged mulching material. Reshape the soil surface and replant areas where prolonged slope instability is present. Where vegetative efforts have failed, reassess the suitability of the chosen species for the site, and the need for structural measures to complement vegetative measures.

Control invasions by undesirable plants by pulling, mowing, or spraying with a selective herbicide. Where wildlife habitat is a concern, do not mow during the primary nesting season (April 15 to August 15). Control noxious weeds as required by state law.

Inspect for insects and diseases, and if an incidence threatens stand survival, take corrective action to bring the pest under control.

If fertilizer is used, it must be applied in compliance with Maryland nutrient management regulations, as applicable.

Grasses and Legumes

During the establishment period, monitor plantings for germination success, water stress, pest problems, and damage by erosion. After one full year from planting, replant all areas with less than 85% plant cover according to the following recommendations:

1. If the stand provides less than 40% ground cover, reestablish following the original seedbed preparation, lime, fertilizer, and seeding recommendations;

2. If the stand provides 40 to 84% ground cover, overseed and fertilize using one-half the original rate. On small areas, reseeding may be accomplished by broadcasting and lightly raking the seed. For larger areas, use of a grass drill or cultipacker-seeder is preferable.

Spring seedings may require an application of fertilizer between September 1 and October 15, at least every two years, according to soil test recommendations. In lieu of a soil test, apply 30 pounds per acre (0.7 pounds per 1,000 square feet) of N, P205 and K20.

Fall seedings may require the above fertilization between March 15 and May 1 the following spring.

Mixtures dominated by legumes may only need topdressing once every three years according to soil test recommendations.

If a slow release form of nitrogen (such as Ureaform or Osmocote) was used, a follow-up topdressing of nitrogen may not be necessary for several years.

Lime according to soil test recommendations at least once every five years. In lieu of a soil test, apply lime at the rate of 1 ton per acre (45 pounds per 1,000 square feet).

Groundcovers

Use a soil test analysis to determine the need for lime and fertilizer. In lieu of a soil test, a general recommendation is to apply 2 to 3 pounds per 100 square feet of 5-10-10 fertilizer in the fall or early spring. Spread 2 to 3 inches of organic mulch such as shredded hardwood or pine bark mulch (or chips) to reduce evaporation of moisture from the soil and help reduce invasion by weeds.

Use hand tools to remove weeds from between plants. Some perennial weeds, such as thistle and dandelion, are difficult to remove by hand weeding, and may require spot treatment with a nonselective broadleaf herbicide. Care must be taken to avoid herbicide contact with the desired groundcovers or vines, because they are susceptible to being killed or severely damaged by nonselective herbicides. Follow all label directions when using herbicides.

Trees and Shrubs

Follow the maintenance recommendations in the Maryland Job Sheet for Trees and Shrubs.

SUPPORTING DATA AND DOCUMENTATION

General Requirements for All Plantings

The following is a list of the minimum data and documentation to be recorded in the case file:

1. Field location and extent of planting in acres, and assistance notes. Also note the location of the planting on the conservation plan map. Assistance notes shall include dates of site visits, name or initials of the person who made the visit, specifics as to alternatives discussed, decisions made, and by whom;

2. Completed copy of the appropriate Job Sheet(s) or other specifications, and management plans. The following items shall be addressed, as appropriate:

   a. Method of site preparation and type of seedbed preparation;

   b. Type of problem site, or Conservation Practice Code to be seeded (if used as the planting component of another conservation practice);

   c. Species and rates to be seeded/planted;

   d. Seeding/planting dates;

   e. Rate and type of soil amendments to be applied;

   f. Rate and type of mulch and anchoring methods.

Additional Documentation for Construction Check Data/As-Built

In addition to the general requirements listed above, the following is a list of minimum documentation to be included in the case file when Critical Area Planting, Code 342, is used to specify the planting component of structural practices:

1. Assistance notes shall include inspection date(s), name of the person who performed the inspection(s), specifics as to what was inspected, alternatives and adjustments discussed, decisions made and by whom;

2. Dimensions of the stabilized area;

3. Certification statement on seeding/planting;

4. Final quantities, and documentation for any quantity changes. Include materials certification when requested;

5. Sign and date check notes and plans to include the statement that the practice meets or exceeds the requirements of the NRCS conservation practice standard.

REFERENCES

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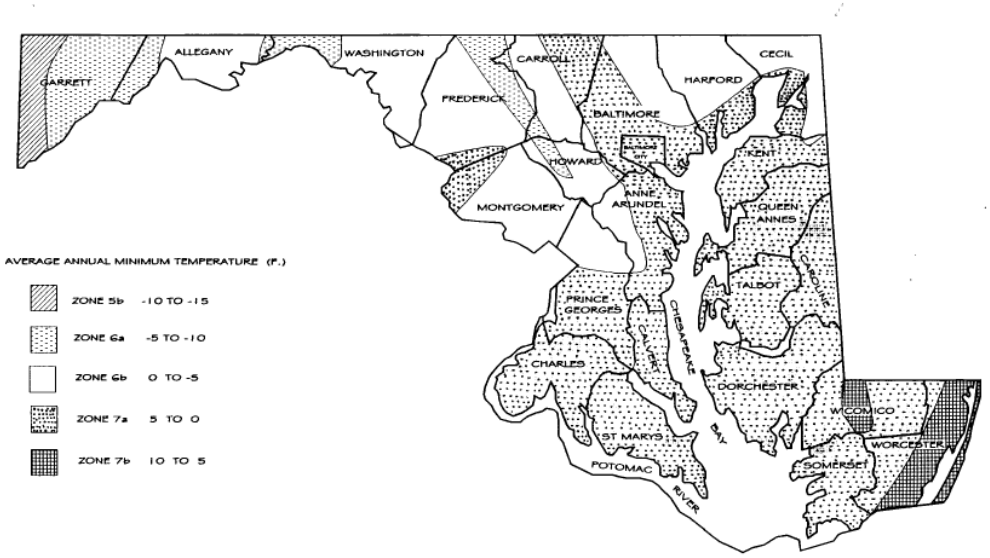
FIGURE 1: USDA Plant Hardiness Zones for Maryland



Plant Hardiness Zones delineate areas where a species can be successfully established based on average annual minimum temperatures.

TABLE 1: Temporary Seeding for Site Stabilization

Plant Species	Seeding Rate [1] lbs./ac.	Seeding Rate [1] lbs./ 1,000 sq.ft.	Seeding Depth (inches) [2]	Recommended Seeding Dates by Plant Hardiness Zone [3] 5b and 6a	6b	7a and 7b
Cool-Season Grasses						
Annual Ryegrass *Lolium perenne* ssp. *multiflorum*	40	1.0	0.5	Mar 15 to May 31 Aug 1 to Sep 30	Mar 1 to May 15 Aug 1 to Oct 15	Feb 15 to Apr 30 Aug 15 to Nov 30
Barley *Hordeum vulgare*	96	2.2	1.0	Mar 15 to May 31 Aug 1 to Sep 30	Mar 1 to May 15 Aug 1 to Oct 15	Feb 15 to Apr 30 Aug 15 to Nov 30
Oats *Avena sativa*	72	1.7	1.0	Mar 15 to May 31 Aug 1 to Sep 30	Mar 1 to May 15 Aug 1 to Oct 15	Feb 15 to Apr 30 Aug 15 to Nov 30
Wheat *Triticum aestivum*	120	2.8	1.0	Mar 15 to May 31 Aug 1 to Sep 30	Mar 1 to May 15 Aug 1 to Oct 15	Feb 15 to Apr 30 Aug 15 to Nov 30
Cereal Rye *Secale cereale*	112	2.8	1.0	Mar 15 to May 31 Aug 1 to Oct 31	Mar 1 to May 15 Aug 1 to Nov 15	Feb 15 to Apr 30 Aug 15 to Dec 15
Warm-Season Grasses						
Foxtail Millet *Setaria italica*	30	0.7	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14
Pearl Millet *Pennisetum glaucum*	20	0.5	0.5	Jun 1 to Jul 31	May 16 to Jul 31	May 1 to Aug 14

TABLE 1 NOTES:

1. Seeding rates for the warm-season grasses are in pounds of Pure Live Seed (PLS). Actual planting rates shall be adjusted to reflect percent seed germination and purity, as tested. Adjustments are usually not needed for the cool-season grasses.

   Seeding rates listed above are for temporary seedings, when planted alone. When planted as a nurse crop with permanent seed mixes, use 1/3 of the seeding rate listed above for barley, oats, and wheat. For smaller-seeded grasses (annual ryegrass, pearl millet, foxtail millet), do not exceed more than 5% (by weight) of the overall permanent seeding mix. Cereal rye generally should not be used as a nurse crop, unless planting will occur in very late fall beyond the seeding dates for other temporary seedings. Cereal rye has allelopathic properties that inhibit the germination and growth of other plants. If it must be used as a nurse crop, seed at 1/3 of the rate listed above.

   Oats are the recommended nurse crop for warm-season grasses.

2. For sandy soils, plant seeds at twice the depth listed above.

3. The planting dates listed are averages for each Zone, and may require adjustment to reflect local conditions, especially near the boundaries of the zone.

TABLE 2: Recommended Planting Dates for Permanent Cover in Maryland [1/]

Type of Plant Material	Plant Hardiness Zones		
	5b and 6a	6b	7a and 7b
Seeds - Cool-Season Grasses (includes mixes with forbs and/or legumes)	Mar 15 to May 31 Aug 1 to Sep 30	Mar 1 to May 15 Aug 1 to Oct 15	Feb 15 to Apr 30 Aug 15 to Oct 31 Nov 1 to Nov 30♦
Seeds - Warm-Season/Cool-Season Grass Mixes (includes mixes with forbs and/or legumes)	Mar 15 to May 31♦♦ Jun 1 to Jun 15*	Mar 1 to May 15♦♦ May 16 to Jun 15*	Feb 15 to Apr 30♦♦ May 1 to May 31*
Sod - Cool-Season	Mar 15 to May 31 Jun 1 to Aug 31* Sep 1 to Nov 1*✦	Mar 1 to May 15 May 16 to Sep 14* Sep 15 to Nov 15*✦	Feb 15 to Apr 30 May 1 to Sep 30* Oct 1 to Dec 1*✦
Unrooted Woody Materials; Bare-Root Plants; Bulbs, Rhizomes, Corms, and Tubers [2/]	Mar 15 to May 31 Jun 1 to Jun 30*	Mar 1 to May 15 May 16 to Jun 30*	Feb 15 to Apr 30 May 1 to Jun 30*
Containerized Stock; Balled-and-Burlapped Stock	Mar 15 to May 31 Jun 1 to Jun 30* Sep 1 to Nov 15*✦	Mar 1 to May 15 May 16 to Jun 30* Sep 15 to Nov 30*✦	Feb 15 to Apr 30 May 1 to Jun 30* Oct 1 to Dec 15*✦

TABLE 2 NOTES:

1. The planting dates listed are averages for each zone. These dates may require adjustment to reflect local conditions, especially near the boundaries of the zones. When seeding toward the end of the listed planting dates, or when conditions are expected to be less than optimal, select an appropriate nurse crop from Table 1 and plant with the permanent seeding mix. (See Table 1, Note 1, for more information.)

2. When planted during the growing season, most of these materials must be purchased and kept in a dormant condition until planting. Bare-root grasses are the exception—they may be supplied as growing (non-dormant) plants.

♦ Additional planting dates for the lower Coastal Plain, dependent on annual rainfall and temperature trends. Recommend adding a nurse crop, as noted above, if planting during this period.

♦♦ Warm-season grasses need a soil temperature of at least 50 degrees F in order to germinate. If soil temperatures are colder than 50 degrees, or moisture is not adequate, the seeds will remain dormant until conditions are favorable. In general, planting during the latter portion of this period allows more time for weed emergence and weed control prior to planting. When selecting a planting date, consider the need for weed control vs. the likelihood of having sufficient moisture for later plantings, especially on droughty sites.

* Additional planting dates during which supplemental watering may be needed to ensure plant establishment.

✦ Frequent freezing and thawing of wet soils may result in frost-heaving of materials planted in late fall, if plants have not sufficiently rooted in place. Sod usually needs 4 to 6 weeks to become sufficiently rooted. Large containerized and balled-and-burlapped stock may be planted into the winter months as long as the ground is not frozen and soil moisture is adequate.

TABLE 3: Recommended Permanent Seeding Mixtures by Site Condition or Purpose													
Site Condition or Purpose of the Planting	Recommended Mix (see Table 4)												
	1	2	3	4	5	6	7	8	9	10	11	12	13
Steep Slopes, Roadsides	✓	✓	✓	◆	✓	◆				◆	◆	✓	✓
Sand and Gravel Pits, Sanitary Landfills	✓	✓	✓	◆	✓	◆				◆	◆	✓	
Salt-Damaged Areas	◆												✓
Mine Spoil, Dredged Material, and Spoil Banks	◆		✓	◆	◆								
Utility Rights-of-Way	✓	✓	✓	✓	✓	✓	◆			✓	✓	✓	
Dikes and Dams	◆	◆	✓	◆		✓	✓	◆		✓	✓	✓	
Berms, Low Embankments (not on Ponds)	✓	✓	✓	✓	✓	✓	◆	◆		✓	✓	✓	◆
Pond and Channel Banks, Streambanks	✓	✓	✓	✓	◆	◆	◆			◆	◆		
Grassed Waterways, Diversions, Terraces, Spillways	◆				◆	✓	✓	◆	✓		✓		◆
Bottom of Drainage Ditches, Swales, Detention Basins				◆		✓	◆			◆	✓		✓
Field Borders, Filter Strips, Contour Buffer Strips	✓	✓	✓	◆	◆	✓	◆	✓	✓	✓	✓	✓	◆
Wastewater Treatment Strips and Areas								✓	◆	◆			
Heavy Use Areas (Grass Loafing Paddocks for Livestock)								✓					
Athletic Fields, Residential and Commercial Lawns							◆	✓	✓		✓		
Recreation Areas							✓	✓	✓		✓		

TABLE 3 NOTES:

✓ Recommended mix for this site condition or purpose.

◆ Alternative mix, depending on site conditions.

TABLE 4: Selected List of Permanent Herbaceous Seeding Mixtures

Mix	Recommended Cultivar	Seeding Rate [1] lbs./ac.	Seeding Rate [1] lbs./ 1000 sq .ft.	Soil Drainage Class [2]	Max. Height (feet)	Maint. Level [3]	Remarks
WARM-SEASON/COOL-SEASON GRASS MIXES							
1. SELECT ONE WARM-SEASON GRASS:							
Switchgrass *Panicum virgatum* **OR**	Blackwell, Carthage, Cave-in-Rock, or Shelter	10	0.23				All species are native to Maryland. Plant this mix with a regular grass drill.
Coastal Panicgrass *Panicum amarum* var. *amarulum*	Atlantic	10	0.23				Coastal panicgrass is best adapted to Zones 7a and 7b.
AND ADD:							
Creeping Red Fescue *Festuca rubra* var. *rubra*	Dawson, Pennlawn, Flyer, Fortess, Ruby, or Salem	15	0.34	E - P	4 - 7	C - D	Creeping red fescue is a cool-season grass that will provide erosion protection while the warm-season grass (switchgrass or coastal panicgrass) is becoming established.
PLUS ONE OF THE FOLLOWING LEGUMES:							
Partridge Pea *Chamaecrista fasciculata*	Common	4	0.09				Switchgrass, coastal panicgrass, the 'Dawson' variety of creeping red fescue, and partridge pea are moderately salt-tolerant. Do not use bush clover or wild indigo on wet sites.
Bush Clover *Lespedeza capitata*	Common	2	0.05				
Wild Indigo *Baptisia tinctoria*	Common	2	0.05				
2. Big Bluestem *Andropogon gerardii*	Niagara or Rountree	6	0.14	E - MW	6 - 8	C - D	All species are native to Maryland. The indiangrass and bluestems have fluffy seeds. Plant with a specialized native seed drill. Creeping red fescue is a cool-season grass that will provide erosion protection while the warm-season grasses are becoming established.
Indiangrass *Sorghastrum nutans*	Rumsey	6	0.14				
Little Bluestem *Schizachyrium scoparium*	Aldous or Blaze	4	0.09				
Creeping Red Fescue *Festuca rubra* var. *rubra*	Dawson, Pennlawn, Flyer, Fortess, Ruby, or Salem	15	0.34				
PLUS ONE OF THE FOLLOWING LEGUMES:							
Partridge Pea *Chamaecrista fasciculata*	Common	4	0.09				
Bush Clover *Lespedeza capitata*	Common	2	0.05				
Wild Indigo *Baptisia tinctoria*	Common	2	0.05				
Showy Tick-Trefoil *Desmodium canadense*	Common	1	0.02				

TABLE 4: Selected List of Permanent Herbaceous Seeding Mixtures

Mix	Recommended Cultivar	Seeding Rate [1/]		Soil Drainage Class [2/]	Max. Height (feet)	Maint. Level [3/]	Remarks
		lbs./ac.	lbs./ 1000 sq .ft.				
WARM-SEASON/COOL-SEASON GRASS MIXES							
3. SELECT THREE GRASSES:							
Deertongue *Dichanthelium clandestinum*	Tioga	20	0.46				Excellent for excessively droughty, low pH (acidic) soils.
Sheep Fescue *Festuca ovina* OR	Common or Bighorn	20	0.46				Sheep fescue, Canada wild rye, and redtop are cool-season grasses that will provide erosion protection while the warm-season grass (deertongue) is becoming established.
Canada Wild Rye *Elymus canadensis*	Common	3	0.07				
Redtop *Agrostis gigantea*	Streaker	1	0.02	E - MW	4 - 6	C - D	
PLUS ONE OF THE FOLLOWING LEGUMES:							
Common Lespedeza *Lespedeza striata*	Kobe	10	0.23				Common lespedeza ('Kobe' variety) is more tolerant of low acidity and high manganese concentrations than Korean lespedeza. These lespedezas are reseeding annuals.
Korean Lespedeza *Lespedeza stipulacea*	Climax or Rowan	10	0.23				
4. Deertongue *Dichanthelium clandestinum*	Tioga	15	0.34				
Creeping Red Fescue *Festuca rubra* var. *rubra*	Dawson, Pennlawn, Flyer, Fortess, Ruby, or Salem	20	0.46				
Virginia Wild Rye *Elymus virginicus* OR	Common	5	0.11	W - P	2 - 3	C - D	Use Virginia wild rye on moist, shady sites.
Canada Wild Rye *Elymus canadensis*	Common	5	0.11				Use Canada wild rye on droughty sites.

TABLE 4: Selected List of Permanent Herbaceous Seeding Mixtures

Mix	Recommended Cultivar	Seeding Rate [1] lbs./ac.	Seeding Rate [1] lbs./ 1000 sq .ft.	Soil Drainage Class [2]	Max. Height (feet)	Maint. Level [3]	Remarks
COOL-SEASON GRASS MIXES							
5. SELECT TWO GRASSES:							
Creeping Red Fescue *Festuca rubra* var. *rubra* OR	Dawson, Pennlawn, Flyer, Fortess, Ruby, or Salem	20	0.46				Use creeping red fescue in heavy shade and on moist sites.
Hard Fescue *Festuca trachyphylla*	Attila or Aurora	20	0.46				Perennial ryegrass and redtop will establish more rapidly than either fescue. Redtop tolerates wet sites better than ryegrass.
Perennial Ryegrass *Lolium perenne* OR	Blazer (II), Pennfine	10	0.23				
Redtop *Agrostis gigantea*	Streaker	1	0.02	E - SP	2 - 3	B - D	Flatpea will suppress woody vegetation. It should be planted in the spring, or as a dormant seeding in late fall or winter. It must be incorporated into the soil or covered with mulch. It may not be winter-hardy if planted late summer - fall. Caution: Flatpea can spread aggressively, and can be toxic to livestock.
AND ADD THE FOLLOWING LEGUME:							
Flatpea *Lathyrus sylvestris*	Lathco	15	0.34				
6. Tall Fescue *Lolium arundinaceum* (formerly *Festuca arundinacea*)	Recommended MD turf-types [4]	40	0.93				
Perennial Ryegrass *Lolium perenne*	Blazer (II), Pennfine	25	0.57				
PLUS ONE OF THE FOLLOWING LEGUMES:				W - SP	2 - 3	C - D	
Birdsfoot Trefoil *Lotus corniculatus*	Empire, Viking, Norcen, Leo	8	0.18				Birdsfoot trefoil is suitable for use only in Zones 5b and 6a.
White Clover *Trifolium repens*	Common	5	0.11				
7. Creeping Red Fescue *Festuca rubra* var. *rubra*	Dawson, Pennlawn, Flyer, Fortess, Ruby, or Salem	60	1.38				
Kentucky Bluegrass *Poa pratensis*	Recommended MD turf-types [4]	15	0.34	W - MW	1 - 2	C - D	This mix has good shade tolerance.

TABLE 4: Selected List of Permanent Herbaceous Seeding Mixtures

Mix	Recommended Cultivar	Seeding Rate [1] lbs./ac.	Seeding Rate [1] lbs./ 1000 sq .ft.	Soil Drainage Class [2]	Max. Height (feet)	Maint. Level [3]	Remarks
COOL-SEASON GRASS MIXES							
8. Tall Fescue *Lolium arundinaceum* (formerly *Festuca arundinacea)*	Recommended MD turf-types [4]	100	2.3	E - SP	2 - 3	A - D	Tall fescue produces a dense turf if frequently mowed, but tends to be clumpy if mowed only occasionally. For best results, recommend using a blend of 3 cultivars. Use low-endophyte cultivars in areas where livestock may graze.
9. SELECT ONE SPECIES OF FESCUE:							Good for highly managed athletic fields.
Tall Fescue *Lolium arundinaceum* (formerly *Festuca arundinacea)* **OR**	Recommended MD turf-types [4]	60	1.38				
Hard Fescue *Festuca trachyphylla*	Attila or Aurora	40	0.92				Tall fescue is more suitable for compacted, high use areas and on moist sites.
AND ADD:							
Kentucky Bluegrass *Poa pratensis*	Recommended MD turf-types [4]	40	0.92	W - SP	2 - 3	A - B	Hard fescue produces finer-textured turf with more shade tolerance.
Perennial Ryegrass *Lolium perenne*	Blazer (II), Pennfine	20	0.46				Use tall fescue instead of hard fescue for wastewater treatment strips and areas. For best results, recommend using a blend of 3 cultivars each for tall fescue and Kentucky bluegrass.
10. Orchardgrass *Dactylis glomerata*	Any	25	0.57				Low maintenance mix that is easy to establish.
Creeping Red Fescue *Festuca rubra* var. *rubra*	Dawson, Pennlawn, Flyer, Fortess, Ruby, or Salem	10	0.23				
Redtop *Agrostis gigantea*	Streaker	1	0.02	W - SP	2 - 3	C - D	
Alsike Clover *Trifolium hybridum*	Common	3	0.07				Alsike clover can be toxic to horses.
White Clover *Trifolium repens*	Common	3	0.07				Omit the clovers if using this mix for wastewater treatment strips and areas.

TABLE 4: Selected List of Permanent Herbaceous Seeding Mixtures

Mix	Recommended Cultivar	Seeding Rate [1] lbs./ac.	Seeding Rate [1] lbs./ 1000 sq .ft.	Soil Drainage Class [2]	Max. Height (feet)	Maint. Level [3]	Remarks
COOL-SEASON GRASS MIXES							
11. Creeping Red Fescue *Festuca rubra* var. *rubra*	Dawson, Pennlawn, Flyer, Fortess, Ruby, or Salem	30	0.69				
Chewings Fescue *Festuca rubra* ssp.*commutata*	Common	30	0.69				
Kentucky Bluegrass *Poa pratensis*	Recommended MD turf-types [4]	20	0.46	E - MW	2 - 3	B - D	
OPTIONAL ADDITION							
Rough Bluegrass *Poa trivialis*	Common	15	0.34				Add rough bluegrass in moist, shady conditions.
12. Creeping Red Fescue *Festuca rubra* var. *rubra*	Dawson, Pennlawn, Flyer, Fortess, Ruby, or Salem	25	0.57				Attractive mix of fine fescues and wildflowers for low maintenance conditions. Once well-established, the grasses may tend to outcompete the wildflowers.
Hard Fescue *Festuca trachyphylla*	Attila or Aurora	25	0.57				
Sheep Fescue *Festuca ovina*	Common or Bighorn	25	0.57				Wildflowers are best established by broadcasting and cultipacking on a prepared seedbed. Drilling can be also used, but care must be taken so that seeds are not drilled too deep.
PLUS WILDFLOWER MIX:							
Black-eyed Susan *Rudbeckia hirta*	Common	2	0.05	E - MW	2 - 3	C - D	
Lance-leaved Coreopsis *Coreopsis lanceolata*	Common	2	0.05				Hydroseeding is not recommended for this mix if wildflowers are used. (They have very small seeds.)
Purple Coneflower *Echinacea purpurea*	Common	2	0.05				
Partridge Pea *Chamaecrista fasciculata*	Common	5	0.11				
OR ADD CLOVER MIX:							
White Clover *Trifolium repens*	Common	3	0.07				
Red Clover *Trifolium pratense*	Any	3	0.07				

TABLE 4: Selected List of Permanent Herbaceous Seeding Mixtures

Mix	Recommended Cultivar	Seeding Rate [1/]		Soil Drainage Class [2/]	Max. Height (feet)	Maint. Level [3/]	Remarks
		lbs./ac.	lbs./ 1000 sq .ft.				
COOL-SEASON GRASS MIXES							
13. Alkali Saltgrass *Puccinellia distans*	Fults or Salty	20	0.46	W - P	2 - 3	B - D	This is the recommended mix for saline sites. Saltgrass will persist only under saline conditions. For best results, use only the 'Dawson' variety of creeping red fescue. It is a salt-tolerant variety.
Creeping Red Fescue *Festuca rubra* var. *rubra*	Dawson	15	0.34				
Fowl Meadowgrass *Poa palustris*	Common	2	0.05				
OPTIONAL ADDITION							
Creeping Bentgrass *Agrostis stolonifera*	Seaside	2	0.05				Add bentgrass for wetter conditions.

TABLE 4 NOTES:

1. **Seeding Rates:** Seeding rates for the warm-season grasses are in pounds of Pure Live Seed (PLS). Actual planting rates shall be adjusted to reflect percent seed germination and purity, as tested. Adjustments are usually not needed for the cool-season grasses, legumes, or wildflowers. All legume seeds shall be inoculated before planting with the appropriate *Rhizobium* bacteria. When feasible, hard-seeded legumes should be scarified to improve germination.
2. **Soil Drainage Class** (refer to the county soil survey for further information):
   E - Excessively Drained; W - Well Drained; MW - Moderately Well Drained; SP - Somewhat Poorly Drained; P - Poorly Drained.
3. **Maintenance Level:**

   A - Intensive mowing (every 2 - 4 days), fertilization, lime, insect and weed control, and watering (examples: high maintenance lawns and athletic fields).
   B - Frequent mowing (every 4 - 7 days), occasional fertilization, lime, pest control, and watering (examples: residential, school, and commercial lawns).
   C - Periodic mowing (every 7 - 14 days), occasional fertilization and lime (examples: residential lawns, parks).
   D - Infrequent or no mowing, fertilization, or lime after the first year of establishment (examples: wildlife areas, roadsides, steep banks)

TABLE 4 NOTES (Continued):

4. Turf-type cultivars of Tall Fescue and Kentucky Bluegrass shall be selected based on recommendations of the University of Maryland Cooperative Extension Service, Agronomy Mimeo 77. (See the "References" section of this standard.) Recommendations in the April, 2000 publication are as follows:

A. Kentucky Bluegrass –

1. The following Kentucky bluegrass cultivars are suitable for general use, and are also noted for shade tolerance:

America	Coventry	Quantum Leap
Ascot	Liberator	Showcase
Brilliant	Moonlight	SR 2000
Champagne	Nuglade	Unique
Compact	Princeton 105	

2. The following Kentucky bluegrass cultivars are suitable for general use, and are also noted for tolerance of low maintenance conditions:

Barirus	Haga	Monopoly
Caliber	Livingston	Washington
Eagleton	Merit	
Freedom	Midnight	

B. Tall Fescue - The following turf-type cultivars are suitable for general use:

Alamo E	Bulldawg	Debutante	Good-En	Micro DD	Rebel 3D*	Scorpio	Titan 2
Apache II	Chapel Hill	Dominion	Grande	Millennium	Rebel III*	Shenandoah	Tomahawk*
Avanti*	Chieftain II*	Duke	Guardian	Olympic Gold	Rebel Jr.	Shenandoah II	Trailblazer II*
Axiom	Chinook	Duster*	Heritage	Oncue	Rebel Sentry	Southern Choice*	Twilight II
Bandana	Cochise II	Eldorado*	Houndog 5	Pixie	Red Coat	SR 8200	Virtue*
Barlexus	Comstock	Empress	Jaguar III	Pixie E+	Regiment*	SR 8300	Watchdog
Barrington	Coyote	Falcon II*	Lancer	Plantation	Rembrandt	Stetson	Wolfpack
Bonanza*	Crossfire*	Finelawn Petite*	Leprechaun	Pyramid	Renegade	Tarheel	WPEZE
Bonanza II	Crossfire II	Genesis	Masterpiece	Rebel 2000	Reserve	TF6	Wyatt

Tall fescue cultivar names that are followed by an asterisk (*) have low endophyte levels (20% or lower, based on seed analysis). To avoid livestock health problems due to endophyte toxicity, use low-endophyte cultivars for critical area plantings where livestock may be allowed to graze (e.g., heavy use grass loafing paddocks). Please note that endophyte levels in plantings can vary between varieties, between fields of the same variety, and with the time of year. For areas where livestock will not have access, cultivars with higher endophyte levels are desirable because they tend to be more drought tolerant and more resistant to disease and insect damage.

TABLE 5: Quality of Seed

Species	Minimum Seed Purity (%)	Minimum Seed Germination (%)	Species	Minimum Seed Purity (%)	Minimum Seed Germination (%)
COOL-SEASON GRASSES			*WARM-SEASON GRASSES*		
Barley	98	85	Bluestem, Big	60	60
Bentgrass, Creeping	95	85	Bluestem, Little	55	60
Bluegrass, Canada	90	80	Deertongue	95	75
Bluegrass, Kentucky	97	80	Indiangrass	60	60
Bluegrass, Rough	96	80	Millet, Foxtail or Pearl	98	80
Fescue, Chewings	97	85	Panicgrass, Coastal	95	70
Fescue, Creeping Red	97	85	Switchgrass	95	75
Fescue, Hard	97	85	*LEGUMES/FORBS*		
Fescue, Sheep	97	85	Clover, Alsike	99	85
Fescue, Tall	97	85	Clover, Bush	--	--
Meadowgrass, Fowl	--	--	Clover, Red	99	85
Oats	98	85	Clover, White	98	90
Orchardgrass	90	80	Flatpea	98	75
Redtop	92	80	Indigo, Wild	--	--
Rye, Cereal	98	85	Lespedeza, Common	98	80
Ryegrass, Annual or Perennial	97	85	Lespedeza, Korean	98	80
Saltgrass, Alkali	85	80	Pea, Partridge	98	70
Wheat	98	85	Tick-Trefoil, Showy	--	--
Wild Rye, Canada	85	70	Trefoil, Birdsfoot	98	85
Wild Rye, Virginia	--	--	Wildflowers	--	--

TABLE 5 NOTE:

1. All seed shall comply with the Maryland State Seed Law. Seed shall be free of prohibited or restricted noxious weeds, as currently listed by the Maryland Department of Agriculture, Turf and Seed Section.

RECOMMENDED TURFGRASS CULTIVARS FOR CERTIFIED SOD PRODUCTION AND SEED MIXTURES IN MARYLAND

University of Maryland
Turfgrass Technical Update
TT-77 July 2012

Dr. Thomas Turner, Turfgrass Specialist and David Funk, Manager of Paint Branch Turfgrass Research Center
University of Maryland - Department of Plant Science & Landscape Architecture

Numerous new turfgrass cultivars continue to be developed and released by turfgrass breeders. However, while many of these cultivars are adapted to the environmental conditions that prevail in other regions of the country, many are not adapted to the difficult environmental conditions that occur in the transition zone, which includes Maryland and Virginia. Thus, to identify cultivars that will perform well in this region, extensive cultivar trials are evaluated each year at the University of Maryland and Virginia Polytechnic Institute and State University.

The cultivar performance data obtained at various locations in Maryland and Virginia are reviewed annually in a joint meeting of university researchers and representatives of the Departments of Agriculture of both states. The use of recommended cultivars usually results in a turfgrass stand of higher quality and density, greater stress tolerance, lower nutrient requirements, less water usage, and fewer pest problems. Also, the use of recommended cultivars generally has the benefit of a reduction in the need for pesticide applications, greater water infiltration, reduced water runoff, and the enhancement of the environmental benefits of properly managed turfgrass.

There has been extensive interest in recent years regarding turfgrass species that have reduced nutrient requirements, especially nitrogen. The two recommended turfgrasses with the lowest nitrogen requirements are the fine fescues and zoysiagrass, while turf-type tall fescue and bermudagrass have intermediate requirements. Although Kentucky bluegrass generally has the highest nitrogen requirements, research has identified several Kentucky bluegrass cultivars that provide fair quality under reduced nitrogen fertility and other maintenance inputs.

The following lists of recommended cultivars consist of two groups. "Proven" cultivars represent those that have been performing well in trials in both states over a period of at least 3-5 years, and have had certified seed tested by the MD and/or VA Departments of Agriculture. "Promising" cultivars, listed in green *italics*, have shown good performance, but have only been tested in Maryland or Virginia for 2 years or may be difficult to find due to limited seed availability.

CULTIVAR NOTATIONS

Cultivars followed by a numerical notation may be removed from these lists in future years for the following reasons:

Cultivar[1] - May be removed from the list due to declining field performance relative to other cultivars

Cultivar[2] – may be removed from the list due to declining seed quality

Cultivar[3] – may be removed from the list because certified seed has not been tested recently by either the Maryland or Virginia seed testing labs.

Cultivar[4] - may be removed from the list due to the lack of current testing data relative to other cultivars. The cultivar will be removed from the list if it is not included in the next available cultivar trial.

KEY POINTS

Recommended cultivars have bee evaluated for performance in Maryland and Virginia.

Maryland Certified Sod must contain only recommended cultivars.

Recommended cultivars generally provide better quality turf and improve ground cover.

The use of recommended cultivars reduces many pest and management problems.

Recommended cultivars often have lower fertilizer and water needs, and the need for pesticide applications should be greatly reduced.

The use of recommended cultivars enhance the environmental benefits of turfgrass.

The Maryland certified sod program is administered by the Maryland Department of Agriculture. Rather than naming individual cultivars, many specifications require that certified sod of a particular turfgrass species be used.

Specifying certified sod guarantees that the sod will contain cultivars that are currently recommended by researchers in Maryland and Virginia, will have been seeded in recommended percentages, and will be of high quality (minimal insects, weeds, and diseases). Thus, the need for constantly updated specifications to reflect improvements in cultivars is greatly minimized. Listed below are the recommendations for zoysiagrass, bermudagrass, Kentucky bluegrass, turf-type tall fescue, and fine fescue sod.

Kentucky Bluegrass Sod

- A minimum of 3 recommended and promising Kentucky bluegrass cultivars must be chosen
- Each cultivar must range from a minimum of 10% to a maximum of 35% of the blend's weight.
- No more than 35% of the mixture may be comprised of promising cultivars.

Cultivar evaluation trials identify disease-prone cultivars

Leaf spot of Kentucky Bluegrass

Summer Patch of Kentucky Bluegrass

Proven and Promising Kentucky Bluegrass Cultivars

Aries	Granite	Raven
Beyond	Impact	Solar Eclipse
Blue Note	Juliet	Sudden Impact
Courtyard	Midnight	Touche
Diva	NuGlade	Yankee
Everglade	Quantum Leap	

Turf-Type Tall Fescue Sod

The following recommended and promising turf-type tall fescue cultivars may be seeded individually or in blends, and may be mixed with Kentucky bluegrass (see note below for percentages). Addition of Kentucky bluegrass may improve sod harvestibility as well as improving overall performance and quality without increasing management inputs.

