CECIL SOIL CONSERVATION DISTRICT

MD-378 SMALL POND APPROVAL PROCESS

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CECIL SOIL CONSERVATION DISTRICT
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I. INTRODUCTION

The purpose of this document is to provide guidance on small pond review submittals through Cecil Soil Conservation District (CSCD).

In the state of Maryland, a Permit issued by the Maryland Department of Environment (MDE) is required to construct, reconstruct, change, or repair any reservoir, dam, or waterway obstruction, unless it is exempt, or it can be reviewed and approved through Cecil Soil Conservation District (CSCD).

The watershed size, embankment/dam height, storage, and hazard classification will determine the reviewing and approval authority. Some water impoundments (small ponds, ESDs, etc.) are exempt from needing Small Pond approval from MDE or CSCD. Those small impoundments will have small watersheds, small earth embankments/dams, small storage reservoirs, and are classified as low hazard structures. In these cases, your local stormwater management approval authority will be the only one to review and approve those small water impoundments.

To determine whether your water impoundment is either 1) exempt, 2) requires CSCD approval, or 3) requires a permit from MDE, use the February 25, 2025, MDE Stormwater, Dam Safety, and Flood Management Program Flow Chart for Determining Embankment Design Category and Approval Authority [Appendix 1]. CSCD has created a WORD document in .DOCX format that moves through the flow chart in a step-by-step method to perform the same evaluation CSCD Step by Step Decision Aid [Appendix 2].

In all cases, where MDE or CSCD must review and approve plans and computations for technical compliance, follow requirements in the USDA NRCS MD Conservation Practice Standard POND CODE 378 [Appendix 3] dated January 2000 which is incorporated by reference in The Code of Maryland Regulations (COMAR) 26.17.02.01-1(B.(2)), and MDE policies and procedures.

II. RESPONSIBILITY OF THE ENGINEER-IN-CHARGE (EIC)

Initially, the Engineer-In-Charge (EIC) will determine the embankment design category and approval authority of all embankments/dams using the “Flow Chart” [Appendix 1] or the “STEP BY STEP DECISION AID” [Appendix 2]. The “Flow Chart” and “STEP BY STEP DECISION AID” will be updated periodically; therefore, the EIC is encouraged to check the MDE and CSCD website routinely for the latest version. After the Embankment Design Category and Approval Authority are determined, the EIC will submit the pond design to the appropriate approval authority. See small pond approval authority roles below. This

document is focused on the process for small ponds requiring CSCD review and approval; however, there is information regarding the roles of local SWM approving authority and MDE regarding MD-378 Small Pond reviews to help the EIC in navigating the process. The EIC is encouraged to contact the local SWM approving authority and MDE directly to make sure the EIC is following the requirements to submit the pond design to these entities as applicable.

The EIC is also responsible for all construction monitoring, inspection, testing, and maintaining proper documentation on any dam/reservoir new construction, reconstruction, repair, or waterway obstruction regardless of who the final approving authority may be. See Section IV.8. below for EIC responsibility to ensure that the construction, reconstruction, removal, change or repairs to any small pond are carried out in accordance with COMAR 26.17.04.05, MD-378 Standards, and MDE policies and procedures.

III. ROLE OF LOCAL STORMWATER MANAGEMENT (SWM) APPROVAL AUTHORITY

The local SWM approval authority provides technical review and approval of the plans and computations for all SWM ponds/structures in accordance with the Environmental Article, Title 4, Subtitle 2, Annotated Code of Maryland, and local SWM regulations/ordinances. The local SWM approval authority is encouraged to coordinate MD-378 Small Pond reviews with the local SCD.

IV. ROLE OF CECIL SOIL CONSERVATION DISTRICT (CSCD)

MDE recognizes Cecil Soil Conservation District as having approval authority of MD-378 Small Ponds when completed in accordance with the Code of Maryland Regulations (COMAR) Title 26.17.04.05, MD-378, and latest version of MDE's policies and procedures as published on the MDE Dam Safety website. To ensure clear implementation of the standards, MDE will accept a MD-378 Small Pond approval for both urban and agriculture ponds from a Soil Conservation District or Department designee when all the following are met:

1. All plans and specifications to construct, reconstruct, alter, repair, or remove, any small pond must be reviewed by the Technical Reviewer in accordance with the following: Small Pond construction drawings and design computations must meet the minimum standards of COMAR 26.17.04.05, MD-378 Standards, and MDE's policies and procedures.

2. All applications to the Cecil Soil Conservation District or the Department's designee, to construct, reconstruct, alter, repair, or remove Small Ponds must be accompanied by an updated dam breach analysis and hazard classification, performed in accordance with MDE Guidance for Completing a Dam Breach Analysis for Small Ponds and Dams in Maryland, draft dated May 2018. The following is a link to the MDE Webpage where the document can be found: https://mde.maryland.gov/programs/water/damsafety/pages/dambreakguidelines.aspx

3. The Cecil Soil Conservation District or Department's designee will only approve construction, reconstruction, alteration, removal, or repair of any small pond which drains to a Coldwater Resource in accordance with MDE Design Guidance. See Dam and Small Pond Approval Guidelines in Coldwater Resource Watersheds, August 2023 [Appendix 12] for "design guidance" for small ponds in a Coldwater Resource watershed. Coldwater Resources such as a stream with Use Class III/III-P can be determined using the mapping tool for Designated Use Classes for Maryland's Surface Waters: (https://mdewin64.mde.state.md.us/WSA/DesigUse/index.html) or as Maryland Trout Wateshed; Benthic Coldwater Macroinvertebrate watershed; or, Put and Grow Trout Watershed which is identified on the Maryland DNR Freshwater Fisheries – Coldwater Resource Mapping Tool: (https://maryland.maps.arcgis.com/apps/webappviewer/index.html?id=dc5100c0266d4ce89df813f34678944a).

4. The Cecil Soil Conservation District or Department's designee may issue a small pond approval. The Department has provided an example of a SMALL POND APPROVAL document [Appendix 4]. The Soil Conservation District or Department's designee may use an alternate document, provided the conditions in the small pond approval meet or exceed those in the example.

5. The Cecil Soil Conservation District or Department's designee must notify MDE of all plans and specifications for MD-378 Small Ponds approved in accordance with COMAR 26.17.04.05G. The notification shall include a copy of the SMALL POND APPROVAL [Appendix 4] and a completed POND SUMMARY SHEET form [Appendix 5] supplied by MDE. The notification shall be submitted by CSCD to MDE via email: MDE.PondApprovals@Maryland.gov or by mail (Maryland Department of the Environment, Attn: Chief, Dam Safety Permits Division, 1800 Washington Boulevard, Suite 440, Baltimore, MD 21230) within 30 days of the end of each quarter (September 30, December 31, March 31, and June 30) in which the approval was granted. NRCS MD-14 Pond Summary Sheets are no longer accepted.

6. The Cecil Soil Conservation District or Department's designee shall inform the owner of their responsibility to ensure that the construction, reconstruction, removal, change or repairs to any MD-378 Small Pond are carried out in accordance with COMAR 26.17.04.05, MD-378 Standards, and MDE policies and procedures either by direct observation of the work, by review of construction progress reports submitted by the engineer responsible for design of the MD-378 Small Pond, or a combination of both. See Appendix 6 for Construction Monitoring Notification documents and Appendix 7 for As-Built submission documents.

7. The Cecil Soil Conservation District or Department's designee is required to keep on-file the accepted "as-built" small pond plans and specifications for perpetuity.

8. The Engineer-In-Charge (EIC) must certify that the subject pond was

constructed in conformance with the approved plans and specifications and the "as-built" plans are true and accurate and within acceptable deviation tolerance. The As-Built Certification statement [Appendix 8] must appear on the as-built plan set, and in the format of Form 1: Project Completion Report [Appendix 4] which shall accompany the As-Built submittal package. The As-Built Certification on plans and submitted with the As-Built Submission Documents must be sealed and signed by a Maryland registered professional engineer who performed either direct observation of the construction, received progress reports from qualified professionals, or a combination of both in sufficient detail to enable them to certify the construction. If there are deficiencies that prevent the certification of the pond construction, they shall be brought to the attention of the Engineer-In-Charge and Owner and corrected in a prompt manner. If a certification cannot be made, the Soil Conservation District or Department's designee shall notify MDE Dam Safety.

9. Within 90 days after the completion of construction, the Cecil Soil Conservation District or Department's designee shall submit the following to the Department:

   - Form 1: Project Completion Report [Appendix 4]
   - Completed As-Built Submission Checklist [Appendix 7]
   - As-Built Pond Summary Sheet Form [Appendix 5]

   MDE will provide technical assistance to the Cecil Soil Conservation District or Department's designee for review of Small Ponds as time and personnel are available. When CSCD requests MDE to provide complete technical review and concurrence, MDE will instead issue small pond approval. Where necessary, MDE will take appropriate enforcement action when notified by the CSCD of any small pond completed for which the appropriate "As-Built" drawings have not been submitted within the required 60 days of pond completion. MDE may grant an extension if proper justification can be provided.

10. An Application for CSCD review, Checklist for 1st Review Submittal for MD-378 Small Pond Approval, and MD-378 SMALL POND REVIEW CHECKLIST [Appendix 9] is available to guide the EIC how to prepare and package their submittals for small pond 1st review at CSCD. CSCD will instruct the EIC on what to submit for subsequent submittals as applicable.

V. ROLE OF MDE DAM SAFETY PERMITS DIVISION

The Maryland Department of the Environment (MDE or Department) through regulation and oversight ensures all dams in Maryland are designed, constructed, operated and maintained safely to prevent failures and the resulting consequences. Maryland's Dam Safety Program develops and enforces the implementation of applicable dam safety laws, regulations, and best practices.

Environment Article § 5-503 of the Environment Article, Annotated Code of Maryland, requires that a person (or entity) proposing to construct, reconstruct,

change, or repair any reservoir, dam or waterway obstruction shall obtain a waterway construction permit from MDE. EN-503 specifies that a person is exempt from the requirement to obtain a waterway construction permit from MDE for construction, reconstruction, alteration, repair, or removal for any dam or reservoir if:

- the contributory drainage area is less than 1 square mile (640 acres)
- the dam is not greater than 20 feet in height measured vertically from the lowest point on the top of the dam to the lowest point on the upstream toe of the dam
- the dam can impound no greater than 50 acre-feet of water at the crest elevation
- the pond is a low hazard (class “a”) structure, which is unlikely to cause loss of life or property damage if it were to fail
- the pond meets minimum standards for safety set forth in MDE rules and regulations (“COMAR”)
- the plans and specifications are approved by the appropriate Soil Conservation District or the Department’s designee
- the pond is not located within the drainage of the Gwynns Falls, Jones Falls, or Herring Run streams situated in or adjacent to Baltimore City; and,
- the Soil Conservation District or Department’s designee notifies MDE of any pond approved under this exemption.

Dams meeting the above requirements are referred to as “MD-378 Small Ponds”.

MDE will provide technical assistance to the Soil Conservation District or Department’s designee for review of Small Ponds as time and personnel are available. When the District requests MDE to provide complete technical review and concurrence, MDE will instead issue a Small Pond Approval. Where necessary, MDE will take appropriate enforcement action when notified by the District of any Small Pond completed for which the appropriate “as-built” drawings have not been submitted within the required 90 days of pond completion.

VI. SUMMARY

In summary:

A. The local stormwater management (SWM) approving authority has joint jurisdiction over all SWM ponds/structures. The local SWM approving authority can confirm that a pond is exempt from CSCD and MDE approval or they can ask CSCD to make the determination.

B. CECIL SOIL CONSERVATION DISTRICT (CSCD) may review and approve MD-378 Small Ponds if all of the following criteria are met:
   - If contributory drainage area is less than 1 square mile (640 acres)
   - If the dam is not greater than 20 feet in height measured vertically from the lowest point on the top of the dam to the lowest point on the upstream

toe of the dam
- If the dam impounds less than 50 ac-ft of water at the crest elevation
- If pond is a low hazard (class “A”) structure, which is unlikely to cause loss of life or property damage if it were to fail
- If the pond meets minimum standards for safety set forth in MDE rules and regulations (“COMAR”)
- If the pond is not located within the drainage of the Gwynn’s Falls, Jones Fall, or Herring Run streams situated in or adjacent to Baltimore City
- If pond is in a Use III watershed and meets MDE Thermal Design Criteria

C. Anyone proposing to construct, reconstruct, change, or repair any reservoir, dam or waterway obstruction shall obtain a waterway construction permit from MDE:
   - If the pond does not meet any of the previous requirements under VI.A. or B.
   - If pond has non-earthen dam
   - If pond has an embankment that is > 20 ft high

APPENDIX 1

MDE FLOW CHART

- *FEBRUARY 25, 2025 MDE STORMWATER, DAM SAFETY, AND FLOOD MANAGEMENT PROGRAM FLOW CHART FOR DETERMINING EMBANKMENT DESIGN CATEGORY AND APPROVAL AUTHORITY (.PDF FORMAT)
- MDE FLOW CHART FOOTNOTES (.PDF FORMAT)

Notes:
* The “MDE Flow Chart” will be updated periodically; therefore, all those using the “Flow Chart” are encouraged to check the MDE website routinely for the latest version.

COLOR LEGEND

- EXEMPT (LOCAL SWM APPROVAL AUTHORITY ONLY)
- MDE DAM SAFETY SMALL POND APPROVAL AUTHORITY
- CECIL SCD SMALL POND APPROVAL AUTHORITY

February 25, 2025

MDE Stormwater, Dam Safety, and Flood Management Program
Flow Chart for Determining Embankment Design Category and Approval Authority

START HERE

STEP 1 — FOR PONDS WITH WEIR SPILLWAY ONLY: START HERE

STEP 2 — Does the pipe conduit have a riser or control structure[1]?
- NO → **STEP 3**
- YES → **STEP 11**

STEP 3 — Does the pipe conduit through the embankment traverse a roadway or railroad?
- YES → **STEP 4**
- NO → **STEP 9**

STEP 4 — Is there a permanent pool > 3ft?
- NO → **STEP 5**
- YES → **STEP 11**

STEP 5 — Is HW-TW ≤ 10 ft per Policy Memo #2?
HW-TW:_____
- NO → **STEP 6**
- YES → **STEP 10**

STEP 6 — Is $HW_{depth}/D \leq 2$ per Policy Memo #2?
HW_{depth}:_____ / D:_____=_____
- NO → **STEP 7**
- YES → **STEP 10**

STEP 7 — Does the embankment meet the minimum width required for SUPERWIDE classification per Table 1 in Policy Memo #5?
H:_____; Vw:_____;
min. W_____; actual W:_____
- NO → **STEP 11**
- YES → **STEP 8**

STEP 8 — Is $HW_{depth}/D \leq 4$ per Policy Memo #2?
- NO → **STEP 11**
- YES → **STEP 10**

STEP 9 — Is the pipe conduit the spillway for a SWM BMP?
- NO → **STEP 10**
- YES → **STEP 11**

STEP 10 — *CULVERT. SWM approval authority.*

STEP 11 — Is maximum storage volume[2] ≥ 50 ac-ft?
MSV = _____ ac-ft
- YES → **STEP 12**
- NO → **STEP 14**

STEP 12 — Is the principal spillway a weir [wall]?
- NO → **STEP 13**
- YES → **STEP 15**

STEP 13 — Does pond meet the criteria for SUPERWIDE EMBANKMENT per Policy Memo #5"?
- YES → **STEP 15**
- NO → **STEP 15**

STEP 15 — *SUPERWIDE DAM. Submit JPA for MDE Dam Safety review.*

STEP 15 — *DAM. Submit JPA for MDE Dam Safety review.*

STEP 14 — Is contributing drainage area ≥ 640 acres?
DA = _____
- YES → **STEP 15**
- NO → **STEP 16**

STEP 16 — Is embankment height[4] ≥ 20 ft?
embankment height = _____ ft
- YES → **STEP 17**
- NO → **STEP 18**

STEP 17 — *DAM. Submit JPA for MDE dam safety review. Prior to submitting determine whether dam is a superwide embankment per Policy Memo #5 and, if applicable, follow superwide dam requirements. If pond is constructed on fill, follow dam safety design/ review criteria (under development) for ponds constructed on fill.*

STEP 18 — Is maximum active storage volume[3] < 8,000 cf?
brim up storage = _____ cf
- YES → **STEP 19**
- NO → **STEP 20**

STEP 19 — *MICRO-POND/ESD FACILITY. Exempt from small pond approval. Review by SWM approval authority.*

STEP 20 — Is embankment fill around reservoir rim ≤ 2 ft above natural ground surface per Policy Memo #13?
- YES → **STEP 21**
- NO → **STEP 24**

STEP 21 — Is the projection of L horizontally downstream from the pond bottom below the existing or proposed ground per Policy Memo #13?
H = top of dam:_____- pond bottom:_____ = _____
L = 10 H + 20 ft = _____
- YES → **STEP 22**
- NO → **STEP 24**

STEP 22 — Is the existing or proposed downstream ground slope > 10% at any point below elevation design WSEL + 1 foot and within projection of L?
- NO → **STEP 23**
- YES → **STEP 24**

STEP 23 — *EXCAVATED SMALL POND. Design as an excavated pond. Exempt from small pond approval. Review by SWM approval authority.*

STEP 24 — Is embankment height[4] < 4 ft?
embankment height = _____ft
- YES → **STEP 26**
- NO → **STEP 25**

STEP 25 — Is maximum active storage volume[3] < 40,000 cf and embankment height[4] ≤ 6 ft?
MASV=_____ cf and embankmen = _____ ft
- YES → **STEP 26**
- NO → **STEP 31**

STEP 26 — Is structure a small impoundment per Policy Memo #4?
top of dam: _____ - upstream toe:_____ = _____
top of dam: _____ - downstream toe:_____ = _____
maximum storage volume:_____
- YES → **STEP 29**
- NO → **STEP 27**

STEP 27 — Does pond meet the criteria for SUPERWIDE EMBANKMENT per Policy Memo #5?
- YES → **STEP 29**
- NO → **STEP 28**

STEP 28 — Complete dam breach analysis. Is pond low hazard?
- YES → **STEP 29**
- NO → **STEP 30**

STEP 29 — *EXEMPT SMALL POND. Exempt from small pond approval. Follow criteria for Chapter 3 practice. Review by SWM approval authority.*

STEP 30 — *DAM. Submit JPA for MDE Dam Safety review.*

FOR PONDS WITH WEIR SPILLWAY ONLY: SKIP THIS ROW

STEP 31 — Does pond meet the criteria for SUPERWIDE EMBANKMENT per Policy Memo #5?
- YES → **STEP 32**
- NO → **STEP 35**

STEP 32 — Is pond located in Jones Fall, Gwynn's Falls, or Herring Run watersheds?
- NO → **STEP 33**
- YES → **STEP 34**

STEP 33 — *SUPERWIDE SMALL POND. Design to meet superwide small pond/ dam requirements per Policy Memo #5. Review by small pond approval authority.*

STEP 34 — *SUPERWIDE SMALL POND in regulated watershed. Design to meet superwide small pond/dam requirements per Policy Memo #5. Submit JPA for MDE Dam Safety review.*

STEP 35 — Is structure a small impoundment per Policy Memo #4?
top of dam: _____ - upstream toe:_____ = _____ft
top of dam: _____ - downstream toe:_____ = _____ft
MASV:_____ ac-ft
- YES → **STEP 37**
- NO → **STEP 36**

STEP 36 — Complete dam breach analysis. Is pond low hazard?
- YES → **STEP 37**
- NO → **STEP 40**

STEP 37 — Is pond located in Jones Fall, Gwynn's Falls, or Herring Run watersheds?
- NO → **STEP 38**
- YES → **STEP 39**

STEP 38 — *SMALL POND. Design as regular small pond. Review by small pond approval authority.*

STEP 39 — *SMALL POND in regulated watershed. Design as regular small pond. Submit JPA for MDE Dam Safety review.*

STEP 40 — *DAM. Submit JPA for MDE Dam Safety review.*

REVISIONS BY CSCD

1. 2/28/25 ADDED COLOR LEGEND, TEXT PERTAINING TO STEPS, AND COLOR CODING

Definitions:

[1]Control Structure: Any device that controls the flow into the pipe including, but not limited to a riser, orifice plate, weir, or gabion baskets. An open culvert is not considered a control structure provided the pipe diameter is uniform through the embankment or increases in diameter in the downstream direction when additional flow is added.

[2]Maximum Storage Volume ("Brim Full" or "Brim Up"): The National Inventory of Dams defines maximum storage as the total storage space in a reservoir below the maximum attainable water surface elevation. This is the "brim full" volume. If the probable maximum flood (PMF) does not fill the storage space, then the PMF volume can be used as the maximum storage volume, and using the brim full volume would be conservatively acceptable. The upper limit of the storage volume is the top of dam/incipient point of overflow, not the invert of the emergency spillway. For media ponds, include the volume of water in the pore space (voids) of the filter media, which can be approximated using a porosity of 0.4.

[3]Maximum Active Storage Volume: This is the portion of the maximum storage volume that would contribute to the breach volume. Dead storage below the elevation of the downstream toe of embankment that does not contribute to the breach volume may be excluded from the maximum storage volume for the referenced purposes. For media ponds, if the filter media is part of the embankment height, the maximum storage volume includes the volume of water in the pore space (voids) of the filter media, which can be approximated using a porosity of 0.4.

[4]Embankment height has been defined by the MDE Dam Safety Division as the vertical distance between the lowest point of fill on the upstream face of the dam to the lowest point on the crest of the dam (excluding the auxiliary spillway). Oftentimes this is found at the principal spillway location but can be at other locations along the embankment. For the purposes of this definition, the lowest point of fill includes human-placed materials such as spillway conduits and cradles. Refer to MDE Dam Safety Policy Memorandum No. 22 – Determining Embankment Height for background information and diagrams.

