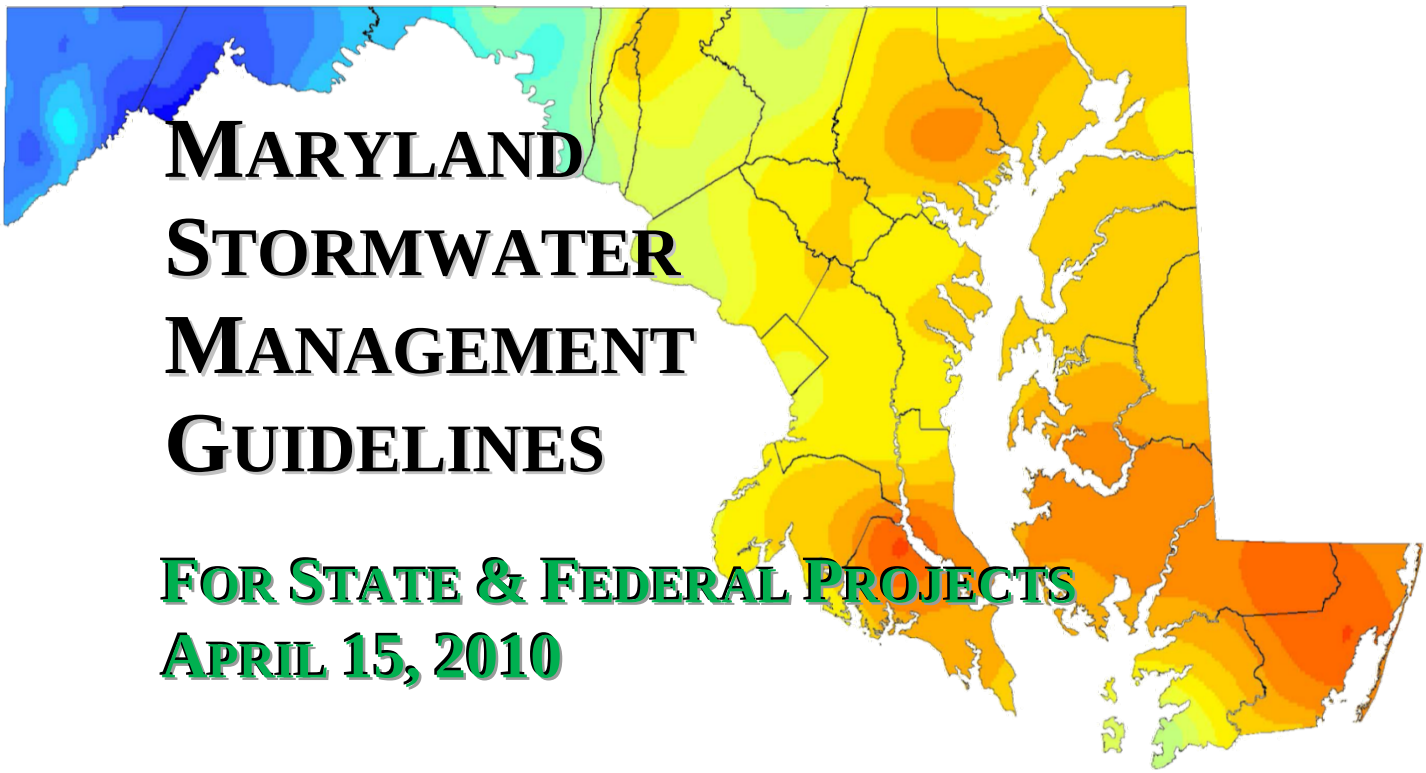

MARYLAND STORMWATER MANAGEMENT GUIDELINES

FOR STATE & FEDERAL PROJECTS

APRIL 15, 2010

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INTRODUCTION

The Environment Article, Title 4, Subtitle 2 requires the Maryland Department of the Environment (MDE) to implement a statewide stormwater management program to control runoff from development. To meet this mandate, MDE has adopted regulations that establish criteria and procedures for managing stormwater throughout Maryland.

The Stormwater Management Act of 2007 (Act) further requires that the Code of Maryland Regulations (COMAR) be modified and guidance and ordinances be developed for the purpose of implementing environmental site design (ESD) to the maximum extent practicable (MEP). The Act defines ESD 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." ESD also promotes conserving natural features, drainage patterns, and vegetation; minimizing impervious surfaces; slowing down runoff; and increasing infiltration. Significant changes to COMAR and the 2000 Maryland Stormwater Design Manual, Volumes I & II (Design Manual) were adopted in May 2009. These changes specify how ESD is to be implemented, how the MEP standard is to be met, and how the review of erosion and sediment control and stormwater management plans is to be integrated. The Maryland Stormwater Management Guidelines for State and Federal Projects represent the next step toward meeting MDE's obligations under current law and serves as guidance for developing, reviewing, and approving stormwater management plans for State and federal projects.

The changes required to implement the Act are significant and will force developers and designers to consider runoff control from the start of the land development process. The definition of ESD, the modifications to COMAR, and the procedures and minimum plan contents specified herein will guide all State and federal agencies submitting stormwater management plans to MDE. Because stormwater management for new development and redevelopment will be conceived, designed, reviewed, and built differently from procedures used prior to passage of the Act, transitioning to the new methods will take some time, and obstacles may be encountered. However, implementing ESD to the MEP must be the overriding goal that pervades each step.

Guidance for preparing an erosion and sediment control plan is provided separately in the Maryland Erosion and Sediment Control Guidelines for State and Federal Projects. If there are any questions or comments regarding these guidelines, please contact the Sediment & Stormwater Plan Review Division in the Water Management Administration of MDE at 410-537-3563.

MARYLAND DEPARTMENT OF THE ENVIRONMENT
SWM GUIDELINES
FOR STATE AND FEDERAL PROJECTS

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1.0 PURPOSE AND AUTHORITY

The purpose of these Guidelines is to protect, maintain and enhance the public health, safety, and general welfare by establishing minimum requirements and procedures to reduce the adverse impacts associated with increased stormwater runoff. The goal is to manage stormwater by using environmental site design (ESD) to the maximum extent practicable (MEP) to reduce stream channel erosion, pollution, siltation, sedimentation, and local flooding, and to use appropriate structural best management practices (BMPs) only when necessary. This will restore, enhance, and maintain the chemical, physical, and biological integrity of streams, minimize damage to public and private property, and reduce the impacts of land development.

The provisions of these Guidelines are pursuant to the Annotated Code of Maryland, Environment Article, Title 4, Subtitle 2 and the Stormwater Management Regulations, COMAR 26.17.02.01 through 26.17.02.12. These Guidelines supplement the 2000 Maryland Stormwater Design Manual and all subsequent revisions. They provide the minimum stormwater management requirements for plans submitted by State and federal agencies to the Maryland Department of the Environment (MDE), for review and approval. These Guidelines do not affect the validity of any portion of either the Environment Article or COMAR and apply to all new and redevelopment projects.

1.1 Incorporation by Reference

For the purpose of these Guidelines, the following documents are incorporated by reference:

A. The 2000 Maryland Stormwater Design Manual Volumes I & II (Maryland Department of the Environment, April 2000), Supplement No. 1, and all subsequent revisions serve as the official guide for stormwater principles, methods, and practices.

B. USDA Natural Resources Conservation Service Maryland, Conservation Practice Standard, Pond- Code 378 (January 2000) or latest revision.

2.0 DEFINITIONS

For the purpose of these Guidelines, the definitions below describe the meaning of the following terms:

1. "Administration" means the Maryland Department of the Environment, Water Management Administration.

2. "Adverse impact" means any deleterious effect on waters or wetlands, including changes to quality, quantity, surface area, species composition, aesthetics or usefulness for human or natural uses which are or may potentially be harmful or injurious to human health, welfare, safety or property, to biological productivity, diversity, or stability or which unreasonably interfere with the enjoyment of life or property, including outdoor recreation.

3. "Agricultural land management practices" means those methods and procedures used in the cultivation of land in order to further crop and livestock production and conservation of related soil and water resources.

4. "Applicant" means any State or federal governmental agency that executes the necessary forms to procure official approval to carry out construction of a project (i.e., the entity responsible for the project, not necessarily the land owner).

5. "Best management practice (BMP)" means a structural device or nonstructural practice designed to temporarily store or treat stormwater runoff in order to mitigate flooding, reduce pollution, or provide other amenities.

6. "Channel Protection Storage Volume (Cpv)" means the volume used to design management practices to control stream channel erosion. Methods for calculating the channel protection storage volume are specified in the 2000 Maryland Stormwater Design Manual, Volumes I and II and Supplement No. 1.

7. "Clearing" means the removal of trees and brush from the land.

8. "Concept plan" means the first of three required plan approvals that includes the information necessary to allow an initial evaluation of a proposed project.

9. "Design Manual" means the 2000 Maryland Stormwater Design Manual, Supplement Number 1, and all subsequent revisions, that serve as the official guide for stormwater management principles, methods, and practices.

10. "Direct discharge" means the concentrated release of stormwater to tidal waters or vegetated tidal wetlands in the Critical Area from new development or redevelopment projects.

11. "Disturbance" means exposing the soil.

12. "Drainage area" means that area, measured in a horizontal plane, that contributes runoff to a specific location.

13. "Easement" means a grant or reservation by the owner of land for the use of such land by others for a specific purpose or purposes, and which must be included in the conveyance of land affected by such easement.

14. "Environmental site design (ESD)" means 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. Methods for designing ESD practices are specified in the Design Manual.

15. "Exemption" means those land development activities that are not subject to the stormwater management requirements contained in these Guidelines.

16. "Final stormwater management plan" means the last of three required plan approvals that includes the information necessary to allow all approvals and permits to be issued by the Administration.

17. "Grading" means any act by which soil is stripped, stockpiled, excavated, scarified, filled, or any combination thereof.

18. "Grubbing" means exposing the earth by removal of the root mat.

19. "Impervious area" means any surface that does not allow stormwater to infiltrate into the underlying soil. Examples include pavement and gravel surfaces used for vehicular traffic.

20. "Infiltration" means the passage or movement of water into the soil.

21. "Institutional Management Plan" means an Administration approved plan developed by a State or federal agency that addresses stormwater management for an institution with respect to the associated watersheds.

22. "Maintenance" with regard to disturbance of impervious surfaces means pavement overlay and/or patching and replacement of deteriorated impervious surfaces.

23. "Maximum extent practicable (MEP)" means designing stormwater management systems so that all reasonable opportunities for using ESD planning techniques and treatment practices are exhausted and only where absolutely necessary, a structural BMP is implemented.

24. "Off-site stormwater management" means the design and construction of a BMP located outside the project limits to control stormwater from one or more sites.

25. "On-site stormwater management" means the design and construction of systems necessary to control stormwater within the limits of the project.

26. "Overbank flood protection volume (Qp)" means the volume of stormwater runoff controlled by structural practices to prevent an increase in the frequency of out of bank flooding generated by development. Methods for calculating the overbank flood protection volume are specified in the Design Manual.

27. "Predevelopment" means existing, prior to conception of a proposed project.

28. "Planning techniques" means a combination of strategies employed early in project design to reduce the impact from development and to incorporate natural features into a stormwater management plan.

29. "Point of Investigation (POI)" means the location where runoff from the drainage area leaves the project site.