Proven turf-type tall fescue cultivars:

AST 9003	Forte	Regiment II
Avenger	Grande II	Rendition
Barvado	Greenkeeper WAF	Rhambler SRP
Bingo	Guardian 21	2nd Millennium
Blackwatch	Houndog 5	Shenandoah Elite
Bullseye	Inferno	Shenandoah III
Cochise III	Justice	Sidewinder
Constitution	Magellan	Skyline
Coyote II	Masterpiece	Spyder LS
Crossfire II[4]	Matador GT	Taos
Dakota	Monet	Tarheel II
Davinci	Montana	3rd Millennium SRP
Daytona	Mustang 4	Titanium
Endeavor	Pedigree	Titanium LS
Faith	Penn 1901	Tombstone
Falcon IV	Raptor[3]	Tulsa Time
Falcon V	Raptor II	Turbo
Fidelity	Rebel Exeda	Wolfpack
Firecracker LS	Rebel IV	Wolfpack II

Promising turf-type tall fescue cultivars:

Aggressor	*Firenza*	*Speedway*
AST 7002	*Garrison*	*SR 8550*
AST 7003	*Gazelle II*	*SR 8600*
AST 9002	*Greenbrooks*	*SR 8650*
Bladerunner II	*Hemi*	*Stetson II*
Braveheart	*Hudson*	*Sunset Gold*
Cannavaro	*Jamboree*	*Tahoe II*
Catalyst	*Lindbergh*	*Talladega*
Cezanne RZ	*LS 1010*	*Tanzania*
Cochise IV	*LS1200*	*Terrier*
Compete	*Patagonia*	*Toccoa*
Escalade	*Penn RK4*	*Traverse SRP*
Essential	*Renovate*	*Trio*
Falcon NG	*Reunion*	*Umbrella*
Fat Cat	*Rocket*	*Venture*
Finelawn Xpress		*Van Gogh*

Kentucky Bluegrass Cultivars Recommended for Mixing with Tall Fescue Sod

The following Kentucky bluegrass cultivars may be mixed with turf-type tall fescue to enhance sod strength during harvesting: Dura Blue, Thermal Blue, Thermal Blue Blaze, Wildhorse[1], and all recommended Kentucky bluegrass cultivars. A maximum of 10% Kentucky bluegrass by weight may be included with tall fescue.

Fine Fescue Sod

- The recommended and promising fine fescue cultivars may be used for the production of certified sod.
- No one cultivar may be more than 40% of the seed mixture by weight.
- Hard fescue cultivars must be 40-95% of the mixture by weight.
- Chewings, and creeping red fescue may be 0-40% of the mixture by weight.
- Promising cultivars may not compose more than 40% of the mixture by weight.
- Kentucky bluegrass must 5-20% of the mixture by weight.
- Kentucky bluegrasses must be selected from those eligible for mixing with tall fescue.
- Md. State Highway Administration will not accept sod with creeping red fescue.

Recommended Fine Fescue Cultivars

The following recommended fine fescue cultivars may be seeded individually or in blends.

Key to table, below:

R) = Strong Creeping Red Fescue, (C) = Chewings Fescue, (H) = Hard Fescue,

Beacon (H)	*Intrigue 2 (C)*	7 Seas (C)
Berkshire (H)	*LaCrosse (C)*	*Spartan II (H)*
Chariot (H)	Longfellow II (C)	SR 5130 (C)
Fairmont (C)	*Navigator II (R)*	*Treazure II (C)*
Firefly (H)	Predator (H)	Wendy Jean (R)
Gotham (H)	*Radar (C)*	*Zodiac (C)*

Note: See page 1 for explanation of superscripts and italics

Zoysiagrass Sod

Only seven cultivars are currently recommended in Maryland for certified sod production due to potential winter hardiness problems of other cultivars or due to a lack of availability. The group listed as vegetative (v) cultivars can only be obtained as sod, plugs, or sprigs. The group listed as seeded may be obtained as seed (s) as well as in vegetative forms.

Compadre (s)	Zenith (s)
Jamur (v)	*Zeon (v)*
Meyer (v)	Zorro (v)
Palisades (v)	

Note: See page 1 for explanation of italics

Bermudagrass Sod

Six vegetatively (v) reproduced cultivars are currently recommended for use in Maryland for certified sod production. These can only be obtained as sod, plugs, or sprigs. Three cultivars that can also be seeded (s) are recommended as well. A prime characteristic in evaluating bermudagrasses for use in Maryland is winter hardiness (cold tolerance). Cultivars listed have improved winter hardiness, but may exhibit some damage in extreme years, particularly under low mowing heights.

Latitude 36 (v)	Riviera (s)	Tifton 10 (v)
Northbridge (v)	Sovereign (s)	Vamont (v)
Patriot (v)	Tifsport (v)	Yukon (s)

Bermudagrass winter hardiness is a major consideration for cultivar recommendations.

Recommended Cool Season Species for Seeding Blends and Mixtures

The following seed blends and mixtures are those recommended for the large majority of sites in Maryland. Seed mixtures other than those recommended in this publication may be appropriate for the specific conditions or use at a particular site, but should be checked with a turfgrass specialist. The percentages (%) recommended for seed mixtures are on a seed weight basis. For example, when mixing 10 pounds of a 95% tall fescue – 5% Kentucky bluegrass mixture, 9.5 pounds tall fescue and 0.5 pounds Kentucky bluegrass should be used for the mixture.

Medium Maintenance Turf - Full Sun to Moderate Shade (For use in full sun to moderately shady areas and for turf that will tolerate a wider range of management inputs, with infrequent or no irrigation). Turf-type tall fescue is the most commonly recommended species for home-lawns, institutional grounds, and general use areas. They are also extensively used for general-purpose athletic fields and in golf course roughs.

Turf-type Tall Fescue (90-100%) and Kentucky Bluegrass (0-10%). A single cultivar or a blend of turf-type tall fescue cultivars may be used, and may be mixed with up to 10% of a recommended Kentucky bluegrass. The addition of Kentucky bluegrass to turf-type tall fescue generally results in an excellent turf without increasing needed management inputs.

Recommended Tall Fescue Cultivars: Same as the cultivars recommended for certified sod production (page 3).

Recommended Kentucky Bluegrass Cultivars: Same as the cultivars recommended for certified sod production (page 2) and Dura Blue, Thermal Blue, Thermal Blue Blaze, and Wildhorse.

turf-type tall fescue

turf-type tall fescue + perennial ryegrass

The effect of the mixing of perennial ryegrass with turf-type tall fescue on red thread disease. Perennial ryegrass should generally not be mixed with turf-type tall fescue due to increased disease problems.

High Maintenance Turf - Full Sun (For use in full sun areas that will receive irrigation and intensive management).

Kentucky Bluegrass (85-100%) and Perennial Ryegrass (0-15%). Due to the high maintenance requirements to successfully maintain most Kentucky bluegrasses in Maryland, it is primarily for use on showcase sites, for stadium athletic fields, and for low cut rough areas on golf courses. A minimum of 3 bluegrass cultivars should be selected, with each ranging from a minimum of 10% to a maximum of 35% of the mixture by weight.

No more than 15% perennial ryegrass should be used, as it will predominate if seeded at a higher rate. Although perennial ryegrass is generally not recommended for home-lawns due to its susceptibility to disease problems, its inclusion may be warranted with Kentucky bluegrass where erosion may be a significant problem. Perennial ryegrass germinates and becomes established much more quickly than Kentucky bluegrass.

Recommended Kentucky Bluegrass Cultivars: Same as the cultivars recommended for certified sod production (page 2).

Recommended Perennial Ryegrass Cultivars: The recommended cultivars are listed below:

Affirmed[3]	Divine	Palmer V
Apple GL	Fiesta 4	Paragon GLR
ASP6004	Gator 3	Silver Dollar
Buena Vista	Homerun	Soprano
Catalina II[3]	Jet	Stellar GL
Charismatic II GLSR	Line Drive GLS	Uno

Low Maintenance Turf – Full Sun or Shade (For use on sites that will receive minimal management, including no irrigation and low fertility).

Fine Fescue (100%). The fine fescues include creeping red fescue, chewings fescue, hard fescue, and sheep fescue. Creeping red fescue should be considered only for shady sites and not for sunny, low maintenance sites. One or more recommended fine fescue may be selected. However, neither mixing fine fescue species nor blending cultivars has been studied extensively in MD or VA for compatibility. Limited research doesn't indicate an advantage to either.

Recommended Fine Fescue Cultivars: Same as the cultivars recommended for certified sod production (page 4).

___ I. **FINAL ROUGH GRADING PLAN CHECKLIST**

___ 1. As enumerated in the supplemental Memorandum of Understanding among Prince George's County, the Prince George's Soil Conservation District and the USDA-Natural Resources Conservation Service, PGSCD will provide technical review and concurrence of all rough grading plans as part of the grading, erosion and sediment control plan review in accordance with State sediment control law, Section B-3 of the Standards and Specifications, and the county grading ordinance. To meet minimum County requirements for a rough grading approval the following items will need to be addressed on the grading, erosion and sediment control plans.

___ a. Final rough grading plans are subject to the three step review process and will require a Concept (CSC) and Environmental Site Development (SSC) review and approval. An approved NRI and SWM plan will also be required.

___ b. It will be to your benefit to concurrently apply for your G-permit grading, erosion and sediment control approval. This will expedite the process since Final Rough Grading Plan review and approval by PGSCD is required before a Final Grading, Erosion and Sediment Control Plan can be approved.

___ c. Revisions to G-permits will be referred to PGSCD when there are changes to the disturbed area or a significant technical change in grading.

___ d. When PGSCD approves a Final Rough Grading, Erosion and Sediment Control Plan, the original (optional) and three green stamped copies will be returned to the applicant, along with two standard memorandum. The applicant will transmit plan packages directly to the DPIE inspector and the DPIE Permit Section.

___ e. PGSCD approval stamp has been combined with the County's grading stamp.

___ 2. **General Requirements:**

___ a. Obtain PGSCD review and approval of a Concept and Environmental Site Development Grading, Erosion and Sediment Control Plan.

___ b. Submit a Final Rough Grading, Erosion and Sediment Control Plan with fee paid.

___ c. The following signed certifications are required on the plans:

___ (1) "I certify that I have inspected this site and that drainage onto this site from properties, and from this site onto other downgrade properties, has been addressed in substantial accordance with applicable codes".

___ (2) "I hereby certify that this plan conforms to Subtitle 32, Division 2 of the Grading Ordinance of Prince George's County, Maryland".

___ d. A plat reference number, or deed recordation number must be included on the plans.

___ e. A disturbed area statement must be added to the plans.

___ f. Utilities must be shown with easements delineated. Include MISS UTILITY note on each sheet.

___ g. The following wetland note is required on the plans:

It is the applicant's responsibility to obtain any state permits, if required, for any construction activity covered by this plan which impacts a State regulated wetland. Any changes to plans for this development whether required by the State or initiated by the applicant to meet State requirements, must be approved by PGSCD.

___ h. Approved floodplain must be delineated on the plan. Submit appropriate plans and letters of floodplain approval.

___ i. Include permission for offsite grading. A recorded grading easement is required for all areas of offsite grading. If offsite areas are to be disturbed, but existing grades maintained, a notarized letter of permission is acceptable.

___ j. Submit a letter of permission from WSSC for grading and/or disturbance within the existing WSSC easement.

___ k. Include DPW&T street approval file number on the plans.

___ 3. **Design Requirements:**

___ a. The maximum slope on a residential site is 3:1.

___ b. The minimum acceptable yard slope is 2.5%. Verify flat areas with spot elevations.

___ c. The minimum acceptable slope in a vegetated swale is 2.0%. Verify flat areas with spot elevations.

___ d. Proposed slopes steeper than 4:1 must be set back from the property line as detailed in the Grading Ordinance, Subtitle 32, Division 2, 32-161.

___ e. The limits of all proposed class 1 fill must be delineated on the plans.

___ f. A soils report is required for the placement of class 1 fill, the placement of fill on slopes steeper than 4:1, and where Marlboro Clays may be present. Submit a detailed soils report indicating recommendations for construction for these conditions.

___ J. **FINAL GRADING, EROSION AND SEDIMENT CONTROL PLAN SUBMITTAL**

___ 1. **General**

___ a. **Fees are payable by check or money order to Prince George's Soil Conservation District**

___ b. All Final Grading, Erosion and Sediment Control Plans submitted for review shall contain **two sets of folded (9" x 12") review prints** and one set of accompanying data. **Do not submit original/sepia until PGSCD indicates the plan is ready for approval**. Four sets of final prints and original/sepia (optional) shall be submitted for approval and signing. Additional or approved plans submitted for green stamping will be processed at the current fee rate.

___ c. Include **signed** and completed owner/developer and consultants certification.

___ d. All Final Grading, Erosion and Sediment Control Plan sheets shall be **sealed** by a registered professional civil engineer, architect, landscape architect, or land surveyor.

___ 2. **PGSCD Final Grading, Erosion and Sediment Control Plan Transmittal Letter** – is required for each submittal. Include project name (same as on plan), contents listed, check reason for submittal (sediment control - pond – asbuilt) and type of submittal (new-resubmittal-revision-update-green stamp). If a revision, note what has been revised and why in comments section (include copy of violation notice/inspection report if revision is due to violation). Include PGSCD sediment control number, pond number, and grading permit number, once assigned, in any subsequent correspondence or resubmittals.

___ 3. **PGSCD Final Grading, Erosion and Sediment Control Plan Site Analysis** - is required for each new submittal or revision. Include project name (same as on the plan); complete the plan review fee, map coordinates, area of site, area to be disturbed and remaining items.

___ 4. **Final Supplementary Information** - all supplementary information shall be adequately and appropriately identified.

___ a. Final soils report with soils, soil boundaries and soil survey sheet number from Soil Survey, Prince George's County Maryland-December 2009 or later revisions. Provide a photocopy of the appropriate soil survey sheet with the site boundaries clearly outlined.
Website for soil survey for Prince George's County is:
http://websoilsurvey.nrcs.usda.gov/app/homepage.htm

___ b. Final drainage area map of site, including off-site contributory areas. Delineate drainage divides and note acres to all sediment control devices. **Note**-existing topography is required.

___ c. Copy of DPW&T **approved** Final Storm Water Management Plan.

___ d. Site Plan, in accordance with Prince George's County Grading Ordinance, Subtitle 32, Division 2, Section 32-130.

___ e. Limits/property lines for entire site to be eventually developed if greater than that for which sediment control plan approval is requested.

___K. **PRINCE GEORGE'S SOIL CONSERVATION FINAL GRADING, EROSION AND SEDIMENT CONTROL FEES**

___1. **Final Grading, Erosion and Sediment Control Plan Review**

Sediment Control Plan Review		**Pond Review**	
Application Fee	$100.00	Pond(s)	$100.00
5000 sq. ft. – 1.0 Disturbed Acre =	$200.00 (minimum 1 acre)	Pond exemption(s)	50.00
>1.0 – 5.0 Disturbed Acres	$100.00 per acre	Pond As-Built(s)	100.00
>5.0 Disturbed Acres	$ 50.00 per acre		

Fees are based on an application fee and the number of acres disturbed.

Compute fees above one acre to the nearest 1/10th acre.

Maximum Fee: 300 disturbed acres per plan;
500 disturbed acres on mining and landfill plans.

NOTE: Fees are payable by check or money order ONLY (no cash). Make check(s) payable to Prince George's Soil Conservation District.

___2. **Exemptions to the State Sediment Control Law**

___ a. Letter of Exemption – No Charge

___ b. Construction of a single family home on a lot of two acres or more when disturbed area is less than one half acre.

___ c. Grading that involves less than 5,000 square feet and/or 100 cubic yards of earth.

___ d. Exempt plans are normally processed on a walk-thru basis (call for appointment).

___3. **Unapproved Plans**

___ a. If no activity occurs within one year, plan will be considered expired and will be cancelled.

___ b. The engineer/owner may request a six month continuance in writing prior to cancellation.

___4. **Plan Expiration**

___ a. All plans expire two years after approval per State law (five years for mining and landfills).

___ b. Expired plans require a complete fee starting at the beginning of the pay scale.

___5. **Updating or Extending a Plan**

___ a. Plans can only be updated on or before the plan expiration date. If the plan has expired, a full fee is required.

___ b. Updates extend the plan approval for another 2 years (5 years for mining, landfills and Class III fills). (See section III-P for grandfathered plans).

___ c. Fee for the first update is $300.00 (plans not requiring design or plan concept changes). If a second update is needed, a full fee is required at that time. You are only allowed one update after a full fee is paid.

For example:

Original plan submission	=	Full Fee
First Update	=	$300.00
Second Update	=	Full Fee
Third Update	=	$300.00
Fourth Update	=	Full Fee

___ d. Pond fees are required to update a plan.

___ e. For plan concept or design changes, see revisions. Revision approval dates and revision fees paid have no bearing on update fees or plan expiration.

___ 6. **Revisions to Approved Erosion and Sediment Control Plans**

___ a. Stamped copies (must match approved plans exactly with no changes)
___ (1) Additional copies - $50.00 each.
___ b. Minor revision of $100.00
___ (1) Owner change;
___ (2) Engineer change.
___ c. Minor revision of $300.00
___ (1) Plan or design changes affecting up to one acre;
___ (2) Rough grading permit review (after sediment control approval).
___ d. Partial revision ≥ to $300.00
___ (1) Fee starting at the beginning of the pay scale for the disturbed acreage/affected drainage area (minimum $300.00);
___ e. Major revision
___ (1) Fee starting at the beginning of the pay scale for the disturbed acreage/affected drainage area (minimum $300.00);
___ (2) Once you exceed 50% of the original plan disturbed acreage/affected drainage area, pay complete fee starting at the beginning of the pay scale.
___ f. **Revised approval does not extend expiration dates.**

___7. **Governmental Fees**

___ a. County agencies will no longer charge each other fees. The County agencies include DER, OCS, DPW&T, MNCPPC, PGSCD and Fire/EMS Department.
___ b. Prince George's County School Board fees after the one acre minimum ($300.00), will be reduced by 50%.
___ c. Complete fees will be required for municipalities.

___8. **Standard Erosion and Sediment Control Plans**
(Not for Use in Actively Developing Subdivisions)

___ a. 5,000 – 30,000 sq. ft. disturbed area = $300.00;
___ b. Form to be completed and signed by the Owner/Developer;
___ c. Revisions or updated = $300.00

___9. **Dam Safety Preliminary Pond Plans**

___ a. Pond Approval $100.00 each.
___ (1) To construct, reconstruct, or repair any dam or reservoir approval is required when:
___ (a) The contributory drainage area is less than one square mile;
___ (b) The dam is not greater than 20 feet in height;
___ (c) The pond is a low hazard structure (see pond guidelines).
___ b. Pond Exemptions - $50.00 each
___ (1) Pond approval does not apply to certain small urban stormwater management quality or quantity low hazard structures that meet any of the eight exemption conditions – (see pond guidelines).
___ c. Pond As-builts - $100.00 each
___ (1) Required within 30 days of construction of the principal spillway and embankment – (see pond guidelines).

___10. **Forest Harvest Erosion and Sediment Control Plans**

___ a. $100.00 per plan;
___ b. Revisions or updates = $100.00.

___11. **Optional Conceptual Review (prior to plan submittal)**

___ a. $75.00 per hour, or portion (minimum one hour charge);
___ b. By appointment only.

___12**. Checks Returned for Insufficient Funds**

___ a. The engineer/owner/applicant shall be liable for a collection fee of $35.00.
___ b. Fees not satisfied within ten days notice given by PGSCD may result in prosecution under the Maryland criminal code and/or withdrawal of any plan approvals and notification of permitting authorities for stop work orders.
__ c. We accept only **certified checks or money orders** from an engineer/owner/ applicant for payment of a returned check.
___ d. For a period of six months from the date the insufficient funds are paid, a **certified check or money order** will be required on any additional plans submitted.

___ 13. **District Fee Return Policy**

___ a. On occasion a request for a refund of plan review fees is made. The following conditions have resulted in an applicant receiving a refund:
___ (1) The owner or engineer requested a plan be **withdrawn before plan review has started;**
___ (2) During review a plan is found to be exempt from erosion and sediment control approval and only an exemption letter is issued;
___ (3) Evidence of overpayment has been provided by the owner or engineer;
___ (4) Transfer of payment from one plan to another by separating a plan. This can only be done when no additional design review or overlapping of plans will occur.
___ b. A letter to the District Manager requesting return of fee and reason is required by the owner/applicant. Also, a copy of the cancelled check is required. The $100.00 application fee on all projects is not refundable.

___14. **Freedom of Information Act – Copies**

___ a. Review of plan files is by appointment only.
___ b. All requests for copies must be in written form to the District Manager and Include:
___ (1) Reference the Freedom of Information Act;
___ (2) Clear indication of what materials and/or information is being requested;
___ (3) Statement of willingness to pay for costs associated to the request.
___ c. Fees are based upon reproductive costs, handling and administrative costs, and are on a case by case basis.
___ d. PGSCD costs are determined and fees received from applicant before copies will be made. Allow at least one week for requests to be processed.

___15. **Prince George's Soil Conservation Soil Erosion and Sediment Control -Pond Safety Reference Manual**

___ a. Website – http://www.PGSCD.org = free.

___ L. **FINAL GRADING, EROSION AND SEDIMENT CONTROL PLAN APPROVAL**

___ 1. Final Grading, Erosion and Sediment Control Plans are approved for one owner/developer only. All permits under an erosion and sediment control plan must and can only be issued to the owner/developer that signs the certification on the plan. If a plan is returned to the PGSCD office with a new owner/developer, the new or revised plan must contain a new certification signed by the new owner/developer.

___ 2. The owner/developer that signs the certification on an erosion and sediment control plan is the responsible party regardless of any sale of the property or work of subcontractors.

___ 3. PGSCD approval of an erosion and sediment control plan, pursuant to meeting local permit requirements for grading, building or street permits, etc., is valid only when the work to be performed under the permit is the same as (no more/no less than) that contained in the plan as approved by the PGSCD.

___ 4. Any changes or modifications to an approved erosion and sediment control plan, not approved by the PGSCD, shall invalidate the plan approval.

___ 5. PGSCD erosion and sediment control plan approval shall remain valid for a period of two years from the approval date. Mining and landfills remain valid for five years from the approval date. An expiration date will be shown on all plans.

___ 6. Four sets of final prints and original/sepia shall be submitted for approval and signing. The copy or copies (prints) of the erosion and sediment control plan as green stamped, along with the signed PGSCD approval stamp, will become an official record copy of the approved erosion and sediment control plan. Copies made from the approved mylars are approved copies as long as no changes to the plans have been made.

___ 7. Include the PGSCD approval stamp in close proximity to the title block (lower right hand corner) on the first sheet of the erosion and sediment control plan. **Note: Do not alter approval block.** The approval stamp shall show on the outside when the plans are folded.

___ 8. Revisions and updates to previously approved erosion and sediment control plans shall be processed as a new submittal. Plans so submitted will be reviewed in accordance with PGSCD requirements in effect at time of submittal. Include an explanation of what was revised, changed, or added, and why.

___ 9. A soil conservation district shall withhold approval when it determines that the provisions of any outstanding order affecting the developer have not been complied with, or there is a violation of the terms of an existing erosion and sediment control plan. (COMAR 26.17.01.08)

___ 10. A soil conservation district by written notice may suspend approval of the erosion and sediment control plan. The county shall also suspend the grading or building permit related to it. (COMAR 26.17.01.08)

___ 11. PGSCD reserves the right to deny the issuance of an approval where the proposed project would adversely affect the public safety and welfare. (COMAR 26.17.01.08)

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___ M. **PRINCE GEORGE'S SOIL CONSERVATION DISTRICT FINAL GRADING, EROSION AND SEDIMENT CONTROL**

APPROVAL STAMP

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT **FINAL APPROVAL** **GRADING, EROSION AND SEDIMENT CONTROL**
FSC# **EXPIRATION DATE**
POND (P#)
DISTRICT SIGNATURE **APPROVAL DATE**

___1. **NOTE:**

INCLUDE THE PGSCD APPROVAL STAMP IN CLOSE PROXIMITY TO THE TITLE BLOCK (LOWER RIGHT HAND CORNER) ON THE FIRST SHEET OF THE FINAL GRADING, EROSION AND SEDIMENT CONTROL PLAN ONLY.

STAMP MUST SHOW ON THE OUTSIDE WHEN FINAL GRADING, EROSION AND SEDIMENT CONTROL PLANS ARE FOLDED

PGSCD WILL SIGN AND/OR INITIAL THE APPROVAL AND INCLUDE APPROVAL AND EXPIRATION DATES ON PLANS AS APPROPRIATE.

DO NOT ALTER THE SIZE (2-7/8" X 3-3/4") OR CONTENT OF THE APPROVAL STAMP.

APPROVAL NUMBERS DESIGNATE THE (NUMERICAL ORDER, YEAR, AND NUMBER OF ANY REVISIONS)

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PRINCE GEORGE'S SOIL CONSERVATION DISTRICT
FINAL
GRADING, EROSION AND SEDIMENT CONTROL PLAN
APPROVAL STAMP
(EXAMPLES)

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT **FINAL APPROVAL** **GRADING, EROSION AND SEDIMENT CONTROL**
FSC# 44-13-00
EXPIRATION DATE **POND** **P#** X
DISTRICT SIGNATURE **APPROVAL DATE**
PERMIT 1084-2013-G
SSC# 44-13-00
CSC# 44-13-00

_____ 2. ENGINEER IS TO INCLUDE THE APPROVAL STAMP IN THE LOWER RIGHT HAND CORNER OF THE FIRST SHEET OF THE GRADING, EROSION AND SEDIMENT PLAN. (THIS SIZE ONLY)

ADD FINAL GRADING, EROSION AND SEDIMENT CONTROL PLAN NUMBER FSC# WHEN ASSIGNED BY THE DISTRICT

GRADING, EROSION AND SEDIMENT CONTROL APPROVAL WITH ROUGH GRADING PERMIT
COMBINED CONCEPT, SITE DEVELOPMENT AND FINAL APPROVAL

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT **FINAL APPROVAL** **GRADING, EROSION AND SEDIMENT CONTROL**	
FSC# 98-13-00	
	EXPIRATION DATE
POND **(Pond #1)**	**(Pond #2)**
P# 10-13-00 DPWT	11-13-00 DPWT
DISTRICT SIGNATURE	**APPROVAL DATE**

_____ 3. GRADING, EROSION AND SEDIMENT CONTROL APPROVAL AND SMALL POND APPROVAL. ADD POND NUMBER **P#** WHEN ASSIGNED BY THE DISTRICT. ADD **DPWT** FOR COUNTY **ACCEPTED** PONDS

YOU MAY HAVE MULTIPLE POND NUMBERS, ONE FOR EACH POND APPROVAL. IDENTIFY EACH POND WITH A **POND #** i.e.: (Pond #1) 10-13-00
(Pond #2) 11-13-00

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT **FINAL APPROVAL** **GRADING, EROSION AND SEDIMENT CONTROL**
FSC# 156-13-00
EXPIRATION DATE **POND** **P#** 12-13-00 EXEMPT
DISTRICT SIGNATURE **APPROVAL DATE**

_____ 4. GRADING, EROSION AND SEDIMENT CONTROL APPROVAL AND A S.W.M. POND STRUCTURE REVIEWED AND MET EXEMPTION CRITERIA.

ADD POND NUMBER **P# EXEMPT**

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT
FINAL
GRADING, EROSION AND SEDIMENT CONTROL PLAN
APPROVAL STAMP
(EXAMPLES)

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT **FINAL APPROVAL** **GRADING, EROSION AND SEDIMENT CONTROL**
FSC# 101-13-00
EXPIRATION DATE
POND **P# MDE**
DISTRICT SIGNATURE APPROVAL DATE

_____ 5. PGSCD GRADING, EROSION AND SEDIMENT CONTROL APPROVAL AND POND APPROVED BY STATE OF MARYLAND DEPARTMENT OF THE ENVIRONMENT

ADD **MDE** FOR POND NUMBER

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT **FINAL APPROVAL** **GRADING, EROSION AND SEDIMENT CONTROL**
FSC# 131-13-00
EXPIRATION DATE
POND **P# 54-13**
DISTRICT SIGNATURE APPROVAL DATE
REVISION #1
UPDATE #1

_____ 6. GRADING, EROSION AND SEDIMENT CONTROL APPROVAL AND SMALL POND APPROVAL THAT HAS REVISED APPROVAL.

ADD **REVISION#**

GRADING, EROSION AND SEDIMENT CONTROL APPROVAL AND SMALL POND APPROVAL THAT HAS UPDATE APPROVAL FOR ADDITIONAL 2 YEARS. (NOTE: MINING AND FILL SITES HAVE A 5 YEAR APPROVAL).

ADD **UPDATE#**

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT **FINAL APPROVAL** **GRADING, EROSION AND SEDIMENT CONTROL**
FSC# 272-13-00
EXPIRATION DATE
POND **P# 60-13-00**
DISTRICT SIGNATURE APPROVAL DATE
AS-BUILT

_____ 7. GRADING, EROSION AND SEDIMENT CONTROL APPROVAL AND A SMALL POND APPROVAL WITH AN ACCEPTED POND AS-BUILT

FOR MULTIPLE PONDS INDENTIFY WHICH PONDS AND POND NUMBERS ARE AS-BUILTS

FROM:

PRINCE GEORGE'S
SOIL CONSERVATION DISTRICT
FINAL
GRADING, EROSION AND SEDIMENT CONTROL
PLAN TRANSMITTAL LETTER
(Required for each submittal)

TO: PRINCE GEORGE'S SOIL
CONSERVATION DISTRICT
5301 MARLBORO RACE TRACK RD.
UPPER MARLBORO, MD 20772
301-574-5162 x 3
301-574-5156 Fax

DATE:
ATTENTION:
FSC#
RE:
REFERENCE SSC#

SUBMITTED FOR: ____Final Grading, Erosion and Sediment Control Plan Review (FSC)
____Pond Review (P) ____Pond As-Built Review (AB)
(Always submit two sets of prints for review)

TYPE OF SUBMITTAL: ___New ___Resubmission ____Revision ____Update
___ Green Stamp Copies ____Final Approval (Include originals & four prints)
Do Not Send Until Requested

COPIES	DESCRIPTION

INFORMATION ENCLOSED: Check appropriate spaces

Final Grading, Erosion and Sediment Control Plan
___Review Fees
___2 Sets of Prints (folded)
___Signed Certifications
___Plans Sealed
___Site Analysis Sheet
___Soil Boundaries
___Drainage Area Map
___SWM Concept Plan & Approval Letter
___Site Plan
___Limits/Property Lines

Final Pond Plan
___2 Sets of Prints (folded)
___Signed Certifications
___Computations
___Soils Report
___Hazard Class
___Drainage Area Map: TC, RCN, Soils, etc.
___Small Pond Approval Letter (2)
___MD-378 Pond Summary (2)
___O&M Plan (2)
___Landscape Plan
___SC Plan
___Final Small Pond Exemption

As-Builts
___2 Sets of Prints (folded)
___Signed Certifications: As Built Cert
Geotech Cert
Vegetative Cert
___Red-Lined
___Boxed or Checked
___All Supporting Info

COMMENTS:_____

_____

_____

_____

PRINT NAME_____PH#_____

EMAIL ADDRESS_____

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT
FINAL GRADING, EROSION AND SEDIMENT CONTROL PLAN
SITE ANALYSIS
(Required for each new submittal or revision)

NAME OF PROJECT IN
TITLE BLOCK: _____

1. **Final Grading, Erosion and Sediment Control Plan Review**

		Amount
Application Fee	$100.00	_____
_____5,000 sq. ft. – 1.0 Disturbed Acre =	$200.00 (minimum 1 acre)	_____
_____>1.0 – 5.0 Disturbed Acres =	$100.00 per acre	_____
_____>5.0 Disturbed Acres =	$ 50.00 per acre	_____

Pond Review

_____Pond(s)	$100.00 (each)	_____
_____Pond exemption(s)	$ 50.00 (each)	_____
_____Pond As-Built(s)	$100.00 (each)	_____
	Total Due	_____

Compute fees above one acre to the nearest 1/10th acre.

NOTE: Checks or money orders ONLY made payable to Prince George's Soil Conservation District (no cash or credit/debit cards accepted).

2. Location P.G. Co. Street Map Book Coordinates _____
3. StreetAddress_____
   _____
4. Area of Site/Property _____ ac.
5. Area to be Disturbed _____ ac.
6. Area to Vegetatively Stabilized _____ ac.
7. Existing Site Conditions: Wooded _____ Grass _____ Cropland _____
   Disturbed/Graded _____ Other _____
8. SWM Permit/Inspection Agency
   _____M.D.E.
   _____Prince George's County
   _____City of Bowie
9. Sediment Control Permit/Inspection Agency
   _____M.D.E.
   _____Prince George's County
   _____City of Bowie
   _____City of Greenbelt
   _____City of Laurel
   _____Other _____
10. Utilities Proposed: Storm Drain _____ Sewer _____ Water _____ Septic_____
    Gas _____ Electric _____
    Utilities Existing: Storm Drain _____ Sewer _____ Water _____ Septic _____
    Gas _____ Electric _____
11. SWM Events Attenuated _____
12. Storm Drainage Approval Agency _____
13. 100-year Flood Plain on site? _____ Yes _____ Elevations _____ No
14. Critical Area Requirements? _____ Yes _____ No
15. Wetlands On-Site? _____Yes _____ No _____Approval Agency

REFERENCE SSC#_____

___ P. **FINAL GRADING, EROSION AND SEDIMENT CONTROL PLAN UPDATES**

___ 1. Generally, plans submitted for update review and approval must meet the current criteria in effect at time of submittal. A plan that received final approval by January 9, 2013, for erosion and sediment control using the "1994 Maryland Standards and Specifications" may be updated under its existing conditions (except for stabilization) if grading activities have begun on the site.

___ 2. For projects approved by January 9, 2013, using the "1994 Standards and Specifications" that have not started grading may be updated with an expiration date of January 8, 2015, under its existing condition (except for stabilization).

___ 3. Stabilization **practices** on all projects must be in compliance with the "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control" by January 9, 2013, regardless of when the plan was approved.

___ 4. Plans can only be updated on or before the expiration date. If the plan has expired it will be treated as a new submittal for fees. Plans expire two years after approval (five years for mining and landfills). Revision approval dates have no bearing on plan expiration dates.

___ 5. Provide **re-signed and dated** owner's/developer's certification and consultant's certification on the first sheet. Do not remove original signatures and dates.

___ 6. Include status of all sequences of operation items. Clarify what is in progress or completed. Time frames need to show a sliding range to include the **total time** an activity will occur.

___ 7. Provide complete and current general notes.

___ 8. Provide a completed, signed, sealed and dated "Adequacy of Existing Sediment Controls Checklist".

___ 9. Use Prince George's Soil Conservation District details if those practices are used.

___ 10. Provide **re-signed and dated** small pond approval letter for ponds not yet constructed. Provide as-built plan for ponds that have been constructed.

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___ Q. ADEQUACY OF EXISTING SEDIMENT CONTROLS CHECKLIST

(Use for All Revisions, Updates, or Supersedes)

When plans are submitted for revision, update, or supersede approval the engineer shall include the following checklist. The completed checklist is to be based on **field observations** of any existing sediment controls. Include comments or corrective action as needed on the check list and in the plan sequence. Include any inspection reports or stop work orders related to the plan submittal issued by the sediment control inspector.