Note regarding Ponds in Use III and Use IV watersheds:

Effective June 14, 2021, small ponds located in Use III and IV watersheds no longer require a permit from the Dam Safety Division. Thermal concerns in accordance with DNR guidance must be addressed and upheld by the small pond approval authority.

References:

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

MDE Dam Safety Policy Memorandum No. 2 - Roadway/Railroad Embankment with Culvert Crossing, February 15, 2022 or latest revision.

MDE Dam Safety Policy Memorandum No. 4 - Hazard Classification of Small Impoundments, January 29, 2025 or latest revision.

MDE Dam Safety Policy Memorandum No. 5 - Superwide Roadway/Railroad Embankments, February 16, 2022 or latest revision.

MDE Dam Safety Policy Memorandum No. 13 - Excavated Ponds, April 24, 2023 or latest revision.

MDE Dam Safety Policy Memorandum No. 20 - Spillways Discharging to Storm Drain Networks, October 27, 2023 or latest revision.

MDE Dam Safety Policy Memorandum No. 22 – Determining Embankment Height, January 29, 2025 or latest revision.

MDE Dam Safety Policy Memorandum No. 23 – Small Ponds Not Requiring Small Pond Approval, January 29, 2025 or latest revision.

APPENDIX 2

CSCD STEP-BY-STEP DECISION AID

- STEP-BY-STEP DETERMINATION OF APPROVAL AUTHORITY (WORD .DOCX FORMAT)

  Notes:
  * If needed, contact CSCD to obtain a determination aid in WORD (.docx) format

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STEP BY STEP DECISION AID TO DETERMINE EMBANKMENT DESIGN CATEGORY AND APPROVAL AUTHORITY:

Project Name: _____ **Date:** _____

Pond Label: _____ **CSCD Tracking No.:** _____

Step 1 Does pond have a "Weir Wall" Spillway?
☐ Yes - Go to Step 11
☐ No - Go to Step 2

Step 2 Does the pipe conduit have a riser or control structure[1]?
☐ Yes - Go to Step 11
☐ No - Go to Step 3

Step 3 Does the pipe conduit through the embankment traverse a roadway or railroad?
☐ Yes - Go to Step 4
☐ No - Go to Step 9

Step 4 Is there a permanent pool > 3 ft?
Design permanent pool depth = _____ ft > 3 ft?
☐ Yes - Go to Step 11
☐ No - Go to Step 5

Step 5 Is HW-TW ≤ 10 ft per MDE Dam Safety Policy Memo #2?
Design HW Elevation = _____
Design TW Elevation = _____
HW – TW = _____ ft ≤ 10 ft?
☐ Yes - Go to Step 10
☐ No - Go to Step 6

Step 6 Is HW_{DEPTH} / D ≤ 2 per MDE Dam Safety Policy Memo #2?
Design HW_{DEPTH} = _____ ft / D = _____ ft = _____ ≤ 2?
☐ Yes - Go to Step 10
☐ No - Go to Step 7

Step 7 Does the embankment meet the minimum width required for SUPERWIDE classification per Table 1 in MDE Dam Safety Policy Memo #5?
Design Height of Embankment, H = _____ ft (Step 16)
Design Maximum Storage Volume, Vw = _____ ac-ft
Minimum Embankment Width Required in Table 1 of Memo #5, W_R = ____ ft
Is Design Minimum Embankment Width, W_D = _____ ft ≥ W_R
☐ Yes - Go to Step 8
☐ No - Go to Step 11

Step 8 Is HW_{DEPTH} / D ≤ 4 per MDE Dam Safety Policy Memo #2?
Design HW_{DEPTH} / D = _____ ≤ 4? (Step 6)
☐ Yes - Go to Step 10
☐ No - Go to Step 11

Step 9 Is the pipe conduit the spillway for a SWM BMP?
☐ Yes - Go to Step 11
☐ No - Go to Step 10

Step 10 *CULVERT.* ***REVIEW BY LOCAL SWM APPROVAL AUTHORITY.***

Step 11 Is maximum storage volume ^{2} ≥ 50 ac-ft?
MSV ^{2} = _____ ac–ft ≥ 50 ac-ft?
☐ Yes - Go to Step 12
☐ No - Go to Step 14

Step 12 Is the principal spillway a weir [wall]?
☐ Yes - Go to Step 15
☐ No - Go to Step 13

Step 13 Does pond meet the criteria for SUPERWIDE EMBANKMENT per MDE Dam Safety Policy Memo #5? **(Step 7)**
☐ Yes - Go to Step 15
☐ No - Go to Step 15

Step 14 Is contributing drainage area ≥ 640 acres?
Design DA = _____ acres ≥ 640 acres?
☐ Yes - Go to Step 15
☐ No - Go to Step 16

Step 15 *SUPERWIDE DAM OR NOT. Submit JPA for* ***MDE DAM SAFETY REVIEW****.*

Step 16 Is embankment height [4] ≥ 20 ft?
Lowest point on the crest of dam, X = _____
Lowest point of fill on the upstream face of dam (fill includes human-placed materials such as spillways-conduits-cradles), Y = _____
X – Y = _____ ft ≥ 20 ft?
☐ Yes - Go to Step 17
☐ No - Go to Step 18

Step 17 *DAM. Submit JPA for **MDE DAM SAFETY REVIEW**. Prior to submitting, determine whether dam is a superwide embankment per MDE Dam Safety Policy Memo #5 and if applicable follow superwide dam requirements. If pond is constructed on fill, follow dam safety design/review criteria (under development) for ponds constructed on fill.*

Step 18 Is maximum active storage volume [3] ≤ 8,000 cf?
"brim up" storage = _____ cf ≤ 8,000 cf?
☐ Yes - Go to Step 19
☐ No - Go to Step 20

Step 19 *MICRO-POND / ESD FACILITY. Exempt from small pond approval. Review by **REVIEW BY LOCAL SWM APPROVAL AUTHORITY**.*

Step 20 Is embankment fill around reservoir rim ≤ 2 ft above natural ground surface? MDE Dam Safety Policy Memo #13
☐ Yes - Go to Step 21
☐ No - Go to Step 24

Step 21 Is the projection of "L" horizontally downstream from the pond bottom below the existing or proposed ground per MDE Dam Safety Policy Memo #13?
L = 10(H) + 20 ft, where
H = Lowest point on the crest of dam – Lowest point of fill on the upstream face of dam (fill includes human-placed materials such as spillways-conduits-cradles) = X – Y = _____ ft (Step 16)
L = 10(H) + 20 ft = _____ ft
☐ Yes - Go to Step 22
☐ No - Go to Step 24

Step 22 Is the existing or proposed downstream ground slope > 10% at any point below design water surface elevation (WSEL) + 1 ft and within projection of "L"? MDE Dam Safety Policy Memo #13
Design Elevation WSEL = _____ + 1.0 ft = _____
Is maximum ground slope within projection "L" _____ % > 10 %?
☐ Yes - Go to Step 24
☐ No - Go to Step 23

Step 23 *EXCAVATED SMALL POND. Design as Code 378 excavated pond. Exempt from small pond approval.* ***REVIEW BY LOCAL SWM APPROVAL AUTHORITY.***

Step 24 Is height of embankment[4] < 4 ft?

Lowest point on the crest of dam, X = _____

Lowest point of fill on the upstream face of dam (fill includes human-placed materials such as spillways-conduits-cradles), Y = _____

X – Y = _____ ft < 4 ft? (Step 16)

☐ Yes - Go to Step 26

☐ No - Go to Step 25

Step 25 Is maximum active storage volume[3] volume < 40,000 cf and height of embankment[4] ≤ 6 ft?

Design 100-YR Elevation = _____

Design 100-YR volume = _____ cf < 40,000 cf ☐ **Yes** ☐ **No**

X – Y = _____ ft ≤ 6 ft (Step 16) ☐ **Yes** ☐ **No**

☐ All Yes - Go to Step 26

☐ No - Go to Step 31

Step 26 Is structure a small impoundment per MDE Dam Safety Policy Memo #4?

X – Y = _____ ft ≤ 6 (Step 16) ☐ **Yes** ☐ **No**

X – Z = _____ ft ≤ 12 ☐ **Yes** ☐ **No**

Maximum Storage Volume _____ ac-ft at maximum WSEL at design storm

No Emergency Spillway ≤ 1.0 ac-ft ☐ **Yes** ☐ **No**

With Emergency Spillway ≤ 1.5 ac-ft ☐ **Yes** ☐ **No**

☐ All Yes - Go to Step 29

☐ No - Go to Step 27

Step 27 Does pond meet the criteria for SUPERWIDE EMBANKMENT per MDE Dam Safety Policy Memo #5? **(Step 7)**

☐ Yes - Go to Step 29

☐ No - Go to Step 28

Step 28 Complete Dam Breach Analysis[5].

☐ Low Hazard ☐ Significant Hazard ☐ High Hazard

Is pond low hazard?

☐ Yes - Go to Step 29

☐ No – Go to Step 30

Step 29 *Exempt from small pond approval. Follow criteria for Chapter 3 practice.* ***REVIEW BY LOCAL SWM APPROVAL AUTHORITY.***

Step 30 *DAM. Submit JPA for **MDE DAM SAFETY REVIEW**.*

Step 31 Does pond meet the criteria for SUPERWIDE EMBANKMENT per MDE Dam Safety Policy Memo #5? **(Step 7)**
☐ Yes - Go to Step 32
☐ No - Go to Step 35

Step 32 Is the pond located in Jones Fall, Gwynn's Falls, or Herring Run watersheds?
☐ Yes - Go to Step 34
☐ No – Go to Step 33

Step 33 *SUPERWIDE SMALL POND. Design to meet superwide small pond/dam requirements per MDE Dam Safety Policy Memo #5; **REVIEW BY CECIL SCD**.*

Step 34 *SUPERWIDE SMALL POND in regulated watershed. Design to meet superwide small pond/dam requirements per MDE Dam Safety Policy Memo #5. Submit JPA for **MDE DAM SAFETY REVIEW**.*

Step 35 Is structure a small impoundment per MDE Dam Safety Policy Memo #4?
X – Y = _____ ft ≤ 6 (Step 16) ☐ **Yes** ☐ **No**
X – Z = _____ ft ≤ 12 (Step 26) ☐ **Yes** ☐ **No**
Maximum Storage Volume _____ ac-ft at maximum WSEL at design storm
No Emergency Spillway ≤ 1.0 ac-ft ☐ **Yes** ☐ **No**
With Emergency Spillway ≤ 1.5 ac-ft ☐ **Yes** ☐ **No**
☐ All Yes - Go to Step 37
☐ No - Go to Step 36

Step 36 Complete Dam Breach Analysis[5].
☐ Low Hazard ☐ Significant Hazard ☐ High Hazard
Is pond low hazard?
☐ Yes - Go to Step 37
☐ No – Go to Step 40

Step 37 Is the pond located in Jones Fall, Gwynn's Falls, or Herring Run watersheds?
☐ Yes - Go to Step 39
☐ No – Go to Step 38

Step 38 *SMALL POND. Design as regular Code 378 pond. **REVIEW BY CECIL SCD**.*

Step 39 *SMALL POND in regulated watershed. Design as regular Code 378 pond. Submit JPA for **MDE DAM SAFETY REVIEW**.*

Step 40 *DAM. Submit JPA for **MDE DAM SAFETY REVIEW**.*

FOOTNOTES:

[1] Control Structure: Any device that controls the flow into the pipe including, but not limited to a riser, orifice plate, weir, or gabion baskets. An open culvert is not considered a control structure provided the pipe diameter is uniform through the embankment or increases in diameter in the downstream direction when additional flow is added.

[2] Maximum Storage Volume ("Brim Full" or "Brim Up"): The National Inventory of Dams defines maximum storage as the total storage space in a reservoir below the maximum attainable water surface elevation. This is the "brim full" volume. If the probable maximum flood (PMF) does not fill the storage space, then the PMF volume can be used as the maximum storage volume, and using the brim full volume would be conservatively acceptable. The upper limit of the storage volume is the top of dam/incipient point of overflow, not the invert of the emergency spillway. For media ponds, include the volume of water in the pore space (voids) of the filter media, which can be approximated using a porosity of 0.4.

[3] Maximum Active Storage Volume: This is the portion of the maximum storage volume that would contribute to the breach volume. Dead storage below the elevation of the downstream toe of the embankment that does not contribute to the breach volume may be excluded from the maximum storage volume for the referenced purposes. For media ponds, if the filter media is part of the embankment height, the maximum storage volume includes the volume of water in the pore space (voids) of the filter media, which can be approximated using a porosity of 0.4.

[4] Embankment height has been defined by the MDE Dam Safety Division as the vertical distance between the lowest point of fill on the upstream face of the dam to the lowest point on the crest of the dam (excluding the auxiliary spillway). Oftentimes this is found at the principal spillway location but can be at other locations along the embankment. For the purposes of this definition, the lowest point of fill includes human-placed materials such as spillway conduits and cradles. Refer to MDE Dam Safety Policy Memorandum No. 22 – Determining Embankment Height for background information and diagrams.

[5] See guidance for dam breach analysis published by MDE titled "Guidance for Completing a Dam Breach Analysis for Small Ponds and Dams in Maryland" draft dated May 2018.

[6] This STEP-BY-STEP DECISION AID document, created by Cecil Soil Conservation District, follows the **February 25, 2025 MDE Stormwater, Dam Safety, and Flood Management Program Flow Chart for Determining Embankment Design Category and Approval Authority**. Copies are available in .pdf and .docx from the Cecil Soil Conservation District.

Notes regarding Ponds in Coldwater Resource Watersheds:

Effective June 14, 2021, small ponds located in Use III and IV watersheds no longer require a permit from the Dam Safety Division. Thermal concerns in accordance with DNR guidance must be addressed and upheld by the small pond approval authority.

Watersheds in Cecil County draining to streams that are designated as coldwater resources are considered regulated watersheds and must meet MDE Thermal Design Criteria in order to qualify to be reviewed and approved by Cecil Soil Conservation District. See MDE publication **Dam and Small Pond Approval Guidelines in Coldwater Resource Watersheds, August 2023** for "design guidance" for small ponds in a coldwater resource watershed. Coldwater

Resources such as a stream with Use Class III/III-P can be determined using the mapping tool for Designated Use Classes for Maryland's Surface Waters: (https://mdewin64.mde.state.md.us/WSA/DesigUse/index.html) or as Maryland Trout Wateshed; Benthic Coldwater Macroinvertebrate watershed; or, Put and Grow Trout Watershed which is identified on the Maryland DNR Freshwater Fisheries – Coldwater Resource Mapping Tool: (https://maryland.maps.arcgis.com/apps/webappviewer/index.html?id=dc5100c0266d4ce89df813f34678944a).

REFERENCES:

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

MDE Dam Safety Policy Memorandum #2 - Roadway/Railroad Embankment with Culvert Crossing, February 15, 2022 or latest revision.

MDE Dam Safety Policy Memorandum #4 – Hazard Classification of Small Impoundments, January 29, 2025 or latest revision.

MDE Dam Safety Policy Memorandum #5 - Superwide Roadway/Railroad Embankments, February 16, 2022 or latest revision.

MDE Dam Safety Policy Memorandum #13 – Excavated Ponds, April 24, 2023 or latest revision.

MDE Dam Safety Policy Memorandum #20 – Spillways Discharging to Storm Drain Networks, October 27, 2023 or latest revision.

MDE Dam Safety Policy Memorandum #22 – Determining Embankment Height, January 29, 2025 or latest revision.

MDE Dam Safety Policy Memorandum #23 – Small Ponds Not Requiring Small Pond Approval, January 29, 2025 or latest revision.

*The MDE Dam Safety Policy & Technical Memorandums that are stated herein are available on the MDE website. As the design professional you are expected to be knowledgeable of all these MDE policies and memorandums and keep up-to-date with any revisions to these documents. They can be found at the following website addresses:

There is a total of 23 (1-23) MDE Dam Safety Policy Memoranda available at the following URL address as of the printing of this document:
https://mde.maryland.gov/programs/water/damsafety/pages/guidelines.aspx

There is a total of 13 (1-12,16) MDE Technical Memoranda available at the following URL address as of the printing of this document:
https://mde.maryland.gov/programs/water/stormwatermanagementprogram/pages/planreviewforstateandfederalprojects.aspx

APPENDIX 3

USDA NRCS MD POND CODE 378

- USDA NATURAL RESOURCES CONSERVATION SERVICE MARYLAND CONSERVATION PRACTICE STANDARD POND CODE 378 (JANUARY 2000) (.PDF FORMAT)

USDA
NATURAL RESOURCES
CONSERVATION SERVICE
MARYLAND

CONSERVATION PRACTICE
STANDARD

POND

CODE 378
(Reported in No.)

DEFINITION

A water impoundment made by constructing a dam or an embankment or by excavating a pit or dugout.

In this standard, ponds constructed by the first method are referred to as embankment ponds, and those constructed by the second method are referred to as excavated ponds. Ponds constructed by both excavation and the embankment methods are classified as embankment ponds if the depth of water impounded against the embankment at the principal spillway storm design high water elevation is 3 feet or more (See Table 1).

This 3 feet shall be measured from the low point on the upstream toe of the embankment to the design high water.

PURPOSE

To provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard spraying, and other related uses, and to maintain or improve water quality. This standard also applies to stormwater management ponds.

CONDITIONS WHERE PRACTICE APPLIES

General - This practice applies where it is determined that stormwater management, water supply, or temporary storage is justified and it is feasible and practicable to build a pond which will meet local and state law requirements.

This standard establishes the minimum acceptable quality for the design and construction of ponds if:

1. Failure of the dam will not result in loss of life; in damage to homes, commercial or industrial buildings, main highways, or railroads; or interruption of the use or service of public utilities.

2. The product of the storage times the effective height of the dam is less than 3,000. Storage is the volume, in acre-feet, in the reservoir below the elevation of the crest of the emergency spillway.

   The effective height of the dam is the difference in elevation, in feet, between the emergency spillway crest and the lowest point on a profile taken along the centerline of the dam, excluding the cutoff trench. If there is no emergency spillway, the top of the dam becomes the upper limit for determining the storage and the effective height.

3. For dams in rural areas, the effective height of the dam (as defined above) is 35 feet or less and the dam is hazard class ”a”. For dams in urban areas, the effective height of the dam is 20 feet or less and the dam is hazard class ”a”.

Ponds exceeding any of the above conditions shall be designed and constructed according to the requirements of Technical Release 60.

Exemptions - Soil Conservation District small pond approval is not required for small class “a” structures where the following exists:

1. Ponds or other structures have less than four (4) feet of embankment, or

2. The storage at emergency spillway design

high water elevation according to Table 1 does not exceed 40,000 cubic feet, and the height of the embankment is 6 feet or less.

The height of the embankment shall be measured from the top of the dam to the lowest point of excavation, excluding the cutoff trench, along the centerline of the dam.

In addition, an embankment pond that meets the criteria below shall be considered an excavated pond and is also exempt from small pond approval.

1. The calculation of 10H+20=L, where H=height from the pond bottom to the top of the dam, is provided, and

2. The projection of L horizontally downstream from the pond bottom is below the existing or proposed ground, and

3. The existing or proposed downstream ground slope within the projection of L is less than 10% at any point.

The review and design of such class "a" structures shall be based on sound engineering judgment assuring a stable outfall for the ten (10) year, 24-hour storm event.

Site Conditions - Site Conditions shall be such that runoff from the design storm can be safely passed through (1) a natural or constructed emergency spillway, (2) a combination of a principal spillway and an emergency spillway, or (3) a principal spillway.

Drainage Area - The drainage area above the pond must be protected against erosion to the extent that expected sedimentation will not shorten the planned effective life of the structure.

For ponds whose primary purpose is to trap sediment for water quality, adequate storage should be provided to trap the projected sediment delivery from the drainage area for the life of the pond.

If the intent is to maintain a permanent pool, the drainage area should be at least 4 acres for each acre-foot of permanent storage. These recommendations may be reduced if a dependable source of ground water or diverted surface water contributes to the pond. The water quality shall be suitable for its intended use.

Soils Investigation - A soils investigation is required on all ponds. As a minimum it shall include information along the centerline of the proposed dam, in the emergency spillway location, and the planned borrow area. The type of equipment used and the extent of the investigation will vary from site to site. All investigations shall be logged using the Unified Soil Classification System.

Road Embankments - Where road embankments are being designed to impound a specific volume of water, either as a permanent pool or temporary stormwater storage, special design and evaluation criteria may be required as determined by Appendix B.

CONSIDERATIONS

Water Quantity - The following items should be considered for water quantity:

1. Effects upon components of the water budget, especially effects on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

2. Variability of effects caused by seasonal or climatic changes.

3. Effects on the downstream flows or aquifers that could affect other water uses or users.

4. Potential for multiple use.

5. Effects on the volume of downstream flow to prohibit undesirable environmental, social or economic effects.

Water Quality - The following items should be considered for water quality:

1. Effects on erosion and the movement of sediment, pathogens, and soluble and sediment attached substances that are carried by runoff.

2. Effects on the visual quality of on-site and downstream water resources.

3. Short-term and construction-related effects of this practice on the quality of downstream water courses.

4. Effects of water level control on the temperatures of downstream waters to prevent undesired effects on aquatic and wildlife communities.

5. Effects on wetlands and water-related wildlife habitats.

6. Effects of water levels on soil nutrient processes such as plant nitrogen use or denitrification.

7. Effects of soil water level control on the soil chemistry, soil water, or downstream water.

8. Potential for earth moving to uncover or redistribute sulfidic bearing soils.

CRITERIA

Embankment Ponds

Structure Hazard Classification - Documentation of the classification of dams is required. Documentation is to include but is not limited to location and description of dam, configuration of the valley, description of existing development (houses, utilities, highways, railroads, farm or commercial buildings, and other pertinent improvements), potential for future development, and recommended classification. It is also to include results obtained from breach routings, if breach routings are used as part of the classification process. The class ("a", "b", and "c") as contained in this document is related to the potential hazard to life and property that might result from a sudden major breach of the earth embankment. Structure classification and land use for runoff determination must take into consideration the anticipated changes in land use throughout the expected life of the structure. The classification of a dam is the responsibility of the designer, and subject to review and concurrence of the approving authority.

