



SEDIMENT BASINS and CODE 378

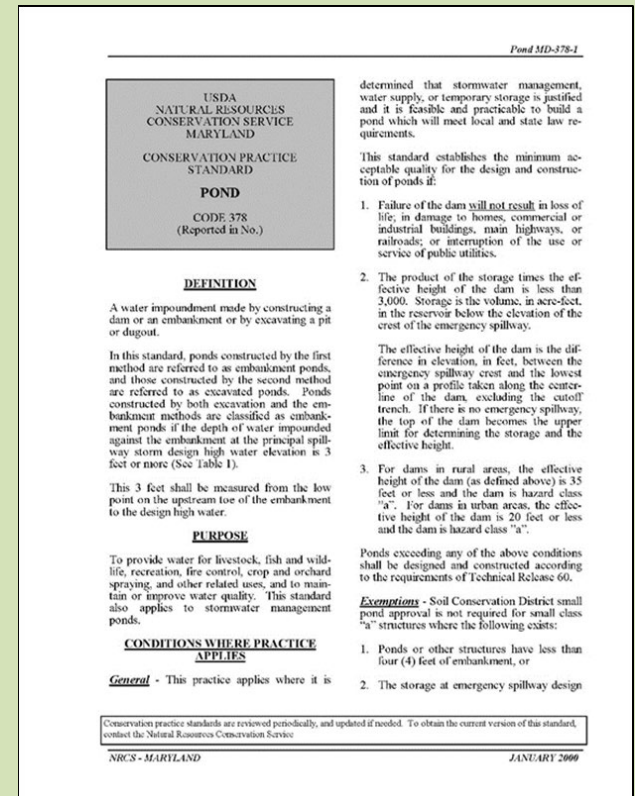
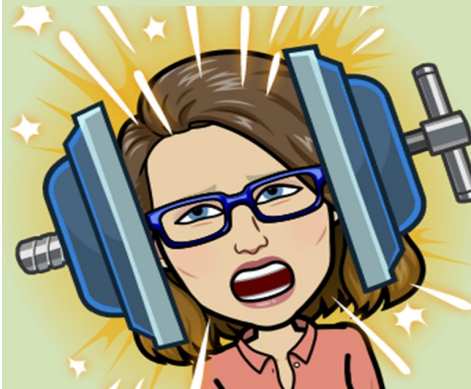
plus a few other things...



October 14, 2020
Amanda Malcolm, P.E.

Photo source: MDE SSDS

When is 378 small pond approval required for a sediment basin?





G-2 Standard and Specifications for Sediment Basins

G-2 STANDARD AND SPECIFICATIONS

FOR

SEDIMENT BASINS

Definition

A temporary pond formed by excavation and/or construction of an embankment and equipped with a draw-down device.

Purpose

To intercept sediment-laden runoff and retain sediment in order to protect drainage ways, properties, and rights-of-way downstream of the sediment basin from sedimentation.

Conditions Where Practice Applies

A sediment basin is required where sediment trap drainage areas are exceeded. Stormwater management ponds may be used as sediment basins provided they meet the requirements of this section and that the construction sequence addresses converting the sediment basin to the permanent stormwater management pond.

Conditions of Use

This standard applies to the installation of temporary sediment basins on sites where:

1. Failure of the structure would not result in loss of life, damage to homes or buildings, or interruption of use or service of public roads or utilities;
2. The drainage area does not exceed 100 acres;
3. The maximum embankment height does not exceed 15 feet measured from the natural ground to the embankment top along the centerline of embankment; and
4. The basin is to be removed within 36 months after the beginning of construction of the basin.

Where any of these criteria cannot be met, the structure must be designed in accordance with Environmental Article, Title 5, Subtitle 5, Annotated Code of Maryland or Natural Resource Conservation Service (NRCS) Maryland Conservation Practice Standard Code No. 378 for Ponds.