Plan Name _____ FSC#_____

GRADING AND STABILIZATION

____ **B.1 Stabilized Construction Entrance**

- _____ a. Location per plan_____
- _____ b. Proper materials (stone size and filtercloth)_____
- _____ c. Proper length and width_____
- _____ d. Adequate diversion of water flows_____
- _____ e. Proper maintenance and removal of mud_____
- _____ f. Wash rack properly installed and maintained_____

____ **B.3 Benching**

- _____ a. Location per plan_____
- _____ b. Proper outlets installed_____
- _____ c. Proper grading, slope and depth_____
- _____ d. Incremental stabilization_____

____ **B.4 Vegetative Stabilization**

- _____ a. Soil testing, site over 5 acres disturbed_____
- _____ b. Adequate topsoil stockpiles_____
- _____ c. Proper topsoil application_____
- _____ d. Proper water conveyance practices for incremental stabilization_____
- _____ e. Proper soil stabilization matting on channels and slope >3:1_____
- _____ f. Adequate 95% cover for sediment controls_____
- _____ g. Adequate 95% cover for steep slopes >3:1_____
- _____ h. Mulch and anchoring (for non seeding dates)_____
- _____ i. All other areas within 1 week of grading (95% cover)_____

WATER CONVEYANCE

____ **C.1 Earth Dikes**

- _____ a. Positive drainage is maintained_____
- _____ b. Maximum slope is not steeper than 10%_____
- _____ c. Flow area of dike stabilized_____
  - _____ (1) Required flow width_____
  - _____ (2) Seed and mulch_____
  - _____ (3) Seed and matting_____
  - _____ (4) 4" – 7" stone_____
- _____ d. Compacted with no inappropriate materials_____
- _____ e. Stabilized outlet – non-erosive_____
- _____ f. Adequate vegetative stabilization (95% cover)_____

____ **C.5 Temporary Asphalt Berm**

_____ a. Location per plan_____

_____ b. Proper height and width_____

_____ c. Positive drainage is maintained_____

_____ d. Proper outlet_____

____ **C.6 Clear Water Diversion**

_____ a. Location per plan_____

_____ b. Proper materials (pipes, sandbags and sheeting)_____

_____ c. Proper height sand bags_____

_____ d. Proper outlet protection_____

_____ e. Proper dewatering_____

____ **C.8 Mountable Berm**

_____ a. Location per plan_____

_____ b. Proper materials (stone, filter cloth and piping)_____

_____ c. Proper length, width and height_____

_____ d. Adequate conveyance of water flows_____

____ **C.9 Diversion Fence**

_____ a. Proper slope >10%_____

_____ b. Proper materials and installation_____

_____ c. Proper flow channel protection_____

_____ d. Proper nonerosive outlet_____

EROSION CONTROL

____ **D.1 Pipe Slope Drain**

_____ a. Location per plan_____

_____ b. Proper materials (pipe, stone and geotextiles)_____

_____ c. Proper points of inflow and outlet_____

_____ d. Slope drain properly anchored_____

_____ e. Proper height of berm over pipe_____

____ **D.3 Inflow Protection**

_____ a. Slopes >4:1 for riprap_____

_____ b. Slopes >2:1 for gabions_____

_____ c. Proper materials (stone, geotextile and baskets)_____

_____ d. Proper Entrance and Exit sections_____

_____ e. Proper 0% outlet slope_____

____ **D.4 Outlet Protection**

_____ a. Proper dimensions (length, width and depth)_____

_____ b. Proper materials (stone and geotextile)_____

_____ c. Proper 0% slope_____

_____ d. Non-erosive downstream channel_____

FILTERING

____ **E.1 Silt Fence**
- _____ a. Proper size and materials_____
- _____ b. No concentrated flows_____
- _____ c. Parallel to contours_____
- _____ d. Adequately embedded into ground_____
- _____ e. No disturbance downstream_____

____ **E.3 Super Silt Fence**
- _____ a. Proper size and materials_____
- _____ b. No concentrated flows_____
- _____ c. On contour, no section over 5% more than 50'_____
- _____ d. Adequately embedded into ground_____
- _____ e. No disturbance downstream_____

____ **E.5 Filter Berm**
- _____ a. Proper size and materials_____
- _____ b. No concentrated flows_____
- _____ c. On contour, no section over 5% more than 50'_____
- _____ d. No disturbance downstream_____

____ **E.6 Filter Log**
- _____ a. Proper size and materials_____
- _____ b. No concentrated flows_____
- _____ c. Proper trenching and staking_____
- _____ d. Placed on the contour_____

____ **E.9 Storm Drain Inlet Protection**
- _____ a. Proper materials and construction_____
- _____ b. No flow bypass_____
- _____ c. Proper trenching and staking_____
- _____ d. Clogging – needs cleaning_____

DEWATERING

____ **F.2 Sump Pit**
- _____ a. Clogging – needs cleaning_____
- _____ b. Proper size and materials_____
- _____ c. Proper discharge to non-erosive area_____
- _____ d. Location per plan_____

____ **F.4 Filter Bag**
- _____ a. Proper materials_____
- _____ b. Proper base (size and materials)_____
- _____ c. Clogging – needs cleaning_____
- _____ d. Proper slope and discharge_____

SEDIMENT TRAPPING

____ **G.1 Sediment Trap(s) #**

_____ a. Outlet Structure_____
_____ (1) Proper size_____
_____ (2) Proper materials_____
_____ b. Check structure for leaking_____
_____ (1) Between barrel and riser (pipe outlet)_____
_____ (2) Trap not holding water_____
_____ (3) At riser base (pipe outlet)_____
_____ (4) Piping along barrel (pipe outlet)_____
_____ c. Embankment conditions_____
_____ (1) Adequate vegetative stabilization (95% cover)_____
_____ (2) Proper side slopes and top width_____
_____ (3) Inappropriate material in embankment (roots, rocks)_____
_____ (4) Trees growing on embankment_____
_____ d. Storage of trap_____
_____ (1) Proper dimensions_____
_____ (2) Needs cleaning out_____
_____ e. Proper relative elevations_____
_____ (1) Between weir crest and top of embankment (1 foot)_____
_____ f. Dewatering (pipe outlet)_____
_____ (1) 1⁄2" hardware cloth and geotextile fabric_____
_____ (2) Clogging – needs cleaning_____
_____ g. Trash rack/anti-vortex device existing per plan design (pipe outlet)_____
_____ h. Baffle adequate (if required)_____
_____ (1) Proper material and location_____
_____ (2) 6" above weir crest_____
_____ (3) 6" minimum in ground_____
_____ i. Pipe slope drain (into trap where necessary)_____
_____ 1) Geotextile inflow apron_____
_____ (2) Anchors_____
_____ (3) Rip-rap outlet protection_____
_____ j. Rip-rap outlet protection (pipe outlet)_____
_____ (1) Filter cloth_____
_____ (2) Adequate length and width_____
_____ (3) Silted up (needs cleaning)_____
_____ k. Safety fence adequate (if required or utilized)_____
_____ (1) Proper materials_____
_____ (2) Does not interfere with weir outlet_____

____ **G.2 Basin(s) #**

_____ a. Barrel and riser_____
_____ (1) Proper size_____
_____ (2) Proper materials_____

_____ b. Check structure for leaking:_____
_____ (1) Between barrel and riser_____
_____ (2) Basin not holding water_____
_____ (3) At riser base_____

_____ c. Embankment conditions_____
_____ (1) Adequate vegetative stabilization (95% cover)_____
_____ (2) Proper side slopes and top width_____
_____ (3) Inappropriate material in embankment (roots, rocks)_____
_____ (4) Trees growing on embankment_____
_____ d. Storage of basin_____
_____ (1) Proper dimensions_____
_____ (2) Cleanout elevation marked on riser_____
_____ (3) Needs cleaning out_____
_____ e. Condition of emergency spillway_____
_____ (1) Proper dimensions_____
_____ (2) Proper stabilization_____
_____ (3) Proper 25 foot level section_____
_____ f. Proper relative elevations_____
_____ (1) Between riser crest, emergency spillway and top of dam (one foot minimum freeboard to top of embankment-two foot for permanent ponds)_____
_____ g. Dewatering device_____
_____ (1) Proper material and size_____
_____ (2) Proper elevation_____
_____ (3) Watertight end cap_____
_____ (4) Support rod_____
_____ (5) 1⁄2" hardware cloth and geotextile fabric_____
_____ (6) Clogging-needs cleaning_____
_____ h. Trash rack/anti-vortex device existing per plan design_____
_____ i. Baffle adequate (if required)_____
_____ (1) Proper materials and location_____
_____ (2) 6" above riser crest_____
_____ (3) 6" minimum in ground_____
_____ j. Pipe slope drain (into basin where necessary)_____
____ (1) Geotextile inflow apron_____
_____ (2) Anchors_____
_____ (3) Rip-rap outlet protection_____
_____ k. Rip-rap outlet protection_____
_____ (1) Filter cloth_____
_____ (2) Adequate length and width_____
_____ (3) Silted up (needs cleaning)_____
_____ l. Safety fence adequate (if required or utilized)_____
_____ (1) Proper materials_____
_____ (2) Does not interfere with emergency spillway_____
_____ m. Permanent ponds utilized as basins_____
_____ (1) Accepted As-Built_____
_____ (2) Opening(s) blocked (watertight) to basin riser crest elevation_____

____ **H. Miscellaneous**_____

_____

_____

_____ _____

Signature Seal Date

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___ R. **MINOR PLAN CHANGES**

___ 1. Minor changes are made in the field with the approval or direction of the inspector. Such changes are not required to be approved by the Prince George's Soil Conservation District. These include:

___ a. Adjustment of sediment control feature to meet field contours.
___ (1) No change allowed in storage capacity or minimum criteria.

___ b. Adjustments to allow for positive drainage.

___ c. Increase size of sediment control feature from minimum design.
___ (1) No change allowed in pipe size.

___ d. Addition of earth dikes, SOS, straw bales or silt fence where needed - not replacement for another required practice or poor phasing.

___ e. Addition of stabilized construction entrance where needed or devices to allow crossing of berms and swales.

___ f. Addition to trapping devices greater than minimum requirements; does not relate to riprap changes.

___ g. Emergency measures needed to minimize/eliminate a problem needing immediate attention. Emergency measures of a major plan change nature shall be referred to the Prince George's Soil Conservation District.

___ h. Alternate method of stabilization of disturbed areas and/or sediment control practices as taken from the Standards and Specifications.

___ i. Incidental disturbance beyond approved limit of disturbance that are immediately stabilized.

___ j. Addition of stockpiles incidental to installation of sediment control practices.

___ 2. Minor plan changes to a District approved Final Grading, Erosion and Sediment Control Plan are to be shown on the plan, initialed and dated by the appropriate inspector. (i.e., Prince George's County, City of Bowie, City of Laurel and City of Greenbelt).

___ 3. Revisions to the approved minor plan changes list cannot be made unless approved by the Prince George's Soil Conservation District and the Maryland Department of the Environment.

___ S. **MAJOR PLAN CHANGES**

___ 1. Major changes require revised plans submitted to the Prince George's Soil Conservation District from Prince George's County, City of Bowie, City of Laurel and City of Greenbelt.

___ a. Recommending practices when the plan has not been followed.

___ b. Phasing change on the plan.

___ c. Changing size of practices.
___ (1) Eliminating or decreasing storage area.

___ d. Substituting for required practices.

___ e. Allowing temporary seeding when permanent seeding is required.

___ f. Decreasing minimum size of trap, berm, stone outlet, size and type of stone, pipes, etc.

___ g. Allowing on-site grading changes which:
___ (1) Alter drainage area, e.g., retaining walls, benches, storm drain, etc.;
___ (2) Steepen slopes, lengthen slopes;
___ (3) Concentrate flows;
___ (4) Extend grading beyond disturbed limits.

___ h. Any sediment control practice not included in the Standards and Specifications for Soil Erosion and Sediment Control.

___ 2. Revisions to the approved major plan changes list cannot be made unless approved by the Prince George's Soil Conservation District and the Maryland Department of the Environment.

___ T. **LOCATIONS OF RESOURCE DOCUMENTS**

___ 1. **Prince George's Soil Conservation District Soil Erosion and Sediment Control – Pond Safety Reference Manual**

We no longer have books available Copies of the manual can be downloaded free of charge from this website:
http://www.pgscd.org

___ 2. **Prince George's Soil Conservation District Soil Survey books:**

We no longer have books available.
Custom soil maps must be created using this website:
http://www.websoilsurvey.nrcs.usda.gov/app/

___ 3. Sediment Control Publications are available from:
Maryland Department of the Environment
(410-537-3543)

Publication List – July/2013 (underlined items are available online)

1.	Soil Erosion & Sediment Control Guidelines for Forest Harvest Operations in Maryland (2005)	Draft-N.C.
2.	1994 Maryland Standards & Specifications for Soil Erosion & Sediment Control	$15.00
3.	2011 Maryland Standards & Specifications for Soil Erosion & Sediment Control	$25.00
4.	Model Erosion & Sediment Control Ordinance (2012)	$ 1.00
5.	Sediment Control Guidelines for State and Federal Projects (1990) (revised 2004)	$ 1.00
6.	"Sediment More than Just a Dirty Word"	N.C.

Mail Order Form & Check Payable to:
MDE
P.O. Box 2057
Baltimore, MD 21230

Website: **mde.state.md.us**
On left side of screen-click on **Water**
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SECTION IV

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT

STANDARD

GRADING, EROSION AND SEDIMENT CONTROL PLAN

___ A. STANDARD EROSION AND SEDIMENT CONTROL PLAN CHECKLIST

The following information is presented to assist with the preparation of Standard Erosion and Sediment Control Plan Form

___ 1. **Form Preparation**

___ a. The standard erosion and sediment control plan shall not be used in actively developing subdivisions and **<u>can only be approved by Prince George's Soil Conservation District.</u>**

___ b. Exemption to the State Sediment Control Law. No sediment control plan is needed for:

___ (1) Construction of a single family home on a lot of two acres or more when the disturbed area is less than ½ acre.

___ (2) Grading that involves less than 5,000 square feet and/or 100 cubic yards of earth.

___ c. Provide Prince George's County approved SWM plans showing ESD to the MEP or exemption/wavier.

___ d. Include PGSCD soils map and identify any highly erodible soils.

___ e. The Standard Erosion and Sediment Control Plan review fee will be required before processing the plan.

___ f. Include four copies of the site plan in accordance with Prince George's County Building Code, Subtitle 32, Division 2, Section 32.130 with enough information to show that the minimum required conditions are met as stated on the Standard Erosion and Sediment Control Plan form. Include four completed copies of the form. The form may be included on the site plan.

___ g. Ensure that all the blocks on the Standard Erosion and Sediment Control Plan form are completed except Part C. Sediment Controls and the Prince George's Soil Conservation District approval block. Sediment control requirements will be filled out by the District reviewer.

___ h. The form must be signed and dated by the owner/developer. Note: Representative must have a letter of authorization.

___ **B. PRINCE GEORGE'S COUNTY NONTIDAL WETLANDS OF SPECIAL STATE CONCERN**

___	1.	Beck Woods	Laurel
___	2.	Belt Woods	Lanham
___	3.	Beltsville Airport Bog	Laurel
___	4.	Beltsville Bottomland Forest	Laurel, Beltsville
___	5.	Beltsville Forest and Meadow	Laurel
___	6.	Beltsville Seasonal Bog	Laurel
___	7.	Buck Lodge Road Bog	Beltsville
___	8.	Chews Lake	Bristol
___	9.	Fort Ravine	Mount Vernon
___	10.	Johnson's Gully	Mount Vernon
___	11.	Huntington Park Woods	Laurel
___	12.	Patuxent Maple Swamp	Bowie
___	13.	Patuxent W.R.C.	Laurel
___	14.	Route I-95 Bog	Beltsville
___	15.	Southwest Branch Bottomland Forest	Lanham Upper Marlboro
___	16.	Suitland Bog	Anacostia
___	17.	Watkins Regional Park	Lanham
___	18.	Zekiah Swamp	Brandywine

NONTIDAL WETLANDS OF SPECIAL STATE CONCERN LOCATED IN THE CRITICAL AREA

___	19.	Magruder Ferry Seep	Lower Marlboro
___	20.	Mockley Swamp	Mount Vernon
___	21.	Upper Patuxent Marshes Natural Heritage Area	Bristol

- No earth disturbance shall occur within 25 feet of any nontidal wetland or within 100 feet of any nontidal wetland of special State concern.

- 1989 Nontidal Wetlands Guidance Maps 1:24000 are available by appointment only for viewing within the office.

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT
STANDARD EROSION AND SEDIMENT CONTROL PLAN
(Not for use in actively developing subdivisions)
See checklist to complete form – www.PGSCD.org

Project Name_____Lot_____Block_____

Site Address_____
Street City State Zip

Owner/Developer_____
Name Phone

_____
Address State Zip

Lot Area_____square feet Area Disturbed_____square feet

I (We) certify that the following conditions will be met:

A. **Grading**

1. Attached signed and sealed site plan (with vicinity map) showing proposed development with grades and/or flow arrows. Include a narrative/sequence of construction. Include soils map.
2. No contiguous lots are undergoing development.
3. Total disturbed area does not exceed 30,000 square feet
4. No cut or fill will exceed 3 feet (existing to final grade).
5. Volume of grading or earth disturbance involved does not exceed 1,000 cubic yards.
6. No earth disturbance shall occur within the limits of the 100-year floodplain of any stream, or 100 feet of any perennial stream, water body, Mean High Water Line of any water body affected by tidal action, or tidal wetland.
7. No earth disturbance shall occur within 25 feet of any nontidal wetland or within 100 feet of any Nontidal Wetland of Special State Concern.
8. No earth disturbance shall occur on highly erodible soils and steep slopes 15% or greater.
9. The proposed work is not located in High Quality (TIER II) waters in Prince George's County per COMAR 26.08.02.04.
10. The proposed work is not located in Water Impaired Stream Segments and Tributaries for sediments in Prince George's County.
11. The proposed work does not require a State Waterway or Wetland Permit.
12. There will be no final graded slope steeper than 3:1.
13. No fill will be placed on any existing slope steeper than 5:1.
14. Initial earth disturbance shall be limited to installing sediment controls.
15. All fills will be free of any organic or other deleterious material and will be compacted. All areas to receive fill will have the ground surface prepared by removing all existing vegetation.
16. The proposed grading will not impair existing surface drainage, constitute a potential erosion hazard, or a source of sedimentation to any adjacent property or right-of-way.

B. Stormwater Management Coordination with Sediment Controls

1. Provide Prince George's County approved Stormwater Management Plan showing environmental site design (ESD) practices are used to the maximum extent practicable (MEP).
2. Final grading for ESD practices should not take place until the surrounding site is stabilized. If this cannot be accomplished, runoff from disturbed areas shall be diverted around proposed ESD practices using approved water conveyance practices (i.e.: Earth Dikes or Diversion Fence) to a safe outlet.

C. Sediment Controls

Provide sediment controls below disturbed area to prevent sediment from being transported off-site. For details, specifications, and maintenance for sediment controls and vegetative stabilization, refer to the "2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control" or any subsequent revisions. Any controls that are damaged or disturbed shall be restored or repaired before the end of each day. Any pumping of water must be filtered through an approved filtering device.

Stabilized Construction Entrance_____ _____Super Silt Fence_____
Stone Outlet Structure_____Earth Dikes_____
Diversion Fence_____Filter Berm_____
Filter Log _____Storm Drain Inlet Protection_____
Other_____
_____
_____
_____

D. Stabilization

1. Following initial soil disturbance or redisturbance, permanent or temporary stabilization shall be completed within:
   a. Three calendar days for surface of all perimeter controls, and all perimeter slopes.
   b. Seven calendar days for all other disturbed or graded areas.
2. Provide topsoil uniformly 5 to 8 inches deep, lightly compacted to a minimum thickness of 4 inches prior to establishment of permanent vegetation. Topsoil stockpiled from the existing site may be used if the material meets the standards.

I certify that I have the authority to make the foregoing application; that the information above and on the attached site plan is correct; and that I have the ability to meet all the limitations and conditions set forth by this agreement.

Nothing herein relieves the applicant from complying with any and all Federal, State, and local requirements (e.g., Stormwater Management, Chesapeake Bay Critical Area, Forest Conservation, State Waterway or Wetland Permit, Grading, etc.)

Owner/Developer's
Signature_____Date_____

Owner/Developer's
Name_____
(Please Print) Email Address and/or Phone Number

Prince George's Soil Conservation District
Upper Marlboro, Maryland 20772 Phone: (301)574-5162 x3

Approved by:_____ S#_____

Approval Date_____Expiration Date_____

(Revised 7/2013)

SECTION V

PRINCE GEORGE'S
SOIL CONSERVATION DISTRICT

PGSCD DETAILS

GRADING, EROSION AND SEDIMENT CONTROL PLAN

SEDIMENT BASIN HORIZONTAL DRAW- DOWN DEVICE

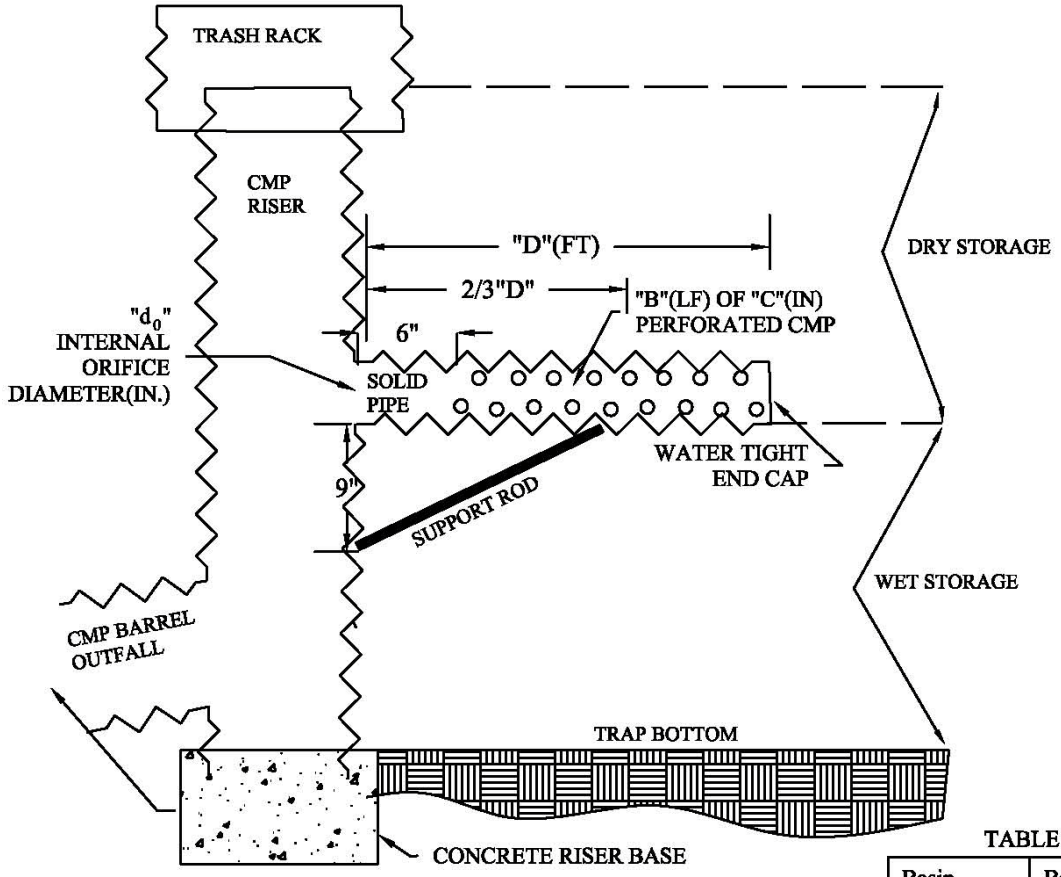

TABLE 1

	Basin ____	Basin ____
d_0	_____ IN	_____ IN
B	_____ LF	_____ LF
C	_____ IN	_____ IN
D	_____ FT	_____ FT

CONSTRUCTION SPECIFICATIONS

1. The perforations shall be 1" in diameter spaced 3" on center. Allow no perforations within 6" of riser connection. Provide internal orifice plate if d_0 is smaller than C, see table 1.
2. Securely attach 1/2" hardware cloth then Geotextile Class E fabric around entire perforated portion of draw-down pipe. Include a watertight end cap.
3. Draw-down pipe shall not exceed 6 1/2' in total length and shall be placed at the wet storage elevation. If necessary provide multiple draw-down pipes.
4. Provide support of draw-down pipe ≥ 2 feet in length to prevent sagging and floatation. Use a minimum of 3 support rods (#6 rebar) welded to riser and pipe. Support rods shall be connected to both sides and bottom of draw-down pipe.
5. An alternative method is to stake both sides of draw-down device with 1" steel angle, or 1" by 4" square or 2" round wooden posts set 3' minimum into the ground and securely attached to the pipe with 12 gauge minimum wire.

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SEDIMENT BASIN HORIZONTAL DRAW-DOWN DEVICE

The water in the basin from the riser crest to the permanent pool shall be drawn down over a 10 hour period through an internal orifice in a draw-down device. Draw-down shall be done in such a manner as to remove the clean water without removing sediment that has settled out or floating debris.

PROCEDURE TO DETERMINE DIAMETER AND LENGTH OF DRAW-DOWN PIPE

Table 2 Draw-Down Device

Drainage Area (acres)	Maximum Orifice Diameter (d_o)	Maximum Orifice Area (A_0)	Total Area of Perforations (A_t)
5-10	4"	0.087ft^2	0.34 ft^2
10-20	6"	0.20 ft^2	0.80 ft^2
20-40	8"	0.34 ft^2	1.36 ft^2
40-60	10"	0.55 ft^2	2.20 ft^2
60-80	12"	0.79 ft^2	3.16 ft^2
80-100	15"	1.07 ft^2	4.28 ft^2

Step #1 Determine maximum orifice area (A_o) from Table 2 based on drainage area.

Step #2 Determine maximum orifice diameter (d_o) from Table 2.

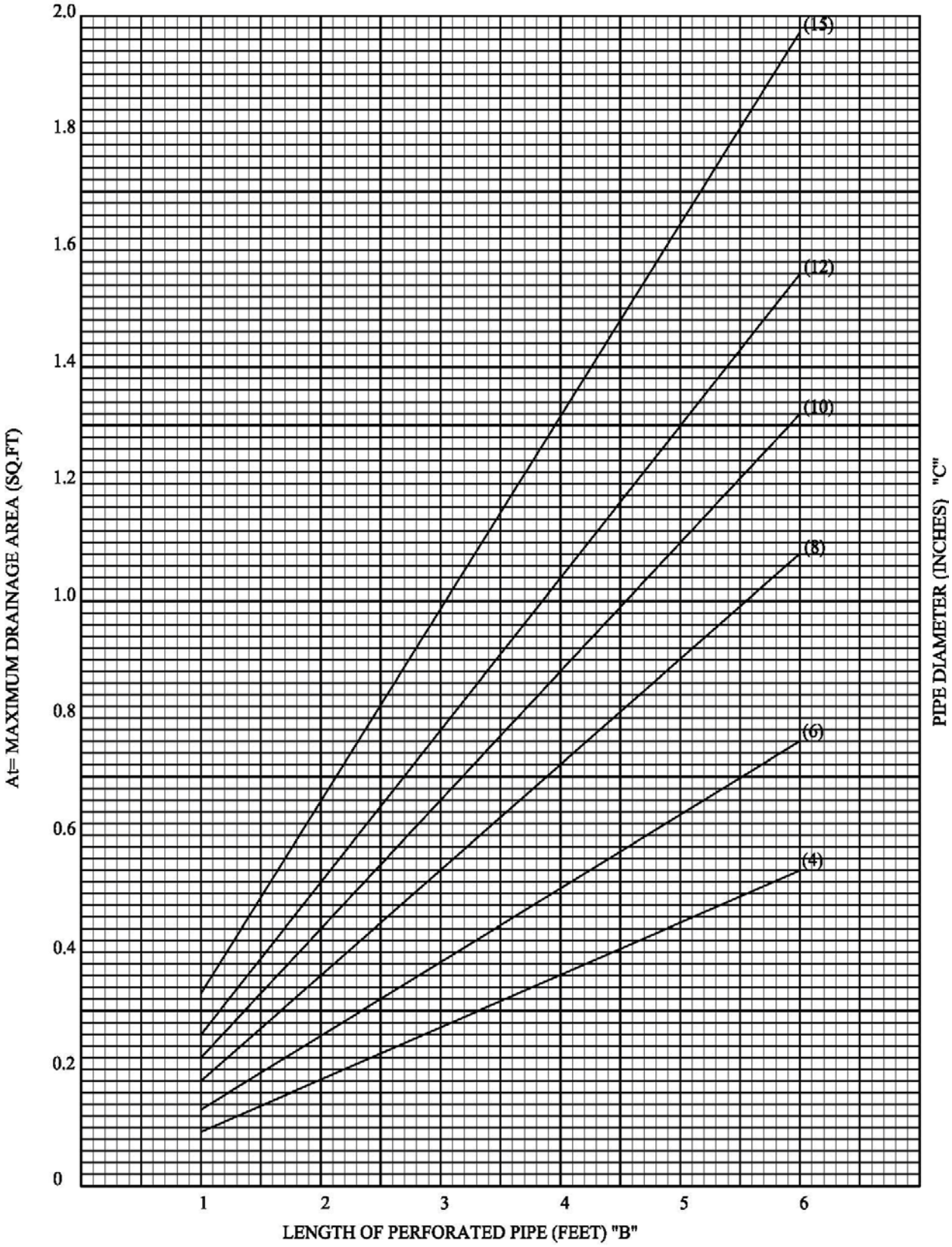
Step #3 Determine total area of perforations (At)$\geq$4 (A_o) from Table 2. Maximum perforation diameter is 1" with 3" on center.

Step #4 Determine length of perforated pipe (D) and pipe diameter (C) from Figure 3. Figure 3 is limited to 60 acres for a maximum 6' perforated length of pipe. If necessary divide (A_t) and use multiple draw-down pipes.

Step #5 Complete Table 1 on Detail 1 and include on the sediment and erosion control plan.

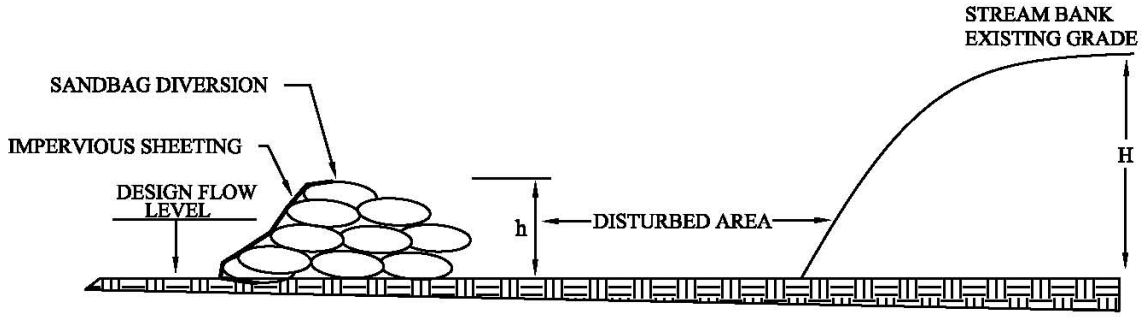
Note: Use of this information does not preclude meeting all of the requirements of the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control.

FIGURE 3 DRAW-DOWN DEVICE HORIZONTAL SEDIMENT BASIN



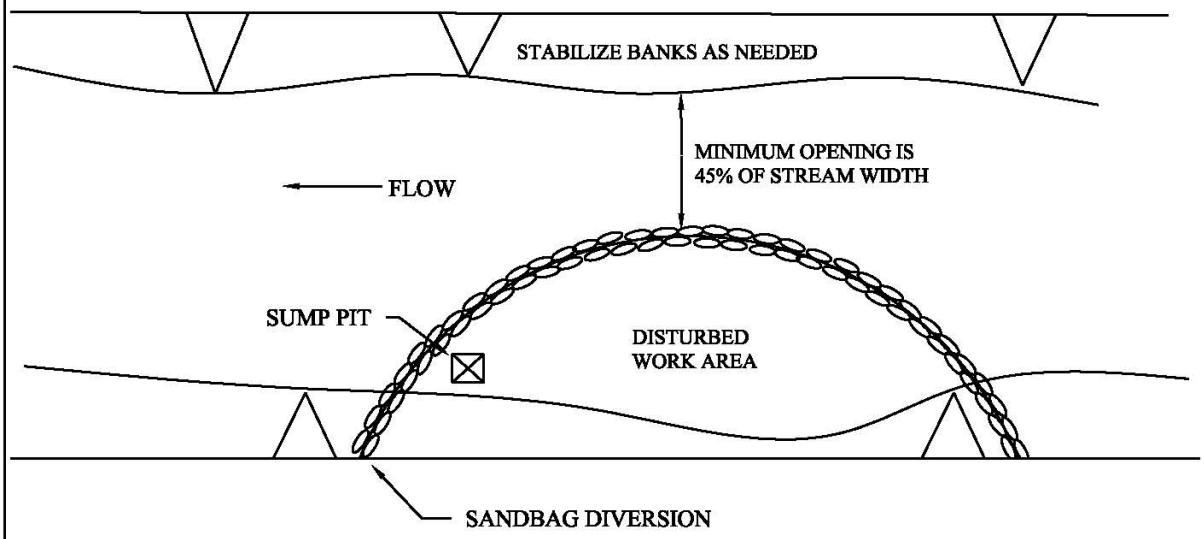
PGSCD DETAIL 2 SANDBAG DIVERSION

SECTION VIEW



h= H/2 + 1ft for projects of duration <2 weeks;
H=2 year flood elevation for projects of longer duration. (bank full height)

PLAN VIEW



TEMPORARY IN-STREAM CONSTRUCTION MEASURES	PAGE V-5	Prince George's Soil Conservation District

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PGSCD DETAIL 2 SANDBAG DIVERSION

Construction Specifications

1. The height (H) of the sandbag diversion shall be 2-year flood elevation (bankfull height) for projects of two weeks or greater duration. For projects of shorter duration the height (h) can be H/2 + 1 foot where H is the height of the embankment.

2. Sandbags shall consist of materials which are resistant to ultra-violet radiation, punctures and tearing. Sandbags must be woven tightly enough to prevent leakage of fill material (i.e. sand, fine gravel, etc.).

3. Sheeting shall be10 MIL or thicker, UV resistant, polyethylene or other material which is impervious and resistant to punctures and tearing. Sheeting shall be overlapped such that the upstream portion covers the downstream portion with at least an 18 inch overlap. Impervious sheeting shall be placed under the bottom sandbags and around the top sandbags to secure sheeting. Use staples as necessary.

4. The diversion structure shall be installed from upstream to downstream during periods of low flow.

5. The streambed shall be hand prepared prior to placement of the base layer of sandbags to ensure a water tight fit. It may be necessary to prepare the bank in a similar fashion.

6. All excavated material shall be deposited and stabilized in an approved area outside of the 100 year floodplain.

7. Dewatering of sediment laden water from the construction area shall be pumped from a sump pit to a trapping device or filter bag and to a stable outlet.

8. Sandbag diversions can not obstruct more than 55% of the stream width. Bank stabilization measures need to be placed in the constricted section if accelerated erosion and bank scour are observed during the construction time or if the project time will last more than 2 weeks.

9. Inspection and any required maintenance shall be performed periodically and after each rain event.

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SECTION VI

PRINCE GEORGE'S
SOIL CONSERVATION DISTRICT

FOREST HARVEST

EROSION AND SEDIMENT CONTROL PLAN

___ A. **GUIDELINES AND CRITERIA FOR FOREST HARVEST OPERATIONS EROSION AND SEDIMENT CONTROL PLAN PREPARATION AND PLAN REVIEW**

___ 1. The Code of Maryland Regulations (COMAR) 26.17.01 Erosion and Sediment Control, has removed forest harvest operations from the agricultural land management practice exemption. Yet, timber harvesting activities have been exempt from the permitting requirements of the Clean Water Act only provided that Best Management Practices (BMPs) are used. The ways in which timber harvests disturb soil are different from typical urban construction. The forest harvest industry therefore, has its own special set of erosion and sediment control measures.

A sediment control plan is required for all harvests exceeding 5,000 sq. ft. of disturbed soil area. All sediment control plans submitted to PGSCD for review and approval are to be in conformance with this document and the criteria established in the publication, **Maryland's Erosion and Sediment Control Standards and Specifications for Forest Harvest Operations 2005 Draft**, or subsequent revisions.

The latest standards represented the first update in over 30 years. Our understanding of how best to protect watersheds during timber harvest activities continues to grow. Recent research into the nature of erosion on forest harvest sites has shown that the vast majority of sedimentation occurs at three primary locations: a) entrance to the site, b) forest access system (haul roads, skid trails and landings), and c) adjacent to watercourses. Proper installation and maintenance of BMPs can effectively counter this disturbance, and the Erosion and Sediment Control Plan's focus must be on protecting these areas.