The classification of a dam is determined only by the potential hazard from failure, not by the criteria. Classification factors in the National Engineering Manual, as supplemented, are given below:

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

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

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

"Rural areas" is defined as those areas in which residents live on farms, in unincorporated settlements, or in incorporated villages or small towns. It is where agriculture, including woodland activities, and extractive industries, including seafood harvesting, provides the primary employment base for residents and where such enterprises are dependent on local residents for labor.

Non-rural areas shall be classified as urban.

Peak Breach Discharge Criteria - Breach routings are used to help delineate the area potentially impacted by inundation should a dam fail and can be used to aid dam classification. The breach hydrograph is the outflow hydrograph attributed to the sudden release of water in reservoir storage. This is due to a dam breach during non-storm conditions.

Stream routings made of the breach hydrograph are to be based upon topographic data and hydraulic methodologies mutually consistent in their accuracy and commensurate with the risk being evaluated.

The minimum peak discharge of the breach hydrograph, regardless of the techniques used

to analyze the downstream inundation area, is as follows:

$Q_{max} = 3.2\ H_w^{2.5}$ where,

Q_{max} = the peak breach discharge, cfs.

H_w = depth of water at the dam at the time of failure, feet. This is measured to the crest of the emergency spillway or to design high water, if no emergency spillway exists. Use "non-storm" conditions downstream of the dam.

Where breach analysis has indicated that only overtopping of downstream roads will occur, the following guidelines will be used:

Class	**Depth of Flow (d) ft.**
"a"	$d \leq 1.5$
"b" & "c"	$d > 1.5$

Use and importance of the roadway shall be considered when making a classification.

Hydrology - Principal and emergency spillways will be designed within the limitations shown on TABLE 1. The storm duration used shall be 24 hours except where TR-60 is specified. The pond shall be designed to safely pass the base flow along with volume and peak rates of runoff from design storms, specified in Table 1. All storm water management ponds shall be designed using urban criteria. This can be done by using principal and emergency spillways. The following shall be used to determine runoff rates and volumes:

1. NRCS "Engineering Field Handbook, Part 650" or;

2. NRCS, NEH, Section 4, Hydrology" or;

3. NRCS, TR-55, "Urban Hydrology for Small Watersheds" or;

4. NRCS, TR-20, "Computer Program for Project Formulation" or,

5. Computer programs using NRCS hydrology methods with identifiable inputs and outputs as approved by the reviewing agency.

Earth Embankment

Top Width - The minimum top width of the dam is shown in Table 2. When the embankment top is to be used as a public road, the minimum width is to be 16 feet for one-way and 26 feet for two-way traffic. If the embankment is to be used for infrequent vehicle crossings, the minimum top width shall be 10 feet. Guardrails or other safety measures are to be used where necessary and are to meet the requirements of the responsible road authority.

Side Slopes - The combined upstream and downstream side slopes of the settled embankment shall not be less than five horizontal to one vertical (5:1) with neither slope steeper than 2:1. If the dam is used as a road crossing with a top width greater than 26 feet, then the combined side slopes of the settled embankment shall not be less than 4 horizontal to one vertical (4:1) with neither slope steeper than 2:1. Slopes must be designed to be stable in all cases, even if flatter side slopes are required.

Earth Cuts - If cuts in an existing fill or in natural ground are required for the rehabilitation of an existing pond spillway or the construction of a new pond, the slope of the bonding surfaces between the existing material in place and the fill to be placed shall not be steeper than a ratio of two horizontal to one vertical (2:1).

Foundation Cutoff - A cutoff trench of relatively impervious material shall be provided under the entire length of the dam and shall be located at or upstream from the centerline of the dam. The cutoff trench shall have a bottom width adequate to accommodate the equipment used for excavation, backfill and compaction operations, with the minimum width being 4 feet, and shall have side slopes no steeper than one horizontal to one vertical. Minimum depth shall be 4 feet.

Impervious Core - Any impervious core within the embankment shall be located at or upstream from the centerline of the dam, and shall extend up the abutments to the 10-year water surface elevation. The impervious core shall extend vertically from the cutoff trench up to the 10-year water surface elevation throughout the embankment.

Seepage Control - Seepage control is to be included: (1) if pervious layers are not intercepted by the cutoff; (2) if seepage from the abutments may create a wet embankment; (3) if the phreatic line intersects the downstream slope; or (4) if special conditions require drainage to insure a stable dam. The phreatic line shall be drawn on a 4:1 slope starting on the inside slope at the normal pool elevation. For stormwater management ponds, normal pool shall be considered as the 10-year water surface elevation.

Seepage may be controlled by (1) foundation abutment or embankment drains; (2) reservoir blanketing; or (3) a combination of these measures. Foundation drains may control seepage encountered in the cutoff trench during construction. These drains must be located downstream of the dam centerline and outside the limits of the proposed cutoff trench. All drains must be designed according to the section Principal Spillway, *Conduit Piping and Seepage Control*.

Wave Erosion Protection - Where needed to protect the face of the dam, special wave protection measures such as a bench, rock riprap, sand-gravel, soil cement or special vegetation shall be provided. (Reference NRCS Technical Releases 56 & 69)

Freeboard - The top elevation of the settled embankment shall be determined in accordance with minimum criteria established in Table 1

Allowance for Settlement - The design height of the dam shall be increased by the amount needed to insure that the design top of fill elevation will be maintained after all settlement has taken place. This increase shall not be less than 5 percent, except where detailed soil testing and lab analyses indicate a lesser amount is adequate.

Principal Spillway

Capacity - A conduit, with needed appurtenances, shall be placed under or through the dam, except where a weir type structure is used. The minimum capacity of the principal spillway shall be that required in Table 1.

Crest Elevation of Inlet - The crest elevation of the principal spillway shall be no less than 1.0 foot below the crest of the emergency spillway. The crest elevation is the invert elevation of the lowest opening 6 inches or larger in any direction.

The inlet or riser size for the pipe drops shall be such that the flow through the structure goes from weir-flow control to pipe-flow control without going into orifice-flow control in the riser. The inlets and outlets shall be designed and analyzed to function satisfactorily for the full range of flow and hydraulic head anticipated.

The riser shall be analyzed for flotation assuming all orifices and pipes are plugged. The factor of safety against flotation shall be 1.2 or greater.

Pipe Conduits - Pipe conduits under or through the dam shall meet the following requirements:

1. All pipes shall be circular in cross section except for cast-in-place reinforced concrete box culverts.

2. Pipe shall be capable of withstanding the external loading without yielding, buckling, or cracking.

3. Pipe strength shall be not less than those shown on Tables 3, 4 and 5 for corrugated steel, aluminum, and plastic pipes and applicable ASTM's for other materials.

4. Where inlet or outlet flared sections are used, they shall be made from materials compatible with the pipe.

5. All pipe joints shall be made watertight by the use of flanges with gaskets, coupling bands with gaskets, bell and spigot ends

with gaskets, or by welding. See Construction Specifications for details.

6. The joints between sections of pipe shall be designed to remain watertight after joint rotation and elongation caused by foundation consolidation.

The capacity of the pipe conduit shall be adequate to discharge long duration, continuous or frequent flows without flow through the emergency spillway. The diameter of the pipe shall be not less than 6 inches.

For dams 20 feet or less in effective height, the following pipe materials are acceptable: cast-iron, ductile iron, steel, corrugated steel or aluminum, concrete with rubber gaskets, plastic, and cast-in-place reinforced concrete box culverts. Plastic pipe that will be exposed to direct sunlight should be made of ultraviolet resistant materials and protected by coating or shielding. Connections of pipe to less flexible pipe or structures must be designed to avoid stress concentrations that could rupture the pipe.

For dams over 20 feet in effective height, conduits are to be reinforced concrete pipe, cast-in-place reinforced concrete box culverts, corrugated steel, ductile iron, welded steel or aluminum pipe. The maximum height of fill over any principal spillway steel, aluminum, or plastic pipe must not exceed 25 feet.

Concrete pipe shall have a concrete cradle extending up the sides of the pipe at least 50% of its outside diameter with minimum thickness of 6 inches. Where a concrete cradle is not needed for structural reasons, flowable fill may be used as described in the CONSTRUCTION SPECIFICATIONS section of this standard. Gravel bedding is not permitted. Cantilever outlet sections, if used, shall be designed to withstand the cantilever load. Pipe supports shall be provided when needed. Other suitable devices such as plunge basin, stilling basin, impact basin, or rock riprap spreader should be used to provide a safe outlet. Cathodic protection is to be provided for welded steel and corrugated steel pipe where the need and importance of the structure warrant. Cathodic protection should normally be provided for corrugated steel pipe where the saturated soil resistivity is less than 4,000 ohms-cm or the pH is lower than 5. The National Handbook of Conservation Practices, Irrigation Water Conveyance, Steel Pipeline Standard (430-FF), provides criteria for cathodic protection of welded steel pipes.

Multiple Conduits - Where multiple conduits are used, there shall be sufficient space between the conduits and the installed anti-seep collars to allow for backfill material to be placed between the conduits by the earth moving equipment and for easy access by hand operated compaction equipment. This distance between conduits shall be equal to or greater than half the pipe diameter but not less than 2 feet.

Conduit Piping and Seepage Control - Seepage along pipe conduit spillways extending through the embankment shall be controlled by use of (1) anti-seep collars, or (2) filter and drainage diaphragm. Seepage control will not be required on pipes 6 inches in diameter or less.

Anti-seep collars shall be installed around all conduits through earth fills according to the following criteria:

1. Sufficient collars shall be placed to increase the seepage length along the conduit by a minimum of 15 percent of the pipe length located within the saturation zone.

2. The assumed normal saturation zone shall be determined by projecting a line at a slope (4) horizontal to (1) vertical from the point where the normal water elevation meets the upstream slope to a point where this line intersects the invert of the pipe conduit or bottom of the cradle, whichever is lower. For Stormwater Management ponds, the phreatic line starting elevation shall be the 10-year water elevation.

3. Maximum collar spacing shall be 14 times the required projection above the pipe. The minimum collar spacing shall be 5 times the required minimum projection.

4. Anti-seep collars should be placed within the saturated zone. In cases where the spacing limit will not allow this, at least one collar will be in the saturated zone.

5. All anti-seep collars and their connections to the conduit shall be watertight and made of material compatible with the conduit.

6. Collar dimensions shall extend a minimum of 2 feet in all directions around the pipe.

7. Anti-seep collars shall be placed a minimum of two feet from pipe joints except where flanged joints are used.

8. For pipes with concrete cradles, the projection shall be measured from the cradle.

Filter and drainage diaphragms are always recommended, but are required when the following conditions are encountered:

1. The pond requires design according to TR-60.

2. Embankment soils with high piping potential such as Unified Classes GM, SM, and ML.

Filter and drainage diaphragms shall be designed in accordance with procedures from NRCS TR-60, Earth Dams and Reservoirs, Section 6, Principal Spillways, as described below.

The drainage diaphragm shall usually consist of sand, meeting the fine concrete aggregate requirements (ASTM C-33). A design analysis shall be made using Part 633 of the National Engineering Manual, Chapter 26, Gradation Design of Sand and Gravel Filters.

The drainage diaphragm shall be a minimum of 3 ft thick and extend vertically upward and horizontally at least three times the conduit outside diameter or the width of the cradle, whichever is greater except that:

1. The vertical extension need be no higher than the maximum potential reservoir water level, and

2. The horizontal extension need be no further than 5 feet beyond the sides and slopes of any excavation made to install the conduit.

3. The minimum soil cover over any portion of the filter-drainage diaphragm measured normal to the nearest embankment surface shall be at least 2 feet.

It shall extend vertically downward at least 2 ft beneath the conduit outside diameter or bottom of the cradle, whichever is greater. The drainage diaphragm shall be located immediately downstream of the cutoff trench, approximately parallel to the centerline of the dam but no further upstream than the centerline of the dam.

The drainage diaphragm shall outlet at the embankment downstream toe, preferably using a drain backfill envelope continuously along the pipe to where it exits the embankment. Protecting drain fill from surface erosion will be necessary.

It is required that the outlet for the filter diaphragm is sized to safely discharge the design flow. Where a drain backfill envelope is used as the outlet, it is recommended that it be designed so the hydraulic head does not exceed the depth of the drain outlet. The exposed area of the drain outlet must also be protected from external attack such as surface erosion and slope instability due to horizontal seepage pressures. A weighted toe cover such as riprap can be effective if protected with a properly designed filter between the sand drain material and the riprap cover.

If pipe drain outlets are used, consideration must be given to the structural design of the conduit in resisting external loading and the design life of the pipe must be consistent with the design life of the dam and physical conditions of the site. Also, the pipe must be designed for capacity and size of perforations as outlined in NEH Part 633, Chapter 26 and Soil Mechanics Note 3. If the pipe corrodes, is crushed by exterior loading, or is otherwise damaged, the outlet of the filter diaphragm is lost and a piping failure may occur.

The design quantity (Q) used to size the outlet can be calculated by Darcy's Law, Q = kiA where:

k = permeability of the embankment or drain outlet material (ft/day)

i = hydraulic gradient where i = h/l

h = head differential (ft)

l = seepage path (ft)

A = area of flow (diaphragm or outlet) (ft^2)

Anti-vortex Devices - Drop inlet spillways are to have adequate anti-vortex devices. Splitter type anti-vortex devices shall be placed in line with the barrel. An anti-vortex device is not required if weir control is maintained in the riser through all flow stages.

Trash Racks - All pipe and inlet structures shall have a trash rack. Openings for trash racks shall be no larger than 1/2 of the barrel conduit diameter, but in no case less than 6 inches.

Flush grates for trash racks are not acceptable. Inlet structures that have flow over the top shall have a non-clogging trash rack such as a hood-type inlet extending a minimum of 8 inches below the weir openings, which allows passage of water from underneath the trash rack into the riser.

For inlet structures with solid covered tops, the bottom of the cover slab must be set at an elevation to prevent orifice flow control before pipe flow control governs.

Low stage releases, where the opening is larger than 6 inches, shall have a non-clogging trash rack with openings no larger than half the low flow dimension.

For all low stage releases 6 inches or smaller in any direction, the emergency spillway design storm shall be routed assuming the release has failed, using storage and discharge only above the elevation of the next opening larger than 6 inches in all directions. This design storm routing shall not overtop the dam.

Drain Pipe - A pipe with a suitable valve shall be provided to drain the pool area, where needed for proper pond management. The principal spillway conduit may serve as a pond drain, when so located, to accomplish this function.

Water Supply Pipes or Utilities - All pipes through the dam shall have an inside diameter of not less than 1 1/4 inches. Pipes / utilities not parallel to the axis of the dam shall meet all principal spillway requirements (i.e. filter diaphragm, embankment soils, etc.). Pipes / utilities parallel to the axis of the dam shall be constructed with no granular bedding.

Earth Emergency Spillways

Emergency spillways are provided to convey large flood flows safely past earth embankments. An emergency spillway must be provided for each dam, unless the principal spillway is large enough to pass the routed design hydrograph peak discharge and any trash without overtopping the dam. The only design that may be utilized without an emergency spillway is: a principal spillway with a cross-sectional area of 3 square feet or more and an inlet that will not clog, such as a hood-type inlet which allows passage of water from underneath the trash rack into the riser.

Capacity - The minimum capacity of emergency spillways shall be that required to pass the peak flow expected from a design storm of the frequency and duration shown in Table 1 less any reduction creditable to conduit discharge and detention storage.

The emergency spillway shall (1) safely pass the storm design peak or (2) the storm runoff shall be routed through the reservoir. The routing shall start with the water surface at the elevation of the crest of the principal spillway, or at the water surface after 10 days drawdown, whichever is higher. The 10-day drawdown shall be computed from the crest of the emergency spillway or from the elevation that would be attained had the entire design storm been impounded, whichever is lower. Emergency spillways are to provide for passage of the design flow at a non-erosive velocity to a point downstream where the dam will not be endangered.

Component Parts - Earth spillways are open channels and usually consist of an inlet channel, level section, and an exit channel. The minimum difference in elevation between the crest of the emergency spillway and the settled top of dam shall be 2.0 feet.

Cross-Section - Earth spillways shall be trapezoidal and shall be located in undisturbed earth. The side slopes shall be stable for the material in which the spillway is to be constructed, but not steeper than 2:1. The emergency spillway shall have a bottom width of not less than 8 feet.

The inlet channel may be curved to fit existing topography; however, it should be flared to allow unrestricted flow to the level section. The level section should be located as near the centerline of dam as possible. The level section shall be 25 feet in length, and shall be rectangular or square.

Exit channel centerline shall be perpendicular to the level section downstream edge and must be straight for a distance beyond the downstream toe, so that discharges will not reach the earth embankment. The grade of the exit channel shall fall within the range established by discharge requirement and permissible velocities.

The crest of any "token" spillway will be located at or above the 100-year storm elevation in undisturbed earth and have a minimum depth of one foot and bottom width of 8 feet.

Permissible Velocities - Earth spillways shall be designed for non-erosive velocities through the control section and to a point downstream where the dam will not be endangered. The maximum permissible velocity for the grass and grass mixture to be used shall be selected from Table 6. Velocities exceeding these values will require use of linings other than vegetation.

Infiltration / Water Quality Basins – Ponds, either excavated or embankment, that are designed solely for infiltration or as water quality basins will have an emergency spillway. The capacity of the spillway will be determined by the following procedure:

Pass the routed 100-Year Storm with 1 foot of freeboard to the top of dam elevation. Routing will begin at the emergency spillway crest.

Structural Emergency Spillways

Chutes or drops, when used for principal spillways or principal-emergency or emergency spillways, shall be designed in accordance with the principals set forth in the National Engineering Handbook, Section 5 "Hydraulics"; Section 11 "Drop Spillways"; and Section 14 "Chute Spillways". The minimum capacity of a structural spillway shall be that required to pass the peak flow expected from a design storm of the frequency and duration shown in Table 1 less any reduction creditable to conduit discharge and detention storage.

Visual Resource Design

The visual design of ponds shall be carefully considered in areas of high public visibility and those associated with recreation. The underlying criterion for all visual design is appropriateness. The shape and form of ponds, excavated material, and plantings are to relate visually to their surroundings and to their functions.

The embankment may be shaped to blend with the natural topography. The edge of the pond should be shaped so that it is generally curvilinear rather than rectangular. Excavated material shall be shaped so that the final form is smooth, flowing, and fitting to the adjacent landscape rather than angular geometric mounds. If feasible, islands may be added for visual interest and to attract wildlife.

Trees and Shrubs

Non-Roadway Embankments - Trees and/or shrubs will not be allowed on any embankment, will not be allowed within the buffer zone (15 feet from the toe of the dam), and will not be allowed within a 25-foot radius around the inlet structure.

Roadway Embankments - Trees and/or shrubs will not be allowed on any embankment, except for dry stormwater management

structures that will be utilized as a roadway under all the following conditions:

1. Plantings may only be on top of the dam along the roadway and/or sidewalks.

2. The top of the dam shall have a minimum of 50-foot top width.

3. Plantings will not be allowed on the side slopes of the embankment.

4. Plantings will not be allowed within the buffer zone (15 feet from the toe of the dam).

5. Plantings will only be shallow rooted (roots less than 3' deep) trees or shrubs.

6. The pond is a "dry" structure (normal pool not exceeding 18 inches).

7. A landscape plan showing type and location of planting must be prepared by a Landscape Architect certifying shallow rooted plants (roots less than 3' deep) under mature conditions.

8. A minimum of 3 feet freeboard above the 100-year water surface elevation must be maintained.

9. The structure is a low hazard (Class "a") pond.

Safety

Special considerations should be made for safety and access during the design of a pond. Measures to be considered may include fencing, slope benching, access roads, flattened side slopes, etc. When fencing a structure, the fence will be located so it will not interfere with the operation of the emergency spillway.

Excavated Ponds

General - Excavated ponds that create a failure potential through a constructed or created embankment will be designed as embankment ponds. Excavated ponds that include a pipe or weir outlet control system for urban stormwater management shall be designed using the principal and emergency spillway hydrologic criteria for Embankment Ponds, Table 1.

Side Slopes - Side slopes of excavated ponds shall be such that they will be stable and shall not be steeper than 1 horizontal to 1 vertical. Flatter slopes are to be utilized where safety for children, livestock watering, etc. is a design factor.

Perimeter Form - Where the structures are used for recreation or are located in high public view, the perimeter or edge should be shaped to a curvilinear form.

Inlet Protection - When the excavated pond is a bypass type and water is being diverted from a stream, the minimum size inlet line shall be a 4-inch diameter pipe. All state laws concerning water use and downstream rights shall be strictly adhered to.

Where surface water enters the pond in a natural or excavated channel, the side slope of the pond shall be protected against erosion.

Outlet Protection – An excavated pond with a low embankment (combination excavation / embankment pond) shall be designed to ensure a stable outfall for the 10-year, 24-hour frequency storm.

Placement of Excavated Material - The material excavated from the pond shall be placed in one of the following ways so that its weight will not endanger the stability of the pond side slopes and where it will not be washed back into the pond by rainfall:

1. Uniformly spread to a height not exceeding 3 feet with the top graded to a continuous slope away from the pond;

2. Uniformly placed or shaped reasonably well with side slopes no steeper than 2 to 1. The excavated material will be placed at a distance equal to the depth of the pond, but not less than 12 feet from the edge of the pond;

3. Shaped to a designed form that blends visually with the landscape;

4. Used for low embankment and leveling; or

5. Hauled away.

Reservoir Area for Wet Ponds

For most ponds, the topography of the site shall permit storage of water at a depth and volume that ensures a dependable supply, considering beneficial use, sedimentation, season of use, and evaporation and seepage losses. Soils in the reservoir shall be impervious enough to minimize seepage losses or shall be of a type that sealing is practical.