30. "Project Site" means the area bounded by the limit of disturbance or as approved by the Administration.

31. "Recharge volume (Rev)" means that portion of the water quality volume used to maintain groundwater recharge rates for new development. Methods for calculating the recharge volume are specified in the Design Manual.

32. "Redevelopment" means any construction, alteration, removal, or improvement performed on existing impervious area at a site where existing land use is commercial, industrial, institutional, or multifamily residential and existing project site impervious area exceeds 40 percent.

33. "Retention structure" means a permanent structure that provides for the storage of runoff by means of a permanent pool of water.

34. "Sediment" means soils or other surficial materials transported or deposited by the action of wind, water, ice, or gravity as a product of erosion.

35. "Site" means any tract, lot, or parcel of land, or combination of tracts, lots, and parcels of land that are in one ownership or are contiguous and in diverse ownership, where development is to be performed as part of a unit, subdivision, or project.

36. "Site development plan" means the second of three required plan approvals that includes the information necessary to allow a detailed evaluation of a proposed project.

37. "Stabilization" means the prevention of soil movement by covering exposed earth using any of various vegetative and/or structural means.

38. "Stormwater" means water that originates from a precipitation event.

39. "Stormwater management" means, for:
    a. Quantitative control, a system of vegetative and structural measures that control the increased volume and rate of surface runoff caused by man-made changes to the land; and
    b. Qualitative control, a system of vegetative, structural, and other measures that reduce or eliminate pollutants that might otherwise be carried by runoff.

40. "Stormwater management system" means ESD practices, BMPs, and any other structural or nonstructural measures through which stormwater is detained, filtered, or infiltrated prior to discharge from a site.

41. "Variance" means the modification of the minimum stormwater management requirements for specific circumstances such that strict adherence to the requirements would result in unnecessary hardship and would not fulfill the intent of these Guidelines.

42. "Waiver" means the reduction of stormwater management requirements for a specific project on a case-by-case review basis.

43. "Watercourse" means any natural or artificial stream, river, creek, ditch, swale, gutter, channel, canal, conduit, culvert, drain, waterway, gully, or ravine in and including any adjacent area that is subject to inundation from overflow or flood water.

44. "Water quality volume (WQv)" means the volume needed to capture and treat 90 percent of the average annual runoff volume at a development site. Methods for calculating the water quality volume are specified in the Design Manual.

45. "Watershed" means the total drainage area contributing runoff to a single point.

46. "Watershed Management Plan" means a county or local municipality approved plan that is acceptable to the Administration.

3.0 APPLICABILITY

3.1 Scope

A State or federal agency shall not develop any land without having provided stormwater management measures that control or manage runoff from such development, except as provided within this Section. Stormwater management measures for new development and redevelopment must be consistent with the Design Manual and constructed according to an approved plan.

3.2 Exemptions

The following are exempt from the provisions of these Guidelines and the requirements of providing stormwater management:

A. Agricultural land management practices; and

B. Any project that does not disturb over 5,000 square feet of land area.

3.3 Waivers

The 2007 Stormwater Management Act restricts stormwater management waivers because ESD must be implemented to the MEP. There will be, however, development situations that warrant relaxing management obligations due to site specific circumstances. The goal is to use the clear mandate found in the Act for implementing ESD to the MEP to change the prevailing mindset of seeking a waiver for a project before considering management.

A Stormwater Management Waiver Application must be submitted by the Applicant or authorized representative and specifically indicate the appropriate waiver category. The application must include sufficient descriptions, drawings, and other information necessary to evaluate the proposed project and confirm the applicability of the waiver request. A new Stormwater Management Waiver Application may be required in accordance with the provisions of this Section if there are subsequent additions, extensions, or modifications to a project receiving a waiver. A written notice from the Administration must be received for a waiver to be valid. A Stormwater Management Waiver Application must be required for each eligible point of investigation where runoff leaves the project site. A copy of the Stormwater Management

Waiver Application may be found in the Appendix of these Guidelines.

For projects with multiple points of investigation (POI), the waiver applies to the POI and not to the entire project.

A. The Administration may grant a waiver of all quality and quantity stormwater management control requirements where an Applicant can demonstrate to the satisfaction of the Administration that the disturbed area for certain pipeline projects, conduit projects, underground projects, landscaping projects, maintenance projects, etc. will be returned to the existing condition and will have no hydrologic change.

B. The Administration may grant a waiver of the stormwater management quantity control requirements where the Applicant can demonstrate to the satisfaction of the Administration that the cumulative effects of the waiver policy ensure no adverse impact to the downstream watercourse, that ESD has been implemented for a minimum of one inch of rainfall, and that:

1. The POI discharges to tidally influenced receiving waters:
    a. For direct discharges (Cpv and Qp);
    b. For discharges (Cpv and Qp) within property boundaries with stable conveyance [see Section 4.1.A.4];
    c. For discharges (Qp) within property boundaries for which Cpv is provided; or

2. The POI discharges into a major waterway (see Table 2):
    a. For direct discharges (Cpv and Qp);
    b. For discharges (Cpv and Qp) within property boundaries with stable conveyance [see Section 4.1.A.4.];
    c. For discharges (Qp) within property boundaries for which Cpv is provided; or

3. The POI discharges into an existing closed storm sewer system that outfalls directly to a major waterway or tidally influenced waters with:
    a. Adequate capacity for Q10-year (Cpv and Qp);
    b. Adequate capacity for Q1-year (Cpv); or

4. Historical downstream flooding problems do not exist and the local jurisdiction does not require management of the overbank flood protection (Qp) volume within the watershed (see Table 1). Cpv must be provided as required by the Design Manual.

3.4 Variance

The Administration may grant a written variance from any requirement of Section 4.0, Stormwater Management Criteria of these Guidelines if there are exceptional circumstances applicable to the site such that strict adherence will result in unnecessary hardship and not fulfill the intent of the Guidelines. A written request for variance must be provided to the Administration and must state the specific variance sought and any evidence necessary to support the request. A variance may be granted upon consideration and as deemed appropriate by the Administration.

3.5 New Development

New development projects have an increase in impervious surfaces and/or change the site's hydrologic conditions. New development projects must be designed in accordance with Section 4.0 Stormwater Management Criteria. New development management requirements extend to areas of redevelopment where the impervious area of the existing project site is less than 40 percent.

3.6 Redevelopment

Redevelopment is the construction, alteration, removal, or improvement performed to existing impervious area at a site where the existing project site impervious area exceeds 40 percent. Redevelopment projects have no net increase in impervious surfaces. When calculating site imperviousness, the lands protected by forest preservation, conservation easements, or other mechanism may be subtracted from the site area. This will create an incentive to preserve and protect natural resources in redevelopment projects.

The stormwater management goal for redevelopment is to gain water quality treatment on existing developed lands while supporting initiatives to improve urban areas. All options for ESD must be exhausted during planning and site design of redevelopment projects; however, it is recognized that a wide range of site constraints may limit effective implementation of ESD. Alternative management options after compliance with the ESD to the MEP are available.

Stormwater management for redevelopment must be in accordance with the following:

A. ESD must be implemented to the MEP to provide water quality treatment for a minimum of 50 percent of the existing impervious area within the LOD. To meet stormwater management requirements for redevelopment using ESD, treatment must be provided for the runoff from 1 inch of rainfall (i.e., $P_E = 1$ inch) for 50 percent of the redeveloped impervious area. Quantity management, including Cpv treatment, is not required for redevelopment.

B. The redevelopment designs must reduce existing impervious areas within the project limit of disturbance (LOD) by a minimum of 50 percent. When a combination of impervious area reduction and ESD implementation is used, the combined reduction and treated areas must be equal to, or exceed, 50 percent of the existing impervious area within the LOD. When redevelopment reduces the impervious area within the LOD by 50 percent or more, water quality treatment is satisfied.

C. Where conditions prevent impervious area reduction and/or the implementation of ESD

to the MEP, alternative management practices may be considered in accordance with Section 3.8 Alternative Management Measures.

D. If a redevelopment activity changes the site runoff characteristics in a manner that creates points of concentrated flow where previously there was sheet flow or increases discharge rates for 1-year, 2-year, and 10-year 24-hour frequency storms, Cpv and Qp may be required by the Administration.

E. The Administration may determine that certain practices that do not involve earth disturbance such as pavement overlay and/or patching and sidewalk replacement are considered maintenance and redevelopment requirements may not be applicable.

F. When existing impervious areas drain to an existing BMP meeting previously approved requirements, these areas are considered treated. Redevelopment requirements will apply to the remaining unmanaged existing impervious areas within the LOD. The performance of an existing BMP will need to be verified, and if the BMP is not functioning as designed, necessary improvements to meet appropriate standards must be provided.

3.7 Combination of New Development and Redevelopment

A project that includes both new development and areas of redevelopment must manage the new development portion in accordance with Section 3.5 New Development and the redevelopment portion in accordance with Section 3.6 Redevelopment. If a net increase in impervious area occurs, stormwater management for the increased impervious area must be addressed according to new development requirements and must follow Section 4.0 Stormwater Management Criteria.

3.8 Alternative Management Measures

Where conditions prevent impervious area reduction and/or the implementation of ESD to the MEP, alternative management measures may be considered in the following order of preference:

A. An on-site structural BMP designed in accordance with Chapter 3 of the Design Manual:
   1. Stormwater filtering systems, open channel systems, and stormwater infiltration;
   2. Stormwater ponds;

B. An off-site structural BMP designed in accordance with Chapter 3 of the Design Manual, located within the project watershed, and included as part of the project:
   1. Stormwater filtering systems, open channel systems, and stormwater infiltration;
   2. Stormwater ponds;

C. Retrofitting an existing BMP;

D. Watershed or stream restoration; or

E. Other practices approved by the Administration.

3.9 Compensatory Stormwater Management

The Administration may allow compensatory stormwater management when ESD cannot be implemented on a specific site and:

A. Compensatory stormwater management will be implemented in accordance with a Memorandum of Agreement (MOA) between MDE and the State or federal agency; or

B. The Compensatory stormwater management MOA incorporates a locally approved watershed management plan that is acceptable to the Administration.

3.10 Agency/Institutional Management Plan

An Agency/Institutional Management Plan developed for the purpose of implementing stormwater management practices to address existing and future development within the contiguous lands of a State or federal agency shall:

A. Evaluate both quantity and quality management and opportunities for ESD implementation;

B. Include detailed hydrologic and hydraulic analyses to determine hydrograph timing;

C. Include cumulative impact assessment of current and future development;

D. Identify existing flooding areas and receiving stream channel conditions;

E. Include a detailed site map indicating the location of all existing and future stormwater management practices as well as the delineated drainage area to each practice, presented at a reasonable scale;

F. Specify where on-site or off-site quantitative and qualitative stormwater management practices and watershed improvements are or will be implemented;

G. Be consistent with the General Performance Standards for Stormwater Management in Maryland found in Section 1.2 of the Design Manual;

H. Be consistent with any relevant local watershed management plan(s) and/or include compensatory stormwater management;

I. Be signed by the Applicant;

J. Be signed by the Applicant's engineer; and

K. Be approved by the Administration.

4.0 STORMWATER MANAGEMENT CRITERIA

4.1 Minimum Control Requirements

The primary standard of ESD is to reduce post development runoff to levels found in natural, forested conditions. This requires capturing and treating from 1 inch to 2.6 inches of rainfall depending on the design and site conditions (e.g., proposed imperviousness, soils). ESD must be used to treat runoff from 1 inch of rainfall (WQv, and Rev). This is a minimum level of compliance. When the entire target rainfall is treated using ESD, the Cpv requirements, in addition to WQv, and Rev, are satisfied. Designers are responsible for determining specific rainfall targets using the methods outlined in Section 5.2 of the Design Manual.