___ 2. Review of an erosion and sediment control plan by PGSCD will not be scheduled unless the plan submitted includes the following: Standard Plan and Application Form, Site Plan, Vicinity Map, Tax Map, USGS Topographic map covering the site, copy of deed, Soil Survey Map and Zoning/Agricultural Assessment Information. The PGSCD review fee must be paid upon application.

___ 3. If requested, the PGSCD will, by appointment, continue to provide sediment control planning and technical assistance on specific control problems. Detailed overall sediment control plan review will not be undertaken during these meetings.

___ 4. For sites on which the following conditions are met, the Standard Erosion and Sediment Control Plan alone may be sufficient for approval:

___ a. Road cuts or fills are less than 3 feet.
___ b. Grades for haul roads are less than 15 percent.
___ c. Grades for skid trails are less than 20 percent.
___ d. Landings are located on slopes less than 10 percent.
___ e. Site does not include any *Waters of the State* or will maintain an **uncut** and **undisturbed** Streamside Management Zone.
___ f. Provide a copy of a type II TCP for areas not zoned for open space or residential agriculture.

___ 5. Sites for which any of these conditions will not be met require preparation of a **Custom Grading Erosion and Sediment Control Plan for Forest Harvest**. The custom plan must list, detail, and address the strategy behind selection of Best Management Practices used to mitigate the condition and show their proposed locations on the site plan. The custom plan must be prepared by a Maryland licensed Forester. Plans involving non-tidal wetlands, Chesapeake Bay Critical Areas, stream crossings must be of this type.

Whether Standard or Custom Plans are utilized, a **Streamside Management Zone Plan** (formerly "Buffer management Plan") is required for harvesting or *any disturbance* within streamside management zones.

___ 6. Provide the following for Standard Erosion and Sediment control review and approval. Include 7 copies. An erosion and sediment control plan must include:

___ a. Sediment control plan application (VI - C) – Completed site information, landowner and operator information, signed agreement and PGSCD review fee ($100.00).

___ b. Site Plan – Limits/property lines for the entire site. This could be by survey, record plat, or tax map to scale. Provide the following on the site plan.

___ (1) Site Access – stabilized with corduroy logs, wood chips, mats or a stone construction entrance. Indicate method and length (50' minimum).

To prevent blocking of road drainage, pipe culverts shall be installed. Show location and size.

___ (2) Streamside Management Zone – A minimum 50 ft. SMZ buffer is to be shown on all sides of perennial or intermittent streams and waters of the State in accordance with appropriate specifications in the current manual.

The governing relationship is: 50 feet + (2 feet x % slope) = SMZ

Average Percent Slope To Watercourse	Width of SMZ (feet) on Each Side of Watercourse
0	50
5	60
10	70
15	80
20	90

___ (3) Haul Road – delineate any major haul roads and skid trails.
___ (4) Landings – delineate landing areas on reasonably level, well drained ground (between 3-10 percent slope). Use the maximum slope area if site is less than 3%.
___ (5) Harvest Area – delineate limits of harvest.
___ (6) Show stream crossings and provide detail of method to be used.
___ (7) Provide detail and/or specification for each Best Management Practice to be used.

___ c. Vicinity Map – site specific, to scale, include road identification, and nearest intersections and distance to. Include enough detail on the vicinity map so that someone unfamiliar with the site can quickly locate it in the field. A photocopy of the P.G. Co. street map from A.D.C. with sheet number will suffice.

___ d. USGS Topo – United States Geological Survey 7.5 Minute Series (topographic) quadrangle map with property boundaries and all perennial or intermittent streams, rivers, lakes, ponds, bogs or marshes delineated. Include quadrangle name. Delineate harvest area.

___ e. Soils Information – Soil Survey map must be created via the Web Soil Survey. Maps should delineate the site as the "Area of Interest" (AOI) as closely as possible. With area properly outlined, navigate to the Soil Data Explorer tab. Continue on to select, *Suitablities and Limitations for Use>Land Management>Construction Limitations for Haul road and Log Landings*. Submit the color printout of the resulting soil map, ensuring site plan and practices agree with the information it contains.

___ f. Stabilization – To ensure appropriate revegetation provide seeding and mulching specifications for the reestablishment of cover for all disturbed areas (exposed soil) having slopes 10 percent or greater after harvesting VI-E). See NRCS/MD Code 342 for full requirements.

___ g. Standard Erosion and Sediment Control Plan (VI-D).

___ h. (MDE – WMA) General Waterway Construction Permit required for all stream crossings.

___ i. For use of a county maintained road, see Bond and Special Permit Requirements below.

___ 7. Custom Erosion and Sediment Control Plans for Forest Harvest Operations.
*Written narrative explaining sediment control precautions required.

___ a. <u>Streamside Management Zone Plan</u> Requirements

___ (1) Meet all the requirements of the Standard Erosion and Sediment Control Plan for Forest Harvest Operations.

___ (2) Location of SMZ and all sediment controls properly shown on the site plan.

___ (3) Be very specific in describing which trees are to be cut. Trees scheduled for removal are to be individually marked.

___ (5) Method of removal noted.

___ (6) Roads, trails and stream crossings in streamside areas are to be avoided.

___ (a) No new roads or trails shall be permitted within SMZ except to access an authorized stream crossing.

___ (b) Usage of skid trails are to be minimized within SMZ and damage is to be repaired in accordance within the Specification.

___ (7) Basal areas to be removed and retained shall be stated, as well as method of harvest and provision to ensure that sufficient regeneration is established.

___ (8) Exposed soil within the buffer shall be seeded. Include specifications.

___ (9) Any additional activities shall be explicitly detailed in SMZ plan designed by the Forester.

___ (10) PGSCD may require additional controls where deemed necessary for certain site limitations.

___ b. Non-Tidal Wetland Logging Requirements

___ (1) Meet the requirements of the Standard Erosion and Sediment Control Plan for Forest Harvest Operations. A Custom plan is recommended and may be required.

___ (2) Wetland area delineated on the plan. (SCD may assist in delineation or review).

___ (3) Written description for sediment control precautions needed.

___ (4) Best Management Practices are listed and shown on the plan. BMP details to be included with plan.

___ (5) Minimize disturbance to the non-tidal wetland hydrology.

___ (6) Exposed soil within the wetland shall be seeded. Include specifications.

___ (7) Nontidal Wetland BMP checklist (VI-G).

___ 8. Chesapeake Bay Critical Area Forest Harvest Operations

The Chesapeake Bay Critical Area is the land within 1,000 feet of the Chesapeake Bay and its tidal waters or tidal wetlands. Timber harvests in the Chesapeake Bay Critical Area which are regulated by the Critical Area Criteria are one acre or more in size and occur within a one-year interval. The Timber Harvest Plan is to be approved by the District Forestry Board in conjunction with the Prince George's Soil Conservation District's approved Standard Erosion and Sediment Control Plan for Forest Harvests.

___ a. Custom Erosion and Sediment Control Forest Harvest Plan

___ (1) Include all requirements as stated above.

___ b. Timber Harvest Plan – for details see Appendix F-2 of Maryland's Erosion and Sediment Control Standards and Specifications for Forest Harvest Operations 2005 Draft.

___ (1) Meet Forest and Woodland Protection requirements.

___ (2) Include Habitat Protection Areas requirements with,

___ (a) Buffers,

___ (b) Non-tidal wetlands,

___ (c) Habitat for threatened or endangered species,

___ (d) Anadromous fish spawning areas,

___ (e) Other plant and wildlife habitat.

___ 9. County Road Bond

___ a. If accessing logging site from a county road, an entrance permit from the Dept. of Public Works & Transportation. (VI-H).

*Maryland's Erosion and Sediment Control Standards and Specifications for Forest Harvest Operations 2005 Draft.

Table 1 - Summary Of Erosion And Sediment Control Plan Approval Options

Harvesting specifications	Plan to Use
• Road cuts/fill 3 feet or less (5 feet in Garrett, Allegany, Washington, & Fredrick) • Haul road grades do not exceed 15% • Landings on slopes of 10% or less • Skid trail slopes do not exceed 20% • Uncut and undisturbed Streamside Management Zone	Standard Plan
• Harvests involving a NTW • Harvest involving a SMZ • Harvests involving haul roads with slopes between 15% and 20% for a maximum of 200', skid trails with slopes between 20% and 25% for a maximum of 200', or road cuts/fills greater than 3/5 feet. • In general any proposed activity that exceeds the limits set in the standard plan	Custom Plan
Harvests involving haul roads with slopes greater than 20%, skid trails with slopes grater than 25% and landings with slopes greater than 10%	Custom Plan with specific BMP design as directed by the Appropriate Plan Approval Authority (the SCD)
• Harvesting involving silvicultural activities within a SMZ	Custom Plan (including SMZ issues) Or Standard Plan Plus SMZ plan

___ B. **LOGGER ASSISTANCE FORM**

County: PRINCE GEORGE'S SOIL CONSERVATION DISTRICT

CITY, STATE, ZIP CODE	UPPER MARLBORO, MARYLAND 20772
PHONE NUMBER	301-574-5162 x3
CONTACT PERSON	URBAN STAFF
Inspection Agency for the County:	DNR-Forest Service
Enforcement Agency:	Prince George's Department of Environmental Resources

Procedure: What steps does a logger need to take to have a Standard/Custom Plan processed? FOLLOW PGSCD FOREST HARVEST EROSION AND SEDIMENT CONTROL GUIDELINES:

Step 1 SUBMIT PLANS FOR REVIEW AND APPROVAL	OFFICE ADDRESS CITY, STATE, ZIP CODE PHONE NUMBER CONTACT PERSON FEE	PRINCE GEORGE'S SOIL CONSERVATION DISTRICT UPPER MARLBORO, MARYLAND 20772 (301) 574-5162 X3 URBAN STAFF $100.00 FOR PLAN REVIEW - PAYABLE TO PGSCD
Step 2: SUBMIT APPROVED PLANS	OFFICE ADDRESS CITY, STATE, ZIP CODE PHONE NUMBER CONTACT PERSON	DEPT. of Permits Inspection and Enforcement (DPIE) 9400 PEPPERCORN PL LARGO, MD 20774 301-883-5776 PERMITS Counter
Step 3: CALL 48 HRS PRIOR TO STARTING	OFFICE ADDRESS CITY, STATE, ZIP CODE PHONE NUMBER CONTACT PERSON	DNR-FOREST SERVICE 6904 Hallowing Lane Prince Frederick, MD 20678 410-595-1303 FOREST SERVICE STAFF

Additional Comments:
A standard plan or a modified plan by a registered professional forester will need to be submitted for review and approval.

Prince George's County Critical Area Offices: 301-731-8790

For additional information you may also consult: Guide to Maryland Regulation of Forestry and Related Practices

FOREST HARVEST OPERATION
Erosion and Sediment Control Plan Application

For Official Use:

_____-_____-_____
PGSCD FH#

Approved:_____ _____
Prince George's Soil Conservation District Date
Expires:_____

A. LANDOWNER INFORMATION

1. Last Name_____ 2. First Name_____ 3. MI_____
4. Address_____
5. City_____ 6. State_____ 7. Zip_____ 8.Phone (___)_____

B. OPERATOR INFORMATION

1. Last Name_____ 2. First Name_____ 3. MI_____
4. Address_____
5. City_____ 6. State_____ 7. Zip_____ 8. Phone (____)_____
9. Training Certificate No.(Green Card)_____ 10. F.P.O. Lic. No._____

C. FORESTER INFORMATION (if appropriate)

1. Last Name_____ 2. First Name _____ 3. MI_____
4. Lic. Forester No._____ 5. Phone (___)_____

D. SITE INFORMATION

1. County_____ 2. Total Acres Harvested_____ 3. Pine Acres Harvested_____
4. [Tax Acct._____ Dist._____Map_____Grid_____Parcel____] or [ADC Map Page____Coord.____]
5. Location_____

_____

6. Harvest Method:_____ 7. Regeneration Method:_____
8. Proposed Beginning Date:_____ 9. Proposed Completion Date:_____

Secondary operations require approval under a separate Erosion and Sediment Control Plan

E. HARVEST PROFILE

Activity	Requirement	Encl	DNR
1.☐ Standard Plan	Submittal Form	☐	☐
2.☐ Road/Trail>15% slope	Custom Sediment Control Plan	☐	☐
3.☐ Streamside Management Zone (SMZ)	Buffer Management Plan	☐	☐
4.☐ Nontidal Wetlands	Nontidal Wetland BMP Checklist	☐	☐
5.☐ Seedtree Law	DNR 362	☐	☐
6.☐ Stream Crossings	Waterway Permit	☐	☐
7.☐ Chesapeake Bay Critical Areas	Timber Harvest Plan	☐	☐
8.☐ Is this under the prescription of a Forest Management Plan?		☐	☐

F. FOREST CONSERVATION ACT

I hereby declare that no regulated activity shall occur on the above referenced harvest area of the property within five (5) years of the effective date of this Declaration of Intent or the conditions upon which this declaration was granted are changed. I understand that any regulated activity, as defined in the Forest Conservation Act, that is not the subject of this Declaration of Intent will require additional approval.

_____ _____

Landowner Date

G. SEDIMENT CONTORL

1) The below signed agree(s) to the terms of the Standard Plan for Forest Harvest Operations and other attached required plans and to grant official state or county representatives and the Maryland Forest Service the right of entry to the site to monitor compliance.
2) Each of the below signed is aware of the landowner's responsibility in preventing accelerated erosion and sedimentation during and subsequent to forest harvest operations as mandated by the rules and regulations adopted by the State of Maryland and the local ordinances.
3) The below signed agree(s) to require that all operators conducting forest harvest operations on the above named property shall adhere to the requirements of the standard plan and any amendments to the plan.
4) The below signed agree(s) to notify the local office of the Maryland Forest Service within 48 hours before beginning the harvest and 48 hours before completing the harvest.
5) This plan shall expire after two (2) years from the approval date.

_____ _____

Landowner Date

_____ _____

Operator Date

IMPORTANT: You must attach a copy of the appropriate topographic or ADC map with the boundaries, entrances, stream crossings, and proposed landings of this forest harvest operation clearly marked.

STANDARD EROSION AND SEDIMENT CONTROL PLAN FOR FOREST HARVEST OPERATIONS IN MARYLAND (THE STANDARD PLAN)

I. General Requirements

An erosion and sediment control plan is required for all harvests exceeding 5,000 sq. ft. of disturbed area, or which cross any perennial or intermittent watercourse.

This Standard Erosion and Sediment Control Plan may be used for forest harvest operations when all of the following conditions are met:

- Road cuts/fills are 3 feet or less (5 feet in Garrett, Allegany, Washington, & Frederick counties),
- Grades for haul roads do not exceed 15 percent,
- Landings are located on slopes 10 percent or less, and
- Grades for skid trails do not exceed 20 percent.

If the above conditions or any other criteria of this plan cannot be met, a Custom Erosion And Sediment Control Plan listing controls necessary to prevent erosion and ensure site stabilization will have to be submitted to the appropriate plan approval authority (the SCD) for approval.

NOTE: Use of this Standard Plan by itself is intended only for sites having:

- **No waters of the State, or**
- **An uncut Streamside Management Zone (SMZ) where roads, trails, and harvesting equipment are prohibited**

II. Conditions

A. Unless one operator assumes full responsibility for implementing this plan, all forest harvest operators working at a site must obtain an erosion and sediment control plan. An operator is defined as any individual or company that has contracted or subcontracted a portion of the harvest operation. This also applies to those operators conducting firewood cutting or separate forest harvest operations in conjunction with or subsequent to the initial harvest. Each operator must implement and maintain the required practices.

B. The applicant shall notify the appropriate Inspection Agency at least seven days prior to commencing forest harvest operations. The inspection agency also must be notified at least five days prior to the completion of work.

C. A copy of this plan and any applicable SMZ plan(s) shall be available on site during harvest operations.

D. Each site will be inspected periodically by local government and/or State inspectors for compliance with this Plan. State and local inspectors may require field modifications or a plan revision as conditions dictate, to prevent movement of sediment from the site. Plan revisions require approval by the appropriate plan approval authority (the SCD).

E. Failure to properly implement or maintain the practices required by this plan, or to comply with written requirements for corrective action may result in the operation being stopped (issuance of a stop work order) until the deficiencies have been corrected. Failure to take required corrective action may also result in legal action.

F. All erosion and sediment controls must be implemented in accordance with specifications contained in the document entitled the 2005 Maryland Erosion And Sediment Control Standards And Specifications For Forest Harvest Operations (the Standards And Specifications) available from the Maryland Department of Environment (MDE) or the Department of Natural Resources - Forest Service.

G. The issuance of an approval by the MDE, a Soil Conservation District, a municipality not within a soil conservation district, or the Washington Suburban Sanitary Commission does not relieve the applicant of the continuing responsibility to effectively abate sediment pollution, and to comply with all other applicable local and State laws.

III. Standard Plan Requirements

A. Site Maps:

1. Site maps or sketches shall be prepared for all harvests and submitted with the plan application to the appropriate plan approval authority (the SCD). The map shall identify the site location and provide directions and distances from the nearest major road intersection.

2. All access points, landings, haul roads, water bodies, uncut SMZ, and stream crossings must be identified on the map or sketch.

3. A more detailed map of SMZ areas is required when SMZ plans accompany the standard plan. The harvest area should also be delineated on a photocopy of the United States Geological Survey 7.5 Minute Series (Topographic) quadrangle maps (USGS maps.)

B. Site Access

1. Access points to the site shall be stabilized with wood chips, corduroy mats, a stone construction entrance or other methods approved in the Standards And Specifications. Any soil or debris that is tracked onto adjoining off-site roads shall be removed and deposited in a controlled area immediately.

2. A grading or entrance permit may be required for a new entrance onto a county or

State road. Details may be obtained from the local permitting agency or the State Highway Administration.

3. Existing public road drainage shall not be blocked or damaged by access construction. Pipe culverts or a bridge shall be installed if necessary to maintain existing drainage.

C. Waterway Protection

1. SMZ shall be marked and maintained on all sides of waters of the State. For the purpose of establishing the limits of the SMZ, waters of the State shall not include the 100 year floodplain, manmade ditches created and managed under a Public Drainage Association, or natural and man-made systems that convey stormwater runoff only in direct response to precipitation events (SEE THE TWO SPECIFICATIONS FOR STREAMSIDE MANAGEMENT ZONES in the Standards And Specifications and use the specification appropriate to the subject harvest.) These features are identified on USGS maps. The minimum SMZ width shall be 50 feet. This applies to land with no slope. Where sloping land is encountered, the following formula shall be adhered to:

50' feet + (2 feet x % slope) = SMZ width
(To A Maximum Of 150 Feet)

Example for 20% Slope: 50' + (2' x 20%) = 50' + 40' = 90' SMZ

Average Percent Slope to Watercourse	Width of SMZ (ft) on Each Side of Watercourse
0	50
5	60
10	70
15	80
20	90

2. New roads, trails and harvesting equipment shall <u>not</u> be allowed in any SMZ except to provide access to authorized stream crossings.

3. Harvesting within the SMZ is <u>not</u> allowed unless a SMZ plan, along with the Standard Plan, is submitted to and approved by the appropriate plan approval authority (the SCD). This SMZ plan shall be prepared by a Maryland Licensed Forester and include the harvest method, the square footage of basal area to be removed and retained, provisions for removing and restocking the cut trees and other criteria established below and in the Standards And Specifications. All trees

to be removed from the SMZ shall be marked at the base of the stump (so the mark remains after harvesting) by the Maryland Licensed Forester in advance of the harvest operation. Tree marking is not required if site is approved for clearcut.

In order for harvesting within the SMZ to be permitted, the approved SMZ plan must adhere to the following criteria. Basal area shall not be reduced below 60 square feet of evenly distributed trees which are 6 inches or greater in diameter, measured at 4.5 feet above the ground (diameter breast height, dbh). Where there is a sound silvicultural basis, the SMZ may be clearcut. The clearcut must be a part of the SMZ plan and approved by the appropriate plan approval authority (the SCD). Where clearcut is authorized, the SMZ plan shall specify that perimeter controls be implemented as close as practical to the body of water. Acceptable perimeter control includes silt fence, straw bale dike, approved vegetated buffer of specified width, and earth berm. Other practices may be approved by the appropriate plan approval authority. Any slash that inadvertently falls into adjacent water bodies must be pulled back to prevent waterway blockage. Except for stream crossings, no new roads shall be permitted within the SMZ. Timber cut within 50 feet of any waters of the State must be removed by cable, non-vehicular means, extended reach equipment, or by skidder using a limited number of passes. Limited number of passes is defined as ceasing use of the trail before the humus layer is compacted or otherwise disturbed. The use of low ground pressure equipment is strongly recommended. (See SPECIFICATIONS FOR STREAMSIDE MANAGEMENT ZONES in the Standards And Specifications.)

D. Haul Roads and Skid Trails

1. Grading of existing roads and/or trails will be limited to that necessary to make them operable, provided that the requirements of Section D(2), (3), (4), (5), and (6) below are met. If any of the conditions cannot be met, an approved Custom Erosion And Sediment Control Plan will be required in order to utilize the existing roads and/or trails.

2. Haul roads and skid trails shall be laid out along natural land contours to avoid excessive cuts, fills, and grades. No road cut or fill shall exceed 3 feet (5 feet in Garrett, Allegany, Washington, and Frederick Counties). All roads requiring mapping must be flagged in advance of the harvest.

3. Crossing of perennial or intermittent streams should be avoided. Where it becomes necessary to cross either a perennial or an intermittent stream, a bridge, culvert, or ford crossing shall be temporarily installed. A MDE - Water Management Administration Waterway Construction Permit shall be obtained prior to crossing any stream. (SEE APPENDIX D AND G.1.)

4. Grades for haul roads shall not exceed 15 percent. Grades for skid trails shall not exceed 20 percent. If it is not feasible to maintain these grade limits, a custom erosion and sediment control plan that identifies the controls required to prevent

erosion, must be approved by the appropriate plan approval authority (the SCD) prior to road or trail construction.

5. No haul roads or skid trails other than those providing access to waterway crossings shall be constructed within the SMZ. Drainage from approaches to waterway crossings shall be diverted to undisturbed areas.

6. Drainage structures shall be provided at the time of construction of haul roads and skid trails according to requirements contained in the Standards And Specifications.

E. Landings

Landings shall be located outside of the SMZ. Landings shall be located on reasonably level (between 3 and 10 percent slope) well drained ground. If harvest sites do not have any area with a slope of at least 3 percent, landings shall be located on the maximum slope of the site. Landings located on slopes exceeding 10 percent shall require prior approval of a custom erosion and sediment control plan by the appropriate plan approval authority (the SCD).

F. Stabilization

1. Following completion of installation of all perimeter erosion and sediment controls and all cut and fill slopes steeper than 3:1 (H:V) stabilization must be accomplished within seven calendar days.

2. For all other disturbance, stabilization must be accomplished within fourteen calendar days following completion of the activity.

3. Upon completion of the harvest, all roads, trails and landings located on slopes 10% or greater shall be graded or backdragged, and seeded and mulched according to specifications. The surface of roads and landings of trails less than 10 percent shall be backdragged and left in a condition that permits successful natural regeneration of trees, shrubs, or other annual and perennial plants. Under certain circumstances, stabilization of these roads and landings with seed and mulch shall be required.

G. Maintenance

1. All practices installed shall be maintained at all times to function as intended.

2. Any practice that fails to function properly will be repaired or corrected immediately.

____ E. **SEEDING SEASON FOR MARYLAND**

Suggested seeding mixtures, rates and dates. See **Specifications for Revegetation of Disturbed Soils** (Forest Harvest 2005 Draft) and Maryland Code 342 for more details.

Table 8: Nurse Crops (Temporary Seeding) To Be Added to Permanent Seeding Mixes

Mix	Recommended Cultivar	Seeding Rate		Soil Moisture Conditions	Remarks
		lb/ac	lb/ 1000 SF		
Annual Ryegrass *Lolium perenne* ssp. *Multiflorum*	Common	10	0.3	Dry to moist	Planting dates: Western Maryland – August 1 to May 31 Piedmont – August 1 to April 30 Coastal Plain – August 15 to April 30
Barley *Hordeum vulgare*	Common	40	1.0	Dry to moderately moist	
Oats *Avena sativa*	Common	40	1.0	Dry to moist	
Wheat *Triticum aestivum*	Common	40	1.0	Dry to moderately moist	Planting dates: Western Maryland – June 1 to July 31 Piedmont – May 1 to July 31 Coastal Plain – May 1 to August 14
Foxtail Millet *Setaria italic*	Common	10	0.3	Dry to moist	
Pearl Millet *Pennisetum glaucum*	Common	7	0.2	Dry to moist	

TABLE 8 NOTE:

1. Select a nurse crop to add to the permanent seeding mix, based on the time of year for planting. Use only one nurse crop for each permanent seeding mix. Do not use a mixture of nurse crops.

Table 9: Permanent Seeding Mixtures

Mix	Recommended Cultivar	Seeding Rate		Soil Moisture Conditions	Wildlife Value	Remarks
		lb/ac	lb/ 1000 SF			
1. SELECT ONE SPECIES OF FESCUE:	Recommended MD turf-types	60	1.38			Tall fescue is more suitable for highly compacted area and moist sites.
Tall Fescue *Lolium arundinaceum* (formerly) *Festuca arundinacea* Or	Common or Bighorn	40	0.92			
Hard Fescue *Festuca trachyphylla*				Dry to moist	Low	Hard fescue has better shade tolerance.
AND ADD:						
Kentucky Bluegras *Poa pratensis*						
Perennial Ryegrass *Lolium perenne*	Recommended MD turf-types	40	0.92			
	Blazer (II).Pennfine	20	0.46			For best results, recommend using a blend of 3 cultivars each for tall fescue and Kentucky bluegrass.
2. Creeping Red Fescue *Festuca rubra* var. *rubra*	Dawson. Pennlawn. Flyer. Fortess.	30	0.69			
Chewings Fesuce *Festuca rubra ssp. commutate*	Ruby. or Salem Common	30	0.69			
Kentucky Bluegrass *Poa pratensis*	Recommended MD turf-types	20	0.46	Very dry to moist	Low	
OPTIONAL ADDITION						
Rough Bluegrass *Poa trivialis*	Common	15	0.34			Add rough bluegrass in moist, shady conditions.
3.Deertongue *Dicanthelium clandestinium*	Tioga. Dawso. Pennlawn. Flyer. Fortess.	15	0.93			All species are native to Maryland.
Creeping Red *Fescue Festuca rubra* var. *rubra*	Ruby. or Salem Common	5	0.11	Dry to wet	Moderate	
Virginia Wild Rye *Elymus virginicus* Or	Common	5	0.11			Use Virginia wild rye on moist, shady sites.
Cananda Wild Rye *Elymus canadensis*						Use Canada wild rye on droughty sites.

STREAMSIDE MANAGEMENT ZONE (SMZ) PLAN

Landowner's Name: _____

Address: _____

Location: _____

(Attach a map indicating the location of streamside management zone, waterways, planned stream crossings, roads, main skid trails, and landings)

Area in streamside management zone (SMZ): _____ acres.

Width of SMZ (each side of stream):
Range (min. – max. width) _____ feet; Average Width _____ feet.

Boundary of SMZ is marked with _____ (color) _____ (paint or flagging).

Predominant species: _____
Percent of loblolly pine _____%; Virginia pine _____%; yellow-poplar _____%.

Current stocking density (basal area):
Range (min. – max.) _____ sq. ft./acre; Average _____ sq. ft./acre.

Average stocking to be retained: _____ sq. ft./acre. (Normally > 60 sq. ft. in trees > 6" dbh.)

Trees to be harvested are marked with _____ color paint at eye level and on base.
Type of harvest within SMZ: _____
Thinning, Selection, Shelterwood, Clearcut (Clearcutting allowed if stand is >25% Loblolly or Va. Pine, or Yellow-Poplar)
Regeneration will be from: _____
Advanced reproduction, seed, sprouts, planted seedlings, or N/A
This SMZ Plan is used in conjunction with the "Standard Erosion and Sediment Control Plan" for this operation. All limitations for harvesting timber within a SMZ, as described in "Specifications for Streamside Management Zone (SMZ)", will be followed. Additional comments may be attached.

==========

Prepared by: _____
(MD Licensed Forester) Printed Name Signature Date

Agreed to by: _____
(Landowner) Printed Name Signature Date

Approved by: _____
(Soil Conservation Dist.) Printed Name Signature Date

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___ G. **NONTIDAL WETLANDS BEST MANAGEMENT PRACTICES FOR FOREST HARVEST OPERATIONS**

The following is a checklist for your use in determining which best management practices may be appropriate for your project.

To meet the requirements of the Nontidal Wetlands Protection Act please submit this checklist and the following information along with the Erosion and Sediment Control Plan:

- a wetland delineation
- an acknowledgement/approval of landowner
- name/address/RPF # of registered professional forester

Check when appropriate:

____ Major skid trails, wherever feasible, will be located on soils that resist compaction and ruts, or other disturbances that adversely impact nontidal wetland hydrology.

____ Appropriate equipment to skid logs will be selected based on slope and the ability of the soil to resist erosion or other disturbances.

____ Truck roads, wherever feasible will be located on uplands or on the highest available ground available as to minimize impact to nontidal wetlands.

____ Truck roads will be of minimum dimensions necessary to accomplish their purpose and minimize impacts to nontidal wetlands.

____ Truck roads will follow the natural contour of the land, wherever feasible, and shall be stabilized to minimize erosion.

____ Wetland hydrology will be maintained by constructing diversion ditches at the minimum depth to maintain flow of water.

____ Wooden mats, filter cloth or similar temporary structures will be used to reduce compaction or creation of ruts.

____ Fill material will be used only when absolutely necessary to maintain or construct a road. If needed, fill shall be excavated from uplands and shall be free from state or federally designated toxic pollutants.

____ Intermittent and perennial streams, sloughs, or channels will not be crossed unless absolutely necessary. When necessary crossings will be at the shortest distance feasible, of appropriate design and allow unrestricted movement of aquatic life in the stream.

NOTE: A WATERWAY CONSTRUCTION PERMIT MAY BE REQUIRED

_____ Log decks will be, (a) located prior to road layout, (b) located in uplands as far from streams and/or nontidal wetlands as practicable or on the highest available ground if uplands are unavailable, (c) kept to minimum size and number necessary for the operation, and (d) diversion ditches will be installed to direct water away from the deck during use.

_____ Trash, debris, and chemicals will be collected and disposed of outside wetlands areas.

_____ Utilization of low ground pressure equipment (i.e.) high flotation tire, wide tracks, etc.) will be used when nontidal wetland soils are unable to support conventional equipment.

_____ Scheduling of forest harvest operations will be during periods when wetland soils are dry or frozen and are capable of supporting conventional equipment to prevent compaction, ruts, or other significant disturbances to nontidal wetland soils or hydrology.

_____ All forest harvest operations will be conducted so as to prevent impoundment of water or increase runoff in the nontidal wetland, unless the change is recommended in a sediment and erosion control plan.

_____ Harvesting will be conducted during dry periods or at times that enhance natural regeneration.

_____ Natural regeneration will be utilized where feasible and will be the preferred method of regeneration in wetland areas.

_____ Other (Describe additional practices)

_____

_____

_____

_____

_____

_____

___ H. **SPECIAL PERMIT REQUIREMENTS & RESTORATION OF EXISTING ADJACENT ROADWAYS**

The Department of Public Works and Transportation hereby grants permission, which will enable the property owner, or the _____(Agent), to obtain "Special Permit" Number _____for transporting approximately_____ loads of logs per day with commercial/industrial vehicles over a _____month period. Approximately_____acres of timber will be harvested on the property owned by_____(Parcel/Lot_____Block_____Liber_____ Folio_____) Located at _____.
(address)

Permission, however, to use_____which is a rural/
(Name of Roadway)

urban residential roadway, as a temporary commercial/industrial hauling route, is subject to the operator/applicant following the conditions and adhering to the responsibilities described in the Prince George's County Code, Subtitle 23, Divisions 1 and 2, Sections 23-103 (g), 23-105 (a) (b) (c), 23-107 (b), 23-109(a) (b), and 23-116(a) (d) (e) (1) (A) (ii):

1. Performance Bond Required

Because of possible damage to the existing County-maintained roadway, a Performance Bond, or some other form of security in the amount of $5,000, will be required. The Performance Bond will assure restoration of any damage to the existing residential roadway surface, shoulders, side ditches, adjacent shrubbery/trees located within the public right-of-way, underground/above ground utilities, culverts, bridges, underground storm drainage system, curb and gutter, etc., caused by the temporary commercial industrial hauling operation.

The Performance Bond shall be held by the DPW&T throughout the duration of the permit and until documentation has been produced by the County which states that said Performance Bond may be released. The security posted to ensure performance shall be certified as discharged upon acceptance of the termination of the use of the specified hauling route and, if applicable, acceptance of the restoration of damage that may have resulted within the public rights-of-way during the performance of the DPW&T issued "Special Permit". However, discharge of the security posted to ensure performance shall not operate as a discharge of any other bonds.

In the event that the bond amount collected is not sufficient to cover the damage, if any should result, the operator/permittee, or their agent, should be aware that the County is entitled to bill for any additional costs required for corrective action. The Performance Bond and associated permit fees are to be posted at the DPW&T's Permits counter, located on the 6th floor, 9400 Peppercorn Place, Landover, Md. 20785 (301) 883-5972.

2. Permit Fees Required

A permit fee in the amount of $50 is required. The permit fee is non-refundable and shall be charged to offset the administrative costs incurred.

3. Use and Restoration of Existing Adjacent Roadways

All adjacent road surfaces should be kept clean of dirt and debris, at all times, attributable to the use of the haul road, as directed by the DPW&T.

In order to protect the traveling public at all times, especially during any type of commercial/industrial hauling, flagmen, temporary barricades equipped with flashing lights, traffic cones, and temporary portable signs, shall be required at any time to temporarily regulate traffic, if deemed necessary by the DPW&T Construction Regulation Inspector.

It shall be the responsibility of the operator/permittee to notify the DPW&T Construction Regulation Inspector, assigned to the area, 48 hours in advance of commencing with the hauling operations. The Inspector may be reached at (301) 883-5730.

The DPW&T Construction Regulation Inspector will immediately review the existing street conditions to monitor visible problems, and will continue to monitor the hauling route at least twice a week throughout the duration of the permit.

At the termination of the timber harvest and/or hauling operation, it shall be the responsibility of the operator/permittee to repair any damage determined to be a result of the performance of this permit. The public right-of-way, shall be returned to its original condition or better, as directed by the DPW&T.

4. Other Requirements

The DPW&T permit is issued for the purpose of enabling a legal haul activity within the County-maintained (public) right-of-way. The permit does not authorize the use of private driveways, private right-of-way, State-maintained right-of-way, etc., nor does it authorize public road work other than construction of a temporary stabilized construction entrance (SCE).

Every precaution is to be taken to protect adjacent properties from damage through the performance of this permit. Prince George's County assumes no responsibility for any suits or actions resulting from any work executed under this permit. Failure to comply with the conditions and requirements will result in revocation of the permit. Failure to comply will also be considered a violation of the Road Ordinance and the operator/permittee will be subject to penalty.

NOTE: Where applicable, the application submitted for the permit shall be accompanied by a letter, from adjacent property owners, which provides the written consent to temporarily use/cross private property/private road with commercial/industrial vehicles.

I, the undersigned, do hereby certify that I have read the above requirements/general specifications, and I do understand that I am obligated to comply and obtain a permit.

_____ _____

WITNESS PERMITTEE

SECTION VII

PRINCE GEORGE'S
SOIL CONSERVATION DISTRICT

DAM SAFETY POND PLAN

___ A. **PRINCE GEORGE'S SOIL CONSERVATION DISTRICT (PGSCD) GUIDELINES AND CRITERIA FOR STORMWATER MANAGEMENT, POND PLANS**

___ 1. Prince George's Soil Conservation District Pond Review Limits

___ a. The following sections are the minimum acceptable criteria to be adhered to in the preparation of stormwater management pond plans or designs to be submitted to the Prince George's Soil Conservation District (PGSCD) for review and approval. These conditions apply to all pond plans or designs submitted that may be required by federal, state or local agencies including those covered under the Prince George's County and City of Bowie Stormwater Management Ordinances.