Design Criteria

1. Local Requirements. In addition to the requirements herein, the design and construction must comply with local laws, ordinances, rules and regulations.
2. Stormwater Management. Where a sediment basin is to be used as a permanent pond, the total volume must be equal to or exceed the capacity requirements for the permanent pond or provisions must be made for additional grading when the facility is converted to a permanent structure.
3. Location. Locate the basin to obtain the maximum storage benefit from the terrain and for ease of cleanout. The basin should be located to avoid conflicts with utilities and construction activities. Where possible, locate so that storm drains may outfall or be diverted into the basin. Do not locate



Section G-2 Standard and Specification for Sediment Basins **Conditions of Use**

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Photo source: MDE SSDS



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Sediment Basins and 378 Small Pond Approval

- A. A sediment basin embankment that is to be used for more than 36 months does not need to be designed in accordance with Code 378 if the temporary and permanent embankments are both smaller than Code 378 size.
- B. A sediment basin embankment that is Code 378 size needs to be designed in accordance with Code 378 even if, prior to 36 months, it is converted to a permanent SWM pond that has an embankment smaller than 378 size. A dam breach analysis is not required.
- C. An embankment that is Code 378 size in either sediment control mode or permanent stormwater management mode must be designed in accordance with Code 378 and approved prior to constructing the sediment basin. A dam breach analysis is required for the more hazardous of the two operation modes.
- D. A temporary sediment basin embankment that is to be used for more than 36 months needs to be designed in accordance with Code 378 and approved if the embankment is Code 378 size. A dam breach analysis is required.
- E. A sediment basin embankment that exceeds Code 378 size or has a hazard class of significant or high must obtain a permit from the Dam Safety Division even if temporary. A dam breach analysis is required.



NOW WHAT?!

old timer →



MDE photo

What do we do with Code 378 size sediment basins that were intended to be temporary but end up being permanent for whatever reason?



The take away....



APM personal photo

- Code 378 approvals for the embankment need to be issued for both sediment control and stormwater modes, as applicable.
- Code 378 approval for a sediment basin needs to be based on the temporary conditions, but it advisable to also provide the final stormwater management design for review and approval at the time of sediment basin approval.
- Preventative measures need to be taken to keep temporary Code 378 size sediment basins from remaining in the ground for more than 36 months. When in doubt, require basin to be designed and constructed in accordance with Code 378.



CONSTRUCTION INSPECTIONS FOR 378 SEDIMENT BASINS

- Certifying engineer or representative needs to be on site during construction of embankment and spillway.
- Geotechnical testing is needed for soil classification.
- Require a construction inspection checklist and photos. Inform developer of as-built requirements.
- Avoid disjointed inspections. Establish which agency is responsible for inspections.
- Construction inspection documentation required for as-built acceptance.

BMP ID:		MDE#		
CONSTRUCTION INSPECTION CERTIFICATION CHECKLIST FOR CODE 378 EMBANKMENTS				
ACTIVITY	TEST RESULTS	<input type="checkbox"/> = yes <input checked="" type="checkbox"/> = no N/A = not applicable	INSPECTION DATE	CERTIFYING INSPECTOR'S INITIALS
1 SITE PREPARATION				
Pre-construction meeting conducted with inspector, contractor, and certifying engineer.				
Sediment controls and/or flow diversions in place				
Protection areas flagged				
Grading accurately staked out				
Objectionable material removed from immediate area				
2 CUT-OFF TRENCH EXCAVATION				
Located at centerline of embankment				
Cut-off trench extended down to impervious soil				
Length, depth, width, side slopes correct				
Subgrade dry and stable				
Area beneath embankment stripped of all vegetation, topsoil, and organic matter				
3 CUT-OFF TRENCH BACKFILL				
Material free of large stones, roots, etc.				
Layers placed in 8 inch lifts continuous for entire trench length				
Compaction and moisture content tested every 50 feet				
Cut-off trench				
Unified Soil Classification:				
4 PRINCIPAL SPILLWAY CONSTRUCTION AND BACKFILLING				
Pipe spillway:				
Pipe placed prior to construction of embankment				
Pipe size, material, and class correct				
Soil compaction under and adjacent to pipe				
No gravel under spillway				
Full concrete cradle provided				
Watertight joints (joint separation OK)				
Anti-seep collar location and size correct				
Anti-seep collar and cradle installed with monolithic pour				
Structural backfill specification followed				
Soil compaction under and adjacent to pipe				
Riser:				
Overall dimensions and openings correctly located				
Base dimensions correct				
Concrete strength and bearing capacity acceptable				
Watertight joints				
Drain				
For weir spillway:				
Footing excavated on stable subgrade				
5 EMBANKMENT CONSTRUCTION				
Impervious core length, depth, width, side slopes correct				
Material free of large stones, roots, etc.				
Layers placed in 8 inch lifts continuous for entire core length				
Compaction and moisture content tested every 50 feet along core				
Impervious Core				
Unified Soil Classification:				
Filter diaphragm dimensions and placement				
Seepage drain pipe, perforation size, and spacing				
No geotextile in filter diaphragm or seepage drain				
Filter diaphragm materials				
Filter diaphragm compaction				
Embankment soils				
Unified Soil Classification:				
Compacted in 8-inch lifts				
Embankment compaction tested every 5000 sf				
Elevation correct				
Top width and side slopes correct				
No equipment driven within 4 ft of spillway				
6 EMERGENCY SPILLWAY				
Constructed in natural ground				
Elevation correct				
Width and side slopes correct				
Level section length correct				
Exit slope				
7 POND EXCAVATION				
Elevation and topography of pond bottom graded to plan				
Pond side slopes correct				
Bench widths and locations correct				
Maintenance access location, width, and slope acceptable				
8 SPILLWAY OUTFALL PROTECTION				
Outfall protection channel excavated to design cross section				
Filter fabric in place				
Stone size correct				
9 STABILIZATION AND LANDSCAPING				
Topsoil, seed, and mulch applied to site				
Topsoil, seed, and mulch applied to embankment				
Landscaping consistent with plan				
No trees/woody growth planted within 15 ft of embankment or 25 ft of riser				
Inspector's name: _____				
Company or agency: _____				
Certifying Engineer's name: _____				