The Administration will enforce the MEP standard for State and federal projects. Professional judgment will be needed to determine whether site constraints prevent the reasonable implementation of ESD.

A. The minimum control requirements are as follows:

1. The Administration must require that the planning techniques, nonstructural practices, and design methods specified in Chapter 5 of the Design Manual be used to implement ESD to the MEP. The use of ESD planning techniques and treatment practices must be exhausted before any structural BMP from Chapter 3 of the Design Manual is implemented. Stormwater management plans must be designed using ESD sizing criteria for Re_v, WQ_v, Cp_v, according to the Design Manual. The ESD standard is met when post-development hydrology is restored to woods in good condition assuring that channel stability is maintained, that predevelopment groundwater recharge is replicated, nonpoint source pollution is minimized, and that structural stormwater management practices are used only when determined to be absolutely necessary.

2. Refer to Table 1 of these guidelines to determine whether control of the 2-year and 10-year 24-hour frequency storm events is required. When management is required, the design must be in accordance with the Design Manual and all subsequent revisions.

3. Projects located in designated Inter-jurisdictional Flood Hazard Watersheds (Jones Falls, Gwynns Falls, and Herring Run in Baltimore City/County and Carroll Creek in Frederick City/County) will be required to provide management measures necessary to maintain the post-development peak discharges for the 100-year 24-hour frequency storm event at a level that is equal to, or less than, the 100-year 24-hour pre-development peak discharge rates. The stormwater management practices must control the volume, timing, and rate of flow necessary to maintain "no increase" in the downstream peak discharge for the 100-year 24-hour frequency storm event.

4. Stable and safe conveyance of the 10-year 24-hour frequency storm must be provided for all points of discharge from the project. Discharge velocities for the 10-year storms must be non-erosive. The downstream impact analysis must extend to the first downstream tributary whose drainage area equals or exceeds

the contributory drainage area to the POI; or to the downstream point where the flow rate is a minimum of twice the discharge rate from the POI;

5. The Administration may require more than the minimum control requirements specified in these Guidelines if hydrologic or topographic conditions warrant or if historical downstream flooding or receiving channel degradation exists or has the potential to occur as a result of the project.

B. Alternate minimum control requirements may be adopted subject to Administration approval. The Administration shall require that alternative requirements include ESD to the MEP and control flood damages, accelerated stream erosion, water quality, and sedimentation. Comprehensive watershed studies may also be required.

C. Where applicable, stormwater management plans must be consistent with adopted and approved institutional management plans, watershed management plans, or flood management plans as approved by MDE in accordance with the Flood Hazard Management Act of 1976.

D. Identify and provide any additional protection measures for Tier II streams, Critical Areas, and impaired waters or waters with an established Total Maximum Daily Load (TMDL) above the required ESD to the MEP.

4.2 Stormwater Management Measures

The ESD planning techniques and practices and structural stormwater management measures established in the Design Manual must be used either alone or in combination. An applicant must demonstrate that ESD has been implemented to the MEP before using any structural BMP.

A. ESD Planning Techniques.

1. The following planning fundamentals must be applied according to the Design Manual to satisfy the applicable minimum control requirements established in Section 4.1 of these Guidelines:

a. Preserving and protecting natural resources;

b. Conserving natural drainage patterns;

c. Minimizing impervious area;

d. Using green roofs, permeable pavement, reinforced turf, and other alternative surfaces;

e. Reducing runoff volume;

f. Maintaining 100 percent of the annual predevelopment groundwater recharge volume;

g. Clustering development;

h. Limiting soil disturbance, mass grading, and compaction; and

i. Other techniques approved by the Administration.

2. The following ESD treatment practices must be designed in accordance with the Design Manual to satisfy the applicable minimum control requirements established in Section 4.1 of these Guidelines:

a. Disconnection of rooftop runoff;

b. Disconnection of non-rooftop runoff;

c. Sheetflow to conservation areas;

d. Rainwater harvesting;

e. Submerged gravel wetlands;

f. Landscape infiltration;

g. Infiltration/filtration berms;

h. Dry wells;

i. Micro-bioretention;

j. Rain gardens;

k. Vegetated swales;

l. Enhanced filters; and

m. Other practices approved by the Administration.

3. The use of ESD planning techniques and treatment practices specified in this Section must not conflict with existing State law or local ordinances, regulations, or policies.

B. Structural Stormwater Management Measures.

1. If Cpv has not been fully provided after implementing ESD to the MEP, the following structural stormwater management practices must be designed in accordance with the Design Manual to satisfy the applicable minimum control requirements established in Section 4.1 of these Guidelines:

a. Stormwater management ponds;

b. Stormwater management wetlands;

c. Stormwater management infiltration;

d. Stormwater management filtering systems; and

e. Stormwater management open channel systems.

2. The performance criteria specified in the Design Manual with regard to general feasibility, conveyance, pretreatment, treatment and geometry, environment and landscaping, and maintenance must be considered when selecting structural stormwater management practices.

3. Structural stormwater management practices must be selected to accommodate unique hydrologic or geologic conditions, such as Karst topography and high groundwater, encountered within certain regions of the State.

C. Alternative ESD planning techniques, ESD treatment practices, and structural stormwater measures may be used for managing stormwater if they meet the performance criteria established in the Design Manual, and all subsequent revisions, and are approved by the Administration.

D. In situations where the minimum control requirements or design criteria may adversely impact the hydrology or hydraulics downstream of the project, the owner/developer must submit to the Administration an analysis of the impacts of stormwater flows downstream in the watershed. The analysis must include hydrologic and hydraulic calculations necessary to determine the impact of hydrograph timing due to the proposed development upon a dam, highway, structure, or natural point of restricted streamflow. The point of analysis is to be established with the concurrence of the Administration and should be located at the point downstream of the first downstream tributary whose drainage area equals or exceeds the contributing area to the project or stormwater management facility.

E. ESD planning techniques, treatment measures, and structural stormwater management practices, constructed in accordance with an approved plan, must not be altered after construction without approval from the Administration. Prior to considering changes to any stormwater management practice, a conservation area, or an area used as a disconnection, approval must be obtained from the Administration.

F. Compensatory Stormwater Management (Section 3.5).

4.3 Specific Design Criteria

The design criteria, methodologies, and construction specifications, subject to the approval of the Administration, are those of the Design Manual.

A. Infiltration systems must be designed in accordance with the Design Manual and must also meet the following requirements:

1. The facility design must include an overflow system with measures to provide a non-erosive discharge velocity.

2. A least one observation well must be provided for an infiltration trench. The depth to the constructed facility bottom must be marked with permanent marker on the inside of the cap.

B. Ponds, wetlands, filtering systems, and open channel systems must be designed and constructed in accordance with the Design Manual and must also include the following items:

1. Velocity dissipation devices should be placed at the outfall of all detention or retention structures and along the length of any outfall channel as necessary to provide non-erosive velocities at the point of discharge. Flow spreaders may be used to promote sheet flow.

2. If an increase in flooding or stream channel erosion could result at a downstream dam, highway, structure, or natural point of restricted stream flow, the designed release rate of the facility must be reduced.

3. Where the selected BMP is a small pond as defined in Natural Resource Conservation Service (NRCS) Code 378, an NRCS Pond Summary Sheet (see Appendix) must be submitted to and approval obtained from the Administration pursuant to the Environmental Article, Annotated Code of Maryland, Title 5, Subtitle 5.

4. Acceptable methods of modeling the stormwater discharge from a site are TR-55, TR-20 or other methods approved by the Administration.

5.0 STORMWATER MANAGEMENT PLANS

COMAR requires that the ESD process begin at project conception and proceed through final approval. Additionally, COMAR now requires that stormwater and erosion and sediment control strategies be combined. The objective is that review comments be obtained early in the approval process to promote feedback for more effective and improved final stormwater plans. Listed below is the minimum content for the three phases of plan development (concept, site development, and final). Projects with minor impacts may be able to proceed from Concept Approval directly to Final Approval.

The design review and approval process for the three different phases of project planning must ensure that all important resources have been mapped and protected, and all opportunities to enhance natural areas have been explored early in project design. Impervious cover should be minimized, nonstructural practices should be used to disconnect impervious surfaces where possible, and the use of alternative surfaces explored. When all options for the use of ESD have been exhausted, alternative management measures should be used to capture and treat runoff.

5.1 Review and Approval of Stormwater Management Plans

A. For any proposed development disturbing ≥ 5000 square feet, the Applicant must submit phased stormwater management plans to the Administration for review and approval. Plans must be submitted for the concept, site development, and final stormwater management. Each plan submittal must include the minimum content specified in Sections 4.0 and 5.3 of these Guidelines and meet the requirements of the Design Manual.

B. A completed Application for Sediment Control/Stormwater Management Plan Approval must be provided with each submittal (see Appendix).

C. The Administration will review the stormwater management and erosion and sediment control plans for each submittal and provide the applicant with comments as warranted. An approval will be issued at each phase of project design. The approval will contain appropriate comments from the Administration that must be addressed and resubmitted in the subsequent development phases. For any approval phase, the applicant may submit the required plan detail and computations to expedite the review/approval process as outlined in Section 5.3.B or 5.3.C. The Final Stormwater Management and Erosion/sediment Control Plan will be considered approved upon being stamped and signed by the Sediment and Stormwater Plan Review Division Chief and/or designee, and issuance of the written approval for the project.

D. Should the applicant desire a set of approved plans stamped by Sediment and Stormwater Plan Review Division Chief, a request must be made and the final plan submittal must include two sets of plans. Post approval requests for stamped plans cannot be honored.

E. Proposed modifications to an approved stormwater management/erosion and sediment control plan must be submitted to and approved by the Administration in writing. Requests for a modification must be accompanied by a completed application in accordance with Section 5.1.B and must include the reason for and a description of the proposed change, plan sheet(s) showing the proposed changes, and a copy of the

originally approved, affected plan sheet(s).

5.2 Preparation of the Stormwater Management Plan

A. The stormwater management plan must be prepared by any individual whose qualifications are acceptable to the Administration. For State projects, the Administration may require that the design be prepared by a professional engineer, professional land surveyor, or landscape architect licensed in the State of Maryland. For federal projects, the Administration may require that the design be prepared by a professional engineer, professional land surveyor, or landscape architect licensed in the USA.

B. If a dam safety permit or "small pond" approval is required by the Administration, the stormwater BMP design must be prepared by a professional engineer licensed in the State of Maryland for State projects and licensed in the USA for federal projects. A "Small Pond Summary Sheet" found in the Appendix must be completed and submitted to the Administration.