Excavation and shaping required to permit the reservoir area to suitably serve the planned purpose shall be included in the construction plans.

Reservoirs designed specifically for fish production or wildlife management shall follow design criteria in the standards and specifications for Fish Pond Management (MD-399) and Wildlife Wetland Habitat Management (MD-644), as appropriate.

TABLE 1

HYDROLOGIC CRITERIA FOR PONDS

Structure Class	Storage Height Product[1]	Watershed Area (Acres)	Height To Emergency Spwy Crest (Feet)	Normal Surface Area (Acres)	Spillway Capacity[5]				Freeboard[6]
					Principal[2]		Emergency[3, 4]		
					Rural	Urban	Rural	Urban	Rural & Urban
"c" & "b"	Any	Any	Any	Any	TR 60	TR 60	TR 60	TR 60	TR 60
"a"	3,000 or more	Any	Any	Any	TR 60	TR 60	TR 60	TR 60	TR 60
"a"	Less than 3,000	320 and Larger	>20 - 35	≥12	25 YR	TR 60	100 YR	100 YR	2.0' above E.S. Design Storm
			≤20	≥12	10 YR	25 YR	100 YR	100 YR	
			<15	<12	5 YR	10 YR	50 YR	100 YR	
		100 to 320	>20 - 35	≥12	10 YR	TR 60	100 YR	100 YR	2.0' above E.S. Design Storm
			≤20	≥12	5 YR	10 YR	50 YR	100 YR	1.0' above E.S. Design Storm
			<15	<12	2 YR	5 YR	25 YR	100 YR	1.0' above E.S. Design Storm
		Less Than 100	>20 - 35	≥12	5 YR	TR 60	50 YR	100 YR	1.0' above E.S. Design Storm
			≤20	≥12	2 YR	5 YR	25 YR	100 YR	
			<15	<12	10% of 25 YR Peak	5 YR	25 YR	100 YR	

NOTES

1) The storage is defined as the original capacity of the reservoir in acre-feet at the elevation of the crest of the emergency spillway. The effective height is the difference in elevation in feet between the emergency spillway crest and the lowest point on a profile taken along the centerline of the dam, excluding the cutoff trench. If there is no emergency spillway, this height shall be to the top of the dam.

2) Principal - minimum storm to be contained below the crest of the emergency spillway including any combination of temporary storage and principal spillway discharge.

3) Emergency - minimum storm used to proportion the emergency spillway to meet the limitations for shape, size, velocity and exit channel. This storm can be handled by any combination of principal spillway discharge, emergency spillway discharge and storage.

4) For ponds without a separate emergency spillway, the principal spillway functions as the emergency spillway. In this situation, the principal spillway must comply with the emergency spillway hydrologic criteria.

5) All ponds, which are being designed to meet local stormwater requirements, will be required to use the urban criteria. Storm duration used shall be 24 hours except where TR-60 is specified.

6) For ponds without a functioning open channel emergency spillway, minimum freeboard will be 2 feet.

TABLE 2

Total Height Of Embankment (Feet)	Minimum Top Width (Feet)
10 or less	6
11 - 14	8
15 - 19	10
20 - 24	12
25 - 34	14
35 or more	15

TABLE 3[1,2]

MINIMUM GAGES

CORRUGATED STEEL PIPE
2 - 2/3 inches x 1/2 inch Corrugations

Fill Height Over Pipe (Feet)	Pipe Diameter in Inches				
	24 & Less	30	36	42	48
1 - 15	16	16	14	10	10
15 - 20	16	12	10	*	*
20 - 25	16	10	*	*	*

CORRUGATED STEEL PIPE
3 inches x 1 inch or 5 inch x 1 inch Corrugations

Fill Height Over Pipe (Feet)	Pipe Diameter (Inches) Flowable Fill						
	36	42	48	54[3]	60[3]	66[3]	72[3]
1 - 15	16	16	16	14	14	14	14
15 - 20	16	16	12	14	14	14	14
20 - 25	14	14	10	14	14	14	14

* Not Permitted.

TABLE 4[1,2]

MINIMUM GAGES

CORRUGATED ALUMINUM PIPE
2 - 2/3 inches x 1/2 inch Corrugations

Fill Height Over Pipe (Feet)	Pipe Diameter in Inches		
	21 & Less	24	30
1 - 15	16	14	10
15 - 20	12	10	*
20 - 25	10	*	*

CORRUGATED ALUMINUM PIPE
3 inches x 1 inch Corrugations

Fill Height Over Pipe (Feet)	Pipe Diameter in Inches				
	30	36	42	48	54[3]
1 - 15	16	16	14	10	14
15 - 20	16	12	*	*	*
20 - 25	12	*	*	*	*

* Not Permitted.

[1] Coatings for corrugated metal shall be as specified by the MD-378 Construction Specifications.
[2] Tables 3 and 4 were developed using the modified Spangler equation. Sizes other than those shown above are not permitted.
[3] Must use flowable backfill as specified by the MD-378 Construction Specifications and the pipe must be bituminous coated.

TABLE 5

ACCEPTABLE PLASTIC PIPE FOR USE IN EARTH DAM[1, 2]

Nominal Pipe Size (inches)	Schedule or Standard Dimension Ratio (SDR)	Maximum Depth of Fill Over [3]
6 - 24	PVC Schedule 40	10
6 - 24	PVC Schedule 80	15
6 – 24	PVC SDR 26	10
6 - 24	Corrugated HDPE	10

[1] See Specifications, Plastic Pipe

[2] All designs based on Technical Release 77, Reference 20. Other diameters and / or fill heights may be used that meet all the requirements of TR-77.

[3] larger fill heights may be permitted when using flowable fill.

TABLE 6

Permissible Velocities (Ft/Sec)
For Emergency Spillways Lined with Vegetation

Slope Of Exit Channel

Type of Cover	0 - 5%	5 - 10%
Bermudagrass	6	5
Reed Canarygrass	5	4
Tall Fescue	5	4
Kentucky Bluegrass	5	4
Grass-legume mixture	4	3

CONSTRUCTION SPECIFICATIONS

These specifications are appropriate to all ponds within the scope of the Standard for practice MD-378. All references to ASTM and AASHTO specifications apply to the most recent version.

Site Preparation

Areas designated for borrow areas, embankment, and structural works shall be cleared, grubbed and stripped of topsoil. All trees, vegetation, roots and other objectionable material shall be removed. Channel banks and sharp breaks shall be sloped to no steeper than 1:1. All trees shall be cleared and grubbed within 15 feet of the toe of the embankment.

Areas to be covered by the reservoir will be cleared of all trees, brush, logs, fences, rubbish and other objectionable material unless otherwise designated on the plans. Trees, brush, and stumps shall be cut approximately level with the ground surface. For dry stormwater management ponds, a minimum of a 25-foot radius around the inlet structure shall be cleared.

All cleared and grubbed material shall be disposed of outside and below the limits of the dam and reservoir as directed by the owner or his representative. When specified, a sufficient quantity of topsoil will be stockpiled in a suitable location for use on the embankment and other designated areas.

Earth Fill

Material - The fill material shall be taken from approved designated borrow areas. It shall be free of roots, stumps, wood, rubbish, stones greater than 6", frozen or other objectionable materials. Fill material for the center of the embankment, and cut off trench shall conform to Unified Soil Classification GC, SC, CH, or CL and must have at least 30% passing the #200 sieve. Consideration may be given to the use of other materials in the embankment if designed by a geotechnical engineer. Such special designs must have construction supervised by a geotechnical engineer.

Materials used in the outer shell of the embankment must have the capability to support vegetation of the quality required to prevent erosion of the embankment.

Placement - Areas on which fill is to be placed shall be scarified prior to placement of fill. Fill materials shall be placed in maximum 8 inch thick (before compaction) layers which are to be continuous over the entire length of the fill. The most permeable borrow material shall be placed in the downstream portions of the embankment. The principal spillway must be installed concurrently with fill placement and not excavated into the embankment.

Compaction - The movement of the hauling and spreading equipment over the fill shall be controlled so that the entire surface of each lift shall be traversed by not less than one tread track of heavy equipment or compaction shall be achieved by a minimum of four complete passes of a sheepsfoot, rubber tired or vibratory roller. Fill material shall contain sufficient moisture such that the required degree of compaction will be obtained with the equipment used. The fill material shall contain sufficient moisture so that if formed into a ball it will not crumble, yet not be so wet that water can be squeezed out.

When required by the reviewing agency the minimum required density shall not be less than 95% of maximum dry density with a moisture content within ± 2% of the optimum. Each layer of fill shall be compacted as necessary to obtain that density, and is to be certified by the Engineer at the time of construction. All compaction is to be determined by AASHTO Method T-99 (Standard Proctor).

Cut Off Trench - The cutoff trench shall be excavated into impervious material along or parallel to the centerline of the embankment as shown on the plans. The bottom width of the trench shall be governed by the equipment used for excavation, with the minimum width being four feet. The depth shall be at least four feet below existing grade or as shown on the plans. The side slopes of the trench shall be 1 to 1 or flatter. The backfill shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability.

Embankment Core - The core shall be parallel to the centerline of the embankment as shown on the plans. The top width of the core shall be a minimum of four feet. The height shall extend up to at least the 10 year water elevation or as shown on the plans. The side slopes shall be 1 to 1 or flatter. The core shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability. In addition, the core shall be placed concurrently with the outer shell of the embankment.

Structure Backfill

Backfill adjacent to pipes or structures shall be of the type and quality conforming to that specified for the adjoining fill material. The fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material needs to fill completely all spaces under and adjacent to the pipe. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a concrete structure or pipe, unless there is a compacted fill of 24" or greater over the structure or pipe.

Structure backfill may be flowable fill meeting the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 313 as modified. The mixture shall have a 100-200 psi; 28 day unconfined compressive strength. The flowable fill shall have a minimum pH of 4.0 and a minimum resistivity of 2,000 ohm-cm. Material shall be placed such that a minimum of 6" (measured perpendicular to the outside of the pipe) of flowable fill shall be under (bedding), over and, on the sides of the pipe. It only needs to extend up to the spring line for rigid conduits. Average slump of the fill shall be 7" to assure flowability of the material. Adequate measures shall be taken (sand bags, etc.) to prevent floating the pipe. When using flowable fill, all metal pipe shall be bituminous coated. Any adjoining soil fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material shall completely fill all voids adjacent to the flowable fill zone. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a structure or pipe unless there is a compacted fill of 24" or greater over the structure or pipe. Backfill material outside the structural backfill (flowable fill) zone shall be of the type and quality conforming to that specified for the core of the embankment or other embankment materials.

Pipe Conduits

All pipes shall be circular in cross section.

Corrugated Metal Pipe - All of the following criteria shall apply for corrugated metal pipe:

1. Materials - (Polymer Coated steel pipe) - Steel pipes with polymeric coatings shall have a minimum coating thickness of 0.01 inch (10 mil) on both sides of the pipe. This pipe and its appurtenances shall conform to the requirements of AASHTO Specifications M-245 & M-246 with watertight coupling bands or flanges.

   Materials - (Aluminum Coated Steel Pipe) - This pipe and its appurtenances shall conform to the requirements of AASHTO Specification M-274 with watertight coupling bands or flanges. Aluminum Coated Steel Pipe, when used with flowable fill or when soil and/or water conditions warrant the need for increased durability, shall be fully bituminous coated per requirements of AASHTO Specification M-190 Type A. Any aluminum coating damaged or otherwise removed shall be replaced with cold applied bituminous coating compound. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt.

   Materials - (Aluminum Pipe) - This pipe and its appurtenances shall conform to the requirements of AASHTO Specification M-196 or M-211 with watertight coupling

bands or flanges. Aluminum Pipe, when used with flowable fill or when soil and/or water conditions warrant for increased durability, shall be fully bituminous coated per requirements of AASHTO Specification M-190 Type A. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt. Hot dip galvanized bolts may be used for connections. The pH of the surrounding soils shall be between 4 and 9.

2. Coupling bands, anti-seep collars, end sections, etc., must be composed of the same material and coatings as the pipe. Metals must be insulated from dissimilar materials with use of rubber or plastic insulating materials at least 24 mils in thickness.

3. Connections - All connections with pipes must be completely watertight. The drain pipe or barrel connection to the riser shall be welded all around when the pipe and riser are metal. Anti-seep collars shall be connected to the pipe in such a manner as to be completely watertight. Dimple bands are not considered to be watertight.

   All connections shall use a rubber or neoprene gasket when joining pipe sections. The end of each pipe shall be re-rolled an adequate number of corrugations to accommodate the bandwidth. The following type connections are acceptable for pipes less than 24 inches in diameter: flanges on both ends of the pipe with a circular 3/8 inch closed cell neoprene gasket, prepunched to the flange bolt circle, sandwiched between adjacent flanges; a 12-inch wide standard lap type band with 12-inch wide by 3/8-inch thick closed cell circular neoprene gasket; and a 12-inch wide hugger type band with o-ring gaskets having a minimum diameter of 1/2 inch greater than the corrugation depth. Pipes 24 inches in diameter and larger shall be connected by a 24 inch long annular corrugated band using a minimum of 4 (four) rods and lugs, 2 on each connecting pipe end. A 24-inch wide by 3/8-inch thick closed cell circular neoprene gasket will be installed with 12 inches on the end of each pipe. Flanged joints with 3/8 inch closed cell gaskets the full width of the flange is also acceptable.

   Helically corrugated pipe shall have either continuously welded seams or have lock seams with internal caulking or a neoprene bead.

4. Bedding - The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.

5. Backfilling shall conform to "**Structure Backfill**".

6. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Reinforced Concrete Pipe - All of the following criteria shall apply for reinforced concrete pipe:

1. Materials - Reinforced concrete pipe shall have bell and spigot joints with rubber gaskets and shall equal or exceed ASTM C-361.

2. Bedding - Reinforced concrete pipe conduits shall be laid in a concrete bedding / cradle for their entire length. This bedding / cradle shall consist of high slump concrete placed under the pipe and up the sides of the pipe at least 50% of its outside diameter with a minimum thickness of 6 inches. Where a concrete cradle is not needed for structural reasons, flowable fill may be used as described in the "Structure Backfill" section of this standard. Gravel bedding is not permitted.

3. Laying pipe - Bell and spigot pipe shall be placed with the bell end upstream. Joints shall be made in accordance with recommendations of the manufacturer of the material. After the joints are sealed for the entire line, the bedding shall be placed so that all spaces under the pipe are filled. Care shall be exercised to prevent any deviation from the original line and grade of

the pipe. The first joint must be located within 4 feet from the riser.

4. Backfilling shall conform to "**Structure Backfill**".

5. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Plastic Pipe - The following criteria shall apply for plastic pipe:

1. Materials - PVC pipe shall be PVC-1120 or PVC-1220 conforming to ASTM D-1785 or ASTM D-2241. Corrugated High Density Polyethylene (HDPE) pipe, couplings and fittings shall conform to the following: 4" – 10" inch pipe shall meet the requirements of AASHTO M252 Type S, and 12" through 24" inch shall meet the requirements of AASHTO M294 Type S.

2. Joints and connections to anti-seep collars shall be completely watertight.

3. Bedding -The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.

4. Backfilling shall conform to "**Structure Backfill**".

5. Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Drainage Diaphragms - When a drainage diaphragm is used, a registered professional engineer will supervise the design and construction inspection.

Concrete

Concrete shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 414, Mix No. 3.

Rock Riprap

Rock riprap shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 311.

Geotextile shall be placed under all riprap and shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 921.09, Class C.

Care of Water during Construction

All work on permanent structures shall be carried out in areas free from water. The Contractor shall construct and maintain all temporary dikes, levees, cofferdams, drainage channels, and stream diversions necessary to protect the areas to be occupied by the permanent works. The contractor shall also furnish, install, operate, and maintain all necessary pumping and other equipment required for removal of water from various parts of the work and for maintaining the excavations, foundation, and other parts of the work free from water as required or directed by the engineer for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed or leveled and graded to the extent required to prevent obstruction in any degree whatsoever of the flow of water to the spillway or outlet works and so as not to interfere in any way with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent works. The removal of water from the required excavation and the foundation shall be accomplished in a manner and to the extent that will maintain stability of the excavated slopes and bottom required excavations and will allow satisfactory performance of all construction operations. During the placing and compacting of material in required excavations, the water level at the locations being refilled shall be maintained below the bottom of the excavation at such locations which may require draining the water sumps from which the water shall be pumped.

Stabilization

All borrow areas shall be graded to provide proper drainage and left in a sightly condition. All exposed surfaces of the embankment, spillway, spoil and borrow areas, and berms shall be stabilized by seeding, liming, fertilizing and mulching in accordance with the Natural Resources Conservation Service Standards and Specifications for Critical Area Planting (MD-342) or as shown on the accompanying drawings.

Erosion and Sediment Control

Construction operations will be carried out in such a manner that erosion will be controlled and water and air pollution minimized. State and local laws concerning pollution abatement will be followed. Construction plans shall detail erosion and sediment control measures.

OPERATION AND MAINTENANCE

An operation and maintenance plan in accordance with Local or State Regulations will be prepared for all ponds. As a minimum, the dam inspection checklist located in Appendix A shall be included as part of the operation and maintenance plan and performed at least annually. Written records of maintenance and major repairs needs to be retained in a file. The issuance of a Maintenance and Repair Permit for any repairs or maintenance that involves the modification of the dam or spillway from its original design and specifications is required. A permit is also required for any repairs or reconstruction that involve a substantial portion of the structure. All indicated repairs are to be made as soon as practical.

SUPPORTING DATA AND DOCUMENTATION

Field Data and Survey Notes

The following is a list of the minimum data needed:

1. Profile along centerline of structure.
2. Profile along centerline of principal spillway.
3. Profile along centerline of emergency spillway.
4. Survey of storage area to develop topography and storage volumes.
5. Soil investigation logs and notes.

Design Data

Record on appropriate engineering paper. The following is a list of the minimum required design data:

1. Determine pond class and list appropriate spillway design criteria, including map.
2. Determine peak runoff from the contributing area for the design storms selected, including topo map.
3. Develop a stage-storage/discharge curve for the site.
4. Determine the pipe spillway by storm routing using the procedure in the SWM Pond Design Manual; Chapter 11, EFH; Chapter 6, TR-55; or TR-20.
5. Design emergency spillway using EFH 11-61.
6. Drawings should show the following as a minimum: profile along centerline of dam; profile along centerline of emergency spillway; cross section through dam at principal spillway; cross section through emergency spillway; plan view; and construction details & notes and soil logs.
7. Compute earth fill (if needed).
8. Special design feature details; watering, fire hydrants, fish management, irrigation, outfall stabilization, etc.; structural details with design loadings, if applicable, should be shown on the drawings.
9. Complete data required on MD-ENG-14.
10. Record seeding plan on drawings or MD-CONS-10.
11. A written Operation and Maintenance Plan.

Construction Check Data/As-built

Record on survey note paper, SCS-ENG-28. Survey data for ponds will be plotted in red. All construction inspection visits shall be recorded on the CPA-6 or appropriate documentation paper. The documentation shall include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed, and decisions made and by whom. The following is a list of the minimum data needed for As-Builts:

1. A profile of the top of the dam.
2. A cross-section of the emergency spillway at the control section.
3. A profile along the centerline of the emergency spillway.
4. A profile along the centerline of the principal spillway extending at least 100 feet downstream of the fill.
5. The elevation of the principal spillway crest.
6. The elevation of the principal spillway conduit invert (inlet and outlet).
7. The diameter, length, thickness and type of material for the riser.
8. The diameter, length, and type of material for the conduit.
9. The size and type of anti-vortex and trash rack device and its elevations in relation to the principal spillway crest.

10. The number, size and location of the anti-seep collars.

11. The diameter and size of any low stage orifices or drain pipes.

12. Show the length, width, and depth of contours of the pool area so that design volume can be verified.

13. Notes and measurements to show that any special design features were met.

14. Statement on seeding and fencing.

15. Notes on site clean up and disposal.

16. Sign and date check notes to include statement that practice meets or exceeds plans and specifications.

REFERENCES

1. *AWWA Standards*, American Water Works Association, Denver, Colorado.

2. *ASTM Standards*, American Society for Testing and Materials, Philadelphia, Pennsylvania.

3. *Engineering Field Handbook, Part 650*, USDA, Soil Conservation Service.

4. *Handbook of PVC Pipe Design and Construction*, First Edition, Uni-Bell Plastic Pipe Association, Dallas, Texas, 1980.

5. *Handbook of Steel Drainage and Highway Construction Products*, Third Edition, American Iron and Steel Institute, Washington, D.C., 1983.

6. *Maryland Dam Safety Manual*, Maryland Department of Natural Resources, Water Resources Administration, Annapolis, Maryland, June 1993.

7. *Maryland Technical Guide, Section IV, Standards and Specifications*, USDA, Natural Resources Conservation Service.

8. *National Engineering Handbook, Section 4, Hydrology*, USDA, Natural Resources Conservation Service, March 1985.

9. *National Engineering Handbook, Section 5, Hydraulics*, USDA, Natural Resources Conservation Service, August 1956.

10. *National Engineering Handbook, Section 11, Drop Spillways*, USDA, Natural Resources Conservation Service, April 1968.

11. *National Engineering Handbook, Section 14, Chute Spillways*, USDA, Natural Resources Conservation Service, October 1977.

12. *National Handbook of Conservation Practices*, USDA, Natural Resources Conservation Service.

13. *Standard Specifications for Materials and Methods of Sampling and Testing*, Nineteenth Edition, American Association of State Highway and Transportation Officials, Washington D.C., 1998.

14. *Standard Specifications for Construction and Materials*, Maryland Department of Transportation, State Highway Administration, Baltimore, Maryland, October 1993.