Sizing Criteria for Sediment Basins

- Minimum storage volume of 3600 cf/ac
(1800 cf/ac “wet” and 1800 cf/ac “dry”)
- Minimum surface area to discharge ratio of 0.0035
- Minimum flow L:W ratio between inflow and outflow of 2:1
- 10-year conveyance and minimum freeboard above 10-year WSEL
(1 ft freeboard with auxiliary spillway; 2 ft freeboard without auxiliary spillway)

Sizing Criteria for **Code 378** Sediment Basins

- Same as above except design storm for conveyance and freeboard is **100-year** instead of 10-year.



Evaluation of Current Sizing Criteria

- Minimum storage volume of 3600 cf/ac (1800 cf/ac “wet” and 1800 cf/ac “dry”)
- Controlling Discharge Rates during Construction (Interim Conditions)

$Q_{\text{pre}} = 10 \text{ cfs}$

$Q_{\text{during}} = ?? \gg 10 \text{ cfs} ??$

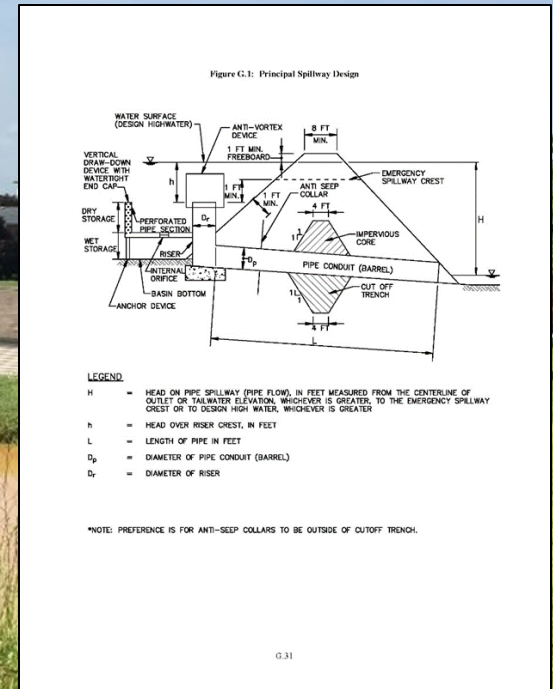
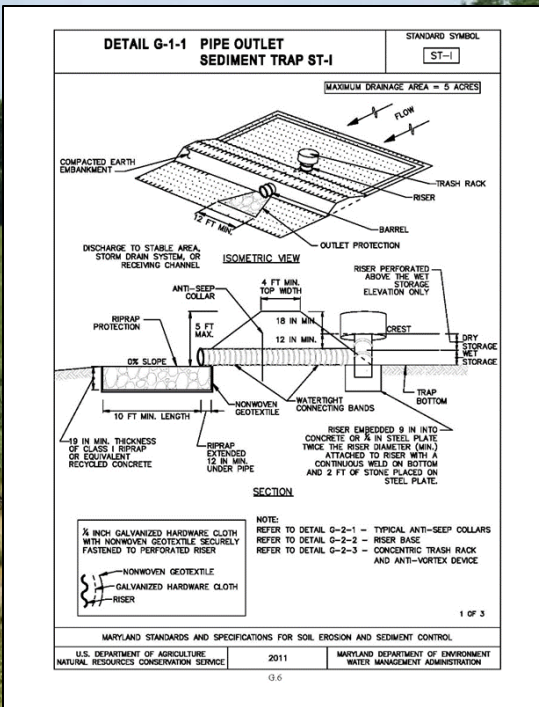
$Q_{\text{post}} = 10 \text{ cfs}$



TRAP

vs.