5.3 Contents of the Stormwater Management Plan

The plan must be accompanied by a report that includes sufficient information to evaluate the environmental characteristics of affected areas, the potential impacts of the proposed development on water resources, and the effectiveness and acceptability of measures proposed for managing stormwater runoff. The minimum information submitted to support the stormwater management plan or waiver application must be in accordance with the following:

A. **Concept Plan.** The owner/developer shall submit a concept plan that provides sufficient information for an initial assessment of the proposed project in accordance with these Guidelines and the Design Manual. Plans submitted for concept approval must include, but are not limited to:

1. A plan at a minimum scale of 1 inch = 100 feet showing site location, property boundaries, existing natural features, water and other sensitive resources, topography, and natural drainage patterns;

2. The location of all proposed impervious areas including buildings, roadways, parking, sidewalks, utilities, and other site improvements;

3. The location of the proposed limit of disturbance as well as the location of highly erodible soils, steep slopes, wetlands and other sensitive areas requiring special protection during construction;

4. Preliminary estimates of stormwater management requirements including the selection and location of ESD practices or alternative management measures to be used and the location of all points of discharge from the site;

5. A narrative that supports the concept design for both erosion and sediment control and stormwater management that describes how ESD to the MEP or alternative management measures will be implemented. Intentions to utilize waivers and/or variances must be indicated;

6. Identification of any additional protection measures for Tier II streams, Critical Areas, and impaired waters or waters with an established Total Maximum Daily Load (TMDL) above the required ESD to the MEP.

7. Any information required for the Site Development Plan or Final Stormwater Management Plan that the applicant elects to include as part of the Concept Plan; and

8. Other information as required by the Administration.

B. **Site Development Plan**. Following concept plan approval by the Administration, the owner/developer shall submit a site development plan that reflects comments received during the previous review phase. Plans and reports submitted for site development approval must be of sufficient detail to allow site development to be reviewed and include but not be limited to:

1. Plans providing the information listed in Section 5.3.E of these guidelines;

2. A report providing the information listed in Section 5.3.D of these guidelines;

3. A narrative within the stormwater report that supports the design, describes how ESD will be used to meet the minimum control requirements, and justifies any proposed structural stormwater management measures; and address the Overbank Flood Protection; and, Extreme Flood Volume, if deemed appropriate;

4. Where deemed necessary by the Administration, an analysis of the impacts of stormwater flows downstream in the watershed. The analysis must include hydrologic and hydraulic calculations necessary to determine the impact of hydrograph timing modifications resulting from the proposed development upon a dam, highway, structure, or natural point of restricted stream flow, established with the concurrence of the Administration, and must extend downstream:

   a. to the first downstream tributary whose drainage area equals or exceeds the contributing area to the BMP; or

   b. to the downstream point where the flow rate is a minimum of twice the discharge rate from the BMP;

5. Where deemed necessary, due to increased volume or rate of discharge from the project site, the Administration may require easements or other necessary property interests concerning stormwater discharge onto adjacent properties. It is the responsibility of the applicant to provide said easements or other necessary property interests. Approval of a stormwater management plan does not create or affect any right to direct runoff onto adjacent property without that property owner's permission;

6. A proposed erosion and sediment control plan that contains the construction sequence, any phasing necessary to limit earth disturbances and impacts to natural

resources, and an overlay plan showing the types and locations of ESD and erosion and sediment control practices to be used;

7. Any information required for the Final Stormwater Management Plan that the applicant elects to include as part of the Site Development Plan; and

8. Other information as required by the Administration.

C. **Final Stormwater Management Plan.** Following site development approval by the Administration the owner/developer must submit final erosion and sediment control and stormwater management plans that reflect the comments received during the previous review phase. Plans submitted for final approval must be of sufficient detail to allow all approvals and permits to be issued according to the following:

1. Final stormwater management plans must be submitted for approval in the form of construction drawings and be accompanied by a report that includes sufficient information to evaluate the effectiveness of the proposed runoff control design;

2. A Stormwater Management Waiver Application, indicating the appropriate waiver category, must be submitted for each Point of Investigation for which a waiver is being requested; and

3. Final erosion and sediment control plans must be submitted in accordance with COMAR 26.17.01.05 and the Maryland Erosion and Sediment Control Guidelines for State and Federal Projects.

D. **Stormwater Management Report.** A stormwater management report must be submitted for site development plan approval. The report should be on 8 1/2" x 11" paper. The report should be typed; however certain computational sheets may be handwritten. Any maps, diagrams, or figures that are larger than 8 1/2" x 11" must be folded to a size of 8 1/2" x 11" or smaller and placed within the report. All maps, diagrams, or figures must be clearly labeled. At a minimum each report must contain the following:

1. Title sheet;

2. Table of contents;

3. List of figures or tables;

4. Body of report;
   a. Introduction;
   b. Methodologies used;
   c. A narrative that supports the stormwater management design;
   d. Analysis;
   e. Summary and conclusions.

5. Appendices must include all the background information used in the stormwater management analysis. The background information must be sufficient to

facilitate a straightforward review and should include as applicable:

a. A drawing showing a breakdown of the site's impervious area including new impervious areas, reconstructed impervious areas, impervious areas removed (i.e. demolition), and maintenance areas not exposing earth. The acreage/square footage of these areas must be quantified on the drawing.

b. Drainage area maps depicting both pre-development and post-development conditions. The drainage area maps must delineate drainage area boundaries and show acreage to all stormwater management practices and to all points of discharge from the site. Maps must include soil types, ground cover, land uses, point(s) of investigation, and time of concentration (tc) flow paths;

c. TR-55 work sheets including computations for drainage, runoff curve number and time of concentration;

d. All associated hydraulic computations including those used to develop elevation-discharge-storage tables.

e. TR-20 analysis including schematic diagrams showing reach lengths, curve numbers, drainage areas, and structure locations, and clearly labeled printouts giving input data, output data and hydrographs;

f. All spillway computations;

g. Geotechnical investigations including boring logs and locations, site specific recommendations, and any additional information necessary for the final stormwater management design;

h. All necessary information for performing a downstream analysis to determine the downstream impacts due to runoff from the site;

i. Hydrologic computations for ESD practices or alternative management measures and other BMPs in accordance with the Design Manual;

j. Unified sizing criteria computations;

k. Stormwater volume computations for ESD practices or alternative management measures and other BMPs;

l. Hydraulic computations for all ESD practices or alternative management measures and other BMPs;

m. Waiver applications as appropriate;

n. Compensatory stormwater management;

o. Small pond summary sheet(s) as applicable;

p. Any other information required by the Administration.

E. Stormwater Management Construction Drawings. At a minimum, drawings submitted for stormwater management plan approval must include:

1. A vicinity map;

2. A location map;

3. Existing site characteristics:

   a. A topographic survey showing all existing contours, watercourses, impoundments, wooded areas, and wetlands within or adjacent to the project that receive runoff from the project site.

   b. All existing features including, but not limited to, structures and utilities.

   c. All existing BMPs including buffers, disconnections, conservation areas, etc.

4. Final site layout showing all proposed improvements including the location of buildings and other structures, impervious surfaces, utilities, storm drain systems, stormwater management practices, and proposed contours;

5. All easements and rights-of-way;

6. The delineation, if applicable, of the 100-year floodplain and any on-site wetlands;

7. Structural and construction details for all components of the proposed drainage system or systems and stormwater management facilities;

8. All necessary construction specifications;

9. A sequence of construction which addresses the implementation of both erosion/sediment control and stormwater management and at a minimum includes the following steps, in correct order;

   a. Notification of MDE's Compliance Program at 410-537-3510 a minimum of seven (7) days in advance of any earth disturbance activity to schedule a pre-construction meeting;

   b. Clearing and grubbing only for installation of perimeter erosion/sediment controls.

   c. Installation of perimeter erosion/sediment controls.

   d. Clearing, grubbing, and rough grading;

e. Construction;

f. Final grading;

g. Vegetative stabilization;

h. Installation of stormwater management practices upon permanent stabilization of contributory drainage areas;

i. With MDE approval, removal of erosion/sediment controls.

j. Stabilization of areas disturbed by removal of sediment controls.

10. A planting plan and schedule for the stormwater management facilities;

11. A maintenance schedule for each type of BMP (samples provided in Appendix);

12. Certification by the owner/developer that all stormwater management construction will be done pursuant to the plan (Owner's/Developer's Certification provided in Appendix);

13. Certification by the Engineer that the plan has been designed in accordance with the Design Manual (Design Certification provided in Appendix);

14. An As-Built certification signature block (provided in Appendix) to be executed after project completion;

15. Identify and provide any additional protection measures for Tier II streams, Critical Areas, and impaired waters or waters with an established Total Maximum Daily Load (TMDL) above the required ESD to the MEP.

16. The appropriate BMP As-Built Tabulation(s) (samples provided in Appendix); and

17. Any other information as required by the Administration.

6.0 INSPECTION

6.1 Inspection Schedule and Reports

A. The Applicant shall notify the Administration (the Compliance Program) at least 7 days before commencing any work in conjunction with the erosion/sediment control and stormwater management plans and again upon completion of the project.

B. For each ESD practice and other BMPs, regular inspections should be performed at the stages of construction specified in the Design Manual and documented by the Applicant or authorized representative. At a minimum, all ESD practices and other BMPs must be inspected upon completion of final grading and upon the establishment of permanent stabilization.

C. The Applicant shall submit notice of construction completion to the Administration on the form provided in the Appendix for each structural stormwater management practice as well as the type, number, total drainage area, and total impervious area treated by all ESD techniques and practices.

6.2 Inspection Requirements During Construction for As-Built Certification

A. Regular inspections should be made and documented during and after completion of construction for the following practices:

1. ESD Practices or Alternative Surfaces;

    a. Permeable pavers;

    b. Green roofs;

    c. Disconnection of rooftop runoff; disconnection of non-rooftop runoff; and Sheetflow to conservation areas;

    d. Rainwater harvesting;

    e. Submerged gravel wetlands;

    f. Landscape infiltration; infiltration/filtration berms; dry wells;

    g. Micro-Bioretention; rain gardens; enhanced filters;

    h. Vegetated swales;

2. Ponds:

    a. During embankment construction including, but not limited to, installation of:

        i. Cutoff trench;

ii. Inlet and outlet structures, filter diaphragms, concrete cradles, and watertight connectors on pipes;

iii. Trench for spillway pipe;

iv. Impervious core;

v. Weir wall;

vi. Riser structure; and

vii. Placement of fill.

3. Wetlands – at the stages specified for pond construction in Section 6.2.A.1 as applicable as well as during and after wetland reservoir planting and during the second growing season to verify a vegetation survival rate of at least 85 percent.

4. Infiltration trenches:

   a. During excavation to subgrade;

   b. During placement of observation wells;

   c. During placement of geotextiles and trench stone;

   d. During construction of appurtenant conveyance systems such as diversion structures, forebays, inlets, outlets, and flow distribution structures; and

5. Infiltration basins – at the stages specified for pond construction in Section 6.2.A.1 as applicable.

6. Sand filters and Bioretention:

   a. During excavation to subgrade;

   b. During placement of underdrain systems and observation wells;

   c. During placement of geotextile and all filter media;

   d. During construction of appurtenant conveyance systems such as flow diversion structures, pre-treatment, inlets, outlets, orifices, and flow distribution structures; and

7. Open channel systems:

   a. During excavation to subgrade;

   b. During placement of under drain system, observation wells, and filter

media for dry swales; and

c. During installation of check dams, or weirs.