___ b. In accordance with the Annotated Code of Maryland, Environment Article 5-503 a person may obtain approval from the Prince George's Soil Conservation District to construct, reconstruct, or repair any dam or reservoir in lieu of obtaining State of Maryland Department of Environment – (MDE) approval when:

___ (1) the contributory drainage area is less than one square mile (640 acres);

___ (2) the dam is not greater than 20 feet in height measured vertically from the lowest point on the top of the dam to the lowest point on the upstream toe of the dam;

___ (3) the pond is a low hazard structure, the failure of which is unlikely to cause loss of life or property damage (class "a" by PGSCD, class "b" and "c" by WMA Dam Safety); and

___ (4) the pond is not a wastewater stabilization pond.

___ 2. **WMA Dam Safety Division Small Pond Review and Approval Criteria**

The following criteria are established for the WMA Dam Safety Division small pond review and approval:

___ a. If any of the following apply, a permit is required from the WMA Dam Safety Division:

___ (1) Drainage area of the pond is greater than 640 acres.

___ (2) Dam embankment height is greater than 20 feet (top of dam to lowest point on the upstream toe).

___ (3) Pond is an intermediate or high hazard structure the failure of which is likely to cause damage to homes, public transportation, loss of life or property (NRCS Class b & c).

___ b. If the pond is in a USE III watershed, a permit is required if the pond will be:

___ (1) Capturing a flowing stream during May through September (base flow), or

___ (2) Capturing any spring, or

___ (3) A wet pond, or

___ (4) Located within 100 feet of a flowing stream, or

___ (5) Designed with extended detention > 12 hours.

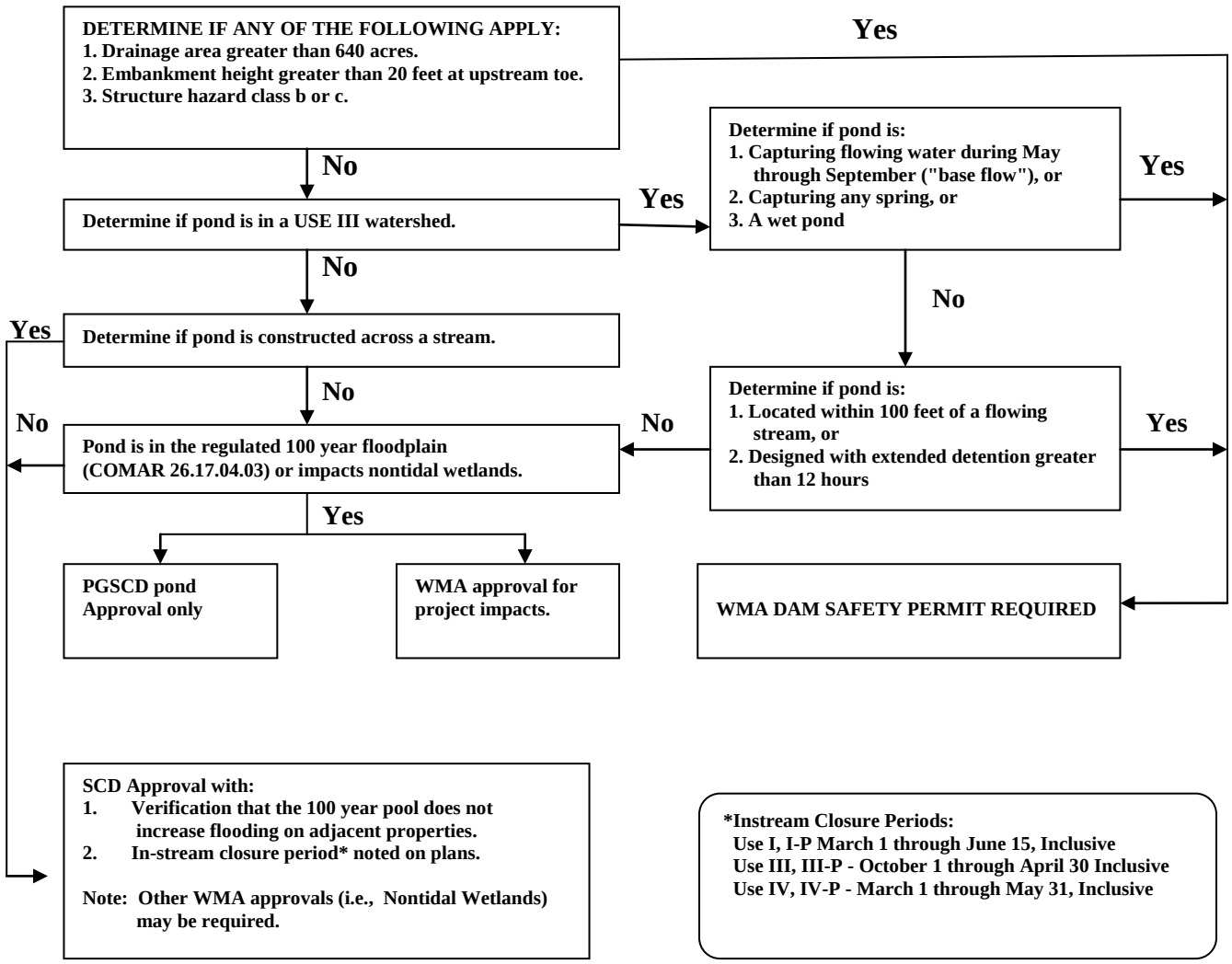
___ c. If the pond is to be constructed across a stream, excluding USE III waters, the Prince George's Soil Conservation District may approve the pond with verification that the 100 year pool based on ultimate development with current zoning does not increase flooding on adjacent properties or is in a floodplain easement. The in-stream closure period must be noted on the plans.

___ d. If the pond is in the floodplain, an WMA Nontidal Wetlands and Waterways Permit may be required. The pond will be evaluated for potential impacts in the floodplain and to nontidal wetlands. However, the pond construction plans may be approved by the Prince George's Soil Conservation District.

* "Base Flow" or "Dry Weather Flow" - Stream flows originating from groundwater or spring contributions that are not influenced by storm events. Base flow measurements should not be made within two days of a storm event.

___ 3. **Small Pond Review Flow Chart**

This flow chart is intended to determine whether WMA or PGSCD will review construction plans. PGSCD pond approval does not relieve the applicant from obtaining other necessary approvals associated with pond construction such as impacts to nontidal wetland.



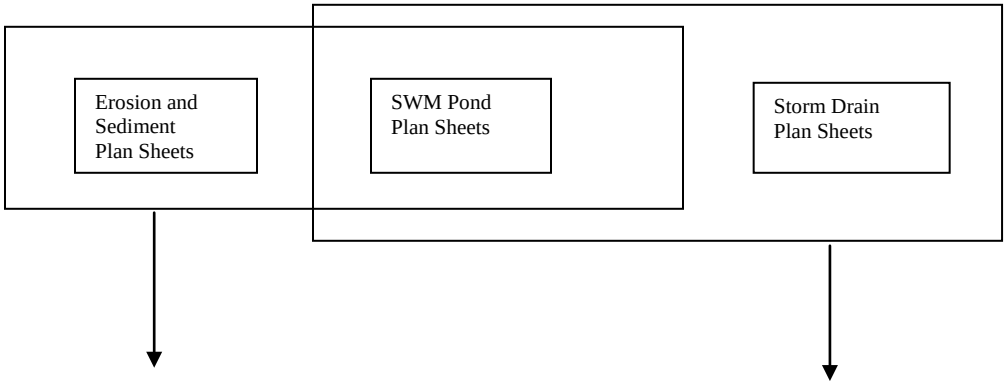
___ B. **POND PLAN SUBMITTAL AND COORDINATION**

___ 1. **Method of Submittal**

___ a. When obtaining joint County storm water management pond and PGSCD small pond approval, the plans submitted are to include the sediment control plans first followed by the pond plan sheets. When the plan contains sediment control for work other than the pond construction, then those sheets should be separable from the pond design sheets.

___ b. The plans submitted to the County are to include the storm water management pond plan separate from the storm drain plan sheets.

___ c. All plans are to be consecutively numbered. Plans for PGSCD are to be prefixed by SC 1 of _____, etc. Those plans for the County are to be numbered SD 1 of ____, etc. This will require the pond plan sheets to have separate numbering for each agency.



___ d. PGSCD approval for SWM ponds will be given after County final design approval is obtained.

___ e. Revisions shall adhere to the same joint review process.

___ 2. **SWM Pond Plan Coordination with Erosion and Sediment Control Plan**

Procedure for using a SWM pond (under separate PGSCD approvals) for sediment control of disturbed areas is as follows: Make sure the pond has not been finaled or turned over to the County.

___ a. The sediment control sequence needs to reference that the embankment and principal spillway are existing from SC#_____.

___ b. Embankment and principal spillway are to be shown on the plan view as existing.

___ c. In the sequence refer back to the SWM pond plan SC#____ to complete the pond after being used for sediment control.

___ d. Include pond cross-section and profile and all information necessary to maintain the pond for sediment control.

___ e. Include a basin design data sheet to verify adequate storage and spillway design for the 10-year storm.

___ f. Include a cleanout elevation on the profile.

___ g. Check length to width ratio, add baffles if necessary.
___ h. Provide slope protection where appropriate.
___ i. Delineate the size of basin if it differs from existing pond delineation and include slope symbols to show extent of basin which must be maintained.
___ j. Include basin specifications for safety, maintenance, and disposal.
___ k. Include blocking or dewatering of low flows and all openings up to the 10 year storm elevation to meet minimum basin volume requirements. Check for adequate freeboard for dam safety design storm. Include all necessary details.
___ l. Coordinate or revise pond plan sequence to be used for sediment control for SC#_____.

____3. **Sediment Control Methods for SWM Structures that Obtain an Exemption**

____ a. Requires diversion of runoff during construction of core trench, principal spillway and embankment.
____ b. Include sump pit detail to dewater any wet areas.
____ c. Modification of riser structure to serve as sediment control structure (i.e., dewatering devices on low flow openings, blocking of low flow openings, increasing height of riser crests, or extra excavation for meeting the sediment storage requirements). Adequate details of the modifications must be provided which maintain the required freeboard.
____ d. Note at end of sequence to dewater, if necessary, and remove sediment from SWM facility and grade to design grades.
____ e. If structure serves as sediment control for another plan, the plans must be “coordinated”.
____ f. Provide toe of slope sediment control.
____ g. Check outfalls for Q and V and protection.
____ h. Water quality first inch runoff systems that back up and that use control at the inlet will not work for sediment control unless a separate storm drain diversion is used.
____ i. Make sure all sediment control outlets meet or exceed the design criteria for the 10 year storm.
____ j. Meet minimum criteria for standard practice (i.e., basin or trap) for any modified structure.

___ C. **POND PLAN PREPARATION**

___ 1. All plans and specifications for pond designs submitted for review and approval by the Prince George's Soil Conservation District must conform with USDA-Natural Resources Conservation Service, Conservation Practice Standard for Pond, Code 378, January 2000, or TR-60, third edition. The principal and emergency spillways must adhere to MD-378, Table 1. Any emergency spillway must be sized according to the latest USDA-NRCS standards (EFM, Chapter 11) if it is to convey any portion of the design storms. All stormwater management ponds shall be designed using urban criteria.

___ 2. Topographic data is to be sufficiently adequate to show conditions of the site and show adjacent properties at a minimum of 100 feet downstream of the barrel outlet. Show the outlet velocities and discharges for the design storm events on the plans (10 and 100 year). Contours are to be adequately labeled and easily identified (spot elevations are to be shown). Existing and/or proposed improvements (building, walls, parking lots, etc.) in the immediate vicinity and downstream of the proposed pond are to be shown. All plan sheets must be the same size with a maximum size no larger than 30" x 42". County permitted projects may require maximum size of 24" x 36".

___ 3 The scope of the plan is to be clearly delineated and identified in the title block. Number the pond plan sheets consecutively with the sediment control sheets first. Plans are to be referenced SC 1 of _____, etc.

___ 4. Provide an erosion and sediment control plan adhering to the PGSCD Erosion and Sediment Control Guidelines with the pond plan. (Must include PGSCD site analysis sheet and PGSCD standard transmittal letter).

___ 5. The pond construction is to be included in the sediment control construction sequence, and shall depict the best method to divert the existing watercourse with the least disturbance during installation of the principal spillway structure and embankment. The following items, in addition to those asked for in the PGSCD Erosion and Sediment Control Guidelines, must be specifically noted in the construction sequence: construction of the core trench; spillway installation; embankment construction; location of and unified class of borrow area; and clearing, stripping, and stockpiling of topsoil for embankment and for the remainder of the pond. The construction sequence must state how the pond will be dewatered during core construction and the grading of the pond bottom. Provide an adequate dewatering detail (e.g. sump pit). If the pond is to be used temporarily as a sediment basin for any other sediment control plan, then the construction sequence of the pond must be properly coordinated with the other sediment control plan construction sequence.

___ 6. Submit two completed small pond approval letters for each pond.

___ 7. Submit two completed pond summary sheets (MD-378, Rev. 10/2000) for each pond.

___ 8. Submit two completed Operation and Maintenance Plans (See O&M Guidelines).

___ 9. Provide the following **completed and signed** engineer certification at the time of plan submittal:

"I certify that this design plan for the construction of the embankment and/or excavated pond represents a practical and workable plan based on my knowledge of the site and was designed in accordance with the requirements of the Natural Resources Conservation Service – Maryland Conservation Practice Standard for Ponds, (MD-378). I have reviewed this plan with owner/developer".
Signature_____Date_____
Name (printed)_____MD License Number_____
Address_____
Phone Number_____P.E. Seal_____

___ 10. Provide a completed small pond approval letter and a completed pond summary sheet on the plan.

___ 11. All existing and/or proposed utilities (surface and subsurface) are to be properly shown on the plans, identified and described. A specific note is required on all plans to notify "Miss Utility" at (800) 257-7777 before beginning construction.

___ 12. The 100-year floodplain delineation, (county or FEMA, whichever is greater) based on existing and ultimate development of the watershed, is to be shown on the plan.

___ 13. State and justify the hazard classification of the pond according to MD-378 utilizing approved USDA-NRCS methods. The classification of a dam is the responsibility of the designer, and subject to review and concurrence by PGSCD. (As accepted during Environmental Site Development review). Also, no buildings are allowed on the dam embankment or in the design storm pool area.

___ 14. Provide soil borings information in the Unified Soil Classification System at the following minimum locations: at the control structure, along the centerline at the embankment, in the emergency spillway location, and in the borrow area for the embankment. Identify the borrow area on the plans. The soils investigation report needs to include boring locations, soil logs, findings and recommendations. Include soil log profiles and boring locations on the plans. (Include soils information as approved during Environmental Site Development review).

___ 15. Include a **project narrative** with sufficient general information to include, but not limited to: total drainage area, location, purpose, storms attenuate, and classifications.

___ 16. All computations must be based on the USDA-NRCS acceptable method. Provide documentation of input information.

___ a. The following are the acceptable storm routing methods:

___ (1) NRCS "Engineering Field Manual"

___ (2) NRCS NEH Section 4, "Hydrology"

___ (3) Current version of NRCS, WINTR-55, "Urban Hydrology for Small Watersheds" storm routing methods

___ (4) Current version of NRCS, WINTR-20 "Computer Program for Project Formulation – Hydrology". Input and output must be adequately labeled. A schematic may be required by the reviewer.

___ b. Computations must clearly show that each pond component (e.g., anti-seep collars, anti-flotation, emergency spillway, outfall protection) was designed according to standards. **Computations shall include a table of contents with all pages numbered.**

___ c. Also, for safety analysis assume full blockage of low flow orifices if less than 6" in diameter. Routing for storage will start at next higher outlet. **Include blocked 100 year design storm elevations on the plan.**

___ 17. For public safety, the Prince George's Soil Conservation District will require that pond designs be based on ultimate hydrologic conditions of the watershed rather than present conditions. Ultimate hydrologic conditions shall be based on land uses as specified in Prince George's County General Plan, current zoning, or local Area Master Plan, whichever indicates the highest runoff.

___ 18. An emergency spillway is required unless the cross-sectional area of the principal spillway is 3 square feet or more and has a hooded non-clogging trash rack. The minimum difference in elevation between the crest of the emergency spillway and the settled top of the dam shall be 2.0 feet. The earth spillway shall be located in undisturbed ground with a minimum bottom width not less than 8 feet. The inlet channel may be curved. The level section shall be 25 feet in length, rectangular or square, and at the centerline of the dam. The exit channel shall be perpendicular to the level section and straight for the required design distance before curving to the receiving channel away from the downstream toe of dam.

___ 19. Normal freeboard required without an emergency spillway (open channel spillway) is two feet from top of settled dam to the (100 year) design storm for an embankment pond and one foot for an excavated pond. Use 100 year design storm elevation with low flow backed when openings are 6" or smaller.

___ 20. An adequate **stage discharge table** must be provided which takes into account all flow conditions. Equations must be provided with references and all variables shown. Flow capacities must be computed at a maximum of one foot increments. The table must be neat and legible. Each column must show the discharge value and the H value used to compute it. Two columns must be provided for each discharge component (e.g., low flow openings, low flow slots, riser), one column must show the weir flow, and the other must show the orifice flow. This will prove which flow/condition governs. The inlet or riser size for pipe drops shall be such that the flow through the structure goes from weir-flow control to pipe flow control without going into orifice flow control in the riser. Two other columns must be provided for the barrel, one for the inlet control and one for the outlet control.*

Another column must show the water surface elevation inside the riser. Finally provide a column which shows the total discharge at the barrel outlet. A **stage discharge chart** must also be provided showing the stage discharge curves for each flow and condition. Provide a stage storage table.

*Account for tailwater or measure the H value from the centerline of the outlet pipe. If the outlet is connected to an existing storm drain system (or to be connected in the future) at a particular junction, measure the H value from the 100-year hydraulic gradient at the junction. Provide 100-year hydraulic gradient profiles and computation from a free outlet.

___ 21. Provide a **summary table** which shows the following pre- and ultimate information: storm event, storm peak elevation, peak discharges, and peak storage values.

___ 22. Any current PGSCD approved pond construction specifications must be shown on the plans. Any additional construction specifications must be shown adjacent to, but separate from, the acceptable construction specifications and will be reviewed separately.

___ 23. Vegetation permissible for dam embankments is provided in NRCS Standards and Specifications for Critical Area Planting, MD-342. Include adequate vegetative stabilization specifications on the plans.

___ 24. Point-by-point responses to review comments must specify where changes were made. Any other changes or additions made to the plans or computations must be mentioned in the response letter. If the changes were not specified, the review may be terminated and the plans returned.

___ 25. Four sets of the final prints are to accompany the original drawing submitted for signing. Also provide, adjacent to the title block, PGSCD approval stamp**. Any unapproved changes to an approved PGSCD approved pond plan will invalidate the small pond approval.**

___ 26. As-Built plans shall be required for all PGCSD approved ponds. Plans shall show "redlined" or boxed and checked construction elevations, cross-sections, and profiles on the approved plan and shall be accompanied by a certification signed and sealed by a registered professional engineer. As-Built plans shall be provided to the Prince George's Soil Conservation District by the landowner within 30 days after completion of construction. Non-compliance with the preceding item shall be cause for withdrawal of PGSCD approval, and notification to the Maryland Department of Environment Dam Safety Division of the action taken. When delegated County stormwater management pond and PGSCD small pond approval have been granted, As-Built plans will be reviewed by the County for acceptance and forwarded to the PGSCD. (See As-Built Plans Checklist)

___ 27. For As-Builts the constructed height of the dam embankment must be shown and verified. If the height does not meet the minimum construction height required, additional fill is required.

___ 28. With As-Built acceptance, one set of the final As-Built prints and the original sepia set (to include the original approval stamp sheet) are to be submitted for signing.

___ D. **POND PLAN PREPARATION CHECKLIST**

___ 1. **Plan View of Pond at Scale of 1" = 50' or Less**

___ a. Existing and final contours (2' interval maximum and clearly labeled)

___ b. Scale, north arrow, and vicinity map

___ c. Property lines, right of way, ownership

___ d. Pond bottom dimensions for construction

___ e. Emergency spillway and outfall channel – include stations

___ f. Limits of core trench along dam centerline

___ g. Stationing along centerline dam and core trench

___ h. Outfall pipe, outlet protection, outfall channel (show peak discharges and velocities)

___ i. Outfall protection, inflow channels and low flow channels (include detail)

___ j. Locations of test borings

___ k. Dam breach area delineation and elevations

___ l. Drainage area to pond stated in acres

___ m. Existing and proposed utilities

___ n. Maintenance and safety benches

___ o. Areas to be sodded (if applicable)

___ p. Access road

___ q. SWM easement

___ r. Approved floodplain and elevations

___ s. Delineate approved wetland areas

___ t. Limits of non-woody buffer

___ 2. **Hazard Classification** (as accepted during Environmental Site Development)

___ a. Documentation and justification

___ b. Peak breach discharge

___ c. Acceptable Programs – TR-66 Third Edition 9/85, TR-20, or HEC-1

___ 3. **Soil Investigation** (as accepted during Environmental Site Development)

___ a. Location map of borings

___ b. Boring log locations shown along centerline of dam, at the control structure, at emergency spillway location and in the borrow area

___ c. Boring logs are to be plotted (with elevations) and materials classified according to the Unified Soil Classification System. Include log on dam profile with soil classifications on log and on the plan. Center of embankment and cutoff trench shall conform to Unified Soil Classification GC, SC, CH, or CL

___ d. Delineate borrow area

___ 4. **Drainage Area Map (1" = 200' scale or less)**

___ a. Show delineation of pre-and ultimate development drainage areas with 2' existing and proposed contours

___ b. Delineate the ultimate development drainage area on a copy of the soil survey sheet. Identify the hydrologic soil groups of each soil type by clearly shading each group differently on a separate copy of the soil survey sheet.

___ c. The RCN (runoff curve number) determination must be justified. Submit a copy of the drainage area map and indicate the following: Delineate the hydrologic soil groups. Identify the land uses in each hydrologic soil group.

___ d. If the time of concentration is computed, show the travel time reaches on the drainage area map. Justify the velocities used.

___ e. Show existing and proposed storm drain structures with designated numbers

___ f. Provide sizes of pipes (proposed and existing)

____ 5. **Emergency Spillway – Requirements, Computations, and Designs**

___ a. Capacity of principal spillway sized by MD-378

___ b. Design by NRCS Engineering Field Manual, Chapter 11

___ c. Located on natural ground or cut

___ d. Profile

___ (1) Existing ground (extend to a minimum of 100 feet below end of exit channel)

___ (2) Inlet channel, level section (25' minimum length) and exit channel.

___ (3) Slopes

___ (4) Design discharges and velocity

___ e. Cross-section of spillway (minimum 8' wide)

___ f. Protection of channels (type)

___ 6. **Profile of Dam along Centerline**

___ a. Top of dam with stationing (settled and constructed)

___ b. Location of emergency and principal spillways

___ c. Existing ground

___ d. Top of impervious core (minimum to 10 year WSEL) and invert elevation.

___ e. Bottom of cutoff trench

___ f. Storm peak elevations

___ g. Soil borings taken at centerline of embankment

___ h. All design storm peak elevations and permanent pool

___ 7. **Cross-Section of Dam Through Principal Spillway**

___ a. Existing ground

___ b. Proposed ground surface (constructed and settled)

___ (1) Slopes of dam (S1 + S2 = 5:1 or flatter), pond (3:1) or flatter both sides

___ (2) Top width

___ (3) Height

___ (4) Type of soil to be used (GC, CH, SC or CL)

___ c. Emergency spillway crest (dotted line at crest elevation)

___ d. Phreatic line (4:1 slope) measured from normal pool or SWM pond from 10-year water elevation

___ e. Cutoff trench

___ (1) Bottom width (4' minimum)

___ (2) Side slopes

___ (3) Depth (4' minimum)

___ (4) Type of soil to be used (GC, SC, CH or CL) with 95% compaction

___ f. Impervious core
___ (1) Height
___ (2) Top width
___ (3) Side slopes
___ (4) Type of soil to be used (GC, CH, SC or CL)
___ g. Riser or similar structure
___ (1) Inside diameter or dimensions
___ (2) Gauge (or thickness if concrete)
___ (3) Depth of embedding in base (if concrete)
___ (4) Connecting strap detail for pre-cast structures
___ h. Riser base
___ (1) Length, width, thickness, gauge, if metal
___ (2) Anti-flotation computations (factor of safety = 1.2:1 or greater)
___ i. Low flow orifice or similar structure
___ (1) Diameter
___ (2) Non-clogging trash rack
___ (3) Method and instruction for plugging while operating as a sediment control device
___ j. Pipe (round, except for cast in place reinforced concrete box culverts)
___ (1) Inside diameter, length, material and gauge
___ (2) First joint within 4 feet from riser
___ (3) Saturated length
___ (4) Slope
___ k. Bedding (detail must meet Md-378)
___ l. Seepage control
___ (1) Foundation, abutment or embankment drains (include detail)
___ (2) Reservoir blanketing
___ m. Anti-seep collars (include detail)
___ (1) Size (Minimum 2' projections)
___ (2) Spacing and location on pipe (locate collar minimum two feet from joints)
___ n. Trash racks – (include detail)
___ o. Anti-vortex device (in trash rack detail)
___ p. Outlet protection
___ (1) Median rip rap size (d50)
___ (2) Length, width, and depth 2.25 x d50 (shown on plan view and cross section)
___ (3) Filter cloth
___ (4) Cross-section
____ q. Filter and drainage diaphragm (include detail)
___ (1) Per MD-378 or TR-60 designs
___ (2) SM, ML soils used in embankment
___ r. Width of maintenance and safety bench VI-16

___ s. Elevations
- ___ (1) Top of dam [constructed (unsettled) and settled height with required freeboard]
- ___ (2) Crest of emergency spillway
- ___ (3) Crest of riser and other openings
- ___ (4) All design storm peak elevations and permanent pool elevations
- ___ (5) Top of impervious core
- ___ (6) Bottom of cutoff trench
- ___ (7) Inlet and outlet inverts of pipe
- ___ (8) 100-year tailwater or 100-year HGL
- ___ (9) Low flow channel inverts at 50' intervals
- ___ (10) Pond bottom

___ 8. **Outfall Study**
- ___ a. Cross-sections at critical points (in improved and existing channel or waterway)
- ___ b. Flow rates and velocities, after development
- ___ c. Existing vegetation and condition

___ 9. **Certifications (on the pond plans)**
- ___ a. Engineer certification (signed and sealed) at the time of plan submittal.
- ___ b. County acceptance block (when applicable)
- ___ c. Small Pond Approval letter (completed and signed by owner)

___ 10. **Construction Specification for Pond**
- ___ a. Per MD-378
- ___ b. Joint approved County/PGSCD Specifications
- ___ c. TR-60 specifications

____ 11. **Other Details**
- ___ a. Pond access road cross sections and percent slope
- ___ b. Riser structure reinforcement detail (Design loading, if applicable)
- ___ c. Landscaping plan required by all agencies (No trees or shrubs on or within 15' of the embankment)
- ___ d. For dry SWM ponds, a minimum of 25' radius around structures shall be cleared

___ E. **POND UPDATING TO CURRENT MD-378**

___ 1. Guide for Updating SWM Ponds from the July, 1981 or January, 1991 or November, 1992 MD-378 to the January, 2000 MD-378.

___ 2. Ponds approved prior to January 2000 that have been constructed and received District as-built approval that require retrofits or repairs need to consider, the following:

___a. Completed new small pond approval letter.
___b. Completed new MD-14.
___c. Complete and sign Operation and Maintenance Plan.
___d. Revised Qmax and hazard class limits.
___e. Limited unified soils acceptable.
___f. Phreatic line starts at 10 year elevation.
___g. Freeboard requirements – two feet.
___h. Anti-seep collars – two foot projections, two feet from joints.
___i. Trash racks openings no larger than 1⁄2 barrel diameter.
___j. Emergency spillway – length 25', alignment, and token.
___k. CMP sizes limited.
___l. Add new construction specifications.
___m. No trees or shrubs on embankment and 25' cleared buffer from structure.
___n RCP – first joint within 4 feet of riser, no AWWA C302 pipe.
___o. Impervious core is up to the 10 year elevation throughout embankment.
___p Concrete – SHA mix.
___q. Rock rip rap – SHA sizes.
___r. Include soil logs on plans.
___s. Low stages or openings less than 6" are not included in routings.
___t. All compaction is by AASHTO method T-99 standard proctor.
___u. Concrete pipe cradles need to be extended 50% up the sides of the pipe with a minimum thickness of six inches. Gravel bedding is not permitted.
___v. Splitter type anti-vortex devices shall be placed in line with the barrel.
___w. Hood type trash racks must extend a minimum of eight inches below the weir opening.
___x. Pipes and utilities not parallel to the axis of the dam shall meet all principal spillway requirements. Pipes and utilities parallel to the axis of the dam shall be constructed with no granular bedding.

___ F. **GENERAL REQUIREMENTS FOR POND CONSTRUCTION**

___ 1. **General**

___ a. Require that inspectors do more than just test fill compaction, i.e., observe foundation preparation, pipe installation, riser construction, filter installation, etc. See checklists in NRCS Pond Standards (MD-378) The latest MD-378 is January 2000 and can be downloaded from NRCS web site.

___ b. Entire dam site must be cleared of trees, roots and other organic or deleterious materials to area at least 15 feet beyond limits of the embankment. Old stream channels and pockets of sand or gravel should be excavated and backfilled with compacted fill. Site should then be proof-rolled under direction of geotechnical engineer (or his inspector). Any soft or excessively wet areas should be undercut and backfilled with compacted soil, not gravel. Avoid the use of "bridge lifts".

___ c. Where possible, avoid using road embankments as dams or stormwater management structures. This helps to minimize future problems with ownership, maintenance and repair. This also minimizes problems with utilities in dams, since the utilities are usually located along the roadways.

___ 2. **Pipe Spillways**

___ a. Many pond failures occur along the principal spillway because of the difficulty in compacting soil along a pipe. Consider use of alternative spillway structures, such as weirs and drop boxes.

___ b. **Never** allow pipe placement in a vertical trench excavated through the embankment or foundation.

___ c. **Do not** use gravel under pipe, riser or outlet structure. Do use a working slab or mud-mat (4 to 6 inches thick) of concrete or flowable fill in bottom of riser excavation and pipe trench. If water is a problem, contractor should use pumps and sumps to keep excavation dry. Undercut areas should be backfilled with compacted fill, concrete, or flowable fill, depending on type structure.

___ d. The inspector must be knowledgeable in pipe standards. For example, does inspector know why reinforced concrete pipe (RCP) conduit labeled "ASTM C-76, Class V" is not acceptable for pond construction?

___ e. All spillway joints must be watertight to prevent infiltration of embankment soil into the conduit. All joints must be constructed as designed by pipe manufacturer. "Field joints", where the ends of the pipes are cut off in the field are not acceptable

___ f. Gaskets for concrete pipe (ASTM C-361) should be o-rings (with circular cross section) seated in a groove. Alternative joint design (shoulders and "profile gaskets") should not be installed without prior approval of the design engineer **and the owner**.

___ g. The pipe manufacturer shall submit certification that pipe meets plan requirements for design load, pipe thickness, joint design, etc. to the design engineer for approval prior to installation.

___ h. All pipe gaskets must be properly lubricated with the material (vegetable grease or soap) provided by pipe manufacturer. Use of incorrect lubricant may cause deterioration of gasket material. The gasket should be properly "tensioned". Failure to do this may result in improper joints that are not watertight, or may cause pipe failure.

___ i. Use concrete cradle under RCP up to springline. Cradles should be poured against undisturbed earth. Or, they can be formed if there is enough room along the outside of forms for proper compaction.

___ j. Corrugated metal pipe (CMP) spillways must meet or exceed the minimum requirements in NRCS MD-378. Check for metal thickness (compare manufacturer's certification that should accompany pipe shipment with plans), corrugation size, number of re-rolled end corrugations, proper connecting bands, and gasket type. Note that the engineer may specify a heavier gauge than MD-378 for increased design life.

___ k. The pipe manufacturer shall properly label and "match mark" their pipe sections. CMP is typically custom fabricated for each job as one long piece and then cut into shipping lengths. By consecutively labeling each piece, the pipe can be re-assembled in the same order as it was manufactured. (Also, the manufacturer shall ship the longest sections possible-the fewer joints the better. Avoid use of short sections with anti-seep collars in the middle, as this increases the number of joints.)

___ l. Six-inch hugger bands and "dimple bands" are not acceptable for CMP conduits. Thirteen-inch bands with either o-ring or flat neoprene gaskets are allowed for pipes less than 24-inches in diameter. Larger pipes require 24-inch wide bands with 24-inch wide flat gaskets and four "rod and lug" type connectors. Note that flanged pipe ends with gaskets are also permitted.

___ m. Maximum allowable deflection of CMP conduits is 5 percent of pipe diameter. However, with the larger pipe sizes, it may be difficult to get acceptable joints even if deflection is less than this amount. No more than 1-inch difference in diameter is allowable between adjacent sections.

___ n. Flat gaskets for CMP must be factory welded or solvent glued into circular ring, with no overlaps or gaps in gasket allowed.

___ o. Use "flowable fill" under CMP up to springline. Caution: pipe will float, so must be held down. Also, flowable fill shrinks, so make at least 2 separate pours. Second pour on top of first fills voids.

___ p. The first pipe joint should occur within four feet of riser in order to accommodate differential movements of riser and pipe yet maintain a watertight connection.

___ q. Precast risers cannot be substituted if plans call for cast-in-place structure, unless reviewed by design engineer and approved by Prince George's Soil Conservation District or County before construction. Sections of precast structures must be anchored together for stability and flotation requirements. Watertight joints between the riser sections and the barrel are required.

___ r. Structural engineer must evaluate shop drawings for pipe, precast structures, or other fabricated appurtenances before fabrication or installation.

___ s. Cinder block, brick and masonry riser structures are not allowed.

___ t. Precast box culverts are not approved, as they do not have watertight joints.

___ 3. **Embankment Construction**

___ a. Do perform frequent tests of compaction effort. Typically, plan to conduct at least one test per 5,000 square feet on each layer of fill. Test frequency may be reduced on large projects where the material is uniform after the contractor proves that a certain compactive effort will consistently achieve specified density.

___ b. Use Standard Proctor (AASHTO Method T-99) for compaction criterion, not Modified Proctor. Standard Proctor results in slightly wetter, more flexible, fill that can better settle without formation of cracks.

___ c. A new Proctor test is required if material changes from that previously tested.

___ d. Do not rely on nuclear density gauge without correlation with traditional methods like sand cone and oven-dry moisture content. Otherwise, dry density and moisture content may not match those obtained in the lab.

___ e. Use sheepsfoot type roller for cohesive soils like clay, silt, clayey sands.

___ f. Use smooth drum vibratory roller on clean sands and gravels.

___ 4. **Filters and Drainage layers**

___ a. Filters are critical for control of seepage. Aggregate size for filter is dependent on embankment soil. If contractor proposes different borrow source than used for filter design, then filter must be redesigned for new soil.

___ b. Clean sands cannot be adequately compacted by tamping alone, because water sets up surface tension between particles that may prevent achieving maximum density. Must flood filter with clean (potable) water, and vibrate just after water drops below sand surface.

___ c. Filter material should be placed in layers no more than a foot thick.

___ d. A maximum of four feet of dam embankment on top of lower portion of the filter and then excavated down with a backhoe to expose previous layers. After removing any unsuitable materials, the trench is then filled in one foot layers, flooded and vibrated as above, until the top of adjacent fill is reached.

___ e. Filter fabric (geotextiles) cannot be used in lieu of sand and gravel layers within the dam embankment.

___ f. Do not wrap filter fabric tightly around perforated pipes used to collect seepage. Because the area of water flow through the fabric is effectively reduced to the area of the perforations, it will clog rapidly. Fabric should be held away from the pipe surface by a layer of gravel or three dimensional geotextile.