BASIN



G-1 SEDIMENT TRAPS

ST-I: $H \leq 5$ ft

ST-II and ST-III: $H \leq 4$ ft

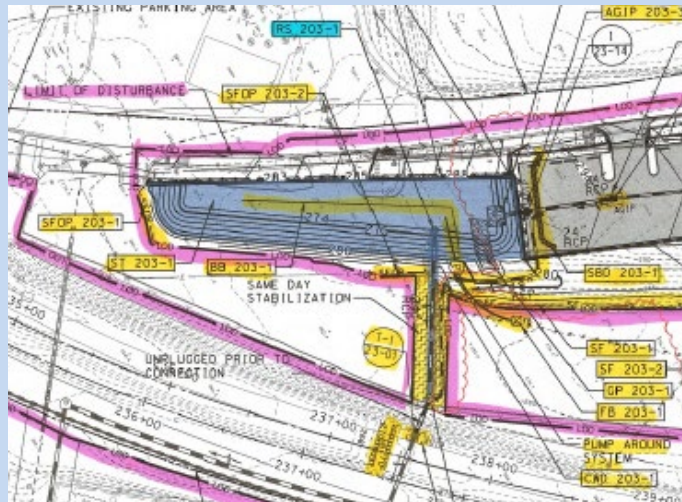
G-2 SEDIMENT BASINS

no height limitation
 except DS permit
 required for $H \geq 20$ ft

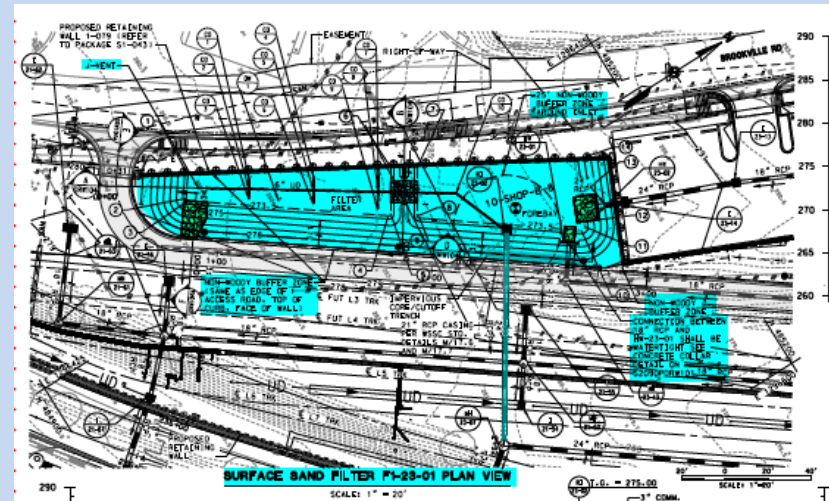
Photo source: MDE SSDS



Converting a Sediment Control Basin to Stormwater Management Facility



ESC plan of sediment basin



SWM plan of permanent 378 pond

- Raising or lowering the embankment
- Performing grading to give pond its final shape
- Adding forebays, underdrain systems, media, plantings, etc.
- Modifying the riser
- Removing the draw down device



Photo source: MDE SSDS



Sediment Basins in Use III Watersheds

Sediment basins in Use III watersheds are not regulated, but if you find yourself reviewing a project that is located in a very sensitive area, please consult with DNR's Environmental Review Program.



Sediment Basins and Flocculants

After exhausting all possible traditional sediment control measures including redundant controls, chemical additives may be used to reduce the turbidity of effluent from a sediment basin or trap.





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The new “20-CP” permit will address the use of chemical additives or polymers to reduce turbidity.

- The permit includes a pre-approved list of products to increase efficiency.
- For products not on the approved list, there is a required method of review established to evaluate potential toxicity of the product.
- The product may be accepted by the MDE and added to the product list after the review.
- Cationic polymers require an additional review with residual testing.
- A SWPPP (stormwater pollution prevention plan) is required for the site for projects using chemical additives or polymers for sediment control.

*Link to webpage: https://mde.maryland.gov/programs/water/wwp/Pages/gp_construction.aspx
Questions should be directed to Paul Hlavinka, MDE, WSA, Industrial Stormwater Permits Division at Paul.Hlavinka@Maryland.gov.*



Thank you

Questions?

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