B. Once construction is complete, As-Built Plan Certification must be submitted to the Administration by either a professional engineer or a professional land surveyor to ensure that constructed stormwater management practices and conveyance systems comply with the approved plans. At a minimum, the "as-built" submittal must include a signed As-Built Certification, completed As-Built Data Table(s), and a set of "as-built" drawings which compare the approved stormwater management plan with what was constructed. The Administration may require additional information. For a project to be closed out by the Administration, As-Built Certification must be received. An As-Built Certification form can be found in the Appendix of these Guidelines.

7.0 MAINTENANCE

A. The owner of the property, or any other person or agent in control of such property, on which work has been done pursuant to these Guidelines, must maintain in good condition and promptly repair and restore all grade surfaces, walls, drains, dams and structures, vegetation, erosion and sediment control measures, and other protective devices. Such repairs or restoration and maintenance must be in accordance with approved plans.

B. A maintenance schedule must be developed for the all stormwater management and/or ESD practices and must state the maintenance to be completed, the time period for completion, and who must perform the maintenance. This maintenance schedule must be printed on the approved stormwater management plan.

Appendix

APPLICATION FOR SEDIMENT CONTROL/STORMWATER MANAGEMENT PLAN APPROVAL

A completed application must be provided with EACH submittal

__ **INITIAL SUBMITTAL**

DATE _____

__ **RESUBMITTAL: MDE NO.** __ __**-SF-**__ __ __ __

__ **MODIFICATION REQUEST: MDE NO.** __ __**-SF-**__ __ __ __

CONTRACT NUMBER: _____
PROJECT DESCRIPTION: _____
_____
PROJECT DISTURBANCE (ACRES): _____
PROJECT LOCATION (TOWN): _____
PROJECT LOCATION (COUNTY): _____
INFORMATION ENCLOSED: _____
_____

APPLICANT NAME: _____
APPLICANT ADDRESS: _____
_____
_____
APPLICANT CONTACT NAME: _____
APPLICANT PHONE NUMBER: _____
APPLICANT FAX NUMBER: _____
APPLICANT e-mail: _____

CONSULTANT NAME: _____
PROJECT ENGINEER: _____
CONSULTANT ADDRESS: _____
_____
_____
CONSULTANT CONTACT NAME: _____
CONSULTANT PHONE NUMBER: _____
CONSULTANT FAX NUMBER: _____
CONSULTANT e-mail: _____

MARYLAND DEPARTMENT OF THE ENVIRONMENT
Water Management Administration
Sediment & Stormwater Plan Review Division
1800 Washington Boulevard, 4th Floor, Suite 440
Baltimore, MD 21230-1708
Telephone: 410-537-3563
Fax: 410-537-3553
www.mde.state.md.us

MARYLAND DEPARTMENT OF THE ENVIRONMENT
Water Management Administration ● Sediment and Stormwater Plan Review Division
1800 Washington Boulevard ● Baltimore, MD 21230
(410) 537-3543 ● 1-800-633-6101 ● http://www.mde.state.md.us

STORMWATER MANAGEMENT WAIVER APPLICATION

OWNER: _____ MDE NO.: _____

ADDRESS: _____ PROJECT NO.: _____

LOCATION/POI: _____

CONSULTANT: _____

DESCRIPTION: _____

I/We, the Owner/Owners hereby request a stormwater management waiver be granted for the above referenced project in accordance with the following Section of the Stormwater Management Guidelines for State and Federal Projects:

____ 3.3.A. Contract plans and provisions, stormwater management report.
____ 3.3.B.1.a. Contract plans and provisions, stormwater management report.
____ 3.3.B.1.b. Contract plans and provisions, stormwater management report.*
____ 3.3.B.1.c. Contract plans and provisions, stormwater management report.*
____ 3.3.B.2.a. Contract plans and provisions, stormwater management report.
____ 3.3.B.2.b. Contract plans and provisions, stormwater management report.*
____ 3.3.B.2.c. Contract plans and provisions, stormwater management report.*
____ 3.3.B.3.a. Contract plans and provisions, stormwater management report.*
____ 3.3.B.3.b. Contract plans and provisions, stormwater management report.*
____ 3.3.B.4. Contract plans and provisions, stormwater management report.*

*Evidence of stable outfall with adequate capacity (e.g., video, photos, statement): _____

Other evidence submitted: _____

_____ _____ _____
Name of Owner or authorized representative | Signature | Date

____ Approved ____ Denied/Reason _____

By _____ _____
Sediment and Stormwater Plan Review Engineer | Date

Submit to:
Maryland Department of the Environment
Water Management Administration
Sediment and Stormwater Plan Review Division
1800 Washington Boulevard
Baltimore, MD 21230

If a project involves a waiver request for more than one (1) drainage area, a Stormwater Management Waiver Application is required for each point of investigation (POI).

MDE/WMA/PER.O58

OWNER'S / DEVELOPER'S CERTIFICATION

I / We hereby certify that all clearing, grading, construction, and/or development will be done pursuant to this plan and that any responsible personnel involved in the construction project will have a certificate of attendance at a Maryland Department of the Environment approved training program for the control of erosion and sediment before beginning the project. I/We hereby authorize the right of entry for periodic on-site evaluation by appropriate inspection and enforcement authority or the State of Maryland, Department of the Environment.

_____	_____
Date	Owner / Developer Signature
_____	_____
Card No.	Printed Name and Title

DESIGN CERTIFICATION

I hereby certify that this plan has been designed in accordance with the Maryland Standards and Specifications for Soil Erosion and Sediment Control, the 2000 Maryland Stormwater Design Manual, Volumes I & II including supplements, the Environment Article Sections 4-101 through 116 and Sections 4-201 and 215, and the Code of Maryland Regulations (COMAR) 26.17.01 and COMAR 26.17.02 for erosion and sediment control and stormwater management, respectfully.

_____	_____
Date	Designer's Signature
Md. Registration No._____	_____
P.E., R.L.S., RLA, or R.A. (circle one)	Printed Name

TABLE 1

For the purposes of Section 3.3 B.4 of these Guidelines, the following are minimum county flood control requirements:

COUNTY	QP_2	QP_{10}
Allegany	NO	See Note 1
Anne Arundel	NO	See Note 1
Baltimore (County & City)	NO	See Note 1
Calvert	NO	See Note 1
Caroline	YES	NO
Carroll	NO	See Note 1
Cecil	See Note 2	See Note 1
Charles	NO	See Note 1
Dorchester	YES	NO
Frederick	NO	YES
Garrett	NO	See Note 1
Harford	NO	YES
Howard	NO	See Note 1
Kent	YES	See Note 1
Montgomery	NO	See Note 1
Prince George's	NO	See Note 1
Queen Anne's	YES	NO
St. Mary's	NO	See Note 1
Somerset	YES	NO
Talbot	YES	NO
Washington	NO	YES
Wicomico	YES	NO
Worcester	YES	NO

1. **Q_{p10} is required where there are downstream flooding issues or conveyance is inadequate.**
2. **Q_{p2} is required in the Coastal Plain (south of the Chesapeake & Delaware Canal).**

TABLE 2

For the purposes Section 3.3 B.2 of these Guidelines, the following are considered MAJOR WATERWAYS:

WATERWAY	LIMITS
Susquehanna River	main stem from mouth to Pennsylvania line
Pokomoke River	main stem from mouth to MD 12
Nanicoke River	main stem from mouth to Delaware line
Choptank River	main stem from mouth to MD 404
Chester River	main stem from mouth to MD 290
Elk River	main stem from mouth to US 40
Bush River	main stem from mouth to US 40
Gunpowder River	main stem from mouth to US 40
Patapsco River	main stem from mouth to US 1
Patuxent River	main stem from mouth to MD 416
Potomac River	main stem from mouth to I 81
Youghiogheny River	main stem from Pennsylvania line to I 68
Wicomico River	main stem from mouth to US 50

Maryland Department of the Environment
POND SUMMARY SHEET

PROJECT INFORMATION

MDE File No: _____
Project Name: _____
_____

MARYLAND COORDINATES
(to nearest 1000 feet)

East _____
North _____
County _____
ADC Map/Grid /

OWNER INFORMATION

Name: _____
Address: _____
_____
City, State, Zip _____

TYPE OF POND: ☐ Excavated ☐ Embankment ☐ Both

Drainage Area: _____ acres
Surface Area: _____ acres
Normal Depth: _____ feet
Storage at Design High Water (DHW): ac-ft

HAZARD CLASS: A(Low) B(Significant) C(High) Design Storm Frequency: _____ Years

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 _____ feet
Maximum Fill Height _____ feet
Top Width _____ feet
Side Slopes: U.S. _____ :1
D.S. _____ :1

Will embankment serve as public roadway? ☐ Yes ☐ No

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

Velocity: _____ ft/sec
Crest Elev: _____ ft
Design Capacity at DHW: _____ cfs
Bottom Width: _____ feet
Side Slopes: _____ :1
Spillway Protection: ☐ Grass ☐ Riprap ☐ Gabions ☐ Other: _____

DISTANCES BELOW POND TO

Property Line: _____ feet
Public Road: _____ feet

MDE Plan Reviewer approving pond: _____

date: _____

Note: This pond summary sheet is to be used by MDE Sediment and Stormwater Plan Review Division to notify MDE Dam Safety Division of low hazard (class "a") ponds which have embankment heights of 20 feet or less approved for State and federal projects. Higher hazard ponds require a permit from Maryland Department of the Environment, Dam Safety Division. October 2007

As-Built Certification and Tables

AS-BUILT CERTIFICATION

I hereby certify that the stormwater management facilities (both BMPs and ESD practices) shown on the plans have been constructed in accordance with the plans approved by the Maryland Department of the Environment, except as noted in red on the "AS-BUILT" drawings.

______________________________	______________________________
Name	Signature
______________________________	______________________________
Maryland Registration Number (PE or LS)	Date

____

MDE No.

Facilities being certified (list each individually using facility ID number and/or description):

______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
______________________________	______________________________
	Attach additional form(s) if necessary.

"Certify" means to state or declare a professional opinion based on sufficient and appropriate onsite inspections and material tests conducted during construction.

- -

PROJECT NAME:		MDE NO:	
AS-BUILT DATA FOR ESD PRACTICES * TO BE COMPLETED BY THE CERTIFYING ENGINEER			
TYPE OF ESD PRACTICE	**ID NUMBER**	**DESIGN FEATURE**	***AS-BUILT FEATURE**
GREEN ROOF			
PERMEABLE PAVEMENT			
REINFORCED TURF			
DISCONNECTION OF ROOFTOP RUNOFF			
DISCONNECTION OF NON-ROOFTOP RUNOFF			
SHEETFLOW TO CONSERVATION AREA			
RAINWATER HARVESTING (CISTERN OR RAIN BARREL)			
SUBMERGED GRAVEL WETLAND			
LANDSCAPE INFILTRATION			
INFILTRATION BERM			
DRY WELL			
MICRO-BIORETENTION			
RAIN GARDEN			
SWALE			
ENHANCED FILTER			

NOTE TO DESIGNER: List all the applicable ESD practices. Include the relevant design feature(s) for the specific ESD practice.