15. Technical Release No. 20, *Computer Programs for Project Formulation Hydrology*, USDA, Natural Resources Conservation Service, 1992.

16. Technical Release No. 55, *Urban Hydrology for Small Watersheds*, USDA, Natural Resources Conservation Service, 1986.

17. Technical Release No. 56, *A Guide for Design and Layout of Vegetative Wave Protection for Earth Dam Embankments*, USDA, Natural Resources Conservation Service, 1974.

18. Technical Release No. 60, *Earth Dams and Reservoirs*, USDA, Natural Resources Conservation Service, 1985.

19. Technical Release 69, *Riprap for Slope Protection Against Wave Action*, USDA, Natural Resources Conservation Service, 1983.

20. Technical Release No. 77, *Design and Installation of Flexible Conduits*, USDA, Natural Resources Conservation Service, 1990.

21. *National Engineering Handbook, Part 633, Chapter 26, Gradation Design of Sand and Gravel Filters*, USDA, Natural Resources Conservation Service, October 1994.

APPENDIX A

DAM INSPECTION CHECKLIST

To help the dam owner perform periodic safety inspections of the structure, a checklist is provided. Each item of the checklist should be completed. **Repair** is required when obvious problems are observed. **Monitoring** is recommended if there is potential for a problem to occur in the future. **Investigation** is necessary if the reason for the observed problem is not obvious.

A brief description should be made of any noted irregularities, needed maintenance, or problems. Abbreviations and short descriptions are recommended. Space at the bottom of the form should be used for any items not listed.

DAM _____ DATE _____ OWNER _____ WEATHER _____ INSPECTED BY _____ POOL LEVEL _____		Y/N	MONITOR	REPAIR	INVESTIGATE
Item	Comments				
1. CREST					
a. Visual settlement?					
b. Misalignment?					
c. Cracking?					
2. UPSTREAM SLOPE					
a. Erosion?					
b. Ground cover in good condition?					
c. Trees, shrubs, or other woody vegetation?					
d. Longitudinal/Vertical cracks?					
e. Adequate riprap protection?					
f. Stone deterioration?					
g. Settlements, depressions, or bulges?					
3. DOWNSTREAM SLOPE					
a. Erosion?					
b. Ground cover in good condition?					
c. Trees, shrubs, or other woody vegetation?					
d. Longitudinal/Vertical cracks?					
e. Riprap protection adequate?					
f. Settlements, depressions, or bulges?					
g. Soft spots or boggy areas?					
h. Movement at or beyond toe?					
i. Boils at toe?					
4. DRAINAGE-SEEPAGE CONTROL					
a. Internal drains flowing?	Est. Left _____ gpm Est. Right _____ gpm				
b. Seepage at toe?	Estimated _____ gpm				
c. Does seepage contain fines?					

INSPECTION CHECKLIST - PAGE 2

INSPECTED BY _____ **DATE** _____

Item	Comments	Y/N	MONITOR	REPAIR	INVESTIGATE
5. ABUTMENT CONTACTS					
a. Erosion?					
b. Differential movement?					
c. Cracks?					
d. Seepage?	Estimated _____ gpm				
e. Adequate erosion protection for ditches?					
6. INLET STRUCTURE	Concrete or Metal Pipe (circle one)				
a. Seepage into structure?					
b. Debris or obstructions?					
c. If concrete, do surfaces show:					
1. Spalling?					
2. Cracking?					
3. Erosion?					
4. Scaling?					
5. Exposed reinforcement?					
6. Other?					
d. If metal, do surfaces show:					
1. Corrosion?					
2. Protective Coating deficient?					
3. Misalignment or split seams?					
e. Do the joints show:					
1. Displacement or offset?					
2. Loss of joint material?					
3. Leakage?					
f. Are the trash racks:					
1. Broken or bent?					
2. Corroded or rusted?					
3. Obstructed?					
4. Operational?					
g. Sluice/Drain gates:					
1. Broken or bent?					
2. Corroded or rusted?					
3. Leaking?					
4. Not seated correctly?					
4. Periodically maintained?					
5. Operational?					

INSPECTION CHECKLIST - PAGE 3

INSPECTED BY _____ **DATE** _____

Item	Comments	Y/N	MONITOR	REPAIR	INVESTIGATE
7. PRINCIPAL SPILLWAY PIPE	Concrete or Metal Pipe (circle one)				
a. Seepage into conduit?					
b. Debris present?					
c. Do concrete surfaces show:					
1. Spalling?					
2. Cracking?					
3. Erosion?					
4. Scaling?					
5. Exposed reinforcement?					
6. Other?					
d. Do the joints show:					
1. Displacement or offset?					
2. Loss of joint material?					
3. Leakage?					
8. STILLING BASIN/POOL	Riprap or Concrete (circle one)				
a. If concrete, condition of surfaces?					
b. Deterioration or displacement of joints?					
c. Outlet channel obstructed?					
d. Is released water:					
1. Undercutting the outlet?					
2. Eroding the embankment?					
3. Displacing riprap?					
4. Scouring the plunge pool?					
e. Tailwater elevation and flow condition:					
9. EMERGENCY SPILLWAY					
a. Is the channel:					
1. Eroding or backcutting?					
2. Obstructed?					
b. Trees or shrubs in the channel?					
c. Seepage present?					
d. Soft spots or boggy areas?					
e. Channel slopes eroding or sloughing?					
10. RESERVOIR					
a. High water marks?					
b. Erosion/Slides into pool area?					
c. Sediment accumulation?					
d. Floating debris present?					
e. Adequate riprap protection for ditches?					

APPENDIX B

ROADWAY EMBANKMENT DESIGN CRITERIA

HW - TW > 10'* AND HW/D > 2, OR PERMANENT POOL > 3' OR PROPOSED RISER

No → **NO SPECIAL DESIGN**

Yes ↓

MEETS SMALL POND CRITERIA, AND CLASS "A"

No → **MDE DAM SAFETY REVIEW**

Yes ↓

8:1 PROJECTION LINE INTERSECTS DOWNSTREAM SLOPE OF THE EMBANKMENT

No → **SPECIAL EMBANKMENT DESIGN**

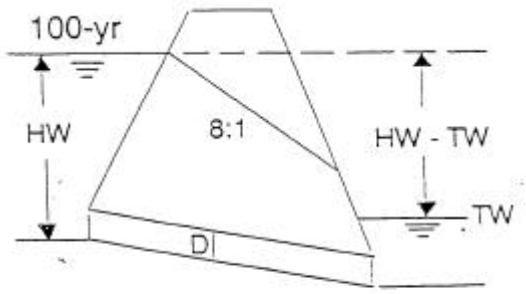
Yes ↓

MD 378 Design

Use any nonorganic soils for the embankment, elimination of the cut-off trench and core based on approval of geotechnical engineer and acceptable to local jurisdictions.

Filter diaphragm is required.

All other MD 378 criteria apply.



* Use HW when TW is below the inlet invert elevation.

APPENDIX 4

SMALL POND APPROVAL DOCUMENTS

- SMALL POND APPROVAL DOCUMENT (WORD .DOCX FORMAT)
- FORM 1: PROJECT COMPLETION REPORT (WORD .DOCX FORMAT)
- FORM 2: TRIENNIAL DAM INSPECTION CHECKLIST (WORD .DOCX FORMAT)
- OPERATION AND MAINTENANCE PLAN GUIDELINES (WORD .DOCX FORMAT)

CECIL SOIL CONSERVATION DISTRICT
105 Chesapeake Boulevard, Suite B-3, Elkton, MD 21921
(410) 398-4411 Ext.3 • www.cecilscd.com

SMALL POND APPROVAL

AGENCY FILE NO. **EFFECTIVE DATE**

[CSCD Tracking No.] **[Leave Blank]**

In accordance with §§5-501 through 5-514, et seq. of the Environment Article, Annotated Code of Maryland (2013 Replacement Volume, as amended), permission is hereby granted to **[ADD APPLICANT INFORMATION HERE],** hereinafter referred to collectively as "the Owner", by the **CECIL SOIL CONSERVATION DISTRICT** to **[CONSTRUCT, REPAIR, ETC.] [NAME OF POND/PROJECT]** as shown on sheets ### through ### on plans prepared by **[NAME OF ENGINEER-IN-CHARGE AND COMPANY]** and approved by the **CECIL SOIL CONSERVATION DISTRICT** on **[Leave Blank]**.

The site is located near **[Road, intersection, etc.]** on **[NAME]** stream in Cecil County, at latitude ##.#### degrees north, longitude -##.#### degrees west.

Sincerely,

CECIL SOIL CONSERVATION DISTRICT

Chris Brown
District Manager

Gerry P. Powell, M.CE., P.E.
Technical Reviewer

* *

This **SMALL POND APPROVAL** is granted subject to the following:

GENERAL CONDITIONS

1. This Approval is valid only for use by the Owner. Permission to transfer the Approval must be obtained from the Department in writing.

2. This Approval is issued based on this structure being classified as a low hazard dam that meets the permit exemption requirements of §§5-503(b) of the Environment Article. Downstream development within the dam break flood zone may cause a change in the hazard classification and may require safety modifications to the structure and submittal of an Emergency Action Plan.

3. This Approval shall become null and void if the construction authorized herein has not begun within two (2) years from the date of this Approval or if the construction authorized herein has not been completed within five (5) years from the date of this Approval. After construction has been completed, the Operation and Maintenance Conditions shall remain in effect.

4. This Approval is subject to all laws and regulations now in effect and may be revoked if it becomes at variance with the laws of the State, or if the Owner fails to comply with the conditions of this Approval.

5. If future repairs, additions, or modifications other than routine maintenance (as defined in MDE Dam Safety Policy Memo #11) must be made to the structure following completion of construction, a separate Approval must be obtained.

6. The Owner shall notify the **CECIL SOIL CONSERVATION DISTRICT ENGINEER** at least five (5) days prior to commencement of construction and no later than five (5) days following completion of construction at **(410) 398-4411 Ext. 3.**

7. This Approval does not preclude the need to obtain required authorizations or approvals from other State, federal or local agencies as required by law.

CONSTRUCTION CONDITIONS

8. The Owner is responsible for implementing all required erosion and sediment controls as approved by the **CECIL SOIL CONSERVATION DISTRICT**. The approved erosion and sediment control plan shall be maintained at the construction site for reference during the construction period. The Owner is responsible for implementing the erosion and sediment control plan.

9. The bed and banks of the waterway shall be disturbed as little as possible. Following initial soil disturbance or redisturbance, permanent or temporary stabilization is required within three (3) calendar days as to the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes steeper than 3 horizontal to 1 vertical (3:1); and seven (7) calendar days as to all other disturbed areas on the project site except for those areas under active grading. Should construction be interrupted or delayed for more than seven (7) days, the Owner, as directed by the Department, shall implement temporary measures to prevent soil erosion during that period. All erosion and sediment control practices during construction shall be in accordance with the 2011 Maryland Standards and Specifications for Erosion and Sediment Control or an approved equivalent. The discharge of untreated sediment laden waters is strictly prohibited.

10. Instream construction in Use I waters is prohibited between the dates of March 1st and June 15th, inclusive, of each calendar year.

11. Instream construction in Use II waters is prohibited between the following dates of each calendar year:
    SAV Closure: 4/15 to 9/15 or 4/15 to 10/15
    Ruppia Closure: 4/15 to 10/14
    Fish Closure: 2/15 to 6/15 or 3/1 to 6/15
    Oysters Closure: 12/15 to 3/31 or 6/1 to 9/30 for spat
    Turtles Closure: 2/16 to 9/30
    Historic Waterfowl Closure: 11/15 to 3/1

12. Instream construction in Use III waters is prohibited between the dates of October 1st and April 30th, inclusive, of each calendar year.

13. Instream construction in Use IV waters is prohibited between the dates of March 1st and May 31st, inclusive, of each calendar year.

14. Motor driven construction equipment is allowed to be used within the stream channel only for that work that is authorized by this Approval and located within the project right-of-way. Spoil material/debris shall be disposed of outside the floodplain. Any temporary excavation or filling within the stream channel or floodplain shall be restored to the elevation existing prior to construction unless the **CECIL SOIL CONSERVATION DISTRICT** requires otherwise.

15. Construction activities, operation, and maintenance shall be carried out in strict accordance with Code of Maryland Regulations (COMAR) 26.17.04.05 and this Approval. The location, dimensions and type of all structures, excavation, or filling is to be in strict accordance with the Approved Plans and

specifications unless written approval for any changes is granted by the **CECIL SOIL CONSERVATION DISTRICT**. If any changes to the Approved Plans are found to be necessary, they shall be submitted to the **CECIL SOIL CONSERVATION DISTRICT** for approval prior to ordering the execution of such change.

16. A person (including Owner, its employees, agents or contractors) who violates or fails to comply with the terms and conditions of this Approval, Approved Plans or an administrative order may be subject to penalties in accordance with §5-514 and §5-911, Environment Article, Annotated Code of Maryland (2013 Replacement Volume, as amended).

17. A copy of the Approved Plans and this Approval shall be kept at all times at the construction site for reference during the construction period.

18. If the Owner, its employees, agents or contractors fail to comply with this Approval or Approved Plans, the **CECIL SOIL CONSERVATION DISTRICT** may, in its discretion refer the case to the **MARYLAND DEPARTMENT OF THE ENVIRONMENT** (The Department) Dam Safety program to issue an administrative order requiring Owner, its employees, agents and contractors to cease and desist any activities that violate this Approval, or the Department may take any other enforcement action available to it by law, including filing civil or criminal charges.

19. This Approval may be suspended or revoked by the Department for cause, including violation of Approval conditions, obtaining an Approval by misrepresentation, failing to disclose a relevant or material fact, or change in conditions. The Department shall notify the violator in writing and provide an opportunity for a hearing, if the Owner: (a) submits false or inaccurate information in the Approval application or subsequently required submittals; (b) deviates from the Approved Plans, specifications, terms and conditions; (c) violates, or is about to violate terms and conditions of this Approval; (d) violates, or is about to violate, any regulation promulgated pursuant to Title 5, Department of the Environment Article, Annotated Code of Maryland as amended; (e) fails to allow authorized representatives of the Department to enter the site of authorized activities at any reasonable time to conduct inspections and evaluations; (f) fails to comply with the requirements of an administrative action or order issued by the Department; or (g) does not have vested rights under this Approval and new information, changes in site conditions, or amended regulatory requirements necessitate revocation or suspension.

20. Overall design of the project has been under the supervision of, **[NAME OF ENGINEER-IN-CHARGE]**, Maryland PE Registration No.: **[12345]**, **[COMPANY]**, hereinafter referred to as Engineer-In-Charge (EIC). The EIC may not be changed without written approval from the **CECIL SOIL CONSERVATION DISTRICT**. Construction shall be under the supervision of the EIC, who shall notify the **CECIL SOIL CONSERVATION DISTRICT** upon the commencement of construction activities and thereafter maintain a record of the results of all field and laboratory material testing, delivery tickets for materials, shop drawings, and several representative digital photographs of the work.

21. The EIC or their representative shall be present and document their findings during all phases of construction including, but not limited to: a) site preparation, b) cutoff trench installation, c) spillway construction, d) embankment construction, and e) upon completion of construction.

22. Within sixty (60) days following substantial completion of construction, the EIC shall submit the documentation described in the above conditions, "As-Built" drawings, and a completed “Project Completion Report” (Form 1) to the **CECIL SOIL CONSERVATION DISTRICT**. The "As-Built" drawings shall include the contract drawings annotated with all changes in elevation, location, quantity, material specification, and any supplemental drawings issued during the construction period. All submittals shall be hardcopies and copies provided electronically. Special attention shall be directed toward documenting the foundation conditions encountered during construction. Where "... or equal" substitutions are made, the As-Built plans shall reflect these installed items.

OPERATION AND MAINTENANCE CONDITIONS

23. The Owner and any heirs, successors, or assigns are responsible for the safety of the dam and the continued operation, surveillance, inspections, and maintenance in accordance with the conditions described herein. The Owner shall promptly notify the **CECIL SOIL CONSERVATION DISTRICT** and the Department of significant changes in conditions.

24. In accepting the Approval, permission is hereby granted to representatives of the **CECIL SOIL CONSERVATION DISTRICT** and the Department to enter in or upon the subject premises at any reasonable time for the purpose of conducting inspections pursuant to the provisions of Title 5 of the Environment Article, Annotated Code of Maryland, as amended.

25. The dam shall be operated in accordance with the approved Operation and Maintenance Guidelines appended to this Small Pond Approval.

26. If the dam is not operated or maintained in full compliance with this Approval, the Owner shall repair all or any part of the structure at his sole cost and expense, as directed by the **CECIL SOIL CONSERVATION DISTRICT** or the Department.

27. Inspections of the facility shall be made by the Owner and/or qualified engineer on a triennial basis. Records of each inspection shall be maintained by the Owner. Triennial inspection reports shall be submitted to the **CECIL SOIL CONSERVATION DISTRICT** and Department within sixty (60) days of each inspection. Extensions may be granted under extenuating circumstances. At a minimum, annual inspection reports shall include a dam inspection checklist (Form 2), photographs of the dam, overall assessment of the condition of the dam and appurtenant works, a review of the downstream danger reach to determine if any new structures exist, etc.

28. Inspections of the facility will also be made during and after storms with significant runoff, by the Owner, to uncover any structural or operational problems. These inspections will include checking of the reservoir pool, spillway and conduit, to assure that they are free of any restricting debris. Records of these inspections shall be maintained by the Owner and submitted to the **CECIL SOIL CONSERVATION DISTRICT** and Department with the triennial inspection report.

29. Maintenance work such as the removal of all new tree growth and mowing of the dam will be scheduled as determined necessary during the Owner's inspections. Mowing of the dam shall be accomplished at least twice each year by the Owner. Any emergency maintenance will also be accomplished by the Owner.

30. The Owner agrees not to plant or allow the growth of any trees or woody vegetation on the dam/embankment or within a 25-ft buffer from the control structure and 15-ft buffer from the upstream and downstream toe of the dam/embankment. The growth of this vegetation shall be removed by the Owner.

31. The costs of the inspection, regular maintenance and emergency repairs will be accomplished by the Owner as warranted or at the direction of the **CECIL SOIL CONSERVATION DISTRICT** or the Department.

This Approval and its conditions including the Operation and Maintenance Guidelines are accepted.

OWNER SIGNATURE: _____ DATE: _____

_____

(PRINT NAME) (TITLE)

[LETTERHEAD OF ENGINEERING COMPANY]

Form 1: Project Completion Report

[**date**]

Cecil Soil Conservation District
105 Chesapeake Boulevard, Suite B-3
Elkton, Maryland 21921

Re: PROJECT COMPLETION REPORT
For **[Project Name]**
Pond Number(s): _____
Small Pond Approval No. **[Number]**

I (We) hereby certify that **[construct, repair, etc.]** of **[Name of Dam or Pond]** in Cecil County was completed on _____, 20___, in accordance with the plans and specifications approved by the Cecil Soil Conservation District. Any minor differences between the As-Built plans and the approved construction plans will not affect the safety of the dam including hydraulic performance or the minimum freeboard criteria.

SEAL

Sincerely,

[Company Name]

[Signature]

[Engineer in Chg (Name)]
Engineer-In-Charge

Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No._____, Expiration Date: _____.

Signature of Owner

_____
[Permittee (person)]
[Permittee Company]

_____
Title
Enclosed: As-Built plans, project history

Project: _____ **Small Pond Approval No.** _____

Dam: _____ **Weather:** _____ **Date:** _____

Inspectors: _____ **Pool Level:** _____

MARYLAND DAM INSPECTION CHECKLIST	✓ YES ✕ NO N/A = NOT APPLICABLE	Monitor Repair	
		INITIALS	DATE
1. CREST			
Ground cover in good condition			
Settlement Depressions/Cracks			
2. UPSTREAM SLOPE			
Ground cover in good condition			
Riprap in good condition			
Erosion (Animal Burrows, Trees, Shrubs)			
Settlement Depressions/Bulges/Cracks			
3. DOWNSTREAM SLOPE			
Ground cover in good condition			
Erosion (Animal Burrows, Trees, Shrubs)			
Settlement Depressions/Bulges/Cracks			
Seepage _____ gpm			
4. INTERNAL DRAINAGE SYSTEM			
Seepage/drain flow: Left _____ gpm, Right _____ gpm, Other _____ gpm			
Does Seepage contain fines?			
5. ABUTMENT CONTACTS			
Trees, Shrubs, Erosion			
Seepage _____ gpm			
6. SPILLWAY/RISER STRUCTURE (Concrete or Metal Pipe)			
Spalling, Cracking, Corrosion, Erosion, Scaling, Exposed reinforcement			
Joints: Displacement, Leakage, Loss of joint material			
Trash racks: Operational, Broken, Bent, Rusted, Debris, Obstructed			
Sluice/Drain gates: Operational, Broken, Bent, Corroded, Leaking			
7. SPILLWAY CONDUIT (Concrete or Metal Pipe)			
Debris, Cracking, Leakage, Spalling, Exposed reinforcement			
Joints: Displacement, Leakage, Loss of joint material			
8. STILLING BASIN/PLUNGE POOL (Riprap or Concrete)			
Spalling, Cracking, Erosion, Scaling, Exposed Reinforcement, Joint Deterioration			
Undercutting, Eroding			
Outlet channel condition:			
Tailwater elevation and flow condition:			
9. EMERGENCY SPILLWAY			
Ground cover in good condition			
Erosion, Trees, Shrubs, Obstructions			
OVERALL CONDITION: Excellent, Good, Fair, Poor, Unsafe			

NOTE: USE ONE INSPECTION CHECKLIST FOR EACH POND/STRUCTURE

OPERATION AND MAINTENANCE PLAN GUIDELINES

Project Name: _____

Small Pond Approval No.: _____ **Date:** _____

Pond(s) Label/No./Lat./Long.: _____

The following are to be considered in the preparation of an Operations and Maintenance plan (O&M). By checking applicable items, these guidelines may be used as a standard O&M plan if deemed appropriate by the design engineer, or may be used in the preparation of a custom O&M plan (complete signature section required). O&M is to be designed to ensure that the facility continues to operate in a safe and effective manner and that problems are prevented or quickly identified and corrected. The O&M is to be in conformance with this document, NRCS MD 378, and COMAR 26.17.04.