___ 5. **Utilities**

___ a. Utilities that run through dam or foundation from upstream to downstream should be avoided. If they cannot be moved, then the conduit must meet the requirements for spillways, i.e., water tight joints, no gravel bedding, encasement in concrete or flowable fill, and restrained to prevent joint separation due to settlement.

___ b. Utilities that run along the axis of the dam (such as water and sewer under a roadway) should also be avoided. No gravel backfill is allowed, as this may allow groundwater to flow into dam embankment from abutments, resulting in seepage and stability problems with the slopes.

___ c. No manholes allowed in dam embankments, unless carefully designed and constructed to be watertight.

___ d. Utility repairs in dam embankment require approval by Prince George's Soil Conservation District.

___ G. AS BUILT PLANS CHECKLIST

___ 1. The owner or the engineer will notify the Prince George's Soil Conservation District in writing when construction is completed. Within 30 days of the completion of construction, the engineer-in-charge that designed the structure shall provide PGSCD with an As-Built plan. Noncompliance with the preceding items shall be cause for withdrawal of PGSCD approval, and notification to the Maryland Department of the Environment of the action taken. The supervision during construction of a pond by the engineer-in-charge is required to meet the minimum requirements of an acceptable As-Built plan. This supervision must be sufficient to provide certification of all design elevations and materials.

___ 2. **Method of Submittal**

- ___ a. Submit two print copies of the As-Built plan.
- ___ b. PGSCD will review and comment on As-Built plan.
- ___ c. PGSCD will issue As-Built acceptance once specified requirements are met.
- ___ d. With As-Built acceptance one set of the final As-Built prints and the original sepia set (to include original approval stamp sheet) is to be submitted for signing.

___ 3. **Method of Documentation**

- ___ a. The minimum constructed information shall be shown on the approved prints or mylars and shall be drawn in ink and in a box, or shown in red. A boxed value and check mark (√) may be made if the planned values were the actual constructed values. For changed values, single line out the planned value and enter the actual value boxed or shown in red next to the planned value.
- ___ b. A field survey with bench marks included is needed to verify constructed values. Elevations to the nearest 0.1' are sufficiently accurate except where higher accuracy is needed to show positive flow.

___ 4. **Minimum Information**

- ___ a. Profile of dam along centerline to include elevation of top of constructed dam.
- ___ b. Cross-section of dam through principal spillway, extending at least 100 feet downstream of the fill.
- ___ c. Cross-section of the emergency spillway at the control section.
- ___ d. Profile along the centerline of emergency spillway.
- ___ e. The elevation of the principal spillway crest or top of structure elevations.
- ___ f. The elevation of the principal spillway inlet and outlet inverts.
- ___ g. Riser diameter/dimensions, and riser base size.
- ___ h. Barrel diameter, length and slope (Include cradle when applicable).
- ___ i. Type of materials used.
- ___ j. Outfall protection; length, width, depth, size of rip rap (d50 and class), and filter cloth.
- ___ k. Proper size and type of anti-vortex and trash rack device; height, diameter, elevations, spacing.

___ l. Proper location, size and number of anti-seep collars.

___ m. The diameter, invert elevation and sizes of any stage orifices, weirs or drain pipes.

___ n. Core trench limits, side slopes, and elevation of bottom of cut off trench (required during construction).

___ o. Show the length, width, and depth or contours of the pool area so that design volume can be verified.

___ p. The following certification statement is required to be placed on the approved print or sepia:

"I hereby certify that the facility was constructed as shown on this "As-Built" plan and meets or exceeds the requirements of the Natural Resources Conservation Service – Maryland Conservation Practice Standard for Ponds (MD-378) and the approved pond plans and specifications".

_____

Signature Engineer-in-charge Date Md. PE Seal and No.

Certify means to state or declare a professional opinion based upon onsite inspections and material tests which are conducted during construction. The onsite inspections and material tests are those inspections and tests deemed sufficient and appropriate by commonly accepted engineering standards. Certify does not mean or imply a guarantee by the engineer nor does an engineer's certification relieve any other party from meeting requirements imposed by contract, employment, or other means, including meeting commonly accepted industry practices.

Note: The paragraph following the signature is optional.

___ q. **Certification of vegetative cover and fencing** (if applicable).

___ r. **A certification by a Geotechnical Engineer** of compaction and unified soil classes.

___ s. Notes and measurements to show that any special design features were met.

___ t. Show location of planted landscaping.

___ 5. **Acceptable Construction**

___ a. The pipe conduit diameter, length, materials, cradle and elevations must be correct.

___ b. Riser must be as designed with correct orifice dimensions and elevations.

___ c. Trash racks must meet design requirement.

___ d. The number, size, and location of the anti-seep collars must be correct.

___ e. Emergency spillway may be 1-2% steeper, but no flatter than design, no narrower than design, and located as shown on the approved plans with property alignment.

___ f. Embankment top elevations must be no less than design elevation plus allowance for settlement (as shown on plans).

___ g. Top width and side slopes of embankment must meet design requirement.

___ h. There must be the proper relationship between the principal spillway crest, emergency spillway crest, and the top of the dam. All elevations must be equal to the design elevations or relative to each other and the required volumes.

___ i. The structure must have an acceptable outlet as provided on the plans.

___ j. Construction shall be in strict accordance with the approved plans and criteria for the pond(s), unless approval for any proposed changes are approved by the Prince George's Soil Conservation District prior to the construction.

___ k. Location of vegetation as per landscape plan.

___ l. The compaction requirements as directed.

___ H. **MAJOR/MINOR POND PLAN CHANGES**

___ 1. **Major Pond Plan Changes**

The following items represent field conditions which require a revision of the original approved plan and must be submitted to PGSCD for review and approval.

___ a. Change of pond storage by decreasing volume

___ b. Changing of pond slopes or lengthening of slopes

___ c. Changing of benches or other safety features

___ d. Changing size and/or class of inlet/outlet pipe

___ e. Changing of site grades and/or drainage area to pond

___ f. Changing elevation and/or size of orifice/weir in riser

___ g. Changing of slope and/or length of inlet/outlet pipe

___ h. Changing location or addition of borrow areas

___ i. Changing rip-rap design

___ j. Changing or addition of trash rack and/or anti-vortex device

___ k. Changing size and/or location of anti-seep collars

___ l. Changing dam or emergency spillway dimension, location, and/or elevation

___ m. Changing riser dimensions

___ n. Changing size, grade and/or spacing or structural steel

___ o. Change in soil or water conditions

___ 2. **Minor Pond Plan Changes**

The following items represent field conditions which result in minor changes in the approved pond plan that may be approved as directed by the County inspector.

___ a. Shift in location or addition of landscaping not on embankment or in storage area or emergency spillway.

___ b. Small adjustment in the horizontal location of pond to accommodate such things as utilities providing rights-of-way and/or easements are not crossed and storage volume is unchanged.

___ c. Undercutting of core trench as per geotechnical engineer's recommendation (no less than minimum requirements).

___ d. Additional rip-rap in outfall provided rights-of way and/or easements are not crossed (no change in size).

___I. HYDROLOGIC SOIL GROUPS FOR PRINCE GEORGE'S COUNTY

Map symbol and soil name	Pct. of map unit	Hydrologic group
AaB:		
Adelphia	75	C
AcA:		
Adelphia	50	C
Aquasco	30	C
AdA:		
Adelphia	60	C
Holmdel	25	C
AdB:		
Adelphia	55	C
Holmdel	25	C
AdC:		
Adelphia	55	C
Holmdel	25	C
AeB:		
Adelphia	30	C
Homdel	30	C
Urban land	30	D
AfA:		
Annapolis	80	B
AfB:		
Annapolis	80	B
AfC:		
Annapolis	80	B
AfD:		
Annapolis	75	B
AfE:		
Annapolis	80	B
AfF:	75	B
Annapolis	75	B
AnB:		
Annapolis	50	B
Urban land	40	D
AnD:		
Annapolis	50	B
Urban land	35	D
ApA:		
Aquasco	80	C
ApB:		
Aquasco	75	C
AuB:		
Aquasco	65	C
Urban land	30	D

Map symbol and soil name	Pct. of map unit	Hydrologic group
BaA:		
Beltsville	75	C
BaB:		
Beltsville	70	C
BaC:		
Beltsville	70	C
BgB:		
Beltsville	35	C
Grosstown	30	B
Woodstream	15	C
BuB:		
Beltsville	50	C
Urban land	40	D
BuD:		
Beltsville	50	C
Urban land	30	D
BwC:		
Brinklow	85	B
BwD:		
Brinklow	85	B
ByD:		
Brinklow	50	B
Blocktown	35	B
ByF:		
Brinklow	50	B
Blocktown	40	C
CaB:		
Chillum	75	B
CaC:		
Chillum	75	B
CaD:		
Chillum	75	B
CbB:		
Chillum	40	B
Urban land	40	D
CbD:		
Chillum	50	B
Urban land	30	D
CdE:		
Chillum	50	B
Urban land	25	D

Map symbol and soil name	Pct. of map unit	Hydrologic group
CcC:		
Christiana	45	C
Downer	30	B
CcD:		
Christiana	50	C
Downer	35	B
CcE:		
Christiana	45	C
Downer	35	B
CcF:		
Christiana	45	C
Downer	35	B
CdD:		
Christiana	30	C
Downer	25	B
Urban land	20	D
CdE:		
Christiana	35	C
Downer	30	B
Urban land	20	D
CF:		
Codorus	40	C
Hatboro	40	D
Ch:		
Codorus	30	C
Hatboro	30	D
Urban land	30	D
CkA:		
Colemantown	80	C/D
CnA:		
Collington	60	B
Wist	25	B
CnB:		
Collington	50	B
Wist	35	B
CnC:		
Collington	45	B
Wist	35	B
CnD:		
Collington	45	B
Wist	30	B
CnE:		
Collington	60	B
Wist	25	B

Map symbol and soil name	Pct. of map unit	Hydrologic group
CnF:		
Collington	60	B
Wist	25	B
CoB:		
Collington	30	B
Wist	30	B
Urban land	25	D
CoD:		
Collington	30	B
Wist	30	B
Urban land	25	D
CoE:		
Collington	40	B
Wist	30	B
Urban land	25	D
CrB:		
Croom	80	B
CrC:		
Croom	75	B
CrD:		
Croom	75	B
CrE:		
Croom	75	B
CsD:		
Croom	50	B
Collington	25	B
Howell	25	C
CsE:		
Croom	50	B
Collington	25	B
Howell	25	C
CsF:		
Croom	50	B
Collington	25	B
Howell	25	C
CuD:		
Croom	40	B
Howell	25	C
Urban land	25	D
CwC:		
Croom	60	B
Marr	25	B

Map symbol and soil name	Pct. of map unit	Hydrologic group
CwD:		
Croom	50	B
Marr	30	B
CwE:		
Croom	50	B
Marr	30	B
CwG:		B
Croom	50	B
Marr	30	B
CxD:		
Croom	45	B
Marr	30	B
Urban land	20	D
CxE:		
Croom	45	B
Marr	30	B
Urban land	20	D
CzB:		
Croom	60	B
Urban land	30	D
CzD:		
Croom	70	B
Urban land	20	D
CzE:		
Croom	70	B
CzE:		
Urban land	20	D
Dam:		
Dam, concrete	100	D
DfA:		
Dodon	70	B
DfB:		
Dodon	70	B
DfC:		
Dodon	75	B
DnA:		
Donlonton	60	C
DnB:		
Donlonton	60	C

Map symbol and soil name	Pct. of map unit	Hydrologic group
DoB:		
Downer	55	B
Hammonton	25	B
DoC:		
Downer	50	B
Hammonton	25	B
DoD:		
Downer	50	B
Hammonton	25	B
DuB:		
Downer	35	B
Hammonton	25	B
Urban land	20	D
DuD:		
Downer	35	B
DuD:		
Hammonton	25	B
Urban land	20	D
EkA:		
Elkton	85	C/D
EnA:		
Elkton	60	C/D
Urban land	30	D
EsA:		
Elsinboro	95	B
EsB:		
Elsinboro	95	B
EuB:		
Elsinboro	65	B
Urban land	30	D
EwB:		
Eveboro	40	A
Downer	30	B
EwC:		
Evesboro	40	A
Downer	30	B
EwD:		
Evesboro	40	A
Downer	30	B
EwE:		
Evesboro	40	A
Downer	30	B

Map symbol and soil name	Pct. of map unit	Hydrologic group
FaA:		
Fallsington	75	B/D
FbB:		
Fallsington	50	B/D
Urban land	30	D
GaB:		
Gaila	85	B
GaC:		
Gaila	85	B
GbB:		
Galestown	60	A
Urban land	30	D
GbD:		
Galestown	65	A
Urban land	25	D
GbB:		
Glenelg	85	B
GcC:		
Glenelg	85	B
GfB:		
Glenelg	45	B
Wheaton	30	B
Urban land	25	D
GfC:		
Glenelg	45	B
Wheaton	30	B
Urban land	25	D
GgA:		
Grosstown	90	B
GgB:		
Grosstown	80	B
GgC:		
Grosstown	90	B
GhC:		
Grosstown	50	B
Hoghole	45	A
GkB:		
Grosstown	35	B
Hoghole	35	A
Urban land	25	D
GmD:		
Grosstown	30	B
Marr	30	B
Hoghole	15	A
Dodon	10	B

Map symbol and soil name	Pct. of map unit	Hydrologic group
GmF:		
Grosstown	30	B
Marr	30	B
Hoghole	15	A
Dodon	10	B
GuB:		
Grosstown	60	B
Urban land	30	D
GuD:		
Grosstown	60	B
Urban land	30	D
Woodstown	5	C
GwD:		
Grosstown	30	B
Woodstown	30	C
Beltsville	20	C
HaA:		
Hammonton	75	B
HgB:		
Hoghole	45	A
Grosstown	30	B
HnB:		
Howell	50	C
Annapolis	35	B
HnC:		
Howell	50	C
Annapolis	40	B
HOD:		
Howell	60	C
Annapolis	30	B
HOE:		
Howell	50	C
Annapolis	40	B
HwB:		
Howell	45	C
Dodon	35	B
HwC:		
Howell	45	C
Dodon	40	B
HZD:		
Howell	45	C
Dodon	40	B

Map symbol and soil name	Pct. of map unit	Hydrologic group
HZE:		
Howell	50	C
Dodon	30	B
HZF:		
Howell	50	C
Dodon	30	B
InA:		
Ingleside	85	B
Is:		
Issue	80	C
Iu:		
Issue	60	C
Urban land	30	D
LQA:		
Lenni, undrained	50	D
Quindocqua, undrained	30	C/D
LsA:		
Leonardtown	75	D
LxD:		
Liverpool	45	C
Piccowaxen	40	C
LY:		
Longmarsh	65	D
Indiantown	25	D
MaB:		
Magnolia	80	B
MbB:		
Magnolia	50	B
Urban land	30	D
McC:		
Manor	85	B
McD:		
Manor	90	B
MfF:		
Manor	55	B
Brinklow	30	B

Map symbol and soil name	Pct. of map unit	Hydrologic group
MIS:		
Miscellaneous Water	100	___
MnA:		
Marr	80	B
Dodon	20	B
MnB:		
Marr	45	B
Dodon	35	B
MnC:		
Marr	50	B
Dodon	35	B
MnD:		
Marr	45	B
Dodon	40	B
MnE:		
Marr	50	B
Dodon	35	B
MoB:		
Marr	40	B
MoB:		
Dodon	30	B
Urban land	30	D
MoD:		
Marr	40	B
Dodon	30	B
Urban land	30	D
MpA:		
Matapeake	85	B
MpB:		
Matepeake	85	B
MT:		
Mispillion	40	D
Transquaking	40	D
NM:		
Naticoke	45	D
Mannington	40	D
PoA:		
Piccowaxen	55	C
Liverpool	45	C
PoB:		
Piccowaxen	55	C
Liverpool	40	C

Map symbol and soil name	Pct. of map unit	Hydrologic group
PrB:		
Piccowaxen	50	C
Urban land	30	D
PT:		
Pits, gravel	100	A
Px:		
Potobac	70	D
Issue	25	C
RcA:		
Russett	45	C
Christiana	25	C
RcB:		
Russett	40	C
Christiana	35	C
RuB:		
Christiana	30	C
Russett	30	C
Urban land	30	D
SaA:		
Sassafras	80	B
SaB:		
Sassafras	80	B
SaC:		
Sassafras	80	B
ScC:		
Sassafras	45	B
Croom	35	B
SdD:		
Sassafras	35	B
Croom	30	B
Urban land	25	D
SnB:		
Sassafras	45	B
Urban land	35	D
SnD:		
Sassafras	55	B
Urban land	30	D
SnE:		
Sassafras	55	B
Urban land	25	D
SOD:		
Sassafras	45	B
Croom	35	B

Map symbol and soil name	Pct. of map unit	Hydrologic group
SOE:		
Sassafras	40	B
Croom	35	B
SOF:		
Sassafras	40	B
Croom	35	B
SrA:		
Shrewsbury	75	C/D
SwB:		
Swedesboro	45	B
Galestown	35	A
UdaF:		
Udorthents, highway	100	D
UdhB:		
Udorthents, loamy	90	B
UdbD:		
Udorthents, loamy	90	B
Urban Land	10	D
UdbE:		
Udorthents, loamy	100	C
UdcB:		
Udorthents, reclaimed clay pits	95	C
UdcD:		
Udorthents, reclaimed clay pits	95	C
UdgB:		
Udorthents, reclaimed gravel pits	100	C
UdgD:		
Udorthents, reclaimed gravel pits	100	C
UdgE:		
Udorthents, reclaimed gravel pits	100	C
UdrF:		
Udorthents, refuse substratum	100	D

Map symbol and soil name	Pct. of map unit	Hydrologic group
UduB:		
Udorthents, reclaimed gravel pits	70	C
Urban land	30	D
UduD:		
Udorthents, reclaimed gravel pits	55	C
Urban land	30	D
Un:		
Urban land	100	D
UraB:		
Urban land	75	D
Adelphia	15	C
UrbB:		
Urban land	80	D
Beltsville	15	C
UrcD:		
Urban land	75	D
Christiana	15	C
Downer	10	B
UrdB:		
Urban land	80	D
Collington	15	B
Wist	5	B
UreB:		
Urban land	80	D
Elsinboro	20	B
UrgB:		
Urban land	80	D
Grosstown	15	B
UrkB:		
Urban land	85	D
Issue	15	C
UrmB:		
Urban land	80	D
Dodon	10	B
Marr	10	B
UrrB:		
Urban land	80	D
Christiana	10	C
Russett	10	C
UrsB:		
Urban land	80	D
Sassafras	15	B

Map symbol and soil name	Pct. of map unit	Hydrologic group
UruB:		
Urban land	80	D
Udorthents	20	C
UrwB:		
Urban land	80	D
Woodstown	20	C
UrzA:		
Urban land	80	D
W:		
Water	100	---
WDF:		
Westphalia	45	B
Dodon	40	B
WDG:		
Westphalia	45	B
Dodon	40	B
WE:		
Issue	40	C
Widewater	40	D
WoA:		
Woodstown	80	C
WoB:		
Woodstown	75	C
WoC:		
Woodstown	65	C
Grosstown	20	B
WuB:		
Woodstown	50	C
Urban land	35	D
Zn:		
Zekiah	40	D
Urban land	30	D
ZS:		
Issue	40	C
Zekiah	40	D

___ J. USDA NRCS CONSERVATION ENGINEERING TOOLS AND DOCUMENTS, JULY/2013

NRCS Pond MD-378 references may be accessed via USDA's eDirectives: National Engineering Handbook. See in particular the following:

NATIONAL ENGINEERING MANUAL				
SUBJECT AREA	NEW NRCS REF	OLD NRCS #	TITLE	VERSION/RELEASE DATE
	210-V-NEM	210-V-NEM	National Engineering Manual	Amend 23. March 1997
NATIONAL ENGINEERING HANDBOOK				
Soils Engineering	Part 633 *H_210_NEH_633*	210-VI-NEH-633.26	Chapter26, Soil Engineering Gradation Design of Sand and Gravel Filters	May 2008
Hydraulic Engineering	Part 630 *H_210_NEH_5*	210-VI-NEH-5	Section 5, Hydraulics	May 2008
Hydraulic Engineering	Part 630 *H_210_NEH_11*	210-VI-NEH-11	Section 11, Drop Spillways	May 2008
Hydraulic Engineering	Part 630 *H_210_NEH_14*	210-VI-NEH-14	Section 14, Chute Spillways (incl. Amendment 1)	May 2008
ENGINEERING FIELD HANDBOOK **H_210_NEH_650**				
Hydrology	Part 650	210-VI-NEH650.11	Chapter 11, Ponds & Reservoirs	(Amend. 48) January 2012
Hydrology	Part 650	210-VI-NEH650.11	Chapter 6, Structures	(Amend. 48) January 2012

TECHNICAL RELEASES				
SUBJECT AREA	NRCS DIRECTIVE	OLD NRCS NO.	TITLE	VERSION/ RELEASE DATE
Dams	TR-210-18	TR-18	Computation of Joint Extensibility Requirements	(8/1/1969)
Dams	TR-210-56	TR-56	A Guide for Design and Layout of Vegetative Wave Protection for Earth Dam Embankments	(12/1/1974)
Dams	TR-210-60	TR-60	Earth Dams and Reservoirs	(7/1/2005)
Dams	TR-210-69	TR-69	Riprap for Slope Protection Against Wave Action	(2/1/1983)
Structural Engineering	TR-210-30	TR-30	Structural Design of Standard Covered Risers (including Notice TR 30-1)	(4/1/1965)
Hydrology	210-9-27	TR-210-20	Project Formulation Hydrology User Guide & Computer Program **WinTR-20, Version 1.11,** (3 MB) - WinTR-20 version 1.00	(7/2004) last updated 3/2009)
Hydrology	210-10-30	TR-210-55	Small Watershed Hydrology User Guide & Computer Program **WinTR-55, Version 1.00.09**	(1/2009)
		TR-210-55	Small Watershed Hydrology Windows 7 Version for 32 and 64 bit PCs **WinTR-55, Version 1.00.**10 (18.5 MB) -	last updated (2/7/2013) ***includes the NOAA 14 rainfall data**
TECHNICAL NOTES				
Soils Engineering	TN_210_SMN_03	SMN-3	Soil Mechanics Considerations for Embankment Drains	(05/1971)

TR-210 Engineering Technical Releases [May 2008]:
http://directives.sc.egov.usda.gov/24937.wba

___ K. **MARYLAND DEPARTMENT OF THE ENVIRONMENT**
(410-537-3543)
PUBLICATION LIST – JULY 2013 (underline items are available online)

QTY TOTAL	STORMWATER MANAGEMENT	COST
	1. 2000 Maryland Stormwater Design Manual, Vol. I & II (April 2000)	$25.00
	2. Model Stormwater Management Ordinance (July 2000)	$ 2.50
	3. Model Stormwater Management Municipal Resolution	N.C.
	4. Stormwater Management Guidelines for State & Federal Projects (Eff. 7/87 – Pending Jan.2001)	$ 1.00
	5. Maryland Dam Safety Manual (1996)	$10.00
	6. Stormwater Management in Maryland, An Administrative Evaluation of Local Programs (1992)	$ 2.50
	7. Financing Stormwater Management: The Utility Approach	$ 3.50
	8. Financing Stormwater Controls – Harford County (1991)	$ 2.50
	9. Financing Stormwater Controls – Cecil County (1991)	$ 2.50
	10. Financing Stormwater Controls – Carroll County (1991)	$ 2.50
	11. Potential Revenues from Stormwater Utilities (1991)	$ 2.50
	12. Sample Stormwater Utility Ordinance (1998)	$ 1.50
	13. A Survey of Stormwater Utilities (1988) & Update (1991)	N.C.
	14. "Financing Stormwater Management: Issues and Ideas"	N.C.
	15. "Nonpoint Source Pollution: The Cleanup Begins with You"	N.C.
	16. Results of the State of Maryland Infiltration Practices Survey (1987) & Update (1991)	$ 6.00
	17. Controlling Stormwater: Some Lessons from the Maryland Experience (1990)	$ 1.00
	18. Maryland's Stormwater Management Program (1988)	$ 1.00
	19. Design Procedures for Stormwater Management Extended Detention Structures (1987)	$ 1.00
	20. Design Procedure for Stormwater Management Detention Structures (1987)	$ 2.50
	21. Policy Guidelines for Controlling Stream Channel Erosion with Detention Structures (1987)	$ 3.50
	22. Guidelines for Constructing Wetland Stormwater Basins (1987)	$ 2.50
	23. Wetland Basins for Stormwater Treatment Discussion & Background (1987)	$ 9.00
	24. Maintenance of Stormwater Management Structures, A Departmental Summary (1986)	$ 3.00
	25. Infiltration as a Stormwater Management Component (1986)	$ 1.00
	26. Feasibility & Design of Wet Ponds to Achieve Water Quality Control (1986)	$ 2.50
	27. Minimum Water Quality Objectives & Planning Guidelines for Infiltration Practices (1986)	$ 2.50
	28. Inspector's Guidelines Manual for Stormwater Management Infiltration Practices (1985)	$ 4.00
	29. Standards & Specifications for Infiltration Practices (1984)	$12.00
	30. The Effects of Alternative Stormwater Management Design Policy on Detention Basins (1983)	$ 1.50
	31. Modeling Infiltration Practices Using the TR-20 Hydrologic Program (1983)	$ 1.50
		TOTAL DUE _____

N.C. (No Charge)

Mail Order Form & Check Payable to:
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Baltimore, MD 21230

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Under programs-click on **Sediment, Stormwater**
and Dam Safety
On left side of screen-click on **Publications List**

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Prince George's Soil Conservation District
5301 Marlboro Race Trace Road, Suite 100 - Upper Marlboro, MD 20772
Phone (301) 574-5162 – Fax (301) 574-5162

SMALL POND APPROVAL

7/2013

_____ SC#_____ P#_____
PROJECT NAME

As authorized by Section 5-503, Environment Article, Annotated Code of Maryland, the Prince George's Soil Conservation District hereby approves the plans and specifications for _____ _____, hereinafter referred to as Owner, to construct a pond located at _____.

This approval is issued under the following conditions and is subject to all laws, regulations, and criteria adopted by Maryland Department of the Environment (MDE) or the Prince George's Soil Conservation District. Non-compliance with these conditions shall be cause for withdrawal of our approval and notification to MDE:

1. The approval is valid only for use by the applicant and may not be transferred to another unless written approval for such transfer is obtained from PGSCD.
2. The approval shall be null and void if the construction under the approval has not begun within two years from the date of the approval except that this time limit may be extended at the discretion of PGSCD.
3. Construction shall be in strict accordance with USDA-Natural Resources Conservation Service criteria for pond construction and terms of this approval. The location, dimensions and type of all structures, as well as any excavation or filling shall be in accordance with the aforementioned plans submitted by the applicant, unless written approval for any proposed change is granted by PGSCD.
4. The owner, or the engineer, will notify PGSCD promptly in writing when construction is begun and when construction is completed.
5. The owner shall engage a registered professional engineer experienced and qualified in the field of dam design and construction and shall be designated as the engineer-in-charge. The project shall be constructed under the supervision of the engineer-in-charge. Within 30 days of the completion of construction, the engineer-in-charge that designed the structure shall provide PGSCD with an As-Built plan and shall certify, with the engineer's seal, that the pond was constructed as shown on the As-Built plans, unless written approval for any proposed change is granted by PGSCD.
6. It is the applicant's responsibility to develop and implement a plan to control erosion and sedimentation during pond construction. A grading, erosion and sediment control plan adhering to the PGSCD Erosion and Sediment Control Guidelines shall be approved in conjunction with the pond design plans. The approved plan shall be implemented prior to the start of construction.

_____ SC#_____ P#_____
NAME

7. The owner shall be responsible for operating and maintaining the pond in the approved completed condition so as to ensure proper functioning of the structure and protection of adjoining properties. (O & M plan is to be attached to this approval letter)

8. The owner is responsible for the safety of the dam, the necessary surveillance and inspections as detailed in the approved operation and maintenance plan. The owner shall promptly notify MDE or PGSCD of significant changes in conditions.

9. If the dam is not constructed, operated or maintained in full compliance with this approval, the owner shall remove or repair all or any part of the structure at the owner's sole cost and expense as may be directed by MDE or PGSCD.

ACCEPTANCE CLAUSE

1. This approval and its conditions are accepted.
2. Permission is hereby granted to representatives of PGSCD to enter in or upon the subject premises at any reasonable time for the purpose of conducting a preliminary feasibility investigation, observing construction progress and reviewing the completed structure.
3. Designate Engineer-in-charge below.

_____
Name (printed) Engineer-in-charge PE# Date

_____
Company

_____
Address Phone

Accepted
by:_____
Owner (Print Name) Date

_____
Owner (Signature)

_____
Address Phone

PRINCE GEORGE'S SOIL CONSERVATION DISTRICT

Supervisor:_____ _____
Signature Date

MD-ENG-14
(Rev. 10/2000)
Reference:
NRCS MD-378

U.S. Department of Agriculture
Natural Resources Conservation Service
POND SUMMARY SHEET

Note: This form to be used for NRCS Class "a" ponds only. Other ponds require permit from Maryland Department of Environment, Dam Safety Division

PROJECT INFORMATION

Project Name: _____
SCD File No: _____
Pond No: _____

Maryland Coordinates
(to nearest 1000 feet)
East _____
North _____
County _____
ADC Map/grid _____/_____

OWNERS INFORMATION

Name: _____
Address: _____
_____
City, State, Zip _____

TYPE OF POND: ☐Excavated
☐Embankment
☐Both

Drainage Area: _____ Acres
Surface Area: _____ Acres
Normal Depth: _____ Feet
Design Storm Frequency: _____ Years
Storage at Design High Water (DHW): _____ Ac-ft

PURPOSE OF POND (check all that apply)

☐Stormwater Management. – Wet	☐Sediment Control	☐Wetland Mitigation
☐Stormwater Management. – Dry	☐Livestock	☐Wildlife/Fish
☐Infiltration/Water Quality	☐Flood Control	☐Fire Control
☐Water Supply/Irrigation	☐Recreation	☐Other (specify below):
☐Sand & Gravel Wash Pond	☐Borrow Material	

EMBANKMENT

Top Elevation: _____ Feet..
Normal Pool Elevation: _____ Feet.
DHW Water Elevation: _____

Maximum Fill Height: _____Feet
Top Width: _____Feet
Side Slopes: U.S. _____ : 1
D.S. _____ : 1

Will embankment serve as a public roadway?

PRINCIPAL SPILLWAY

Barrel Size: _____Inches
Design Capacity at DHW: _____ Cfs

☐BCCMP ☐Alum (CAP) ☐RCP ☐PVC ☐Cast-in-Place Box Culvert

☐Weir ☐Channel ☐Other: _____

EMERGENCY SPILLWAY

Design Capacity at DHW: _____ Cfs
Velocity: _____ Ft/sec
Bottom Width: _____ Feet
Crest Elev: _____ Ft
Side Slope: _____ :1

Spillway Protection: ☐Grass ☐Riprap ☐Gabions ☐Other _____

DISTANCES BELOW POND TO

Property Line: _____ Feet
Public Road: _____ Feet

Soil Conservation District (Name): _____

District Manager Signature:_____Date:_____

The following line to be completed and form is to be resubmitted after As-Built certification has been accepted by the District.

Date As-Builts Accepted:_____ _____
District Representative Signature

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___ N. **OPERATION AND MAINTENANCE PLAN GUIDELINES**

___ 1. The following are items to be considered in the preparation of an Operation and Maintenance plan (O&M). These guidelines may be used as a standard O&M plan if deemed appropriate by the design engineer by checking boxes of applicable items, or may be used in the preparation of a custom O&M plan. O&M is to be designed to ensure that the facility continues to operate in a safe and effective manner and that problems are prevented or quickly identified and corrected. The O&M is to be in conformance with this document, NRCS MD 378, and the Maryland Dam Safety Manual published by the Maryland Department of the Environment.

___ 2. In general, operation items are required for the following major areas: support data, inspections, and emergency procedures. The maintenance items required cover the following major areas: embankment, reservoir, spillway and outlet works.

___ 3. **Operations**

___ a. Support Data

___ (1) Background Information – The owner should maintain a complete up-to-date "as-built" plan and design specifications for the dam. Also, a copy of the completed Small Pond Summary Sheet (MD-14) should be available.

___ (2) Record Keeping - Written records of maintenance and observations should be kept. Photographs are valuable for recording observations and changes.

___ b. Inspections

___ (1) Inspection Guidelines - Owners are to make a visual inspection at least twice a year – once in the summer after mowing, and once in the winter when the vegetative cover is dormant. Inspections are to be made after extreme rainfall events. Owners are encouraged to have an inspection by a registered professional engineer at least once every 5 years.

___ (2) Dam Inspection Checklist – Shall be included as part of the operation and maintenance plan and completed at least annually. See Appendix A of NRCS MD Standards and Specifications Pond (Code 378) for the check list.

___ c. Emergency Procedures

___ (1) Surveillance – Inspect daily or more often under adverse conditions of heavy or extended rainfall, flash flood warnings or snow melt. Inspect for overtopping failures, piping or seepage failures, and structural failures. If any of the following conditions are noted, emergency procedures are warranted: muddy water is flowing from the downstream slope or toe; cracks or depressions are forming on the embankment; or flood flow overtopping of the embankment is imminent.

___ (2) Mitigation – Provide for lowering the reservoir or sand bagging before overtopping. Action to be taken for piping includes lowering the pool and attempting to plug the upstream end with suitable material.

___ (3) Notification – Time permitting, consult a professional engineer experienced in dam design and operation to determine the extent of damage and necessary repairs. Before major repairs, contact Prince George's Soil Conservation District or WMA Dam Safety Division for approval. In the case of anticipated dam failure, the local fire and rescue or police department should be notified regarding the potential emergency. The ultimate responsibility for implementation of a warning plan that includes the danger reach rests with the dam owner.

___ 4. **Maintenance**

___ a. Embankment

___ (1) Vegetation – Proper vegetation is required on earth dams. The proper selection of grasses, seeding rates, planting dates and vegetation maintenance is available in MD NRCS Standards and Specifications for Critical Area Planting (MD-342).

___ (2) Trees and Brush – Trees and shrubs **will not** be allowed on the embankment. Trees that have been allowed to grow on the dam shall be removed. Stumps less than eight inches in diameter can be left in place if treated with a silvicide. All woody material greater than eight inches in diameter must be removed to about 30 inches below the ground surface.

___ (3) Mowing and Brush Removal – Mowing is necessary to control the establishment of woody growth and to maintain the vegetative cover. The embankment, a fifteen foot wide buffer strip adjacent to the toe, upstream and downstream of the embankment, and the area within 25 feet of the control structures need to be mowed. Mowing shall be done at least once per year (mid to late summer).

___ (4) Erosion and Slope Protection – The rate of erosion is directly related to the lack of vegetation. Prompt repair of eroded areas is required. Vegetation should be inspected in the early spring and late summer and any bare or eroded areas repaired and reseeded. Problem erosion areas of pedestrian traffic or abutment contacts should be controlled with filter cloth and rock rip rap. The upstream face of a dam can be protected from wave erosion by the same method.

___ (5) Seepage – Must be controlled in quantity and velocity to minimize damage to the dam. Regular monitoring to detect wet areas, "spring" flow, "piping" and "boils" on the downstream embankment should be done. Excessive seepage pressure can threaten the downstream slope stability. Seepage flow which is muddied by soil is evidence of "piping" and "boils". When this occurs complete failure may happen within hours and professional advice should be obtained immediately. Typical methods used to control the quantity of seepage are installation of an upstream blanket, or the installation of drainage trenches or drains. All of these designs must be approved by PGSCD before installation.

___ (6) Stability – Large cracks, slides, sloughing and excessive settlement are signs of embankment distress and indicate an embankment must be properly "keyed" into the base material. Repair of these conditions is not considered routine maintenance and must be approved by PGSCD.

___ (7) Rodent – Control of rodents such as beaver, groundhog And muskrats is required as they can damage the structural integrity and performance of the embankment and spillway. Groundhog and muskrat burrows serve as pathways for seepage. Beavers may plug the spillway and raise the pool level. Rodent removal and elimination of burrow are required where encountered.