DATE AS-BUILT ACCEPTED BY MDE:_____

PROJECT NAME: **MDE NO:**

AS-BUILT DATA FOR FILTERS (Sand filters and Bioretention)

* TO BE COMPLETED BY THE CERTIFYING ENGINEER

TYPE OF FACILITY: **BMP ID:**

FEATURE	DESIGN	*AS-BUILT
FOREBAY AREA & VOLUME		
FILTER BED DIMENSIONS (L x W x D)		
FILTER BED SURFACE ELEVATION		
FILTER INLET PIPE SIZE / INVERT ELEVATION		
OUTLET PIPE (UNDERDRAIN) SIZE / INVERT ELEV.		
THICKNESS OF FILTER MEDIA		
PLACEMENT OF GEOTEXTILE		
PLANTINGS		
COMPOSITION OF FILTER MEDIA		
OBSERVATION WELL WITH DEPTH TO FILTER BOTTOM INDICATED ON CAP		

NOTE TO DESIGNER: It may be necessary to add and/or delete features as appropriate for the specific BMP.

DATE AS-BUILT ACCEPTED BY MDE: _____

PROJECT NAME:	MDE NO:	
AS-BUILT DATA FOR OPEN CHANNELS (Dry / Wet Swales)		
*TO BE COMPLETED BY THE CERTIFYING ENGINEER		
TYPE OF FACILITY:	**BMP NO:**	
FEATURE	**DESIGN**	***AS-BUILT**
BOTTOM WIDTH		
TOTAL LENGTH		
STORAGE VOLUME		
NUMBER OF CHECK DAMS / WEIRS		
1-YEAR FREEBOARD		
10-YEAR FREEBOARD		
SIDE SLOPE RATIO(S)		
MAXIMUM CHANNEL SLOPE		
UNDERDRAIN PIPE DIAMETER		
THICKNESS OF FILTER MEDIA		
COMPOSITION OF FILTER MEDIA		

NOTE TO DESIGNER: It may be necessary to add and/or delete features as appropriate for the specific BMP.

DATE AS-BUILT ACCEPTED BY MDE: _____

PROJECT NAME: **MDE NO:**

AS-BUILT DATA FOR INFILTRATION TRENCHES

*TO BE COMPLETED BY THE CERTIFYING ENGINEER

BMP ID:

FEATURE	DESIGN	*AS-BUILT
BOTTOM ELEVATION		
SURFACE ELEVATION		
SURFACE DIMENSIONS (W x L)		
BOTTOM DIMENSIONS (W x L)		
STORAGE VOLUME		
OBSERVATION WELL WITH DEPTH TO TRENCH BOTTOM INDICATED ON CAP		
MEDIA TYPE / THICKNESS		

NOTE TO DESIGNER: It may be necessary to add and/or delete features as appropriate for the specific BMP.

DATE AS-BUILT ACCEPTED BY MDE: _____

PROJECT NAME: **MDE NO:**

AS-BUILT DATA FOR INFILTRATION BASINS

*TO BE COMPLETED BY THE CERTIFYING ENGINEER

BMP ID:

FEATURE	DESIGN	*AS-BUILT
BOTTOM ELEVATION		
SURFACE ELEVATION		
SURFACE DIMENSIONS (W x L)		
BOTTOM DIMENSIONS (W x L)		
STORAGE VOLUME		
PRINCIPAL SPILLWAY: DIAM /ELEV OUT /GRADE /LENGTH		
EMERGENCY SPILLWAY: WIDTH / LENGTH / ELEV		
OUTLET PROTECTION: LENGTH/WIDTH/STONE SIZE		
FOREBAY DIMENSIONS/VOLUME		
FOREBAY WEIR LENGTH/ELEVATION		

NOTE TO DESIGNER: It may be necessary to add and/or delete features as appropriate for the specific BMP.

DATE AS-BUILT ACCEPTED BY MDE: _____

PROJECT NAME:	MDE NO:	
AS-BUILT DATA FOR PONDS / WETLANDS * TO BE COMPLETED BY THE CERTIFYING ENGINEER		
TYPE OF FACILITY:	**BMP NO:**	
FEATURE	**DESIGN**	***AS-BUILT**
FOREBAY DIMENSIONS (W x L x D)		
FOREBAY VOLUME		
FOREBAY WEIR LENGTH / ELEVATION		
WQ STORAGE VOLUME		
CPv STORAGE VOLUME		
2-YR STORAGE VOLUME		
10-YR STORAGE VOLUME		
100-YR STORAGE VOLUME		
WQ STORAGE ELEVATION		
CPv STORAGE ELEVATION		
2-YR STORAGE ELEVATION		
10-YR STORAGE ELEVATION		
100-YR STORAGE ELEVATION		
CPv DISCHARGE (CFS)		
2 -YR DISCHARGE (CFS)		
10-YR DISCHARGE (CFS)		
100-YR DISCHARGE (CFS)		
CPv CONTROL OPENING SIZE / INVERT ELEV.		
2-YR CONTROL OPENING SIZE / INVERT ELEV.		
10-YR CONTROL OPENING SIZE / INVERT ELEV.		
PRINCIPAL SPILLWAY: DIAMETER / INVERT IN / INVERT OUT		
PRINCIPAL SPILLWAY: LENGTH / SLOPE		

EMERGENCY SPILLWAY: WIDTH / LENGTH / ELEV.		
OUTLET PROTECTION: (W x L x D)		
OUTLET PROTECTION: STONE SIZE		

NOTE TO DESIGNER: It may be necessary to add and/or delete features as appropriate for the specific BMP.

DATE AS-BUILT ACCEPTED BY MDE: _____

PROJECT NAME: **MDE NO:**

AS-BUILT DATA FOR FLOW SPLITTERS

* TO BE COMPLETED BY THE CERTIFYING ENGINEER

STRUCTURE NO:

FEATURE	DESIGN	*AS-BUILT
INFLOW OPENING SIZE / INVERT ELEVATION		
DIVERSION OPENING SIZE / INVERT ELEVATION		
BYPASS WEIR LENGTH / INVERT ELEVATION		
BYPASS OPENING SIZE / INVERT ELEVATION		

NOTE TO DESIGNER: It may be necessary to add and/or delete features as appropriate for the specific BMP.

DATE AS-BUILT ACCEPTED BY MDE: _____

Maintenance Schedules

STORMWATER MAINTENANCE SCHEDULE
BIORETENTION

Inspection Item	Frequency of Inspection	Inspection Requirements	Remedial Action
Bioretention Basin	Seasonally and after a major storm		
Dewatering		Facility must dewater within 48 hours of rainfall. Noticeable odors, stained water on the filter surface or at the outlet, or the presence of algae or aquatic vegetation are indicators of anaerobic conditions, and inadequate dewatering of the facility.	The top three inches of soil should be removed and replaced with soil material as per plan specifications. Follow up inspections must confirm adequate dewatering. If the facility does not function as intended after the above action, the entire filter and underdrain system may need maintenance. MDE approval may be necessary.
Mulch Layer		Check mulch for adequate cover, sediment accumulation, or discoloration.	Replace and remove old mulch and excess sediments. Provide adequate mulch cover according to approved design.
Vegetative Surfaces	Monthly		
Plant Composition and Health		Compare plant composition with approved plans. Check for invasive species or weeds. Check for dead or dying vegetation.	Remove and replace plants in accordance with plan specifications.
Vegetative Cover and Erosion		Check for evidence of erosion, runoff channelizing, or bare spots.	Re-seed or re-plant in accordance with approved landscaping plans. Re-grading may be required when concentrated flow causes rills or gullying through the facility.
Debris and Trash Cleanout	Monthly	Check that the facility is clean of trash and debris. Inlets, outlets, and contributing areas around the facility must be checked.	Trash and debris must be disposed of in an acceptable manner according to current regulations.
Structural Components	Annually	Check for evidence of structural deterioration, spalling, or cracking. Inlet and outlet structures must be in good condition.	Repair to good condition according to specifications on the approved plans.

STORMWATER MAINTENANCE SCHEDULE
BIORETENTION

Outlets	Seasonally and after a major storm	Check for evidence of erosion, rills, or gullying.	Stabilize all eroded areas and grade to provide stable conveyance.
		Riprap outlet must be maintained in good functional condition.	Repair according to approved plan.
Pretreatment Forebays	Seasonally and after a major storm		
Sediment Accumulation		Check for sediment accumulation in the forebay.	When the forebay depth is less than half the proposed design, sediment must be removed and the forebay restored according to the approved design.
Sand Layer		Check sand for staining and sediment accumulation	Replace first three inches of sand layer with sand materials per plan specifications.
Gravel Diaphragm		Check gravel diaphragm for sediment accumulation and evidence of erosion	Stabilize or replace gravel according to plan specifications.
Grass Channel Conveyance Systems	Seasonally and after a major storm	Check for erosion, flow blockages, and stable conveyance	Stabilize and grade according to approved plan.
Overall Function of the Facility	Annually	Check that flow splitters are functioning as designed and that bypass is operating as designed.	Construction must be in accordance with approved plans.

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STORMWATER MAINTENANCE SCHEDULE
DRY SWALE

Inspection Item	Frequency of Inspection	Inspection Requirements	Remedial Action
Swale Surface	Seasonally and after a major storm		
Dewatering		Facility must dewater within 48 hours of rainfall. Noticeable odors, stained water on the filter surface or at the outlet, or the presence of algae or aquatic vegetation are indicators of anaerobic conditions and inadequate dewatering of the facility.	The top three inches of soil must be removed and replaced with soil material as per plan specifications. Follow up inspections must confirm adequate dewatering. If the facility does not function as intended after the above action, the entire filter and underdrain system may need maintenance. MDE approval may be necessary.
Sediment Accumulation		Check for sediment accumulation on the filter bed.	Silt/sediment must be removed from the swale when accumulation exceeds (1) inch.
Check Dams or Energy Dissipaters		Check for evidence of flow cutting around the structure and evidence of erosion at the downstream toe.	Repair and re-grade as necessary to comply with approved plans.
Vegetative Surfaces	Monthly		
Vegetative Cover		Check for evidence of erosion and/or dead or dying vegetation in the swale or slopes.	Replace or remove plants in accordance with plan specifications.
Mowing		Grass in the swale must be maintained at a height of 4 to 6 inches.	Mow during the growing season to maintain the required height. Clippings must be removed.
Debris and Trash Cleanout	Monthly	Check that the facility is clean of trash and debris. Inlets, outlets, and contributing areas around the facility must be checked.	Trash and debris must be disposed of in an acceptable manner according to current regulations.
Structural Components	Annually	Check for evidence of structural deterioration, spalling, or cracking. Inlet and outlet structures in good condition.	Repair in good condition according to specifications on the approved plans.

STORMWATER MAINTENANCE SCHEDULE
DRY SWALE

Outlets	Seasonally and after a major storm	Check for evidence of erosion, rills, or gullying.	Stabilize all eroded areas and grade to provide stable conveyance.
		Riprap outlet must be maintained in good functional condition.	Repair according to approved plan.
Pretreatment Forebays	Seasonally and after a major storm		
Sediment Accumulation		Check for sediment accumulation in the forebay.	When the forebay depth is less than half the proposed design, sediments must be removed and the forebay restored according to the approved design.
Grass Channel Conveyance Systems	Seasonally and after a major storm	Check for erosion, flow blockages, and stable conveyance.	Stabilize and grade according to approved plan.
Overall Function of the Facility	Annually	Check for evidence of flow bypassing the facility.	Construction must be in accordance with approved plans.