In general, operation items are required for the following major areas: Embankment, Reservoir, Spillway, and Outlet Works.

The term "owner" used in these operation and maintenance plan guidelines refers to the property owner(s) where the pond embankment, spillway and appurtenant works are located.

OPERATIONS

I. Support Data

a. ☑ Background Information – The owner shall maintain a complete up to date as-built plan and design specifications for the dam. A copy of the completed Pond Summary Sheet (latest version) should be available.

b. ☑ Record Keeping – Written records of maintenance and observations should be kept. Photographs are valuable for recording observations and changes.

II. Inspections

a. ☑ Inspection Guidelines – Owners are to make a visual inspection at least once a year. Inspections are to be made after extreme rainfall events. Owners are encouraged to have an inspection by a registered professional engineer at least once every three (3) years.

b. ☑ Dam Inspection Checklist – Shall be included as part of the operation and maintenance plan and completed at least triennially. A visual inspection shall be conducted on an annual basis to detect blockages of the principal spillways that would cause the facility to not function as designed. In addition, if there are any visible trees, shrubs, or other woody growth on the embankment at time of annual inspection, it shall be removed prior to the next inspection.

III. Emergency Procedures

a. ☑ Surveillance – Inspect daily or more often under adverse conditions of heavy or extended rainfall, flash flood warnings or snow melt. Inspect for overtopping failures, piping or seepage failures, and structural failures. If any of the following conditions are noted, emergency procedures are warranted; muddy water is flowing from the downstream slope or toe; cracks or depressions are forming on the embankment; or flood flow over the top of the embankment is imminent.

b. ☑ Mitigation – Provide for lowering the reservoir or sandbagging before overtopping. Action to be taken for piping includes lowering the pool and attempting to plug the upstream end with suitable material.

c. ☑ Notification – Time permitting, consult a professional engineer experienced in dam design and operation to determine the extent of the damage and necessary repairs. Before major repairs, contact the Maryland Dam Safety Permits Division for approval. In the case of anticipated dam failure, the local fire and rescue or police department should be notified regarding the potential emergency. The ultimate responsibility for implementation of a warning plan, that includes the danger reach, rests with dam owner.

MAINTENANCE

IV. Embankment

a. ☑ Vegetation – Proper vegetation is required on earth dams. The proper selection of grasses, seeding rates, planting dates, and vegetation maintenance is available in the current MD Standards and Specifications for Soil Erosion and Sediment Control.

b. ☑ Tree and Brush – Trees and shrubs will not be allowed on the embankment. Trees that have been allowed to grow on the dam shall be removed completely, including all roots in accordance with Dam Safety Policy Memorandum No. 1.

c. ☑ Mowing and Brush Removal – Mowing is necessary to control the establishment of woody growth and to maintain the vegetative cover. The embankment, a fifteen (15) foot wide buffer strip adjacent to the toe, upstream and downstream of the embankment, and the area within 25 feet of the control structures need to be mowed.

d. ☑ Erosion and Slope Protection – The rate of erosion is directly related to the lack of vegetation. Prompt repair of eroding areas is required. Vegetation should be inspected in the early spring and late summer, and any bare or eroded areas repaired and reseeded. Problem erosion areas of pedestrian traffic or abundant contacts should be controlled with filter cloth and rock rip rap. The upstream face of a dam can be protected from wave erosion by the same method.

e. ☑ Seepage – Must be controlled in quantity and velocity to minimize damage to the dam. Regular monitoring to detect wet areas, "spring" flow, "piping, and "boils" on the downstream embankment should be done. Excessive seepage pressure can threaten the downstream slope stability. Seepage flow which is muddied by soil is evidence of "piping" and "boils". When this occurs, complete failure may happen within hours and professional advice must be obtained immediately. Typical methods used to control the quantity of seepage are installation of an upstream blanket, or the installation of drainage trenches or drains. Non-emergency repairs must be approved by the Dam Safety Permits Division before installation.

f. ☑ Stability – Large cracks, slides, sloughing, and excessive settlement are signs of embankment distress and indicate that remedial work is required. Soil added to restore an embankment must be properly "keyed" into the base material. Repair of these conditions is not considered routine maintenance and must be approved by the Dam Safety Permits Division.

g. ☑ Rodent Guard – Control of rodents such as beavers, groundhogs, and muskrats is required as they can damage structural integrity and performance of the embankment and spillway. Groundhog and muskrat burrows serve as pathways for seepage. Beavers may plug the spillway and raise the pool level. Rodent removal and elimination of burrows is required when encountered.

h. ☑ Crest of Dam – Should be graded to direct all surface drainage into the impoundment. When access roads cross the dam any ruts that develop should be repaired as soon as possible.

V. Spillway and Outlet Works

a. ☑ Conduits – All conduits should be inspected thoroughly once a year. Inspect for improper alignment (sagging), elongation, and displacement at joint, cracks, leaks, surface wear, loss of protective coatings, corrosion and blockage.

b. ☑ Trash Racks – The trash rack unit should be checked periodically and especially after storm events. Accumulated debris should be removed, and maintenance performed if necessary. Under no circumstances should the trash rack be removed for an extended period. Annual maintenance for corrosion protection should be provided.

c. ☑ Concrete – Surfaces should be inspected for cracking, spalling, displacement or movement, and deterioration by weathering, chemical reactions or leaching. Extensive cracking, slab or wall movement, large areas of exposed reinforced steel and severe undermining require professional advice and Dam Safety Permits Division approval before repairs can be made. Minor repairs of patching, grouting, and coatings can be performed during routine maintenance.

d. ☑ Vegetated Earth Spillways – An emergency spillway is designed to pass infrequent large flood flows around the dam to prevent overtopping. The vegetative cover should be maintained the same as the embankment to provide a vigorous grass cover. Prompt repair of erosion damage and removal of flow obstructions are required.

e. ☑ Outlet – Erosion at the spillway outlet is a common maintenance problem. Severe undermining, displacement of pipes, and dam failure can occur. Often the outlet is adequate for normal flow, but not for extreme storm flows. Periodically, and especially after storm events, the stilling basin, plunge pool, or rip rap energy dissipator should be inspected. Provide prompt repair of damages.

f. ☑ Drains/Mechanical Equipment – Drains should always be operable to provide draw down in the case of an emergency for necessary repairs. The gate or valve controlling the drain should be operated fully at least once a year or as recommended by the manufacturer. It should be inspected, and all appropriate parts lubricated and repaired before operation. Annual maintenance of metal operating mechanisms should be performed by keeping parts greased or painted to prevent corrosion. All equipment controls should be checked for proper security to prevent vandalism.

Project/Pond(s): _____ Date: _____
CSCD Small Pond Tracking No. _____

VI. Reservoir

a. ☑ Pool Level – When it is necessary to draw down the pool level it should be done gradually over a period of time to prevent slope failures. An annual inspection of the pond/lake perimeter should be done. Potentially damaging fallen trees, debris, and sediments should be removed. Periodic removal of floating debris to prevent clogging of the spillways should be done. During extended periods of severe freezing weather inspection for ice damage or ice formation at the spillways and outlets should be performed.

VII. Additional Requirements: _____

_____

_____

_____

_____

_____

_____

_____

Accepted by Owner: _____ Date: _____
Signature

_____
Printed Name/Title

APPENDIX 5

POND SUMMARY SHEET FORM

- POND SUMMARY SHEET (WORD .DOCX FORMAT)

Maryland Department of the Environment
Dam Safety Program

POND SUMMARY SHEET

Part 1: General Information

APPROVAL TYPE

- ☐ New Small Pond
- ☐ Modify/Repair/Retrofit Small Pond
- ☐ Geotechnical Investigation
- ☐ Work in Reservoir Only
- ☐ Remove Small Pond
- ☐ As-Built Approval
- ☐ Other (Specify below):

PROJECT NAME / LOCATION

Project Name:
MDE/SCD File No.:
Pond/BMP ID No.:
*Cold Water Resource Area Map: https://bit.ly/3gXAI3U

Latitude *(decimal deg)*
Longitude *(decimal deg)*
Stream Name
Use Class
Cold Water? ☐Y / ☐N

PROPERTY OWNER INFORMATION

Owner Company:
Point of Contact:
Street Address:

Phone Number:
Email:

ENGINEER IN CHARGE INFORMATION

Owner Company:
Point of Contact:
Street Address:

Phone Number:
Email:
Maryland PE No.:

Part 2: Structure Information

HAZARD POTENTIAL CLASSIFICATION

Hazard Classification

- ☐ High
- ☐ Significant
- ☐ Low
- ☐ Low (Small Pond)

Breach Analysis Method

- ☐ Screening
- ☐ Simplified
- ☐ Standard
- ☐ Other

Population at Risk:

*If relying on a previously approved breach analysis, provide a copy with application

POND CHARACTERISTICS

- ☐ Excavated
- ☐ Embankment
- ☐ Both
- ☐ Superwide

Distance Below Pond to:

Property Line (feet)
Public Road (feet)
Will embankment serve as roadway/railway? ☐Y / ☐N

POND SUMMARY SHEET

PURPOSE OF STRUCTURE (Check all that apply)

☐ Stormwater Management-Wet Pond	☐ Tailings / Dredged Material	☐ Water Supply/Irrigation
☐ Stormwater Management-Dry Pond	☐ Sediment Control	☐ Wildlife/Fish
☐ Infiltration	☐ Flood Control	☐ Fire Control
☐ Submerged Gravel Wetland	☐ Recreation	☐ Other (Specify Below)
☐ Bioretention	☐ Waste Water	

PROPERTIES OF DAM AND RESERVOIR

Length of Dam	(feet)	Surface Area (normal pool)		(acres)
Crest Width	(feet)	Surface Area (brim full)		(acres)
Embankment Ht.	(feet)	Storage (normal pool)		(acre-ft)
(Height measured from lowest upstream point to crest of dam)		Storage (IDF)		(acre-ft)
Dam Crest Elev.	Datum:	Storage (brim full)		(acre-ft)
Normal Pool Elev.		Side Slopes, US	H : 1V	
IDF Pool Elev.		Side Slopes, DS	H : 1V	
Freeboard	(feet)			
Drainage Area	(acres | sq. mi.)			

IDF = Inflow Design Flood (24-hr, 100-year for low hazard, ½ PMF for significant hazard, PMF for high hazard)

SPILLWAY CHARACERISTICS

Principal Spillway Type	*Auxiliary Spillway Type*	*Auxiliary Spillway Protection*	
☐ Riser & Barrel	☐ Earthen Channel	☐ Grass	
☐ Weir Wall	☐ Rock Channel	☐ Riprap	Class:
☐ Weir & Channel	☐ None	☐ Gabions	
☐ Other (specify below)	☐ Other (specify below)	☐ Other (specify below)	

Principal Spillway Material

☐ RCP	☐ CMP / BCCMP	☐ Alum (CAP)	☐ PVC / HDPE
☐ Ductile Iron	☐ Cast-in-place concrete	☐ Pre-cast concrete	☐ Other _____

Riser & Barrel

Barrel Diameter (in.)	Capacity at IDF (cfs)
Riser Dimensions	Anti-flotation FS

Weir Wall / Weir & Channel

Weir Length (ft)	Overturning FS
Weir Coefficient	Sliding FS

Auxiliary Spillway

Crest Elevation	Capacity at IDF (cfs)
Bottom Width (ft)	Maximum Velocity (ft/sec)
Side Slopes	H : 1V

APPENDIX 6

CONSTRUCTION MONITORING NOTIFICATION

- CSCD SMALL POND CONSTRUCTION INSPECTION NOTIFICATION (WORD .DOCX FORMAT)
- CSCD SMALL POND CONSTRUCTION PHOTO CHECKLIST (WORD .DOCX FORMAT)
- SAMPLE CONSTRUCTION INSPECTION CERTIFICATION CHECKLIST (EXCEL .XLSX FORMAT)

CECIL SOIL CONSERVATION DISTRICT
105 Chesapeake Boulevard, Suite B-3, Elkton, MD 21921
(410) 398-4411 Ext.3 • www.cecilscd.com

Cecil Soil Conservation District
MD-378 Small Pond
Construction Inspection Notification

The engineer-in-charge is responsible for conducting site inspections and documenting the construction of the MD-378 Small Pond facility or facilities listed below:

Project Name: _____

Small Pond Approval No.: _____ Date: _____

Pond(s) Label/No./Lat./Long.: _____

The following information is required to be completed by the engineer-in-charge. This document is provided to clarify certain requirements of construction and is supplemental to any other requirements imposed by applicable law, rules and regulations.

Pre-Construction Meeting

The owner, engineer-in-charge, contractor, Inspector for the local SWM Approving Authority, and District Engineer from Cecil Soil Conservation District (CSCD) shall attend a pre-construction meeting prior to beginning construction on the MD-378 Small Pond(s) for the project noted above. CSCD District Engineer must be notified in writing and immediately, should the engineer-in-charge change during construction or prior to as-built acceptance of the MD-378 Small Pond(s) referenced herein.

Inspection Reports

A daily inspection report shall be completed by the engineer-in-charge or his representative and must include the following information:

- Site location name
- Inspection date
- Name and signature of the inspector
- Daily temperature
- Problems encountered and the subsequent solutions
- Proctor tests and curves, soil classifications, soil gradations with the plasticity index indicated
- Pipe certification (this may be a shipping ticket or a letter from the manufacturer)
- Principal spillway diameter, gaskets and coupling bands dimensions
- Structure measurements - steel spacing, pipe lengths, mud slab dimensions, riser slab dimensions, etc.

- Principal spillway connections (gasket types and widths); coupling band widths
- PVC diameter, length and schedule type
- Filter diaphragm; sand source; width, depth, and length of excavation
- Daily compaction reports
- Photos as applicable (see attached Small Pond Construction Photo Checklist)

The inspection reports shall be maintained by the engineer-in-charge or his representative throughout the construction of the small pond facility. The inspection reports shall be sent to CSCD, and the local SWM approving authority who may visit the site periodically during construction. The local SWM approving authority, their inspection staff, or MDE may issue a stop work order if the engineer-in-charge or his representative is not on site to perform the required construction inspection.

As-Built Submission

The engineer-in-charge is required to submit the inspection reports, as-built drawings and computations to the CSCD within sixty (60) days of the completion of the stormwater management facility.

The CSCD will review all submitted material and perform a field inspection of the facility. The CSCD will recommend acceptance of the facility after all comments have been addressed.

The following information is an example of information to be part of the as-built submission:

- Engineer signature, seal, and expiration date on the as-built certification block:
- Red check marks for items installed as designed; check marks are not to be used in lieu of redline elevations.
- Show changes on plans in red.
- If the elevations of the structure differ from the original plan by two-tenths of a foot or more, the excavated volume is less than designed or the hydrology changes, updated TR-55, stage-storage, and TR20 computations shall be submitted as applicable.
- Provide completed As-Built Pond Summary Sheet form(s) for each pond/structure.
- Compaction certification from the geotechnical engineer. This will include the compaction of the ground beneath the riser (stability) as well as the fill for the dam.
- Concrete break test results for the riser or weir walls, if cast in place.
- Topsoil test for any earth disturbance greater than 5 acres.
- Elevations supporting rooftop disconnects, drainage flows, etc.
- Plant certified concrete delivery tickets for cradles, headwalls, endwalls, and concrete pervious material if used on site.
- Inspection reports, soil test results, pipe certification, filter cloth specifications, landscaping tickets, lime and fertilizer application rates, soil type and mix ratios for any facility requiring a planting medium.

- A Letter from a Professional Landscape Architect (or other qualified professional) certifying their inspection of the Final Landscaping verifying types/quantities of landscape plantings have been installed in compliance with the approved Landscape Plan(s) or any substitutions that were made deviating from the original approval.
- Submit all documentation listed above to include one (1) hard copy, and one (1) digital copy.
- Photographs are to be taken during all phases of construction of the small pond, to include but not limited to: 1) pipe installation; 2) riser construction; 3) core trench/cut-off trench; 4) anti-seep collars; 5) riser's anti-flotation base; 6) filter diaphragm installation; 7) underground storage pipe/stone placement; 8) pipe connections to riser and/or other modified stormwater structure; and 9) hardware cloth placement around dewatering pipes.
- Construction Inspection Certification Checklist, completed for each pond/structure, providing dates/initials when critical aspects of dam were inspected after construction.

We are providing our signatures as verification that we have received and read the requirements and understand the responsibilities of the owner, engineer-in-charge, and all representatives involved with the construction of all Ponds subject to this Small Pond Approval.

[1]The OWNER, DEVELOPER (if different from Owner), and ENGINEER-IN-CHARGE are required to provide signatures on the signature page to obtain Small Pond Approval.

[2]The Contractor, Geotechnical Engineer, and 3rd party inspection/testing representative (if provided) may provide signatures at the pre-construction meeting but must attend the pre-construction meeting to provide signatures.

[3]If the ENGINEER-IN-CHARGE changes, a new form must be filled out, signed and provided to CSCD.

Project: _____ CSCD Small Pond Tracking No.: _____

OWNER[1]

_____
Entity

_____
Representative (print name)

_____
Signature Date

_____
Telephone Number

_____
Email Address

ENGINEER-IN-CHARGE[1]

_____
Engineer (print name) P.E. #

_____
Company

_____
Signature Date

_____
Telephone Number

_____
Email Address

GEOTECHNICAL ENGINEER[2]

_____
Engineer/Representative (print name)

_____
Company

_____
Signature Date

_____
Telephone Number

_____
Email Address

DEVELOPER[1] (If different from Owner)

_____
Entity

_____
Representative (print name)

_____
Signature Date

_____
Telephone Number

_____
Email Adress

CONTRACTOR[2]

_____
Representative (print name)

_____
Company

_____
Signature Date

_____
Telephone Number

_____
Email Adress

OTHER 3RD PARTY INSPECTION[2]

(if provided)

_____
Engineer/Representative (print name)

_____
Company

_____
Signature Date

_____
Telephone Number

_____
Email Adress

CECIL SOIL CONSERVATION DISTRICT
105 Chesapeake Boulevard, Suite B-3, Elkton, MD 21921
(410) 398-4411 Ext.3 • www.cecilscd.com

Small Pond Construction Photo Checklist

Project Name: _____ Date: _____

Small Pond Approval No.: _____ Pond Label: _____

The as-built submission will require photographs to be submitted with the plans, field reports, and other As-Built information documenting construction phases of the small pond. Here is a suggestion list, but not limited to, of instances where photographs would be required during small pond construction:

	Check If Photos Taken	Label Photos
A. CUT-OFF TRENCH:		
Cut-off trench width (prior to clay placement)	☐	Photo #_____
Clay placement/compaction at several locations and lifts	☐	Photo #_____
B. CORE TRENCH:		
Clay placement/compaction at several locations and lifts	☐	Photo #_____
C. PRINCIPAL SPILLWAY:		
Placement prior to core trench	☐	Photo #_____
Rubber gasket installed at each connection	☐	Photo #_____
Metal bands with rods and lugs	☐	Photo #_____
Concrete cradle, depth and width	☐	Photo #_____
Connection into riser	☐	Photo #_____
Connection into precast endwall	☐	Photo #_____
Connection into drop manhole on dam	☐	Photo #_____
Concrete collar precast connections	☐	Photo #_____
Stamp mark inside concrete pipe	☐	Photo #_____
D. RISER:		
Ground prior to slab placement	☐	Photo #_____
Steel tied and placed for slab	☐	Photo #_____
Mud pad under slab	☐	Photo #_____

	Check If Photos Taken:	Label Photos
Water stop placement for precast structures	☐	Photo #_____
Keyways for cast in placement connection to riser base	☐	Photo #_____
Steel tied for riser structure; wall widths	☐	Photo #_____
Top view of chambers prior to lid placement	☐	Photo #_____
Pipe installation	☐	Photo #_____
Trash rack	☐	Photo #_____
Gate valves	☐	Photo #_____
Openings between chambers	☐	Photo #_____
Orifice plate	☐	Photo #_____

E. LOW FLOW/DEWATERING PIPE

Pipe connection into riser	☐	Photo #_____
Pipe showing perforations and wrapped in hardware cloth	☐	Photo #_____

F. RESERVOIR

Grading prior to underwater conditions	☐	Photo #_____
Forebay dewatering pipe installation	☐	Photo #_____
Plantings	☐	Photo #_____

G. FINAL PROJECT PICTURES

Upstream embankment	☐	Photo #_____
Downstream embankment	☐	Photo #_____
Top of dam	☐	Photo #_____
Manhole steps inside riser	☐	Photo #_____
Reservoir	☐	Photo #_____
Orifice plates	☐	Photo #_____
Gate valves	☐	Photo #_____

Project: _____ Date: _____

Small Pond Approval No.: _____

CONSTRUCTION INSPECTION CERTIFICATION CHECKLIST FOR CODE 378 EMBANKMENTS				
ACTIVITY	**TEST RESULTS**	**✓ YES ✗ NO N/A = NOT APPLICABLE**	**INSPECTION**	
			INITIALS	**DATE**
1. SITE PREPARATION				
Pre-construction meeting conducted with the 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 BACKFILLE				
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 (geotech)				
Cut-off trench material tested & classified (geotech)				
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 for concrete pipe				
Watertight joints				
Anti-seep collar location and size correct				
Concrete anti-seep collar(s) and cradle installed with monolithic pour				
Structural backfill specification followed (geotech)				
Riser:				
Overall dimensions and openings correctly located				
Base dimensions correct				
Concrete strength and bearing capacity acceptable (geotech)				
watertight joints				
Drain				
For weir spillway:				