___ (8) Crest of Dam – Should be graded to direct all surface drainage into the impoundment. Where access roads cross the dam any ruts that develop should be repaired as soon as possible.

___ b. Spillway and Outlet Works

___ (1) Conduits – All conduits should be inspected thoroughly once a year. Inspect for improper alignment (sagging), elongation and displacement at joints, cracks, leaks, surface wear, loss of protective coatings, corrosion and blockage.

___ (2) Trash Racks – The trash rack unit should be checked periodically and especially after storm events. Accumulated debris should be removed and maintenance performed if necessary. Under no circumstances should the trash rack be removed for an extended period. Annual maintenance for corrosion protection should be provided.

___ (3) Concrete – Surfaces should be inspected for cracking, spalling, displacement or movement, and deterioration by weathering, chemical reactions or leaching. Extensive cracking, slab or wall movement, large areas of exposed reinforcing steel and severe undermining require professional advice and PGSCD approval before repairs can be made. Minor repairs of patching, grouting, and coatings can be performed during routine maintenance.

___ (4) Vegetated Earth Spillways – An emergency spillway is designed to pass infrequent large flood flows around the dam to prevent overtopping. The vegetative cover should be maintained the same as the embankment to provide a vigorous grass cover. Prompt repair of erosion damage and removal of flow obstructions are required.

___ (5) Outlet – Erosion at the spillway outlet is a common maintenance problem. Severe undermining, displacement of pipes and dam failure can occur. Often the outlet is adequate for normal flow but not for extreme storm flows. Periodically, and especially after storm events, the stilling basin, plunge pool, or rip rap energy dissipater should be inspected. Provide prompt repair of damages.

___ (6) Drains/Mechanical Equipment – Drains should always be operable to provide draw down in the case of an emergency or for necessary repairs. The gate or valve controlling the drain should be operated fully at least once each year or as recommended by the manufacturer. It should be inspected and all appropriate parts lubricated and repaired before operation. Annual maintenance of metal operating mechanisms should be performed by keeping parts greased or painted to prevent corrosion. All equipment controls should be checked for proper security to prevent vandalism.

___ c. Reservoir

___ (1) Pool Level – When it is necessary to draw down the pool level, it should be done gradually to prevent slope failures. An annual inspection of the lake perimeter should be done. Potentially damaging fallen trees, debris and sediments should be removed. Periodic removal of floating debris to prevent clogging of the spillways should be done. During extended periods of severe freezing weather inspection for ice damage or ice formation at the spillways and outlets should be performed.

___ d. Additional Requirements

_____

_____

_____

_____

_____

Prepared by: _____

Engineer-in-charge Signature P.E.# Date

_____

Address Telephone #

Accepted by: _____

Owner Signature Date

_____

Address Telephone #

PGSCD: _____

Signature Date

___ 5. **Dam Inspection Checklist**

___ a. To help the dam owner perform periodic safety inspections of the structure, a checklist is provided. Each item of the checklist should be completed. **Repair** is required when obvious problems are observed. **Monitoring** is recommended if there is potential for a problem to occur in the future. **Investigation** is necessary if the reason for the observed problem is not obvious.

___ b. A brief description should be made of any noted irregularities, needed maintenance, or problems. Abbreviations and short descriptions are recommended. Space at the bottom of the form should be used for any items not listed.

___ c. The following chart may be used as a guide by the dam owner in determining the frequency of inspections for the dam. Each program is dependent on the particular condition of the dam. The WMA Dam Safety Division is available to assist owners in tailoring a program for their facility.

DAM_____ DATE_____
OWNER_____ WEATHER_____
INSPECTED BY_____ POOL LEVEL_____

Item	Comments	Y/N	MONITOR	REPAIR	INVESTIGATION
1. CREST					
a. Visual settlement?					
b. Misalignment?					
c. Cracking?					
2. UPSTREAM SLOPE					
a. Erosion?					
b. Ground cover in good condition?					
c. Trees, shrubs, or other woody vegetation?					
d. Longitudinal/Vertical cracks?					
e. Adequate riprap protection?					
f. Stone deterioration?					
g. Settlements, depressions, or bulges?					
3. DOWNSTREAM SLOPE					
a. Erosion?					
b. Ground cover in good condition?					
c. Trees, shrubs, or other woody vegetation?					
d. Longitudinal/Vertical cracks?					
e. Riprap protection adequate?					
f. Settlements, depressions, or bulges?					
g. Soft spots or boggy areas?					
h. Movement at or beyond toe?					
i. Boils at toe?					
4. DRAINAGE-SEEPAGE CONTROL					
a. Internal drains flowing?	Est. Left____gpm Est. Right ____gpm				
b. Seepage at toe?	Estimated _____gpm				
c. Does seepage contain fines?					

INSPECTION CHECKLIST – PAGE 2 **INSPECTED BY _____ DATE_____**		Y / N	MONITORING	REPAIR	INVESTIGATION
Item	Comments				
5. ABUTMENT CONTACTS					
a. Erosion?					
b. Differential movement?					
c. Cracks?					
d. Seepage?	Estimated _____ gpm				
e. Adequate erosion protection for ditches?					
6. INLET STRUCTURE	Concrete or Metal Pipe (circle one)				
a. Seepage into structure?					
b. Debris or obstruction?					
c. If concrete, do surfaces show:					
1. Spalling?					
2. Cracking?					
3. Erosion?					
4. Scaling?					
5. Exposed reinforcement?					
6. Other?					
d. If metal, do surfaces show:					
1. Corrosion?					
2. Protective Coating deficient?					
3. Misalignment or split seams?					
e. Do the joints show:					
1. Displacement or offset?					
2. Loss of joint material?					
3. Obstructed?					
f. Are the trash racks:					
1. Broken or bent?					
2. Corroded or rusted?					
3. Obstructed?					
4. Operational?					
g. Sluice/Drain gates:					
1. Broken or bent?					
2. Corroded or rusted?					
3. Leaking?					
4. Not seated correctly?					
5. Periodically maintained?					
6. Operational?					

INSPECTION CHECKLIST – PAGE 3

INSPECTED BY _____ DATE_____

Item	Comments	Y/N	MONITOR	REPAIR	INVESTIGATION
7. PRINCIPAL SPILLWAY PIPE	Concrete or Metal Pipe (circle one)				
a. Seepage into conduit?					
b. Debris Present?					
c. Do concrete surfaces show:					
1. Spalling?					
2. Cracking?					
3 Erosion?					
4. Scaling?					
5. Exposed reinforcement?					
6. Other?					
d. Do the joints show:					
1. Displacement or offset?					
2. Loss of joint material?					
3. Leakage?					
8. STILLING BASIN/POOL	Riprap or Concrete (circle one)				
a. If concrete, condition of surfaces?					
b. Deterioration or displacement of joints?					
c. Outlet channel obstructed?					
d. Is released water:					
1. Undercutting the outlet?					
2. Eroding the embankment?					
3. Displacing riprap?					
4. Scouring the plunge pool?					
e. Tailwater elevation and flow condition?					
9. EMERGENCY SPILLWAY					
a. Is the channel:					
1. Eroding or backcutting?					
2. Obstructed?					
b. Trees or shrubs in the channel?					
c. Seepage present?					
d. Soft spots or boggy areas?					
e. Channel slopes eroding or sloughing?					
10. RESERVOIR					
a. High water marks?					
b. Erosion/Slides into pool area?					
c. Sediment accumulation?					
d. Floating debris present?					
e. Adequate riprap protection for ditches?					

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SECTION VIII

PRINCE GEORGE'S
SOIL CONSERVATION DISTRICT

POND MD-378

USDA
NATURAL RESOURCES
CONSERVATION SERVICE
MARYLAND

CONSERVATION PRACTICE
STANDARD

POND

CODE 378
(Reported in No.)

DEFINITION

A water impoundment made by constructing a dam or an embankment or by excavating a pit or dugout.

In this standard, ponds constructed by the first method are referred to as embankment ponds, and those constructed by the second method are referred to as excavated ponds. Ponds constructed by both excavation and the embankment methods are classified as embankment ponds if the depth of water impounded against the embankment at the principal spillway storm design high water elevation is 3 feet or more (See Table 1).

This 3 feet shall be measured from the low point on the upstream toe of the embankment to the design high water.

PURPOSE

To provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard spraying, and other related uses, and to maintain or improve water quality. This standard also applies to stormwater management ponds.

CONDITIONS WHERE PRACTICE APPLIES

General - This practice applies where it is determined that stormwater management, water supply, or temporary storage is justified and it is feasible and practicable to build a pond which will meet local and state law requirements.

This standard establishes the minimum acceptable quality for the design and construction of ponds if:

1. Failure of the dam will not result in loss of life; in damage to homes, commercial or industrial buildings, main highways, or railroads; or interruption of the use or service of public utilities.

2. The product of the storage times the effective height of the dam is less than 3,000. Storage is the volume, in acre-feet, in the reservoir below the elevation of the crest of the emergency spillway.

   The effective height of the dam is the difference in elevation, in feet, between the emergency spillway crest and the lowest point on a profile taken along the centerline of the dam, excluding the cutoff trench. If there is no emergency spillway, the top of the dam becomes the upper limit for determining the storage and the effective height.

3. For dams in rural areas, the effective height of the dam (as defined above) is 35 feet or less and the dam is hazard class "a". For dams in urban areas, the effective height of the dam is 20 feet or less and the dam is hazard class "a".

Ponds exceeding any of the above conditions shall be designed and constructed according to the requirements of Technical Release 60.

Exemptions - Soil Conservation District small pond approval is not required for small class "a" structures where the following exists:

1. Ponds or other structures have less than four (4) feet of embankment, or

2. The storage at emergency spillway design high water elevation according to Table 1 does not exceed 40,000 cubic feet, and the

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service

height of the embankment is 6 feet or less.

The height of the embankment shall be measured from the top of the dam to the lowest point of excavation, excluding the cutoff trench, along the centerline of the dam.

In addition, an embankment pond that meets the criteria below shall be considered an excavated pond and is also exempt from small pond approval.

1. The calculation of 10H+20=L, where H=height from the pond bottom to the top of the dam, is provided, and

2. The projection of L horizontally downstream from the pond bottom is below the existing or proposed ground, and

3. The existing or proposed downstream ground slope within the projection of L is less than 10% at any point.

The review and design of such class "a" structures shall be based on sound engineering judgment assuring a stable outfall for the ten (10) year, 24-hour storm event.

Site Conditions - Site Conditions shall be such that runoff from the design storm can be safely passed through (1) a natural or constructed emergency spillway, (2) a combination of a principal spillway and an emergency spillway, or (3) a principal spillway.

Drainage Area - The drainage area above the pond must be protected against erosion to the extent that expected sedimentation will not shorten the planned effective life of the structure.

For ponds whose primary purpose is to trap sediment for water quality, adequate storage should be provided to trap the projected sediment delivery from the drainage area for the life of the pond.

If the intent is to maintain a permanent pool, the drainage area should be at least 4 acres for each acre-foot of permanent storage. These recommendations may be reduced if a dependable source of ground water or diverted surface water contributes to the pond. The water quality shall be suitable for its intended use.

Soils Investigation - A soils investigation is required on all ponds. As a minimum it shall include information along the centerline of the proposed dam, in the emergency spillway location, and the planned borrow area. The type of equipment used and the extent of the investigation will vary from site to site. All investigations shall be logged using the Unified Soil Classification System.

Road Embankments - Where road embankments are being designed to impound a specific volume of water, either as a permanent pool or temporary stormwater storage, special design and evaluation criteria may be required as determined by Appendix B.

CONSIDERATIONS

Water Quantity - The following items should be considered for water quantity:

1. Effects upon components of the water budget, especially effects on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

2. Variability of effects caused by seasonal or climatic changes.

3. Effects on the downstream flows or aquifers that could affect other water uses or users.

4. Potential for multiple use.

5. Effects on the volume of downstream flow to prohibit undesirable environmental, social or economic effects.

Water Quality - The following items should be considered for water quality:

1. Effects on erosion and the movement of sediment, pathogens, and soluble and sediment attached substances that are carried by runoff.

2. Effects on the visual quality of on-site and downstream water resources.

3. Short-term and construction-related effects of this practice on the quality of downstream water courses.

4. Effects of water level control on the temperatures of downstream waters to prevent undesired effects on aquatic and wildlife communities.

5. Effects on wetlands and water-related wildlife habitats.

6. Effects of water levels on soil nutrient processes such as plant nitrogen use or denitrification.

7. Effects of soil water level control on the soil chemistry, soil water, or downstream water.

8. Potential for earth moving to uncover or redistribute sulfidic bearing soils.

CRITERIA

Embankment Ponds

Structure Hazard Classification - Documentation of the classification of dams is required. Documentation is to include but is not limited to location and description of dam, configuration of the valley, description of existing development (houses, utilities, highways, railroads, farm or commercial buildings, and other pertinent improvements), potential for future development, and recommended classification. It is also to include results obtained from breach routings, if breach routings are used as part of the classification process. The class ("a", "b", and "c") as contained in this document is related to the potential hazard to life and property that might result from a sudden major breach of the earth embankment. Structure classification and land use for runoff determination must take into consideration the anticipated changes in land use throughout the expected life of the structure. The classification of a dam is the responsibility of the designer, and subject to review and concurrence of the approving authority.

The classification of a dam is determined only by the potential hazard from failure, not by the criteria. Classification factors in the National Engineering Manual, as supplemented, are given below:

Class "a" - Structures located in rural, agricultural or urban areas dedicated to remain in flood tolerant usage where failure may damage non-inhabited buildings, agricultural land, floodplains or county roads.

Class "b" - Structures located in rural, agricultural, or urban areas where failure may damage isolated homes, main highways or minor railroads or cause interruption of use or service of relatively important public utilities.

Class "c" - Structures located where failure may cause loss of life or serious damage to homes, industrial and commercial buildings, important public utilities, main highways, or railroads.

"Rural areas" is defined as those areas in which residents live on farms, in unincorporated settlements, or in incorporated villages or small towns. It is where agriculture, including woodland activities, and extractive industries, including seafood harvesting, provides the primary employment base for residents and where such enterprises are dependent on local residents for labor.

Non-rural areas shall be classified as urban.

Peak Breach Discharge Criteria - Breach routings are used to help delineate the area potentially impacted by inundation should a dam fail and can be used to aid dam classification. The breach hydrograph is the outflow hydrograph attributed to the sudden release of water in reservoir storage. This is due to a dam breach during non-storm conditions.

Stream routings made of the breach hydrograph are to be based upon topographic data and hydraulic methodologies mutually consistent in their accuracy and commensurate with the risk being evaluated.

The minimum peak discharge of the breach hydrograph, regardless of the techniques used to analyze the downstream inundation area, is as follows:

$Q_{max} = 3.2\ H_w^{2.5}$ where,

Q_{max} = the peak breach discharge, cfs.

H_w = depth of water at the dam at the time of failure, feet. This is measured to the crest of the emergency spill-

way or to design high water, if no emergency spillway exists. Use "nonstorm" conditions downstream of the dam.

Where breach analysis has indicated that only overtopping of downstream roads will occur, the following guidelines will be used:

Class	Depth of Flow (d) ft.
"a"	d≤1.5
"b" & "c"	d>1.5

Use and importance of the roadway shall be considered when making a classification.

Hydrology - Principal and emergency spillways will be designed within the limitations shown on TABLE 1. The storm duration used shall be 24 hours except where TR-60 is specified. The pond shall be designed to safely pass the base flow along with volume and peak rates of runoff from design storms, specified in Table 1. All storm water management ponds shall be designed using urban criteria. This can be done by using principal and emergency spillways. The following shall be used to determine runoff rates and volumes:

1. NRCS "Engineering Field Handbook, Part 650" or;
2. NRCS, NEH, Section 4, Hydrology" or;
3. NRCS, TR-55, "Urban Hydrology for Small Watersheds" or;
4. NRCS, TR-20, "Computer Program for Project Formulation" or,
5. Computer programs using NRCS hydrology methods with identifiable inputs and outputs as approved by the reviewing agency.

Earth Embankment

Top Width - The minimum top width of the dam is shown in Table 2. When the embankment top is to be used as a public road, the minimum width is to be 16 feet for one-way and 26 feet for two-way traffic. If the embankment is to be used for infrequent vehicle crossings, the minimum top width shall be 10 feet. Guardrails or other safety measures are to be used where necessary and are to meet the requirements of the responsible road authority.

Side Slopes - The combined upstream and downstream side slopes of the settled embankment shall not be less than five horizontal to one vertical (5:1) with neither slope steeper than 2:1. If the dam is used as a road crossing with a top width greater than 26 feet, then the combined side slopes of the settled embankment shall not be less than 4 horizontal to one vertical (4:1) with neither slope steeper than 2:1. Slopes must be designed to be stable in all cases, even if flatter side slopes are required.

Earth Cuts - If cuts in an existing fill or in natural ground are required for the rehabilitation of an existing pond spillway or the construction of a new pond, the slope of the bonding surfaces between the existing material in place and the fill to be placed shall not be steeper than a ratio of two horizontal to one vertical (2:1).

Foundation Cutoff - A cutoff trench of relatively impervious material shall be provided under the entire length of the dam and shall be located at or upstream from the centerline of the dam. The cutoff trench shall have a bottom width adequate to accommodate the equipment used for excavation, backfill and compaction operations, with the minimum width being 4 feet, and shall have side slopes no steeper than one horizontal to one vertical. Minimum depth shall be 4 feet.

Impervious Core - Any impervious core within the embankment shall be located at or upstream from the centerline of the dam, and shall extend up the abutments to the 10-year water surface elevation. The impervious core shall extend vertically from the cutoff trench up to the 10-year water surface elevation throughout the embankment.

Seepage Control - Seepage control is to be included: (1) if pervious layers are not intercepted by the cutoff; (2) if seepage from the abutments may create a wet embankment; (3) if the phreatic line intersects the downstream slope; or (4) if special conditions require drainage to insure a stable dam. The phreatic line shall be drawn on a 4:1 slope starting on the inside slope at the

normal pool elevation. For stormwater management ponds, normal pool shall be considered as the 10-year water surface elevation.

Seepage may be controlled by (1) foundation abutment or embankment drains; (2) reservoir blanketing; or (3) a combination of these measures. Foundation drains may control seepage encountered in the cutoff trench during construction. These drains must be located downstream of the dam centerline and outside the limits of the proposed cutoff trench. All drains must be designed according to the section Principal Spillway, *Conduit Piping and Seepage Control*.

Wave Erosion Protection - Where needed to protect the face of the dam, special wave protection measures such as a bench, rock riprap, sand-gravel, soil cement or special vegetation shall be provided. (Reference NRCS Technical Releases 56 & 69)

Freeboard - The top elevation of the settled embankment shall be determined in accordance with minimum criteria established in Table 1

Allowance for Settlement - The design height of the dam shall be increased by the amount needed to insure that the design top of fill elevation will be maintained after all settlement has taken place. This increase shall not be less than 5 percent, except where detailed soil testing and lab analyses indicate a lesser amount is adequate.

Principal Spillway

Capacity - A conduit, with needed appurtenances, shall be placed under or through the dam, except where a weir type structure is used. The minimum capacity of the principal spillway shall be that required in Table 1.

Crest Elevation of Inlet - The crest elevation of the principal spillway shall be no less than 1.0 foot below the crest of the emergency spillway. The crest elevation is the invert elevation of the lowest opening 6 inches or larger in any direction.

The inlet or riser size for the pipe drops shall be such that the flow through the structure goes from weir-flow control to pipe-flow control without going into orifice-flow control in the riser. The inlets and outlets shall be designed and analyzed to function satisfactorily for the full range of flow and hydraulic head anticipated.

The riser shall be analyzed for flotation assuming all orifices and pipes are plugged. The factor of safety against flotation shall be 1.2 or greater.

Pipe Conduits - Pipe conduits under or through the dam shall meet the following requirements:

1. All pipes shall be circular in cross section except for cast-in-place reinforced concrete box culverts.

2. Pipe shall be capable of withstanding the external loading without yielding, buckling, or cracking.

3. Pipe strength shall be not less than those shown on Tables 3, 4 and 5 for corrugated steel, aluminum, and plastic pipes and applicable ASTM's for other materials.

4. Where inlet or outlet flared sections are used, they shall be made from materials compatible with the pipe.

5. All pipe joints shall be made watertight by the use of flanges with gaskets, coupling bands with gaskets, bell and spigot ends with gaskets, or by welding. See Construction Specifications for details.

6. The joints between sections of pipe shall be designed to remain watertight after joint rotation and elongation caused by foundation consolidation.

The capacity of the pipe conduit shall be adequate to discharge long duration, continuous or frequent flows without flow through the emergency spillway. The diameter of the pipe shall be not less than 6 inches.

For dams 20 feet or less in effective height, the following pipe materials are acceptable: cast-iron, ductile iron, steel, corrugated steel or aluminum, concrete with rubber gaskets, plastic, and cast-in-place reinforced concrete box culverts. Plastic pipe that will be exposed to direct sunlight should be made of ultraviolet resistant materials and protected by coating or shielding. Connections of pipe to less flexible pipe or struc-

tures must be designed to avoid stress concentrations that could rupture the pipe.

For dams over 20 feet in effective height, conduits are to be reinforced concrete pipe, cast-in-place reinforced concrete box culverts, corrugated steel, ductile iron, welded steel or aluminum pipe. The maximum height of fill over any principal spillway steel, aluminum, or plastic pipe must not exceed 25 feet.

Concrete pipe shall have a concrete cradle extending up the sides of the pipe at least 50% of its outside diameter with minimum thickness of 6 inches. Where a concrete cradle is not needed for structural reasons, flowable fill may be used as described in the CONSTRUCTION SPECIFICATIONS section of this standard. Gravel bedding is not permitted. Cantilever outlet sections, if used, shall be designed to withstand the cantilever load. Pipe supports shall be provided when needed. Other suitable devices such as plunge basin, stilling basin, impact basin, or rock riprap spreader should be used to provide a safe outlet. Cathodic protection is to be provided for welded steel and corrugated steel pipe where the need and importance of the structure warrant. Cathodic protection should normally be provided for corrugated steel pipe where the saturated soil resistivity is less than 4,000 ohms-cm or the pH is lower than 5. The National Handbook of Conservation Practices, Irrigation Water Conveyance, Steel Pipeline Standard (430-FF), provides criteria for cathodic protection of welded steel pipes.

Multiple Conduits - Where multiple conduits are used, there shall be sufficient space between the conduits and the installed anti-seep collars to allow for backfill material to be placed between the conduits by the earth moving equipment and for easy access by hand operated compaction equipment. This distance between conduits shall be equal to or greater than half the pipe diameter but not less than 2 feet.

Conduit Piping and Seepage Control - Seepage along pipe conduit spillways extending through the embankment shall be controlled by use of (1) anti-seep collars, or (2) filter and drainage diaphragm. Seepage control will not be required on pipes 6 inches in diameter or less.

Anti-seep collars shall be installed around all conduits through earth fills according to the following criteria:

1. Sufficient collars shall be placed to increase the seepage length along the conduit by a minimum of 15 percent of the pipe length located within the saturation zone.

2. The assumed normal saturation zone shall be determined by projecting a line at a slope (4) horizontal to (1) vertical from the point where the normal water elevation meets the upstream slope to a point where this line intersects the invert of the pipe conduit or bottom of the cradle, whichever is lower. For Stormwater Management ponds, the phreatic line starting elevation shall be the 10-year water elevation.

3. Maximum collar spacing shall be 14 times the required projection above the pipe. The minimum collar spacing shall be 5 times the required minimum projection.

4. Anti-seep collars should be placed within the saturated zone. In cases where the spacing limit will not allow this, at least one collar will be in the saturated zone.

5. All anti-seep collars and their connections to the conduit shall be watertight and made of material compatible with the conduit.

6. Collar dimensions shall extend a minimum of 2 feet in all directions around the pipe.

7. Anti-seep collars shall be placed a minimum of two feet from pipe joints except where flanged joints are used.

8. For pipes with concrete cradles, the projection shall be measured from the cradle.

Filter and drainage diaphragms are always recommended, but are required when the following conditions are encountered:

1. The pond requires design according to TR-60.

2. Embankment soils with high piping potential such as Unified Classes GM, SM, and ML.

Filter and drainage diaphragms shall be designed in accordance with procedures from NRCS TR-60, Earth Dams and Reservoirs, Section 6, Principal Spillways, as described below.

The drainage diaphragm shall usually consist of sand, meeting the fine concrete aggregate requirements (ASTM C-33). A design analysis shall be made using Part 633 of the National Engineering Manual, Chapter 26, Gradation Design of Sand and Gravel Filters.

The drainage diaphragm shall be a minimum of 3 ft thick and extend vertically upward and horizontally at least three times the conduit outside diameter or the width of the cradle, whichever is greater except that:

1. The vertical extension need be no higher than the maximum potential reservoir water level, and

2. The horizontal extension need be no further than 5 feet beyond the sides and slopes of any excavation made to install the conduit.

3. The minimum soil cover over any portion of the filter-drainage diaphragm measured normal to the nearest embankment surface shall be at least 2 feet.

It shall extend vertically downward at least 2 ft beneath the conduit outside diameter or bottom of the cradle, whichever is greater. The drainage diaphragm shall be located immediately downstream of the cutoff trench, approximately parallel to the centerline of the dam but no further upstream than the centerline of the dam.

The drainage diaphragm shall outlet at the embankment downstream toe, preferably using a drain backfill envelope continuously along the pipe to where it exits the embankment. Protecting drain fill from surface erosion will be necessary.

It is required that the outlet for the filter diaphragm is sized to safely discharge the design flow. Where a drain backfill envelope is used as the outlet, it is recommended that it be designed so the hydraulic head does not exceed the depth of the drain outlet. The exposed area of the drain outlet must also be protected from external attack such as surface erosion and slope instability due to horizontal seepage pressures. A weighted toe cover such as riprap can be effective if protected with a properly designed filter between the sand drain material and the riprap cover.

If pipe drain outlets are used, consideration must be given to the structural design of the conduit in resisting external loading and the design life of the pipe must be consistent with the design life of the dam and physical conditions of the site. Also, the pipe must be designed for capacity and size of perforations as outlined in NEH Part 633, Chapter 26 and Soil Mechanics Note 3. If the pipe corrodes, is crushed by exterior loading, or is otherwise damaged, the outlet of the filter diaphragm is lost and a piping failure may occur.

The design quantity (Q) used to size the outlet can be calculated by Darcy's Law, $Q = kiA$ where:

k = permeability of the embankment or drain outlet material (ft/day)

i = hydraulic gradient where $i = h/l$

h = head differential (ft)

l = seepage path (ft)

A = area of flow (diaphragm or outlet) (ft^2)

Anti-vortex Devices - Drop inlet spillways are to have adequate anti-vortex devices. Splitter type anti-vortex devices shall be placed in line with the barrel. An anti-vortex device is not required if weir control is maintained in the riser through all flow stages.

Trash Racks - All pipe and inlet structures shall have a trash rack. Openings for trash racks shall be no larger than 1/2 of the barrel conduit diameter, but in no case less than 6 inches.

Flush grates for trash racks are not acceptable. Inlet structures that have flow over the top shall have a non-clogging trash rack such as a hood-type inlet extending a minimum of 8 inches below the weir openings, which allows passage of water from underneath the trash rack into the riser.

For inlet structures with solid covered tops, the bottom of the cover slab must be set at an eleva-

tion to prevent orifice flow control before pipe flow control governs.

Low stage releases, where the opening is larger than 6 inches, shall have a non-clogging trash rack with openings no larger than half the low flow dimension.

For all low stage releases 6 inches or smaller in any direction, the emergency spillway design storm shall be routed assuming the release has failed, using storage and discharge only above the elevation of the next opening larger than 6 inches in all directions. This design storm routing shall not overtop the dam.

Drain Pipe - A pipe with a suitable valve shall be provided to drain the pool area, where needed for proper pond management. The principal spillway conduit may serve as a pond drain, when so located, to accomplish this function.

Water Supply Pipes or Utilities - All pipes through the dam shall have an inside diameter of not less than 1 1/4 inches. Pipes / utilities not parallel to the axis of the dam shall meet all principal spillway requirements (i.e. filter diaphragm, embankment soils, etc.). Pipes / utilities parallel to the axis of the dam shall be constructed with no granular bedding.

Earth Emergency Spillways

Emergency spillways are provided to convey large flood flows safely past earth embankments. An emergency spillway must be provided for each dam, unless the principal spillway is large enough to pass the routed design hydrograph peak discharge and any trash without overtopping the dam. The only design that may be utilized without an emergency spillway is: a principal spillway with a cross-sectional area of 3 square feet or more and an inlet that will not clog, such as a hood-type inlet which allows passage of water from underneath the trash rack into the riser.

Capacity - The minimum capacity of emergency spillways shall be that required to pass the peak flow expected from a design storm of the frequency and duration shown in Table 1 less any reduction creditable to conduit discharge and detention storage.

The emergency spillway shall (1) safely pass the storm design peak or (2) the storm runoff shall be routed through the reservoir. The routing shall start with the water surface at the elevation of the crest of the principal spillway, or at the water surface after 10 days drawdown, whichever is higher. The 10-day drawdown shall be computed from the crest of the emergency spillway or from the elevation that would be attained had the entire design storm been impounded, whichever is lower. Emergency spillways are to provide for passage of the design flow at a non-erosive velocity to a point downstream where the dam will not be endangered.

Component Parts - Earth spillways are open channels and usually consist of an inlet channel, level section, and an exit channel. The minimum difference in elevation between the crest of the emergency spillway and the settled top of dam shall be 2.0 feet.

Cross-Section - Earth spillways shall be trapezoidal and shall be located in undisturbed earth. The side slopes shall be stable for the material in which the spillway is to be constructed, but not steeper than 2:1. The emergency spillway shall have a bottom width of not less than 8 feet.

The inlet channel may be curved to fit existing topography; however, it should be flared to allow unrestricted flow to the level section. The level section should be located as near the centerline of dam as possible. The level section shall be 25 feet in length, and shall be rectangular or square.

Exit channel centerline shall be perpendicular to the level section downstream edge and must be straight for a distance beyond the downstream toe, so that discharges will not reach the earth embankment. The grade of the exit channel shall fall within the range established by discharge requirement and permissible velocities.

The crest of any "token" spillway will be located at or above the 100-year storm elevation in undisturbed earth and have a minimum depth of one foot and bottom width of 8 feet.

Permissible Velocities - Earth spillways shall be designed for non-erosive velocities through the control section and to a point downstream where the dam will not be endangered. The maximum permissible velocity for the grass and grass mix-

ture to be used shall be selected from Table 6. Velocities exceeding these values will require use of linings other than vegetation.

Infiltration / Water Quality Basins – Ponds, either excavated or embankment, that are designed solely for infiltration or as water quality basins will have an emergency spillway. The capacity of the spillway will be determined by the following procedure:

Pass the routed 100-Year Storm with 1 foot of freeboard to the top of dam elevation. Routing will begin at the emergency spillway crest.

Structural Emergency Spillways

Chutes or drops, when used for principal spillways or principal-emergency or emergency spillways, shall be designed in accordance with the principals set forth in the National Engineering Handbook, Section 5 "Hydraulics"; Section 11 "Drop Spillways"; and Section 14 "Chute Spillways". The minimum capacity of a structural spillway shall be that required to pass the peak flow expected from a design storm of the frequency and duration shown in Table 1 less any reduction creditable to conduit discharge and detention storage.

Visual Resource Design

The visual design of ponds shall be carefully considered in areas of high public visibility and those associated with recreation. The underlying criterion for all visual design is appropriateness. The shape and form of ponds, excavated material, and plantings are to relate visually to their surroundings and to their functions.

The embankment may be shaped to blend with the natural topography. The edge of the pond should be shaped so that it is generally curvilinear rather than rectangular. Excavated material shall be shaped so that the final form is smooth, flowing, and fitting to the adjacent landscape rather than angular geometric mounds. If feasible, islands may be added for visual interest and to attract wildlife.

Trees and Shrubs

Non-Roadway Embankments - Trees and/or shrubs will not be allowed on any embankment, will not be allowed within the buffer zone (15 feet from the toe of the dam), and will not be allowed within a 25-foot radius around the inlet structure.

Roadway Embankments - Trees and/or shrubs will not be allowed on any embankment, except for dry stormwater management structures that will be utilized as a roadway under all the following conditions:

1. Plantings may only be on top of the dam along the roadway and/or sidewalks.
2. The top of the dam shall have a minimum of 50-foot top width.
3. Plantings will not be allowed on the side slopes of the embankment.
4. Plantings will not be allowed within the buffer zone (15 feet from the toe of the dam).
5. Plantings will only be shallow rooted (roots less than 3' deep) trees or shrubs.
6. The pond is a "dry" structure (normal pool not exceeding 18 inches).
7. A landscape plan showing type and location of planting must be prepared by a Landscape Architect certifying shallow rooted plants (roots less than 3' deep) under mature conditions.
8. A minimum of 3 feet freeboard above the 100-year water surface elevation must be maintained.
9. The structure is a low hazard (Class "a") pond.

Safety

Special considerations should be made for safety and access during the design of a pond. Measures to be considered may include fencing, slope benching, access roads, flattened side slopes, etc. When fencing a structure, the fence will be located so it will not interfere with the operation of the emergency spillway.

Excavated Ponds

General - Excavated ponds that create a failure potential through a constructed or created embankment will be designed as embankment ponds. Excavated ponds that include a pipe or weir outlet control system for urban stormwater management shall be designed using the principal and emergency spillway hydrologic criteria for Embankment Ponds, Table 1.

Side Slopes - Side slopes of excavated ponds shall be such that they will be stable and shall not be steeper than 1 horizontal to 1 vertical. Flatter slopes are to be utilized where safety for children, livestock watering, etc. is a design factor.

Perimeter Form - Where the structures are used for recreation or are located in high public view, the perimeter or edge should be shaped to a curvilinear form.

Inlet Protection - When the excavated pond is a bypass type and water is being diverted from a stream, the minimum size inlet line shall be a 4-inch diameter pipe. All state laws concerning water use and downstream rights shall be strictly adhered to.

Where surface water enters the pond in a natural or excavated channel, the side slope of the pond shall be protected against erosion.

Outlet Protection – An excavated pond with a low embankment (combination excavation / embankment pond) shall be designed to ensure a stable outfall for the 10-year, 24-hour frequency storm.

Placement of Excavated Material - The material excavated from the pond shall be placed in one of the following ways so that its weight will not endanger the stability of the pond side slopes and where it will not be washed back into the pond by rainfall:

1. Uniformly spread to a height not exceeding 3 feet with the top graded to a continuous slope away from the pond;

2. Uniformly placed or shaped reasonably well with side slopes no steeper than 2 to 1. The excavated material will be placed at a distance equal to the depth of the pond, but not less than 12 feet from the edge of the pond;

3. Shaped to a designed form that blends visually with the landscape;

4. Used for low embankment and leveling; or

5. Hauled away.

Reservoir Area for Wet Ponds

For most ponds, the topography of the site shall permit storage of water at a depth and volume that ensures a dependable supply, considering beneficial use, sedimentation, season of use, and evaporation and seepage losses. Soils in the reservoir shall be impervious enough to minimize seepage losses or shall be of a type that sealing is practical.

Excavation and shaping required to permit the reservoir area to suitably serve the planned purpose shall be included in the construction plans.

Reservoirs designed specifically for fish production or wildlife management shall follow design criteria in the standards and specifications for Fish Pond Management (MD-399) and Wildlife Wetland Habitat Management (MD-644), as appropriate.