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STORMWATER MAINTENANCE SCHEDULE
WET SWALE

Inspection Item	Frequency of Inspection	Inspection Requirements	Remedial Action
Swale Surface	Seasonally and after a major storm		
Vegetation		Check for healthy vegetation and good cover. Check for evidence of erosion, bare spots or dead or dying vegetation.	Remove unwanted vegetation and re-seed or re-plant according to approved plan.
Sediment Accumulation		Check for excessive sediment in the open water areas causing disruption to flow.	Clean out sediments and restore elevations to approved plan design.
Wet Pool Elevations		Check that water levels and storage are in accordance with the approved design.	Sediments may need to be cleaned out to restore wet pool volume. If the facility is not functioning as designed, contact MDE for review and approval of field modifications.
Check Dams or Energy Dissipaters		Check for evidence of flow cutting around the structure, and evidence of erosion at the downstream toe.	Repair and re-grade as required to comply with approved plans.
Debris and Trash Cleanout	Monthly	Check that the facility is clean of trash and debris. Inlets, outlets, and contributing areas around the facility must be checked.	Trash and debris must be disposed of in an acceptable manner according to current regulations.
Structural Components	Annually	Check for evidence of structural deterioration, spalling or cracking. Outlet structure in good condition.	Repair to good condition according to specifications on the approved plans.
Outlets	Seasonally and after a major storm	Check for evidence of erosion, rills, or gullying.	Stabilize all eroded areas and grade to provide stable conveyance.
		Check that riprap outlet is maintained in good functional condition.	Repair in accordance with approved plan.
Pretreatment Forebays	Seasonally and after a major storm		
Sediment Accumulation		Check for sediment accumulation in the forebay.	When the forebay depth is less than half the proposed design, sediment must be removed and the forebay restored in accordance with the approved design.
Grass Channel Conveyance Systems	Seasonally and after a major storm	Check for erosion, flow blockages, and stable conveyance.	Stabilize and grade according to approved plan.
Overall Function of the Facility	Annually	Check that flow conveyance is operating as designed.	Construction must be in accordance with approved plans.

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STORMWATER MAINTENANCE SCHEDULE
SURFACE SAND FILTER

Inspection Item	Frequency of Inspection	Inspection Requirements	Remedial Action
Filter Surface	Seasonally and after a major storm		
Dewatering		Facility must dewater within 48 hours of rainfall. Noticeable odors, stained water on the filter surface or at the outlet, or the presence of algae or aquatic vegetation are indicators of anaerobic conditions and inadequate dewatering of the facility.	Remove the top three inches of sand and replace with sand material per plan specifications. Follow up inspections must confirm adequate dewatering. If the facility does not function as intended after the above action, the entire filter and underdrain system may need maintenance. MDE approval may be necessary.
Sediment Accumulation		Check for sediment accumulation on the filter bed.	Silt/sediment must be removed from the filter bed when accumulation exceeds 1 inch.
Vegetative Surfaces	Monthly		
Vegetative Cover		Check for evidence of erosion and dead or dying vegetation on the filter or slopes.	Remove and replace plants in accordance with plan specifications.
Mowing		Grass on the filter must be maintained in good condition and be less than 12 inches in height.	Mow during the growing season to maintain the required height. Clippings must be removed.
Debris and Trash Cleanout	Monthly	Check that the facility is clean of trash and debris. Inlets, outlets, and contributing areas around the facility must be checked.	Trash and debris must be disposed of in an acceptable manner according to current regulations.
Structural Components	Annually	Check for evidence of structural deterioration, spalling, or cracking. Outlet structure must be in good condition.	Repair to good condition in accordance with specifications on the approved plans.
Outlets	Seasonally and after a major storm	Check for evidence of erosion, rills, or gullying.	Stabilize all eroded areas and grade to provide stable conveyance.
		Check that riprap outlet is maintained in good functional condition.	Repair according to approved plan.

STORMWATER MAINTENANCE SCHEDULE
SURFACE SAND FILTER

Pretreatment Forebays	Seasonally and after a major storm		
Sediment Accumulation		Check for sediment accumulation in the forebay.	When the forebay depth is less than half the proposed design, sediment must be removed and the forebay restored in accordance with the approved design.
Grass Channel Conveyance Systems	Seasonally and after a major storm	Check for erosion, flow blockages, and stable conveyance.	Stabilize and grade according to approved plan.
Overall Function of the Facility	Annually	Check that flow splitters are functioning as designed and that bypass is operating as designed.	Construction must be in accordance with approved plans.

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STORMWATER MAINTENANCE SCHEDULE
UNDERGROUND SAND FILTER

Inspection Item	Frequency of Inspection	Inspection Requirements	Remedial Action
Filter Chambers	Seasonally and after a major storm		
Dewatering		Facility must dewater within 48 hours of rainfall. Noticeable odors, stained water on the filter surface or at the outlet, or the presence of algae or aquatic vegetation are indicators of anaerobic conditions and inadequate dewatering of the facility.	Remove the top three inches of sand and replace with sand material as per plan specifications. Follow up inspections must confirm adequate dewatering. If the facility does not function as intended after the above action, the entire filter and underdrain system may need maintenance. MDE approval may be necessary.
Water Holding Chambers		Check for evidence of leakage. Chambers should be holding water at normal pool elevation.	Repair to achieve operation in accordance with the approved plans.
Debris and Trash Cleanout	Monthly	Check that the facility is clean of trash and debris. Inlets, outlets, and contributing areas around the facility shall be checked.	Trash and debris must be disposed of in an acceptable manner according to current regulations.
Structural Components	Annually	Check for evidence of structural deterioration, spalling, or cracking. Outlet structure must be in good condition.	Repair to good condition according to specifications on the approved plans.
Outlets	Seasonally and after a major storm	Check for evidence of erosion, rills, or gullying.	Stabilize all eroded areas and grade to provide stable conveyance.
		Check that riprap outlet is in good functional condition.	Repair according to approved plan.
Pretreatment Forebays	Seasonally and after a major storm	Check for sediment accumulation in the forebay.	When sediment accumulates to 6 inches in depth, the pretreatment chamber must be cleaned out. Removed sediment and sediment laden water must be disposed in an approved location.
Grass Channel Conveyance Systems	Seasonally and after a major storm	Check for erosion, flow blockages, and stable conveyance.	Stabilize and grade according to approved plan.
Overall Function of the Facility	Annually	Check that flow splitters are functioning as designed and that bypass is operating as designed.	Construction must be in accordance with approved plans.

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STORMWATER MAINTENANCE SCHEDULE
INFILTRATION TRENCH

Inspection Item	Frequency of Inspection	Inspection Requirements	Remedial Action
Filter Surface	Seasonally and after a major storm		
Dewatering		Facility must dewater within 48 hours of rainfall. Noticeable odors, stained water on the filter surface or at the outlet, or the presence of algae or aquatic vegetation are indicators of anaerobic conditions and inadequate dewatering of the facility.	Remove the top three to six inches of stone and replace with stone material per plan specifications. Follow up inspections must confirm adequate dewatering. If the facility does not function as intended after the above action, the entire facility may need maintenance. Contact MDE.
Cleanouts/ Observation wells		Check operation. Check sediment accumulation.	Repair in accordance with the approved plans.
Sediment Accumulation		Check for sediment accumulation on the trench surface.	Silt/sediment must be removed from the stone when accumulation exceeds 1 inch.
Debris and Trash Cleanout	Monthly	Check that the facility is clean of trash and debris. Inlets, outlets, and contributing areas around the facility must be checked.	Trash and debris must be disposed of in an acceptable manner according to current regulations.
Structural Components	Annually	Check for evidence of structural deterioration, spalling, or cracking. Inlet and outlet structures must be in good condition.	Repair to good condition in accordance with specifications on the approved plans.
Outlets	Seasonally and after a major storm	Check for evidence of erosion, rills, or gullying.	Stabilize all eroded areas and grade to provide stable conveyance.
		Check that Riprap outlet is in good functional condition.	Repair in accordance with approved plans.
Pretreatment Forebays	Seasonally and after a major storm		
Sediment Accumulation		Check for sediment accumulation in the forebay.	When the forebay depth is less than half the proposed design, sediment must be removed and the forebay restored in accordance with the approved design.
Grass Channel Conveyance Systems	Seasonally and after a major storm	Check for erosion, flow blockages, and stable conveyance.	Stabilize and grade in accordance with the approved plan.
Overall Function of the Facility	Annually	Check that flow splitters are functioning as designed and that bypass is operating as designed.	Construction must be in accordance with approved plans.

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STORMWATER MAINTENANCE SCHEDULE
INFILTRATION BASIN

Inspection Item	Frequency of Inspection	Inspection Requirements	Remedial Action
Riser and Outlet Structure	Seasonally and after a major storm		
Debris Present		Check for trash, debris, and/or sediment clogging all openings.	Trash, debris, and sediment must be disposed of in an acceptable manner according to current regulations.
Trash Racks		Check condition.	Repair or replace in good condition.
Cleanouts/Observation Wells		Check operation. Check sediment accumulation.	Repair in accordance with approved plans.
Riser and Barrel		Check for evidence of cracks, spalling, joint failures, water tightness, seepage around spillway pipe, and water tightness.	Repair in accordance with approved plans.
Vegetation		Check for excessive vegetation blocking orifice openings. Woody vegetation shall be less than 5 feet from the barrel and less than 25 feet from the riser	Remove vegetation and roots as necessary.
Other Structural Components		Check for missing manhole covers, grates, concrete, and structural integrity.	Repair in accordance with the approved plans.
Pond Outlet	Annually		
Debris		Check for trash and debris in and around the outlet.	Trash, debris, and sediment must be disposed of in an acceptable manner according to current regulations.
Riprap Protection		Check for displacement, blow outs, stable conveyance, and erosion below the outlet	Repair and restore function in accordance with the approved plans.
Abutment Contacts		Check for erosion, cracks, and seepage	Repair as needed.
Embankment	Annually		
Vegetation		Check that there is no woody vegetation on embankment and ground cover is in good condition. Check for wetland type vegetation.	Remove woody vegetation as necessary. Re-seed bare areas according to plan stabilization requirements. Presence of wetland vegetation on the embankment may indicate seepage and structural integrity concerns.