Project: _____ Date: _____

Small Pond Approval No.: _____

CONSTRUCTION INSPECTION CERTIFICATION CHECKLIST FOR CODE 378 EMBANKMENTS				
ACTIVITY	**TEST RESULTS**	**✓ YES ✗ NO N/A = NOT APPLICABLE**	**INSPECTION**	
			INITIALS	**DATE**
Footing excavated on stable subgrade (geotech)				
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 (geotech)				
Impervious core material tested & classified (geotech)				
Filter diaphragm diemensions and placement				
Seepage drain pipe, perforation size, and spacing correct				
No geotextile in filter diaphragm or seepage drain				
Filter diaphragm diemensions and placement				
Filter diaphragm material tested & classified (geotech)				
Filter diaphragm compaction tested (geotech)				
Embankment soil material tested & classified (geotech)				
Compacted in 8-inch lifts				
Embankment compaction tested every 5000 sf (geotech)				
Elevation correct (survey)				
Top width and side slopes correct (survey)				
No equipment driven within 4-ft of spillway				
6. EMERGENCY SPILLWAY				
Construct 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 (survey)				
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				

Project: _____ Date: _____

Small Pond Approval No.: _____

CONSTRUCTION INSPECTION CERTIFICATION CHECKLIST FOR CODE 378 EMBANKMENTS				
ACTIVITY	**TEST RESULTS**	**✓ YES ✗ NO N/A = NOT APPLICABLE**	**INSPECTION**	
			INITIALS	**DATE**
9. STABILIZATION AND LANDSCAPING				
Topsoil, seed, and mulch applied to site				
Topsoil, seed, and mulch applied to embankment				
Landscaping consitent with plan (Landscape Architect)				
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: _____				
[1]THIS INSPECTION CHECKLIST WILL BE COMPLETED AND SUBMITTED WITH THE AS-BUILT DOCUMENTATION				
[2]CONTRACTOR IS REQUIRED TO NOTIFY INSPECTOR, GEOTECHNICAL ENGINEER, AND ENGINEER-IN-CHARGE PRIOR TO BEGINNING EACH ACTIVITY				
[3]THIS IS A SAMPLE OF THE MINIMUM INFORMATION THAT REQUIRES CONSTRUCTION MONITORING AND INSPECTION BY ENGINEER-IN-CHARGE WHO IS RESPONSIBLE TO CREATE A SCHEDULE THAT INCLUDES ALL PHASES OF CONSTRUCTION OF THE POND THAT WILL REQUIRE MONITORING AND INSPECTION DURING CONSTRUCTION				

NOTE: PROVIDE ONE CHECKLIST FOR EACH POND/STRUCTURE

APPENDIX 7

AS-BUILT SUBMISSION DOCUMENTS

- AS-BUILT SUBMISSION CHECKLIST (EXCEL .XLSX FORMAT)

CECIL SOIL CONSERVATION DISTRICT
105 Chesapeake Boulevard, Suite B-3, Elkton, MD 21921
(410) 398-4411 Ext.3 • www.cecilscd.com

AS-BUILT SUBMISSION CHECKLIST

Project Name: _____ Date: _____

CSCD Project No. (If Known): _____

Type of Submittal: ☐ 1st Review ☐ 2nd Review ☐ Subsequent Review No.___

PLEASE NOTE THAT AS-BUILT SUBMISSION WITHOUT A COMPLETED CHECKLIST MAY BE RETURNED WITHOUT REVIEW

Designer (check off)			MDE/CSCD Reviewer		SUBMISSION ITEM
YES	NO	N/A	received (yes/no)	correct (yes/no)	
GENERAL					
					Signed and sealed copy of Form 1: Project Completion Report on Engineering Company Letterhead [Appendix 4]
					One (1) hardcopy of the as-built plans with the as-built information shown in red with "AS-BUILT PLAN" shown on each sheet
					One (1) sealed geotechnical report certifying that the soil type, compaction, moisture, content, concrete test results, and other items were inspected by the geotechnical engineer in accordance with project specifications
					One (1) sealed copy of the basis of design report with all updated information in red and "AS-BUILT" shown on each sheet revised
					One (1) copy of all construction inspection reports
					One (1) copy of all material spec sheets, delivery tickets, product manuals and warranties
					One (1) copy of all RFIs, submittals, and shop drawings
					For projects located within FEMA 100-year floodplain, provide the FEMA Letter of Map Amendment or Revision
					Provide updated Pond Summary Sheet to reflect as-built conditions
					Provide video inspection of all pipes 48 inches or less in diameter
					Provide the as-built submittal package within 60 days of construciton completion
					Provide pond ownership entity documents showing who has authority to sign and conduct business on behalf of ownership entity
					Provide photographs of all construction phases of the pond
					Provide completed Construction Inspection Certification Checklist for Code 378 Embankments
					Provide a digital copy of all as-built plans and documents submitted

Designer (check off)			MDE/CSCD Reviewer		SUBMISSION ITEM
YES	NO	N/A	received (yes/no)	correct (yes/no)	
DAILY CONSTRUCTION INSPECTION REPORTS[1]					
Daily construction reports prepared by the Engineer-in-Charge (or his representative) must be provided for the following stages of construction (at a minimum):					
					Upon completion of excavation to sub-foundation
					Upon completion of cutoff trench excavation (Note: cutoff trench must tie into impervious stratum)
					Construction of inlet and outlet structure, spillway pipes or weirs, filter diaphragms, and watertight connectors on pipes
					During placement of cutoff trench, impervious core, embankment fill, structural fill and concrete structures
					Upon completion of final grading and establishment of permanent stabilization
AS-BUILT PLANS (GENERAL)					
					Show location of all property lines, easements, owner/description information including Liber/Folio
					Provide name and contact information of engineer/land surveyors that prepared the as-built surveys
AS-BUILT PLANS (ELEVATIONS)					
					As-built survey elevations must be provided to the nearest 0.1 foot
					A check mark may be made beside values on the plans if the as-built constructed value is the same as the approved value
					If the as-built value is different than the approved value, the approved value must be lined out in red and replaced with the constructed value
					Elevations must have proper relationship between principal spillway crest, emergency spillway crest, and top of dam (all elevations must be equal to the design elevations or relative to each other and the required volumes)
AS-BUILT PLANS (CERTIFICATIONS)					
					Provide completed (sealed & signed) Engineer As-Built Certification by a Professional Engineer licensed in the State of Maryland
					[2]Provide completed (sealed & signed) Geotechnical Certification by a Professional Engineer licensed in the State of Maryland
AS-BUILT PLANS (SITE PLAN)					
					Length, width, and depth of pool area so that design volume can be verified
					As-built elevation contours of the entire pond storage area, embankment, 100-ft beyond downstream toe of embankment, or to the end of the outfall whichever is greater
					[3]Location of trees, shrubs, and other woody vegetation

Designer (check off)			MDE/CSCD Reviewer		SUBMISSION ITEM
YES	NO	N/A	received (yes/no)	correct (yes/no)	
					Location, top elevation, length, width, invert, pipe sizes, pipe material, and flow direction of all drainage structures (inlets, manholes, risers, weirs, end sections, end walls, etc.)
					Location of rip rap/gabion inflow and outfall protection
AS-BUILT PLANS (PROFILE ALONG CL OF EMBANKMENT)					
					Profile along the top of embankment
					Top elevation of the impervious core
					Bottom elevation, dimensions, and side slopes of the cut-off trench
					Principal spillway location with stations and elevations
					Emergency spillway location, dimensions, and slopes
					As-built water surface elevations (WSE) for all storm events originally provided in design of pond
AS-BUILT PLANS (PROFILE PRINCIPAL SPILLWAY THROUGH EMBANKMENT)[4]					
					Top and side slopes of embankment
					Emergency spillway crest elevation
					Top elevation, width, and slopes of impervious core
					Bottom elevation, width, and slopes of cut-off trench
					As-built water surface elevations (WSE) for all storm events originally provided in design of pond
					Riser stage elevations and inverts provided in original design
					All pond drain pipe size, length, invert elevation
					Principal spillway barrel length, size, type, corrugation size, gauge, inlet and outlet invert elevations, concrete pipe classification
					Concrete cradel dimensions
					Phreatic line (drawn from the as-built 10-year WSE)
					Sand filter diaphragm location, size, material, and drains
					Outfall protection type, material size, dimensions, filter cloth
AS-BUILT PLANS (PROFILE OF EMERGENCY SPILLWAY)					
					Minimum 25 ft level section and elevation verified
					Slope protection type, dimensions, type of filter cloth all verified
					Slope of spillway verified[5]
AS-BUILT PLANS (SECTION OF EMERGENCY SPILLWAY)					
					Width of level section verified
					Dimensions, side slopes, material lining section verified
AS-BUILT PLANS (RISER DETAIL)					
					Riser material, dimensions, elevations, inverts provided in original design
					Size and type of anti-vortex and trash rack device(s) on all openings
					All stage orifice(s), weir(s) opening size, and invert
					Valve type

Designer (check off)			MDE/CSCD Reviewer		SUBMISSION ITEM
YES	NO	N/A	received (yes/no)	correct (yes/no)	
DRAINAGE AREA MAPS					
					Provide drainage area map(s) with modifications as applicable
VEGETATION					
					Provide letter from Landscape Architect verifying that all approved landscaping has been successfully planted/installed or stating what has been modified and reasons for revisions
					Provide a copy of the approved Landscape Plan with all modifications shown in red
					Provide photographs demonstrating that the approved landscaping plans has been successfully planted/installed and all disturbed areas in and around the pond/embankment are stabilized with at least 95% vegetative coverage

Notes:

[1]Daily construction reports shall include, at a minimum, description of work completed, soil compaction and moisture test results, labortory test results, gradation and/or USCS soil classification of embankment and impervious core/cutoff materials, gradation of filter diaphragm material, and photographs of the work

[2]In addition to the Geotechnical Certification on the plans, the Geotechnical Engineer will provide a Certification Letter indicating that the unified soil classes, compaction, moisture content, concrete test results, and other material inspected by the geotechnical engineer meets or exceeds the project specifications and the letter shall be included in the as-built geotechnical report

[3]No trees, shrubs, or woody vegetation is allowed within 25 ft of the inlet structure, on the fill embankment, and within 15 ft of the fill embankment

[4]As-built survey must extend at least 100 ft downstream of toe of embankment, or to the end of the outfall, whichever us greater

[5]Emergency spillway entrance and exit channels should be located and aligned as shown on approved plans with a maximum 2% steeper slope, but no flatter or narrower than designed

APPENDIX 8

PLAN CERTIFICATIONS

- OWNER'S/DEVELOPER'S CERTIFICATION FOR SMALL POND APPROVAL
- PROFESSIONAL CERTIFICATION
- DESIGN CERTIFICATION
- GEOTECHNICAL CERTIFICATION
- AS-BUILT CERTIFICATION

PLAN NOTES

- STATEMENT OF DETERMINATION OF MD 378
- FILTER DIAPHRAGM NOTE
- ANTI-SEEP COLLAR DETAIL NOTE
- OPERATION AND MAINTENANCE NOTE
- SITE DATA NOTE
- APPROVAL AUTHORITY NOTE
- STREAM CLOSURE NOTE

*All documents in WORD .docx format

CERTIFICATIONS

The following statements of certification must be placed on all projects that require Cecil Soil Conservation District Small Pond Review & Approval:

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 certification of training at a Maryland Department of the Environment approved training program for the control of sediment and erosion before beginning the project. I hereby authorize the right of entry for periodic on-site evaluation by the Cecil Soil Conservation District or their representatives and the State of Maryland, Department of the Environment, compliance inspectors.

I/We hereby certify that development and/or construction will be done according to this plan of development and plan of erosion and sediment control.

(This paragraph below is added only if property is zoned Industrial or is developed as an industrial use and does not meet the criteria of a hot-spot)
The proposed use of the site does not meet the criteria of a hot-spot. If the site's use changes to a type which would be considered a hot-spot in the Maryland Stormwater Design Manual, the stormwater management strategy and design will need to be re-assessed and possibly modified."

Signed: _____ Date: _____

Print Name / Title: _____

PROFESSIONAL CERTIFICATION

I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the state of Maryland.

License No.:_____ Expiration Date: _____

*The professional certification shall appear at least once on every page/sheet the engineer provides their seal with signature/date and shall be updated each time the plans are revised after approval is granted.

DESIGN CERTIFICATION

I hereby certify that all sediment and erosion control measures shown on these plans have been designed in accordance with the 2011 MD Standards and Specifications for Soil Erosion and Sediment Control or current revisions thereof.

I also certify that any stormwater management measures shown on these plans have been designed in accordance with **[*provide name of local SWM review/approval authority*]** standards and regulations, Code of Maryland Regulations (COMAR) Title 26.17.04.05, the USDA Natural Resources Conservation Service Maryland Conservation Practice Standard Pond Code 378 (January 2000), and latest version of Maryland Department of Environment Policies and Procedures for Small Pond Approval, as applicable.

Signed: _____ Date: _____

Print Name: _____ P.E. No.: _____

GEOTECHNICAL CERTIFICATION

In place testing shall be done by a registered soils engineer or their representative to determine suitability of embankment fill material and to certify compaction is at least 95% of maximum dry density with a moisture content within +/- 2% of the optimum, determined by AASHTO T-99.

I _____, of _____
(Print Name) (Company Name)

Certify that the soil(s) used to construct the core at this site is of the type(s):

_____

as listed in the Unified Soil Classification System that are appropriate for use in the structural and non-structural “Best Management Practices” as proposed on these plans and meet the “Earth Fill” requirements of the USDA Natural Resources Conservation Service Maryland Conservation Practice Standard Pond Code 378 (January 2000).

STORMWATER MANAGEMENT AS-BUILT CERTIFICATION

I hereby certify that the facilities shown on these stormwater management plans have been constructed as shown in red hereon. I also certify that the structural and non-structural "Best Management Practices" as constructed, are in compliance with the approved plans and computations and if applicable, meet the requirements of COMAR 26.17.04.05 and the USDA Natural Resources Conservation Service Maryland Conservation Practice Standard Pond Code 378 (January 2000).

Signature	Date
Print Name/Title	Professional License No.
Street Address	License Type
City, State, Zip	

Certify means to state or declare a professional opinion based upon onsite inspections and material tests which are conducted during construction. The on-site inspections and material tests are those inspections and tests deemed sufficient and appropriate by commonly accepted engineering standards. Certify does not mean or imply a guarantee by the engineer nor does an engineer's certification relieve any other party from meeting requirements imposed by contract, employment, or other means, including meeting commonly accepted industry practices.

Engineer's Seal

NOTES

The following note "STATEMENT OF DETERMINATION OF MD 378" is required on all projects with structures that impound water with a dam:

STATEMENT OF DETERMINATION OF MD 378

All stormwater management facilities are to be constructed in accordance with the 2000 Maryland Stormwater Design Manual, Volumes I & II, (Maryland Department of the Environment) and the USDA Natural Resources Conservation Service Maryland Conservation Practice Standard Pond Code 378 (January 2000). These construction drawings are intended to reflect the relevant requirements; however, any lack of specific details on these drawings shall not relieve any of the requirements of these and other relevant codes. The cut-off trench and impervious clay core are required where shown on the approved set of drawings.

If your small pond requires a filter diaphragm, provide this note at the end of the MD-378 Construciton Specifications on the plans:

FILTER-DRAINAGE DIAPHRAGMS AND BLANKET DRAINS:

THE FILTER-DRAINAGE DIAPHRAGM AND BLANKET DRAIN SHALL BE CONSTRUCTED IN ACCORDANCE WITH THIS SECTION AND AS SHOWN ON THESE PLANS. THE MATERIAL SHALL BE PLACED IN CONTINUOUS, APPROXIMATELY HORIZONTAL LAYERS, NOT MORE THAN 12 INCES IN LOOSE THICKNESS. THE WATER CENTENT OF THE DRAINGE MATERIAL BEFORE AND DURING COMPACTION SHALL BE UNIFORM THROUGHOUT EACH LAYER OF THE MATERAL. THE WATER CONTENT SHALL BE SUFFICIENT TO ATTAIN THE REQUIRED DENSITY OF THE MATERIAL IN PLACE WHEN COMPACTED. THE MATERIAL SHALL BE COMPACTED AS SPECIFIED IN "EARTH FILL".

CARE SHOULD BE TAKEN SO THAT THE DRAINAGE MATERIAL DOES NOT BECOME CONTAMINATED. CONTAMINATED DRAINAGE MATERIAL SHALL BE REMOVED AND REPLACED WITH SUITABLE MATERIAL AT THE CONTRACTORS EXPENSE. DURING PERIODS OF SHUTDOWN AND AT ALL EQUIPMENT CROSSING, THE DRAINAGE MATERIAL SHOULD BE PROTECTED BY A PROTECTIVE COVERING SUCH AS POLYETHYLENE SHEET , PVC SHEETING, OR EQUAL. AT EQUIPMENT CROSSINGS, THE SHEETING MATERIAL SHALL BE COVERED WITH A SUFFICIENT DEPTH OF EMBANKMENT MATERIAL TO PREVENT DAMAGE TO THE SHEETING BY THE EQUIPMENT, OR A MINIMUM OF 12 INCES, WHICHEVER PROVIDES GREATER PROTECTION. PRIOR TO PLACING ADDITIONAL DRAINAGE MATERIAL AFTER SHUTDOWN AND/OR AT EQUIPMENT CROSSINGS, THE CONTRACTOR SHALL REMOVE ANY PROTECTIVE COVERINGS AND REPLACE ANY MATERIALS THAT MAY HAVE BECOME CONTAMINATED.

AFTER THE LAST LIFT OF THE FILTER-DRAINAGE DIAPHRAGM HAS BEEN PLACED AND COMPACTED, THE DIAPHRAGM SHALL BE THOROUGHLY FLOODED TO ENSURE COMPLETE CONSOLIDATION OF THE DRAINAGE MATERIAL AND TO VERIFY PROPER FUNCTION OF THE DIAPHRAGHM OUTLET PIPES.

A GEOTECHNICAL ENGINEER SHALL SUPERVISE DESIGN AND CONSTRUCTION.

The following note is required to be placed next to an Anti-Seep Collar Detail if used in lieu of a Filter Diaphragm:

We have read and understand that the Maryland Department of the Environment (MDE) DAM SAFETY POLICY MEMORANDUM #21, titled Use of Anti-Seep Collars and Filter Diaphragms, latest version, and recognized that filter diaphragms are superior to anti-seep collars as a seepage control measure. However, based on the conditions as stated in the MDE Memo, anti-seep collar(s) may be used because the soil and site conditions will be monitored during construction and will meet the prescribed conditions for Anti-Seep Collars to be used.

In order to use Anti-Seep Collars as the seepage control for Ponds/ESDs in lieu of a filter diaphragm, the following soil and site conditions will be confirmed by a Geotechnical Engineer prior to installation of the principal spillway barrel pipe and embankment:

1. Embankment soils have been documented to be non-dispersive by crumb testing or evidence that the site is located in geologic formations that are known to be non-dispersive.
2. Soil tests show that embankment soils have a plasticity index (PI) equal to or greater than 15.
3. The water content of the soils at the time of construction is such that 1/8-inch diameter thread ½-inch long may be rolled out on a flat surface without breaking or falling apart.
4. Natural or excavated ground slopes transverse to the embankment centerline in the vicinity of the conduit are no steeper than two (2) horizontal to one (1) vertical.
5. Laboratory or field tests show that the foundation soils left in-place under the embankment and principal spillway are medium to very stiff in saturated consistency or medium dense to very dense depending on if these soils are cohesive or cohesionless, respectively.
6. Documentation confirming these soil and site conditions will be provided to CSCD and the local SWM Approving Authority, prior to installing the principal spillway barrel pipe and embankment.
7. If these soil and site conditions cannot be confirmed by the Geotechnical Engineer Inspector, the Contractor will contact the Engineer-in-Charge and request the design and replacement of a filter diaphragm in lieu of anti-seep collars for seepage control.

Provide this "OPERATION AND MAINTENANCE" note at the end of the MD-378 Construction Specifications on the plans after the "EROSION AND SEDIMENT CONTROL" note:

OPERATION AND MAINTENANCE:

AN OPERATION AND MAINTENANCE PLAN HAS BEEN PREPARED FOR THIS PROJECT. A DAM INSPECTION SHOULD BE PERFORMED AT LEAST ONCE A YEAR AND MORE IF THERE ARE LARGE STORM EVENTS THAT MAY IMPACT THE POND/STRUCTURE. A DAM INSPECTION CHECKLIST IS INCLUDED IN THE OPERATION AND MAINTENANCE PLAN. ANY REPAIR/MODIFICATION OF THE DAM OR SPILLWAY REQUIRES NOTIFICATION OF THE CECIL SOIL CONSERVATION DISTRICT, AND THE [**LOCAL SWM APPROVING AUTHORITY**]. A PERMIT MAY BE REQUIRED FOR ANY REPAIRS OR RECONSTRUCTION THAT INVOLVES ANY DISTURBANCE OF ANY PART OF THE POND STRUCTURE. THE OWNER(S) OF THE SMALL POND(S), HIS SUCCESSORS AND ASSIGNS, AND ANY OF THEIR REPRESENTATIVES ARE REQUIRED TO OBTAIN A COPY OF THE COMPLETED AND EXECUTED OPERATION AND MAINTENANCE PLAN, SMALL POND APPROVAL LETTER, FORM 1 - PROJECT COMPLETION REPORT, AND FORM 2 – DAM INSPECTION CHECKLIST FROM THE CECIL SOIL CONSERVATION DISTRICT. THESE DOCUMENTS, PLANS, AND RECORDS OF MAINTENANCE AND REPAIRS NEED TO BE RETAINED AND STORED IN A PLACE THAT CAN BE EASILY RETRIEVED AND PRESENTED TO LOCAL, STATE AND FEDERAL AUTHORITIES IF REQUESTED FOR THE LIFE OF THE POND/STRUCTURE.