TABLE 1

HYDROLOGIC CRITERIA FOR PONDS

Structure Class	Storage Height Product[1]	Watershed Area (Acres)	Height To Emergency Spwy Crest (Feet)	Normal Surface Area (Acres)	Spillway Capacity[5]				Freeboard[6] Rural & Urban
					Principal[2]		Emergency[3, 4]		
					Rural	Urban	Rural	Urban	
"c" & "b"	Any	Any	Any	Any	TR 60	TR 60	TR 60	TR 60	TR 60
"a"	3,000 or more	Any	Any	Any	TR 60	TR 60	TR 60	TR 60	TR 60
"a"	Less than 3,000	320 and Larger	>20 - 35	≥12	25 YR	TR 60	100 YR	100 YR	2.0' above E.S. Design Storm
			≤20	≥12	10 YR	25 YR	100 YR	100 YR	
			<15	<12	5 YR	10 YR	50 YR	100 YR	
		100 to 320	>20 - 35	≥12	10 YR	TR 60	100 YR	100 YR	2.0' above E.S. Design Storm
			≤20	≥12	5 YR	10 YR	50 YR	100 YR	1.0' above E.S. Design Storm
			<15	<12	2 YR	5 YR	25 YR	100 YR	1.0' above E.S. Design Storm
		Less Than 100	>20 - 35	≥12	5 YR	TR 60	50 YR	100 YR	1.0' above E.S. Design Storm
			≤20	≥12	2 YR	5 YR	25 YR	100 YR	
			<15	<12	10% of 25 YR Peak	5 YR	25 YR	100 YR	

NOTES

1) The storage is defined as the original capacity of the reservoir in acre-feet at the elevation of the crest of the emergency spillway. The effective height is the difference in elevation in feet between the emergency spillway crest and the lowest point on a profile taken along the centerline of the dam, excluding the cutoff trench. If there is no emergency spillway, this height shall be to the top of the dam.

2) Principal - minimum storm to be contained below the crest of the emergency spillway including any combination of temporary storage and principal spillway discharge.

3) Emergency - minimum storm used to proportion the emergency spillway to meet the limitations for shape, size, velocity and exit channel. This storm can be handled by any combination of principal spillway discharge, emergency spillway discharge and storage.

4) For ponds without a separate emergency spillway, the principal spillway functions as the emergency spillway. In this situation, the principal spillway must comply with the emergency spillway hydrologic criteria.

5) All ponds, which are being designed to meet local stormwater requirements, will be required to use the urban criteria. Storm duration used shall be 24 hours except where TR-60 is specified.

6) For ponds without a functioning open channel emergency spillway, minimum freeboard will be 2 feet.

TABLE 2

Total Height Of Embankment (Feet)	Minimum Top Width (Feet)
10 or less	6
11 - 14	8
15 - 19	10
20 - 24	12
25 - 34	14
35 or more	15

TABLE 3[1,2]
MINIMUM GAGES

CORRUGATED STEEL PIPE
2 - 2/3 inches x 1/2 inch Corrugations

Fill Height Over Pipe (Feet)	Pipe Diameter in Inches				
	24 & Less	30	36	42	48
1 - 15	16	16	14	10	10
15 - 20	16	12	10	*	*
20 - 25	16	10	*	*	*

CORRUGATED STEEL PIPE
3 inches x 1 inch or 5 inch x 1 inch Corrugations

Fill Height Over Pipe (Feet)	Pipe Diameter (Inches)			Flowable Fill			
	36	42	48	54[3]	60[3]	66[3]	72[3]
1 - 15	16	16	16	14	14	14	14
15 - 20	16	16	12	14	14	14	14
20 - 25	14	14	10	14	14	14	14

* Not Permitted.

TABLE 4[1,2]
MINIMUM GAGES

CORRUGATED ALUMINUM PIPE
2 - 2/3 inches x 1/2 inch Corrugations

Fill Height Over Pipe (Feet)	Pipe Diameter in Inches		
	21 & Less	24	30
1 - 15	16	14	10
15 - 20	12	10	*
20 - 25	10	*	*

CORRUGATED ALUMINUM PIPE
3 inches x 1 inch Corrugations

Fill Height Over Pipe (Feet)	Pipe Diameter in Inches				
	30	36	42	48	54[3]
1 - 15	16	16	14	10	14
15 - 20	16	12	*	*	*
20 - 25	12	*	*	*	*

* Not Permitted.

[1] Coatings for corrugated metal shall be as specified by the MD-378 Construction Specifications.
[2] Tables 3 and 4 were developed using the modified Spangler equation. Sizes other than those shown above are not permitted.
[3] Must use flowable backfill as specified by the MD-378 Construction Specifications and the pipe must be bituminous coated.

TABLE 5

ACCEPTABLE PLASTIC PIPE FOR USE IN EARTH DAM[1, 2]

Nominal Pipe Size (inches)	Schedule or Standard Dimension Ratio (SDR)	Maximum Depth of Fill Over [3]
6 - 24	PVC Schedule 40	10
6 - 24	PVC Schedule 80	15
6 – 24	PVC SDR 26	10
6 - 24	Corrugated HDPE	10

[1] See Specifications, Plastic Pipe

[2] All designs based on Technical Release 77, Reference 20. Other diameters and / or fill heights may be used that meet all the requirements of TR-77.

[3] larger fill heights may be permitted when using flowable fill.

TABLE 6

Permissible Velocities (Ft/Sec)
For Emergency Spillways Lined with Vegetation

	Slope Of Exit Channel	
Type of Cover	0 - 5%	5 - 10%
Bermudagrass	6	5
Reed Canarygrass	5	4
Tall Fescue	5	4
Kentucky Bluegrass	5	4
Grass-legume mixture	4	3

CONSTRUCTION SPECIFICATIONS

These specifications are appropriate to all ponds within the scope of the Standard for practice MD-378. All references to ASTM and AASHTO specifications apply to the most recent version.

Site Preparation

Areas designated for borrow areas, embankment, and structural works shall be cleared, grubbed and stripped of topsoil. All trees, vegetation, roots and other objectionable material shall be removed. Channel banks and sharp breaks shall be sloped to no steeper than 1:1. All trees shall be cleared and grubbed within 15 feet of the toe of the embankment.

Areas to be covered by the reservoir will be cleared of all trees, brush, logs, fences, rubbish and other objectionable material unless otherwise designated on the plans. Trees, brush, and stumps shall be cut approximately level with the ground surface. For dry stormwater management ponds, a minimum of a 25-foot radius around the inlet structure shall be cleared.

All cleared and grubbed material shall be disposed of outside and below the limits of the dam and reservoir as directed by the owner or his representative. When specified, a sufficient quantity of topsoil will be stockpiled in a suitable location for use on the embankment and other designated areas.

Earth Fill

Material - The fill material shall be taken from approved designated borrow areas. It shall be free of roots, stumps, wood, rubbish, stones greater than 6", frozen or other objectionable materials. Fill material for the center of the embankment, and cut off trench shall conform to Unified Soil Classification GC, SC, CH, or CL and must have at least 30% passing the #200 sieve. Consideration may be given to the use of other materials in the embankment if designed by a geotechnical engineer. Such special designs must have construction supervised by a geotechnical engineer.

Materials used in the outer shell of the embankment must have the capability to support vegetation of the quality required to prevent erosion of the embankment.

Placement - Areas on which fill is to be placed shall be scarified prior to placement of fill. Fill materials shall be placed in maximum 8 inch thick (before compaction) layers which are to be continuous over the entire length of the fill. The most permeable borrow material shall be placed in the downstream portions of the embankment. The principal spillway must be installed concurrently with fill placement and not excavated into the embankment.

Compaction - The movement of the hauling and spreading equipment over the fill shall be controlled so that the entire surface of each lift shall be traversed by not less than one tread track of heavy equipment or compaction shall be achieved by a minimum of four complete passes of a sheepsfoot, rubber tired or vibratory roller. Fill material shall contain sufficient moisture such that the required degree of compaction will be obtained with the equipment used. The fill material shall contain sufficient moisture so that if formed into a ball it will not crumble, yet not be so wet that water can be squeezed out.

When required by the reviewing agency the minimum required density shall not be less than 95% of maximum dry density with a moisture content within ±2% of the optimum. Each layer of fill shall be compacted as necessary to obtain that density, and is to be certified by the Engineer at the time of construction. All compaction is to be determined by AASHTO Method T-99 (Standard Proctor).

Cut Off Trench - The cutoff trench shall be excavated into impervious material along or parallel to the centerline of the embankment as shown on the plans. The bottom width of the trench shall be governed by the equipment used for excavation, with the minimum width being four feet. The depth shall be at least four feet below existing grade or as shown on the plans. The side slopes of the trench shall be 1 to 1 or flatter. The backfill shall be compacted with construction equipment, roll-

ers, or hand tampers to assure maximum density and minimum permeability.

Embankment Core - The core shall be parallel to the centerline of the embankment as shown on the plans. The top width of the core shall be a minimum of four feet. The height shall extend up to at least the 10 year water elevation or as shown on the plans. The side slopes shall be 1 to 1 or flatter. The core shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability. In addition, the core shall be placed concurrently with the outer shell of the embankment.

Structure Backfill

Backfill adjacent to pipes or structures shall be of the type and quality conforming to that specified for the adjoining fill material. The fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material needs to fill completely all spaces under and adjacent to the pipe. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a concrete structure or pipe, unless there is a compacted fill of 24" or greater over the structure or pipe.

Structure backfill may be flowable fill meeting the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 313 as modified. The mixture shall have a 100-200 psi; 28 day unconfined compressive strength. The flowable fill shall have a minimum pH of 4.0 and a minimum resistivity of 2,000 ohm-cm. Material shall be placed such that a minimum of 6" (measured perpendicular to the outside of the pipe) of flowable fill shall be under (bedding), over and, on the sides of the pipe. It only needs to extend up to the spring line for rigid conduits. Average slump of the fill shall be 7" to assure flowability of the material. Adequate measures shall be taken (sand bags, etc.) to prevent floating the pipe. When using flowable fill, all metal pipe shall be bituminous coated. Any adjoining soil fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material shall completely fill all voids adjacent to the flowable fill zone. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a structure or pipe unless there is a compacted fill of 24" or greater over the structure or pipe. Backfill material outside the structural backfill (flowable fill) zone shall be of the type and quality conforming to that specified for the core of the embankment or other embankment materials.

Pipe Conduits

All pipes shall be circular in cross section.

Corrugated Metal Pipe - All of the following criteria shall apply for corrugated metal pipe:

1. Materials - (Polymer Coated steel pipe) - Steel pipes with polymeric coatings shall have a minimum coating thickness of 0.01 inch (10 mil) on both sides of the pipe. This pipe and its appurtenances shall conform to the requirements of AASHTO Specifications M-245 & M-246 with watertight coupling bands or flanges.

   Materials - (Aluminum Coated Steel Pipe) - This pipe and its appurtenances shall conform to the requirements of AASHTO Specification M-274 with watertight coupling bands or flanges. Aluminum Coated Steel Pipe, when used with flowable fill or when soil and/or water conditions warrant the need for increased durability, shall be fully bituminous coated per requirements of AASHTO Specification M-190 Type A. Any aluminum coating damaged or otherwise removed shall be replaced with cold applied bituminous coating compound. Aluminum surfaces that are to be in contact with concrete shall be painted

with one coat of zinc chromate primer or two coats of asphalt.

Materials - (Aluminum Pipe) - This pipe and its appurtenances shall conform to the requirements of AASHTO Specification M-196 or M-211 with watertight coupling bands or flanges. Aluminum Pipe, when used with flowable fill or when soil and/or water conditions warrant for increased durability, shall be fully bituminous coated per requirements of AASHTO Specification M-190 Type A. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt. Hot dip galvanized bolts may be used for connections. The pH of the surrounding soils shall be between 4 and 9.

2. Coupling bands, anti-seep collars, end sections, etc., must be composed of the same material and coatings as the pipe. Metals must be insulated from dissimilar materials with use of rubber or plastic insulating materials at least 24 mils in thickness.

3. Connections - All connections with pipes must be completely watertight. The drain pipe or barrel connection to the riser shall be welded all around when the pipe and riser are metal. Anti-seep collars shall be connected to the pipe in such a manner as to be completely watertight. Dimple bands are not considered to be watertight.

   All connections shall use a rubber or neoprene gasket when joining pipe sections. The end of each pipe shall be re-rolled an adequate number of corrugations to accommodate the bandwidth. The following type connections are acceptable for pipes less than 24 inches in diameter: flanges on both ends of the pipe with a circular 3/8 inch closed cell neoprene gasket, pre-punched to the flange bolt circle, sandwiched between adjacent flanges; a 12-inch wide standard lap type band with 12-inch wide by 3/8-inch thick closed cell circular neoprene gasket; and a 12-inch wide hugger type band with o-ring gaskets having a minimum diameter of 1/2 inch greater than the corrugation depth. Pipes 24 inches in diameter and larger shall be connected by a 24 inch long annular corrugated band using a minimum of 4 (four) rods and lugs, 2 on each connecting pipe end. A 24-inch wide by 3/8-inch thick closed cell circular neoprene gasket will be installed with 12 inches on the end of each pipe. Flanged joints with 3/8 inch closed cell gaskets the full width of the flange is also acceptable.

   Helically corrugated pipe shall have either continuously welded seams or have lock seams with internal caulking or a neoprene bead.

4. Bedding - The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.

5. Backfilling shall conform to "**Structure Backfill**".

6. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Reinforced Concrete Pipe - All of the following criteria shall apply for reinforced concrete pipe:

1. Materials - Reinforced concrete pipe shall have bell and spigot joints with rubber gaskets and shall equal or exceed ASTM C-361.

2. Bedding - Reinforced concrete pipe conduits shall be laid in a concrete bedding / cradle for their entire length. This bedding / cradle shall consist of high slump concrete placed under the pipe and up the sides of the pipe at least 50% of its outside diameter with a minimum thickness of 6 inches. Where a concrete cradle is not needed for structural reasons, flowable fill may be used as described in the "Structure Backfill" section of this standard. Gravel bedding is not permitted.

3. Laying pipe - Bell and spigot pipe shall be placed with the bell end upstream. Joints shall be made in accordance with recommendations of the manufacturer of the material. After the joints are sealed for the entire line, the bedding shall be placed so that all spaces under the pipe are filled. Care shall be exercised to prevent any deviation from the original line and grade of the pipe. The first joint must be located within 4 feet from the riser.

4. Backfilling shall conform to "**Structure Backfill**".

5. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Plastic Pipe - The following criteria shall apply for plastic pipe:

1. Materials - PVC pipe shall be PVC-1120 or PVC-1220 conforming to ASTM D-1785 or ASTM D-2241. Corrugated High Density Polyethylene (HDPE) pipe, couplings and fittings shall conform to the following: 4" – 10" inch pipe shall meet the requirements of AASHTO M252 Type S, and 12" through 24" inch shall meet the requirements of AASHTO M294 Type S.

2. Joints and connections to anti-seep collars shall be completely watertight.

3. Bedding -The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.

4. Backfilling shall conform to "**Structure Backfill**".

5. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Drainage Diaphragms - When a drainage diaphragm is used, a registered professional engineer will supervise the design and construction inspection.

Concrete

Concrete shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 414, Mix No. 3.

Rock Riprap

Rock riprap shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 311.

Geotextile shall be placed under all riprap and shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 921.09, Class C.

Care of Water during Construction

All work on permanent structures shall be carried out in areas free from water. The Contractor shall construct and maintain all temporary dikes, levees, cofferdams, drainage channels, and stream diversions necessary to protect the areas to be occupied by the permanent works. The contractor shall also furnish, install, operate, and maintain all necessary pumping and other equipment required for removal of water from various parts of the work and for maintaining the excavations, foundation, and other parts of the work free from water as required or directed by the engineer for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed or leveled and graded to the extent required to prevent obstruction in any degree whatsoever of the flow of water to the spillway or outlet works and so as not to interfere in any way with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent works. The removal of water from the required excavation and the foundation shall be accomplished in a manner and to the extent that will maintain stability of the excavated slopes and bottom required excavations and will allow satisfactory per-

formance of all construction operations. During the placing and compacting of material in required excavations, the water level at the locations being refilled shall be maintained below the bottom of the excavation at such locations which may require draining the water sumps from which the water shall be pumped.

Stabilization

All borrow areas shall be graded to provide proper drainage and left in a sightly condition. All exposed surfaces of the embankment, spillway, spoil and borrow areas, and berms shall be stabilized by seeding, liming, fertilizing and mulching in accordance with the Natural Resources Conservation Service Standards and Specifications for Critical Area Planting (MD-342) or as shown on the accompanying drawings.

Erosion and Sediment Control

Construction operations will be carried out in such a manner that erosion will be controlled and water and air pollution minimized. State and local laws concerning pollution abatement will be followed. Construction plans shall detail erosion and sediment control measures.

OPERATION AND MAINTENANCE

An operation and maintenance plan in accordance with Local or State Regulations will be prepared for all ponds. As a minimum, the dam inspection checklist located in Appendix A shall be included as part of the operation and maintenance plan and performed at least annually. Written records of maintenance and major repairs needs to be retained in a file. The issuance of a Maintenance and Repair Permit for any repairs or maintenance that involves the modification of the dam or spillway from its original design and specifications is required. A permit is also required for any repairs or reconstruction that involve a substantial portion of the structure. All indicated repairs are to be made as soon as practical.

SUPPORTING DATA AND DOCUMENTATION

Field Data and Survey Notes

The following is a list of the minimum data needed:

1. Profile along centerline of structure.
2. Profile along centerline of principal spillway.
3. Profile along centerline of emergency spillway.
4. Survey of storage area to develop topography and storage volumes.
5. Soil investigation logs and notes.

Design Data

Record on appropriate engineering paper. The following is a list of the minimum required design data:

1. Determine pond class and list appropriate spillway design criteria, including map.
2. Determine peak runoff from the contributing area for the design storms selected, including topo map.
3. Develop a stage-storage/discharge curve for the site.
4. Determine the pipe spillway by storm routing using the procedure in the SWM Pond Design Manual; Chapter 11, EFH; Chapter 6, TR-55; or TR-20.
5. Design emergency spillway using EFH 11-61.
6. Drawings should show the following as a minimum: profile along centerline of dam; profile along centerline of emergency spillway; cross section through dam at principal spillway; cross section through emergency spillway; plan view; and construction details & notes and soil logs.
7. Compute earth fill (if needed).
8. Special design feature details; watering, fire hydrants, fish management, irrigation, outfall stabilization, etc.; structural details with design loadings, if applicable, should be shown on the drawings.
9. Complete data required on MD-ENG-14.
10. Record seeding plan on drawings or MD-CONS-10.
11. A written Operation and Maintenance Plan.

Construction Check Data/As-built

Record on survey note paper, SCS-ENG-28. Survey data for ponds will be plotted in red. All construction inspection visits shall be recorded on the CPA-6 or appropriate documentation paper. The documentation shall include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed, and decisions made and by whom. The following is a list of the minimum data needed for As-Builts:

1. A profile of the top of the dam.
2. A cross-section of the emergency spillway at the control section.
3. A profile along the centerline of the emergency spillway.
4. A profile along the centerline of the principal spillway extending at least 100 feet downstream of the fill.
5. The elevation of the principal spillway crest.
6. The elevation of the principal spillway conduit invert (inlet and outlet).
7. The diameter, length, thickness and type of material for the riser.
8. The diameter, length, and type of material for the conduit.

9. The size and type of anti-vortex and trash rack device and its elevations in relation to the principal spillway crest.

10. The number, size and location of the anti-seep collars.

11. The diameter and size of any low stage orifices or drain pipes.

12. Show the length, width, and depth of contours of the pool area so that design volume can be verified.

13. Notes and measurements to show that any special design features were met.

14. Statement on seeding and fencing.

15. Notes on site clean up and disposal.

16. Sign and date check notes to include statement that practice meets or exceeds plans and specifications.

REFERENCES

1. *AWWA Standards*, American Water Works Association, Denver, Colorado.

2. *ASTM Standards*, American Society for Testing and Materials, Philadelphia, Pennsylvania.

3. *Engineering Field Handbook, Part 650*, USDA, Soil Conservation Service.

4. *Handbook of PVC Pipe Design and Construction*, First Edition, Uni-Bell Plastic Pipe Association, Dallas, Texas, 1980.

5. *Handbook of Steel Drainage and Highway Construction Products*, Third Edition, American Iron and Steel Institute, Washington, D.C., 1983.

6. *Maryland Dam Safety Manual*, Maryland Department of Natural Resources, Water Resources Administration, Annapolis, Maryland, June 1993.

7. *Maryland Technical Guide, Section IV, Standards and Specifications,* USDA, Natural Resources Conservation Service.

8. *National Engineering Handbook, Section 4, Hydrology*, USDA, Natural Resources Conservation Service, March 1985.

9. *National Engineering Handbook, Section 5, Hydraulics*, USDA, Natural Resources Conservation Service, August 1956.

10. *National Engineering Handbook, Section 11, Drop Spillways*, USDA, Natural Resources Conservation Service, April 1968.

11. *National Engineering Handbook, Section 14, Chute Spillways*, USDA, Natural Resources Conservation Service, October 1977.

12. *National Handbook of Conservation Practices*, USDA, Natural Resources Conservation Service.

13. *Standard Specifications for Materials and Methods of Sampling and Testing*, Nineteenth Edition, American Association of State Highway and Transportation Officials, Washington D.C., 1998.

14. *Standard Specifications for Construction and Materials*, Maryland Department of Transportation, State Highway Administration, Baltimore, Maryland, October 1993.

15. Technical Release No. 20, *Computer Programs for Project Formulation Hydrology*, USDA, Natural Resources Conservation Service, 1992.

16. Technical Release No. 55, *Urban Hydrology for Small Watersheds*, USDA, Natural Resources Conservation Service, 1986.

17. Technical Release No. 56, *A Guide for Design and Layout of Vegetative Wave Protection for Earth Dam Embankments*, USDA, Natural Resources Conservation Service, 1974.

18. Technical Release No. 60, *Earth Dams and Reservoirs*, USDA, Natural Resources Conservation Service, 1985.

19. Technical Release 69, *Riprap for Slope Protection Against Wave Action*, USDA, Natural Resources Conservation Service, 1983.

20. Technical Release No. 77, *Design and Installation of Flexible Conduits*, USDA, Natural Resources Conservation Service, 1990.

21. *National Engineering Handbook, Part 633, Chapter 26, Gradation Design of Sand and Gravel Filters*, USDA, Natural Resources Conservation Service, October 1994.

APPENDIX A

DAM INSPECTION CHECKLIST

To help the dam owner perform periodic safety inspections of the structure, a checklist is provided. Each item of the checklist should be completed. **Repair** is required when obvious problems are observed. **Monitoring** is recommended if there is potential for a problem to occur in the future. **Investigation** is necessary if the reason for the observed problem is not obvious.

A brief description should be made of any noted irregularities, needed maintenance, or problems. Abbreviations and short descriptions are recommended. Space at the bottom of the form should be used for any items not listed.

DAM _____ DATE _____ OWNER _____ WEATHER _____ INSPECTED BY _____ POOL LEVEL _____		Y/N	MONITOR	REPAIR	INVESTIGATE
Item	Comments				
1. CREST					
a. Visual settlement?					
b. Misalignment?					
c. Cracking?					
2. UPSTREAM SLOPE					
a. Erosion?					
b. Ground cover in good condition?					
c. Trees, shrubs, or other woody vegetation?					
d. Longitudinal/Vertical cracks?					
e. Adequate riprap protection?					
f. Stone deterioration?					
g. Settlements, depressions, or bulges?					
3. DOWNSTREAM SLOPE					
a. Erosion?					
b. Ground cover in good condition?					
c. Trees, shrubs, or other woody vegetation?					
d. Longitudinal/Vertical cracks?					
e. Riprap protection adequate?					
f. Settlements, depressions, or bulges?					
g. Soft spots or boggy areas?					
h. Movement at or beyond toe?					
i. Boils at toe?					
4. DRAINAGE-SEEPAGE CONTROL					
a. Internal drains flowing?	Est. Left _____ gpm Est. Right _____ gpm				
b. Seepage at toe?	Estimated _____ gpm				
c. Does seepage contain fines?					

INSPECTION CHECKLIST - PAGE 2

INSPECTED BY _____ **DATE** _____

Item	Comments	Y/N	MONITOR	REPAIR	INVESTIGATE
5. ABUTMENT CONTACTS					
a. Erosion?					
b. Differential movement?					
c. Cracks?					
d. Seepage?	Estimated _____ gpm				
e. Adequate erosion protection for ditches?					
6. INLET STRUCTURE	Concrete or Metal Pipe (circle one)				
a. Seepage into structure?					
b. Debris or obstructions?					
c. If concrete, do surfaces show:					
1. Spalling?					
2. Cracking?					
3. Erosion?					
4. Scaling?					
5. Exposed reinforcement?					
6. Other?					
d. If metal, do surfaces show:					
1. Corrosion?					
2. Protective Coating deficient?					
3. Misalignment or split seams?					
e. Do the joints show:					
1. Displacement or offset?					
2. Loss of joint material?					
3. Leakage?					
f. Are the trash racks:					
1. Broken or bent?					
2. Corroded or rusted?					
3. Obstructed?					
4. Operational?					
g. Sluice/Drain gates:					
1. Broken or bent?					
2. Corroded or rusted?					
3. Leaking?					
4. Not seated correctly?					
4. Periodically maintained?					
5. Operational?					

INSPECTION CHECKLIST - PAGE 3

INSPECTED BY _____ **DATE** _____

Item	Comments	Y/N	MONITOR	REPAIR	INVESTIGATE
7. PRINCIPAL SPILLWAY PIPE	Concrete or Metal Pipe (circle one)				
a. Seepage into conduit?					
b. Debris present?					
c. Do concrete surfaces show:					
1. Spalling?					
2. Cracking?					
3. Erosion?					
4. Scaling?					
5. Exposed reinforcement?					
6. Other?					
d. Do the joints show:					
1. Displacement or offset?					
2. Loss of joint material?					
3. Leakage?					
8. STILLING BASIN/POOL	Riprap or Concrete (circle one)				
a. If concrete, condition of surfaces?					
b. Deterioration or displacement of joints?					
c. Outlet channel obstructed?					
d. Is released water:					
1. Undercutting the outlet?					
2. Eroding the embankment?					
3. Displacing riprap?					
4. Scouring the plunge pool?					
e. Tailwater elevation and flow condition:					
9. EMERGENCY SPILLWAY					
a. Is the channel:					
1. Eroding or backcutting?					
2. Obstructed?					
b. Trees or shrubs in the channel?					
c. Seepage present?					
d. Soft spots or boggy areas?					
e. Channel slopes eroding or sloughing?					
10. RESERVOIR					
a. High water marks?					
b. Erosion/Slides into pool area?					
c. Sediment accumulation?					
d. Floating debris present?					
e. Adequate riprap protection for ditches?					

APPENDIX B

ROADWAY EMBANKMENT DESIGN CRITERIA

HW - TW > 10'* AND HW/D > 2, OR PERMANENT POOL > 3' OR PROPOSED RISER

No → **NO SPECIAL DESIGN**

Yes ↓

MEETS SMALL POND CRITERIA, AND CLASS "A"

No → **MDE DAM SAFETY REVIEW**

Yes ↓

8:1 PROJECTION LINE INTERSECTS DOWNSTREAM SLOPE OF THE EMBANKMENT

No → **SPECIAL EMBANKMENT DESIGN**

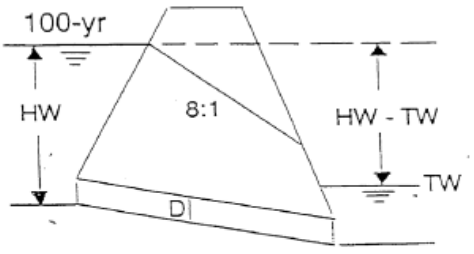
Yes ↓

MD 378 Design

Use any nonorganic soils for the embankment, elimination of the cut-off trench and core based on approval of geotechnical engineer and acceptable to local jurisdictions.

Filter diaphragm is required.

All other MD 378 criteria apply.



* Use HW when TW is below the inlet invert elevation.

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From: Stahl, Allan – Annapolis, MD
Sent: Thursday, October 06, 2005
To: MD-NRCS

Effective immediately, profile joints and gaskets are acceptable for design pressure up to 25 feet of head. They meet all the requirements of ASTM C361 and are acceptable for use in MD-378 ponds.

Attached is the approval letter from the Committee C13 on Concrete Pipe. Please inform designers, reviewers, and inspectors in your respective counties of this acceptance.

Allan H. Stahl, P.E.
State Conservation Engineer

INTERNATIONAL
Standards Worldwide

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Committee C13 on CONCRETE PIPE

Chairman: DONALD E. BOUSE, Chiang, Patel & Yerby, 1820 Regal Row Suite 200, DFW Airport APM Project, Dallas, TX 75235, (972) 586-5755, Fax: (972) 586-5701, e-mail: dbouse@dfwairport.com
Vice Chairman: OLIVER S. DELERY JR., New Orleans Cement Prods Co., PO Box 50520, New Orleans, LA 70150, (504) 254-1596, Fax: (504) 254-3164, e-mail: odelery@nocp.com
Secretary MIKE BEALEY, Mike Bealey and Associates, 12010 Wayland St., Oakton, VA 22124-2236, (703) 620-1979, Fax: (703) 620-1979, e-mail: mikebealey@juno.com
Staff Manager: ROBERT J. MORGAN, (610) 832-9732, Fax: (610) 832-9666, e-mail: rmorgan@astm.org

June 9, 2005

Mr. Mike Barg
4331 Ridgewood Center Dr.
Woodbridge, VA 22191

Gentlemen,

The following revision to Section 8.4.1 has been approved by ASTM Committee C 13, which has jurisdiction of ASTM C 361 specification:

> 8.4.1 *For design pressures greater than 25 feet-head, the rubber gaskets shall be solid gaskets of circular cross section. For design pressures less than or equal to 25 feet-head, the gaskets shall be solid gaskets of circular or non-circular cross-section. All gaskets shall be confined in an annular space formed by shoulders on the bell and spigot or in a groove in the spigot of the pipe so that movement of the pipe or hydrostatic and hydrodynamic pressure cannot displace the gasket. When the joint is assembled, the gasket shall be compressed to form a watertight seal.*

This wording will be included in the next printing of ASTM C 361.

Very Truly Yours,

Joel Olmos
Chairman C 13.04

NRCS

Natural Resources Conservation Service
339 Busch's Frontage Road, Suite 301
Annapolis, MD 21409

Phone: 410-757-0861
FAX: 410-757-0687
www.md.nrcs.usda.gov

DATE: December 5, 2012

SUBJECT: ENG – HDPE corrugated/smooth interior dual wall pipe

TO: District Conservationist
District Managers

File Code: 210

With the increased use of HDPE dual wall pipe with corrugated exterior, such as Hancor HI-Q and ADS N-12 pipe, some applications have included using the pipe vertically as risers in grade stabilization structures, pond spillways or underground outlets. This application shall be avoided due to several failures and the fact that the company will not back the product under this use. The vertical load on the corrugations resulting from settling or surcharge such as equipment weight, causes the dual walls to separate or the interior wall to tear. Other options for risers shall be used in the design of these structures.

Please inform your office, including urban reviewers about this matter. Should you have any questions, please feel free to contact me at 443-482-2912 or by email at allan.stahl@md.usda.gov

ALLAN H. STAHL, P.E.
State Conservation Engineer

cc:
Ann Baldwin, State Environmental Engineer, NRCS, Chestertown, Maryland
Gail Myers, Civil Engineer, LaPlata, Maryland
Warren Johnson, Civil engineer, Frederick, Maryland
Kimberly Whitmon, Civil Engineer, Frederick, Maryland
Sam Tyler, CET, Westminster, Maryland
Jeff Teets, CET, Hagerstown, Maryland
Matt Molchan, CET, Salisbury, Maryland
Christopher, Davidson, CET, Chestertown, Maryland

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SECTION IX

PRINCE GEORGE'S
SOIL CONSERVATION DISTRICT

POND MEMORANDUM

MEMORANDUM OF UNDERSTANDING – POND REVIEW

Effective January 17, 1996
Updated July/2013

The Prince George's Soil Conservation District, the Natural Resources Conservation Service and Prince George's County have a three way agreement concerning technical plan review of County permitted stormwater management ponds. Based on similar agreements in Montgomery and Carroll Counties, successful implementation will eliminate any actual or perceived duplication of services.

Stormwater Management Ponds

PGSCD will delegate its review of ponds (dam safety), up to a certain size, to the County. In accordance with State law, PGSCD will give final approval to these ponds based solely on the County's review. Ponds larger than the delegated County limit and up to PGSCD's limit, will still be reviewed by the County with a final review and approval by PGSCD. This process is enumerated in attachment "A".

Pond As-Builts

According to State regulations, PGSCD guidelines require an as-built submitted within 30 days of pond construction. Ponds used for sediment control are considered complete when initially constructed. The permittee should submit a pond as-built to the County for approval and subsequent acceptance by PGSCD.

To obtain dam safety as-built approval for a pond being used as a sediment basin, the permittee must submit, as a minimum, an as-built topographic survey of the pond embankment, soils report is necessary, ground spot elevations and as-built elevation and the dimensions of pond structure, including functional components associated with the sediment basin design (see PGSCD Dam Safety Pond Guidelines for as-built plans checklist). Along with the stormwater management design storm elevations and freeboard, the 10-year sediment control elevation should be shown. The following notation is to be shown on the plan prior to its approval: "This pond is currently being used for sediment control approved by PGSCD, SC#_____".

A follow-up inspection is not required once the pond's dam safety as-built plan is approved under this requirement. This dam safety as-built approval is not applicable to any permittee's bond reduction request and is considered a final as-built plan by PGSCD. The County is not required to submit the final County as-built plan to PGSCD after this dam safety pond as-built plan is approved and forwarded.

Exemptions, Pond Hazard Classification and Pond Soil Interpretations

The PGSCD's small pond approval does not apply to certain small urban stormwater management quality or quantity structures. PGSCD will provide technical review and approval for all pond exemptions and soil interpretations. PGSCD will provide technical review and acceptance of all pond hazard classifications. This process is enumerated in attachment "A".

Attachment A

Prince George's SWM Ponds Only

I. **Standards**

County will review ponds for PGSCD in accordance with the following:

A. State Pond Law/Regulations

B. Md-378 Soil Conservation Service Maryland Standards and Specifications for Ponds

C. MASCD Pond design manual

D. PGSCD Soil Erosion and Sediment Control/Pond Safety Reference Manual

E. County approval limit – Class "a", 48 inches or less barrel conduit diameter, embankment less than 15 feet, and drainage area less than 200 acres. This approval includes weir structures where the design storm height does not exceed five feet.

F. Ponds that exceed 20 feet in height, 640 acre drainage area, or are Class "b" or Class "c" require approval and as-built from Maryland Department of the Environment.

II. **Pond Review and Approvals**

A. Ponds up to County approval limits

(1) County will ask applicant for PGSCD grading, erosion and sediment control plan number, hazard classification, soil determination and/or pond exemptions before second review of all ponds. PGSCD will review grading, erosion and sediment control, hazard classification, soil determination and/or pond exemption aspects of all ponds.

(2) County sends copy of approved plans with delegated Professional Engineer certification (on plans), computations, owner signed PGSCD small pond approval letter and completed MD-14 pond summary sheet

(3) PGSCD signs small pond approval letter, MD-14, transmits to State, County and owner

(4) Pond revisions follow same procedure as above.

B. Ponds above County approval limits

(1) County reviews for all aspects of pond design
County notifies PGSCD when all SWM requirements are adequate (i.e. storm attenuation, hydrology and hydraulics)

(2) PGSCD does final review and approval

III. **As-Builts**

A. All SWM ponds approved by the County/PGSCD

(1) County sends PGSCD a copy of accepted as-built and computations as appropriate (to include original PGSCD approval stamp sheet)

(2) County sends completed MD-14 to PGSCD

(3) PGSCD signs MD-14 and transmits to MDE and the County

IV. **Exemptions**

A. All pond exemptions approved by the County.

(1) County sends PGSCD copy of approved SWM pond exemptions with documentation

DELEGATED PROFESSIONAL ENGINEER CERTIFICATION

PRINCE GEORGE'S SOIL
CONSERVATION DISTRICT
SMALL POND APPROVAL

Prince George's County, Maryland
Department of Permits Inspections &
Enforcement: Site/Road Plan Review

( ) Certifies Water Quality
Structure Exempt From
MD-378 Approval

_____
Signature Date

( ) Certifies Pond Meets
MD-378 & Recommend
PGSCD Approval

_____
Signature Date

( ) Certifies Pond Meets
MD-378 & Forward For
Final PGSCD Review &
Approval

_____
Signature Date

( ) As Built Meets All
Requirements of MD-378

_____
Signature Date

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