STORMWATER MAINTENANCE SCHEDULE
INFILTRATION BASIN

Embankment Integrity		Check upstream face and downstream face for soft spots and boggy areas, boils at the toe, settlements, depressions and bulges, signs of erosion, animal burrows, slope failures, and seepage.	Repair and stabilize in accordance with the approved plans. MDE Sediment and Stormwater Plan Review Division must be contacted for review and approval of any major pond repairs.
Basin Area	Annually		
Dewatering		Facility must dewater within 48 hours of rainfall. Noticeable odors, stained water on the filter surface or at the outlet, or the presence of algae or aquatic vegetation are indicators of anaerobic conditions and inadequate dewatering of the facility.	Remove the top three to six inches of soil/sediments and replace with approved infiltratable material per plan specifications. Follow up inspections must confirm adequate dewatering. If the facility does not function as intended after the above action, the entire facility may need maintenance. Contact MDE.
Vegetation		Check for invasive and undesirable species, algae, and dead or dying vegetation.	Remove unwanted vegetation and re-seed or re-plant in accordance with the approved plan.
Mowing		Check that grass on the filter bed is maintained in good condition and is less than 12 inches in height.	Mow during the growing season to maintain the required height. Clippings must be removed.
Debris		Check for trash and debris in and around the outlet.	Trash, debris, and sediment must be disposed of in an acceptable manner according to current regulations.
Inlet Conveyance Systems	Annually		
Endwalls/Headwalls		Check for erosion, cracks, and seepage.	Repair as needed.
Open Channels		Check for erosion, blockages, and stable conveyance.	Repair as needed.
Riprap Protection		Check for displacement, blow outs, unstable conveyance, and erosion below the outlet.	Repair and restore function in accordance with the approved plans.
Pretreatment Forebays	Annually		
Sediment Accumulation		Check for sediment accumulation in the forebay.	Clean out the forebay when depth is less than 50% of the design depth. Restore to approved plan design.
Vegetation		Check for presence of algae and unwanted vegetation.	Remove unwanted vegetation and re-seed or re-plant in accordance with the approved plan.

STORMWATER MAINTENANCE PLAN
INFILTRATION BASIN

Emergency Spillway	Annually		
Spillway channel		Check for evidence of erosion, soft or wet areas, or obstructions to stable conveyance.	Stabilize erosion and remove obstructions as necessary.
Vegetation		Check for presence of excessive vegetation obstructing flow or trees in the conveyance channel.	Mow or remove trees as necessary.
Maintenance Access	Annual		
General		Check for accessibility to pond and riser, excessive vegetation growth and erosion on the access road	Repair and maintain access road in good condition
Overall Function of the Facility	Annual	Check aesthetics, and unpleasant odors	Contact MDE for concerns regarding pond function and performance

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STORMWATER MAINTENANCE SCHEDULE
PONDS

Inspection Item	Frequency of Inspection	Inspection Requirements	Remedial Action
Principal Spillway	Seasonally and after a major storm		
Debris and Trash		Check for trash, debris, and sediment clogging at all openings.	Remove debris. Trash and debris must be disposed of in an acceptable manner according to current regulations.
Trash Rack		Check condition.	Repair or replace to good working condition.
Pond Drain		Check operation. Keep drain chained and locked.	Repair according to the approved plans.
Riser and Barrel		Check for evidence of cracks, spalling, joint failures, and seepage around spillway pipe. Water tightness is necessary.	Repair to achieve operation in accordance with the approved plans.
Vegetation		Check for excessive vegetation blocking orifice openings. Woody vegetation must be less than 5 feet from the barrel and less than 25 feet from the riser.	Remove vegetation and roots as necessary.
Other structural components		Check for missing manhole covers or inlet grates. Check for concrete and structural integrity.	Repair according to the approved plans.
Pond Outlet	Seasonally and after a major storm		
Debris and Trash		Check for trash and debris in and around the outlet.	Remove trash and debris.
Riprap Outlet Protection		Check for displacement, blow outs, and erosion below the outlet. Stable conveyance must be provided.	Repair and restore function in accordance with the approved plans.
Abutments		Check for erosion, cracks, and seepage.	Repair as needed.
Pond Embankment	Annually		
Vegetation		Check that there is no woody vegetation on embankment and ground cover is in good condition. Check for wetland type vegetation.	Remove woody vegetation as necessary. Re-seed bare areas according to plan stabilization requirements. Presence of wetland vegetation on the embankment may indicate seepage and structural integrity concerns.
Embankment Integrity		Check upstream face and downstream face for soft spots and boggy areas, boils at the toe, settlements, depressions and bulges, signs of erosion, animal burrows, slope failures, and seepage.	Repair and stabilize in accordance with the approved plans. MDE Sediment and Stormwater Plan Review Division must be contacted for review and approval of any major pond repairs.

STORMWATER MAINTENANCE SCHEDULE
PONDS

Pool/Basin Area	Annually		
Permanent Pool		Check sediment accumulation, stagnant pool areas, and isolated pond areas.	Clean out sediments and restore elevations to approved plan design.
Vegetation		Check for invasive and undesirable species, algae, and dead or dying vegetation.	Remove unwanted vegetation, and re-seed or re-plant according to approved plan.
Debris and Trash		Check for trash and debris in and around the outlet.	Remove debris.
Pond Inlet Conveyance Systems	Seasonally and after a major storm		
Endwalls/Headwalls		Check for erosion, cracks, and seepage.	Repair as needed.
Open Channels		Check for erosion, blockages, and stable conveyance.	Repair as needed.
Riprap Protection		Check for displacement, blow outs, unstable conveyance, and erosion below the outlet.	Repair and restore function in accordance with the approved plans.
Forebays and Micropools	Seasonally and after a major storm		
Sediment Accumulation		Check for sediment accumulation in the forebay.	Clean out the forebay when depth is less than 50% of the design depth. Restore to approved plan design.
Vegetation		Check for presence of algae and unwanted vegetation.	Remove unwanted vegetation and re-seed or re-plant according to approved plan.
Emergency Spillway	Annually		
Spillway Channel		Check for evidence of erosion, soft or wet areas, or obstructions to stable conveyance.	Stabilize erosion and remove obstructions as necessary.
Vegetation		Check for presence of excessive vegetation obstructing flow or trees in the conveyance channel.	Mow or remove trees as necessary.
Maintenance Access	Annually		
General		Check for accessibility to pond and riser.	Prevent excessive vegetative growth and erosion on the access road. Repair and maintain access road in good condition.
Overall Function of the Facility	Annually	Check aesthetics and unpleasant odors.	Contact MDE for concerns regarding pond function and performance.

STORMWATER MAINTENANCE SCHEDULE
PONDS

Stormwater Wetlands	Annually		
Vegetation		Check for unhealthy vegetation and unwanted species.	Remove unwanted vegetation and re-seed or re-plant according to approved plan.
Sediment Accumulation		Check for excessive sediment in the wetland area.	Clean out sediment and restore elevation to approved plan design.
Wetland Pool Elevations		Check for adequate water volume, sustained wet conditions, varied pond depths, and seasonal depth fluctuations.	Regrading in wetland may be necessary. Contact MDE to restore wetland function to approved design.

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STORMWATER MAINTENANCE SCHEDULE
ENVIRONMENTAL SENSITIVE DESIGN

Practice	Frequency of Inspection	Preventive Maintenance	Maintenance Requirements
Green Roofs	Seasonally (and after a major storm)		Provide periodic irrigation, weeding, fertilizing, and in-fill planting as needed.
			Clean associated drainage pipes, inlets, stone edge drains, and other structures draining to/from practice.
Permeable Pavements	Seasonally (and after a major storm)	Prevent trucks and other heavy vehicles from tracking, spilling, or grinding material onto permeable pavement.	Sweep and vacuum to reduce sediment accumulation and ensure surface porosity. Do not use washing systems or compressed air units for surface cleaning. Clean out associated
		Use only non-toxic and organic deicers in moderation and apply as either calcium magnesium acetate or pretreated salt.	Clean associated drainage pipes, inlets, stone edge drains, and other structures draining to/from practice.
		Plow snow carefully with blades set one-inch higher than normal. Do not direct plowed snow piles or snowmelt to permeable pavement.	
Reinforced Turf	Seasonally (and after a major storm)	Prevent trucks and other heavy vehicles from driving on turf.	Mow regularly and remove clippings from application area.
			Clean associated drainage pipes, inlets, stone edge drains, and other structures draining to/from practice.
Rainwater Harvesting (Cisterns and Rain Barrels)	Seasonally (and after a major storm)	Disconnect, drain, and clean above ground systems at the start of winter.	Check underground connections during winter for frozen lines and ice blockages.
			Clean leaf screens, gutters, and downspouts to prevent clogging.
			Clean storage tank lids and mosquito screens.
			Replace damaged components as necessary.

STORMWATER MAINTENANCE SCHEDULE
ENVIRONMENTAL SENSITIVE DESIGN

Submerged Gravel Wetlands	Seasonally (and after a major storm)		Remove any dead or dying vegetation and revegetate.
			Remove accumulated sediment from pretreatment areas.
			Clean inlets and outlets of sediment, debris, and trash.
			Repair erosion at inflow points.
			Check that flow splitters are functioning as designed.
			Signs of uneven flow distribution may indicate that the gravel or underdrain is clogged. Remove, clean, and replace gravel.
Landscape Infiltration	Seasonally (and after a major storm)		Irrigate during prolonged dry periods.
		If specific plants are not surviving, replace with more appropriate species.	Remove any dead or dying vegetation and revegetate.
			Prune vegetation occasionally.
			Remove accumulated sediment from pretreatment areas. Replace top 2 to 3 inches of surface layer as needed.
			If water ponds for more than 48 hours or there is algal growth on the surface, remove and replace the top few inches of planting soil.
			If standing water persists after filter media has been maintained, the gravel, soil, and sand may need to be cleaned and/or replaced.
Infiltration Berms	Seasonally (and after a major storm)		Maintain a dense mat of vegetation. Remove any dead or dying vegetation and revegetate.
			Regrade any areas showing signs of concentrated flow to promote sheetflow.
			Repair erosion.

STORMWATER MAINTENANCE SCHEDULE
ENVIRONMENTAL SENSITIVE DESIGN

Dry Wells	Annually		Clean associated drainage pipes, gutters, downspouts, screens, and other components draining to practice.
			If water ponds for more than 48 hours or more than 6 inches of sediment has accumulated, excavate and replace the gravel media.
Micro-Bioretention	Seasonally (and after a major storm)		Irrigate during prolonged dry periods.
		If specific plants are not surviving, replace with more appropriate species.	Remove any dead or dying vegetation and revegetate.
			Prune vegetation occasionally.
			Remove accumulated sediment from surface of filter bed when accumulation exceeds one inch.
			If water ponds for more than 48 hours, remove and replace the top few inches of filter media.
			Replace mulch annually where practice treats areas with high concentrations of heavy metals. Otherwise, replace top 2-3 inches as necessary.
Rain Gardens	Seasonally (and after a major storm)		Irrigate during prolonged dry periods.
		If specific plants are not surviving, replace with more appropriate species.	Remove any dead or dying vegetation and revegetate.
			Prune vegetation occasionally.
			Remove accumulated sediment from surface of bed as needed.
			If water ponds for more than 48 hours, remove and replace the top few inches of planting soil.

STORMWATER MAINTENANCE SCHEDULE
ENVIRONMENTAL SENSITIVE DESIGN

			Replace mulch annually where practice treats areas with high concentrations of heavy metals. Otherwise, replace top 2-3 inches as necessary.
Swales	Biannually		Mow grass swales at least twice a year.
			Irrigate during prolonged dry periods.
			Remove sediment, debris, and trash.
			Re-seed sparsely vegetated areas to maintain dense coverage.
			Repair erosion on bottom, side slopes, and inlets. Stabilize.
			If water ponds for more than 48 hours, till bottom soil and revegetate.
			Assess performance of facility and maintain the following as as necessary: slope integrity, vegetative health, soil stability, compaction, erosion, ponding, and sedimentation.
Enhanced Filters	Annually		Implement maintenance requirements of primary practice.
			If the observation well holds water for more than 48 hours, remove and clean or replace media.

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