Provide a "SITE DATA" table/note on Title Sheet of every project that contains the following information, and any additional information that may be pertinent:

SITE DATA

OWNER:	[OWNER ENTITY]
OWNER ADDRESS:	[OWNER ADDRESS]
PREMISE ADDRESS:	[PREMISE ADDRESS]
TAX MAP(S):	###
PARCEL(S):	###, ###
LOT AREA:	###.## ACRES
ZONING:	LDR (LOW DENSITY RESIDENTIAL DISTRICT)
COUNCIL DISTRICT:	#
LEGISLATIVE DISTRICT:	#-#
ADC MAP NO.:	##
ADC GRID:	E-# TO G-#

At a minimum, provide on the title sheet, the note below that requires Cecil Soil Conservation District to review and approve a Small Pond:

REQUIRED NOTE:

[Structure Label(s)] #[Number(s)] qualifies as a MD-378 Small Pond and may be reviewed and approved by the Cecil Soil Conservation District in lieu of MDE Dam Safety Division.

REQUIRED NOTES IF APPLICABLE:

[Structure Label(s)] #[Number(s)] are exempt from MD-378 Small Pond Approval and qualify to be reviewed and approved solely by [local SWM approving authority].

[Structure Label(s)] #[Number(s)] qualifies as a MD-378 Small Pond and is required to be reviewed and approved by MDE Dam Safety Division.

*All structures that impound water on your project for stormwater management fall into one of the categories shown above. Provide each note on the plan that accurately describes the SWM structures on your project and provide the structure label(s) and number(s) that fit into that category.

Provide "STREAM CLOSURE DATES" on the plans that correspond to the outfall conveyance stream designated use I, II, III, etc.:

STREAM CLOSURE DATES

THE [NAME OF TRIBUTARY STREAM] IS DESIGNATED AS A USE [I, II, III, ETC.] STREAM PER CODE OF MARYLAND REGULATIONS 26.08.02.11. IN-STREAM WORK ON ANY STREAMS OR TRIBUTARIES OF [WATERSHED] IS PROBITED DURING THE PERIOD OF [DATE THROUGH DATE] INCLUSIVE, DURING ANY YEAR.

Use I and I-P:	March 1 – June 15
Use II:	June 1 – September 30 & December 16 – March 14
Use III and III-P:	October 1 – April 30
Use IV:	March 1 – May 31
SAV*:	April 1 – October 15

*Submerged Aquatic Vegetation (SAV)

For more information about the closures based on stream uses and SAVs, contact MDE Wetlands and Waterways Program.

APPENDIX 9

APPLICATION FOR CSCD REVIEW

- APPLICATION FOR CSCD REVIEW (WORD .DOCX FORMAT)
- CSCD 1ST SUBMITTAL CHECKLIST (WORD .DOCX FORMAT)
- MD-378 SMALL POND REVIEW CHECKLIST (EXCEL .XLSX FORMAT)

Cecil Soil Conservation District
105 Chesapeake Blvd., Suite B-3
Elkton, MD 21921
Phone: 410-398-4411, ext. 3

Rev. 02/28/2025

Application for CSCD Review
Stormwater Management / Erosion and Sediment Control / Small Pond Approval

Date Submitted to the CSCD: _____ Invoice# (CSCD use only): _____ Application Fee: _____

Project Name: _____

Project Description: _____

Site Address: _____

Disturbed Acres: _____ **Total Drainage Area**: _____ **Tax map**: _____ **Parcel**: _____ **Lot**: _____

ESD review requested:

☐ Concept Review (C-ESD) ☐ Preliminary Review (P-ESD) ☐ Final Review (F-ESD)

ESD review waived - Erosion and Sediment Control Review Only

☐ Letter of waiver or exemption from DPW

E&S Plan submitted for:

☐ 1st Review ☐ 2nd Review ☐ 3rd Review ☐ Additional Review

MD-378 Small Pond Plan submitted for:

☐ Design Review ☐ As-Built Review **AND** ☐ 1st Review ☐ 2nd Review ☐ 3rd Review ☐ Additional Review

Proposed Development Type:

☐ Residential ☐ Industrial/Commercial ☐ Mining/Landfill ☐ Agricultural

☐ Other (Specify): _____

Type of Plan Submitted:

☐ Engineered Plan ☐ Restamp ☐ Forest Harvest Plan ☐ Revision to Previously Approved Plan

☐ Basin Review ☐ MD-378 Small Pond Review

Owner (Company Name): _____

Contact Name: _____ Phone: _____

Mailing Address: _____ Fax: _____

City: _____ State: _____ Zip:_____

Contact E-mail Address: _____

Developer (Company Name): _____

Contact Name: _____ Phone: _____

Mailing Address: _____ Fax: _____

City: _____ State: _____ Zip:_____

Contact E-mail Address: _____

Engineering Firm (Company Name):_____

Contact Name: _____ Phone: _____

Mailing Address: _____ Fax: _____

City: _____ State: _____ Zip:_____

Contact E-mail Address: _____

☐ **Expedited Review Requested** (Attach letter explaining the need for expedited review)

Other approvals required

☐ General Waterway Construction Permit
☐ General Permit (NOI)
☐ MDE Small pond approval
☐ Joint Federal/State Permit
☐ Individual Permit
☐ Other (Specify):_____

All plans submitted must be no larger than 24" x 36", must be folded and must be accompanied by this application form. The application fee is due with the initial plan submitted. Checks should be made payable to the Cecil Soil Conservation District.

All plans submitted for approval must have original signatures in the Owner and Engineer Certifications.
The certifications must be signed in either *blue or red ink*.

CECIL SOIL CONSERVATION DISTRICT
105 Chesapeake Boulevard, Suite B-3, Elkton, MD 21921
(410) 398-4411 Ext.3 • www.cecilscd.com

Checklist for 1st Review Submittal for MD-378 Small Pond Approval

Project Name: _____ Date: _____

Provide the following items directly to CSCD after receiving Concept Plan phase approval from local SWM authority:

- ☐ One (1) hard copy of completed Application for CSCD Review
- ☐ One (1) hard copy of Step By Step Decision Aid completed to Determine Embankment Design Category and Approval Authority
- ☐ One (1) hard copy of completed MD-378 Small Pond Review Checklist
- ☐ One (1) hard copy of Preliminary/Final plan phase Small Pond Construction Plans
- ☐ One (1) hard copy of Preliminary/Final plan phase Small Pond Design Report/Analysis
- ☐ One (1) hard copy of Geotechnical Subsurface Evaluation
- ☐ One (1) hard copy of the Dam Breach Analysis
- ☐ One (1) hard copy of the Pond Summary Sheet for Each Pond

Provide digital copies directly to CSCD of everything that was submitted above:

- ☐ Flash Drive
- ☐ Cloud/FTP/Web Service: _____
  Name Date Sent

CECIL SOIL CONSERVATION DISTRICT
105 Chesapeake Boulevard, Suite B-3, Elkton, MD 21921
(410) 398-4411 Ext.3 • www.cecilscd.com

MD-378 SMALL POND REVIEW CHECKLIST

Project Name: _____ Date: _____

CSCD Project No. (If Known): _____

Type of Submittal: ☐ 1st Review ☐ 2nd Review ☐ Subsequent Review No.___

PLEASE NOTE THAT PLANS SUBMITTED WITHOUT A COMPLETED CHECKLIST MAY BE RETURNED WITHOUT REVIEW

Designer (check off)			MDE/CSCD Reviewer		SUBMISSION ITEM
YES	NO	N/A	received (yes/no)	correct (yes/no)	
SUBMISSION DOCUMENTS					
					Application for CSCD Review [Appendix 9]
					Digital Copies of all completed checklists, plans, reports, calculations, analysis, evaluations, etc. to be submitted with hard copies
					MD-378 construction plan set with Professional Engineer's certification, seal, signature, and date[1]
					Stormwater management (SWM) design report with Professional Engineer's certification, seal, signature, and date[1]
					Geotechnical report for SWM pond with Professional Engineer's certification, seal, signature, and date[1]
					Dam breach analysis for small ponds with Professional Engineer's certification, seal, signature, and date[2]
					Provide Determination of Embankment Design Category and Approval Authority [Appendix 2]
CONSTRUCTION PLANS					
					TITLE SHEET(S)
					Project name, street address, zoning, tax map, election district, parcel no., latitude, longitude
					Owner/Developer name, address, and phone number
					Design Professional name, address, and phone number
					CSCD project number
					Vicinity Map to Scale (1"=2000') with major roads identified and site delineated
					Legend

Designer (check off)			MDE/CSCD Reviewer		SUBMISSION ITEM
YES	NO	N/A	received (yes/no)	correct (yes/no)	
					Sheet Index
					Professional Engineer's certification [Appendix 8], seal, signature, and date[1]
					Developer's/Landowner's Certification block [Appendix 8][1]
					Provide note(s) specifying who has final authority for reviewing & approving all pond structures [Appendix 10]
					Provide standardized CSCD signature block for Small Pond Approval [Appendix 10]
					Provide Geotechnical Engineer Certification Block [Appendix 8]
					Provide Engineer's Certification Block [Appendix 8][1]
					Provide Engineer's As-built certification block [Appendix 8]
GENERAL INFORMATION - ALL SHEETS					
					Plan scale (range: 1" = 10' to 1" = 50')
					Profiles: horizontal & vertical scale (Typical: Horiz. 1" = 50', Vert. 1" = 5')
					Maximum drawing size: 24" x 36"
					Minimum 3 grid ticks with lat/long on site plan sheets
					North arrow
					Match lines labeled and referenced
					Profiles, details, and cross-sections drawn to scale
					Sheets numbered, consecutively; revisions noted with date
					CSCD Tracking Number (if known)
					Professional Engineer's certification [Appendix 8], seal, signature, and date[1]
					PLAN VIEW OF POND AT SCALE OF 1"=50' OR LESS show and label the following:
					Existing and final contours (2' interval maximum) with index contours clearly labeled
					Locations of test borings and bench marks (minimum 1 in dam centerline; 1 in emergency spillway, 1 in pond bottom)
					Inflow channel and/or pipe, protection (section/detail required)
					Outflow channel and/or pipe, protection (section/detail required)
					Property lines, easements, owner's & adjacent owner's information
					Low flow channel, protection (section/detail required)
					Emergency spillway with entrance and exit channels (section/detail required)

Designer (check off)			MDE/CSCD Reviewer		SUBMISSION ITEM
YES	NO	N/A	received (yes/no)	correct (yes/no)	
					Stationing of embankment centerline; including POT's, POC's, locations of other sections/profiles crossing centerline (northing & easting on point of beginning and end)
					Site features and existing/proposed grading to 200' beyond pond limits
					"No woody vegetation" zone delineated[3]
					Storm drainage system (existing & proposed) with size, material and easements clearly identified & labeled
					Downstream conveyance system (existing & proposed) with property lines, right-of-ways, easements clearly identified & labeled
					Utilities (existing and proposed) with easements clearly identified & labeled
					Floodplain limits with sections and water surface elevations
					Wetland boundary and wetland buffer labeled
					Chesapeake Bay Critical Area (CBCA) Boundary labeled
					Waters of the U.S. labeled
					Forest conservation easement areas labeled
					Sinkholes and rock outcrops labeled
					Forebays and internal berms (reference berm detail)
					Control Structures (labeled, reference detail)
					Principal spillway (labeled, size, material)
					Seepage control (labeled, reference detail)
					Pond maintenance access (dimension width, slope)
					Fencing (label, height, type, reference detail)
					Limits of pond liner (label, material)
					Benching for ponds with permanent pools (permanent pools required to be ≥ 4' deep)
					Pond Design Criteria Table [Appendix 11]
					Pond Hydrologic Criteria Table [Appendix 11]
					Sediment controls (must match exactly with plans being reviewed for approval)
					CROSS-SECTION OF DAM ALONG PRINCIPAL SPILLWAY (PS) (i.e. profile of principal spillway) - Provide the following:
					Existing and proposed ground surface
					Slope of embankment sides (2:1 max / 5:1 max combined for upstream and downstream for top width ≤ 26')
					Embankment top elevation & width (6' min; 10'-26' for road)
					Cutoff trench (dimensioned); bottom elevation & width 4' min; side slopes 1:1 max; depth 4' min below concrete cradle
					Impervious core (up to 10 yr WSEL); side slopes 1:1 max; top width 4' min; top elevation

Designer (check off)			MDE/CSCD Reviewer		SUBMISSION ITEM
YES	NO	N/A	received (yes/no)	correct (yes/no)	
					Control structure (label, reference detail location, elevation of all top/weirs/openings/inverts)
					Trash rack(s) (label, reference detail)
					SWM WSEL at Design High Water (DHW) Typically 100-YR storm event
					Bottom of pond (lowest elevation)
					Permanent pool WSEL
					10-YR & 100-YR storm event WSEL
					Principal spillway pipe (barrel); inside diameter or dimensions; length, slope, invert in and out
					Material: for concrete pipe, ASTM C-361; for PVC pipe, ASTM D-1785 or D-2241; for HDPE, AASHTO M294 Type S; for HDPE ≤ 10",
					Specify watertight joints
					Phreatic line (4:1 slope from 10-YR WSEL); saturated length
					Saturation length
					Anti-seep collars or filter diaphragm (reference detail location)
					Concrete bedding if pipe is concrete (reference detail location)
					Outlet protection: median riprap size (d_{50}); thickness, length, width, filter cloth, cross-section detail (reference detail location)
					10-YR & 100-YR Q (cfs) and velocities (fps) at PS outfall
					Design Elevations of constructed and settled top of dam
					Freeboard (min 1' above DHW with emergency spillway, or min 2' without emergency spillway)
					Crest of emergency spillway (dotted line)
					PROFILE OF EMERGENCY SPILLWAY (ES) **Provide the following drawn to scale and stationed:**
					Existing and proposed ground surface - locate on natural ground or in cut, or use weir or pass through principal spillway
					Invert elevations of inlet channel, control section, and outlet channel
					Lengths of inlet channel, control section, and outlet channel
					Slopes of inlet channel, control section, and outlet channel
					100-YR Q (cfs) and velocity (fps)
					Cross-section detail of emergency spillway with invert (crest) elevation, 100-YR WSEL, bottom width, existing & proposed ground surface, side slopes labeled
					Proper ground cover/protection of control section
					Proper ground cover/protection of inlet & outlet channels

Designer (check off)			MDE/CSCD Reviewer		SUBMISSION ITEM
YES	NO	N/A	received (yes/no)	correct (yes/no)	
					CROSS-SECTION OF DAM ALONG CENTERLINE Provide the following drawn to scale and stationed:
					Top of dam elevation (constructed and settled)
					Location of principal spillway with concrete cradle (if concrete pipe used)
					Existing ground
					Proposed ground
					Top of core and elevations; limits shaded
					Bottom of cutoff trench and elevation; limits shaded
					Location and crest elevation of emergency spillway (shown in cut)
					100-YR and 10-YR WSEL's
					CONTROL STRUCTURE/CONCRETE WEIR DETAIL Provide the following drawn to scale:
					Material specified (same as principal spillway pipe); thickness or gauge (if metal)
					Riser crest elevation and invert elevations of all openings
					All openings dimensioned
					Inside dimensions (diameter or width, length, height)
					Concrete collar shown and labelled
					Key joint & waterstop detail
					Riser base: length, width, thickness or gage (if metal)
					Depth of embeddment of structure into embankment (on bottom and all sides)
					Low flow orifice pipe anchor and support labelled (as applicable)
					Dewatering device shown and labeled (reference detail)
					Show and label trash rack for all openings (reference detail(s) as applicable)
					Locate and label all steel reinforcement with dimensions
					TRASH RACK DETAIL(S)
					Material specified; galvanized and removable
					Opening sizes dimensioned
					Extension required on top flow inlet structures (no flat trash racks)
					Anti-vortex device (for cylindrical trash racks)
					FILTER DIAPHRAGM
					Drain material noted; ASTM C-33 sand

Designer (check off)			MDE/CSCD Reviewer		SUBMISSION ITEM
YES	NO	N/A	received (yes/no)	correct (yes/no)	
					Extend to normal pool WSEL
					Dimensions - width (min 3D from outer principal spillway pipe); height (min 3D above outer diameter of pipe and 18 inches below outer diameter of pipe); thickness (2 ft min)
					Min 2 ft cover
					Pressure relief drain pipe diameter, material, perforations
					GATE VALVE DETAIL
					Valve stem to top of structure and accessible (with key storage location mounted inside structure)
					Valve stem anchored
					Specify material and manufacturer
					STORM DRAIN PROFILE(S) (inflow structure & slope protection, systems through & exiting pond, any additional systems within pond embankement)
					Structures numbered and stationed
					Size and inverts of all pipes at the structure
					Structure inverts labeled upstream and downstream
					10-YR hydraulic gradient shown and labeled
					Label limits of road, pavement, right-of-way above profile
					Existing and finished ground-over centerline of storm drain shown
					Structure schedule
					Provide Storm Drain Flow Tabulation & Hydraulic Gradient Computations for all storm drain systems shown
					LANDSCAPE PLAN
					Include plant material, number, spacing, location, and size
					"No woody vegetation" zone delineated[3]
REPORTS AND CALCULATIONS					
					SOILS INVESTIGATION REPORT
					Boring Map & Logs[4] (See Pond MD-378 for min. boring locations)
					Determination of seepage potential
					Determination of bearing strength, if soil is an unstable clay
					Provide boring log(s) on dam profile and boring location on plan view

Designer (check off)			MDE/CSCD Reviewer		SUBMISSION ITEM
YES	NO	N/A	received (yes/no)	correct (yes/no)	
					Boring logs shall contain blow counts, elevations, and location of ground water (if located) to minimum depth of 4-ft below the bottom of the proposed pond
					HYDROLOGY
					Existing and ultimate conditions drainage area (DA) maps at scale 1" = 200' or less
					Existing and ultimate DA limits delineated
					Existing and ultimate DA land uses delineated within DA
					Existing and ultimate time-of-concentration (TC) paths shown within DA
					USDA Soils map (site and DA delineated)
					Check DNR maps to determine if pond outfalls to a stream in a Coldwater Resource Watershed & Provide Use In Pond Design Table[5&6]
					RUNOFF COMPUTATIONS
					Define Hydrologic Soil Group (A, B, C or D) for each soil on site
					Existing and ultimate runoff curve numbers (RCNs)
					Existing and ultimate TC
					Existing and ultimate development hydrographs for 10-YR and 100-YR storm events
					POND HYDRAULICS/ROUTINGS
					Basin routing using short cut method of storage indication
					Elevation vs. Storage table for pond from bottom to top of embankment
					HY-8 or culvert capacity analysis
					Elevation vs. Discharge table which includes each stage of outflow control
					Inflow hydrograph NOAA Atlas 14 (provide copy) [7]
					Outflow hydrograph of routed discharges for 10-YR and 100-YR storm events
					Provide routing with low flow stage clogged
					SPILLWAY(S)
					Provide ultimate Capacity of principal and emergency spillway sized by Code 378
					Reference ESC handbook Design by Engineering Field Manual, pps 11-34.1 through 11-54.11

Designer (check off)			MDE/CSCD Reviewer		SUBMISSION ITEM
YES	NO	N/A	received (yes/no)	correct (yes/no)	
					OUTFALL STUDY
					Existing vegetation and condition
					Flow rates and velocities, after development, for 10-YR and 100-YR storm events
					Elevation at end of outlet protection
					Property lines, easements, utility crossings, floodplain limits, waters of U.S., wetlands and wetland buffers, location and first floor elevation of critical structures.
					DAM BREACH ANALYSIS
					Danger reach study per the following guidance: https://mde.maryland.gov/programs/water/damsafety/documents/dam-breach-analysis/2018-05-15-Breach-analysis-guidance.pdf
					Cross sections at critical points (in improved and existing channel)
					Check mapping for additional ponds or embankments in flow path and hazard creep
					d ≤ 1.5 ft, Class "a" structure
					STRUCTURAL/STABILITY COMPUTATIONS
					Anti-flotation computations for riser with Factor of Safety (FOS) ≥ 1.2
					Riser/weir stability computations (bearing, sliding, overturning)
					Riser/weir structural computations for concrete & reinforcement
					Anti-seep collar sizing, number & spacing calculation
					NOTES ON PLANS
					Construction specifications per MD Code 378
					Maintenance schedule for each type of BMP
					Sequence of Construction with CSCD Invited to Preconstruction Meeting

See attached footnotes

FOOTNOTES FOR MD-378 SMALL POND REVIEW CHECKLIST

Notes:

[1]Engineer's seal/signature and owner's signature required at time of submitting final plans to obtain approval signatures from CSCD - only one (1) copy of plans & documents needed for first and subsequent submittals - provide two (2) hardcopies to CSCD once all approving signatures received

[2]See guidance for dam breach analysis published by MDE titled "Guidance for Completing a Dam Breach Analysis for Small Ponds and Dams in Maryland" draft dated May 2018.

[3]No trees, shrubs, or woody vegetation is allowed within 25 ft of the inlet structure, on the fill embankment, and within 15 ft of the fill embankment

[4]All soil investigations shall be logged using the Unified Soil Classification System

[5]Check DNR map to determine stream classification (see link below)

[6]Engineer-In-Charge to verify stream is or is not a designated coldwater resource. Streams in Coldwater Resource Watersheds are considered regulated watersheds and must meet MDE Thermal Design Criteria in order to qualify to be reviewed and approved by Cecil Soil Conservation District in lieu of obtaining a Permit from MDE Dam Safety Program. See *Dam and Small Pond Approval Guidelines in Coldwater Resource Watersheds* for "design guidance" for small ponds in a coldwater resource watershed. Coldwater Resources such as a stream with Use Class III/III-P can be determined using the mapping tool below for Designated Use Classes for Maryland's Surface Waters:

https://mdewin64.mde.state.md.us/WSA/DesigUse/index.html

[6 (cont.)]or as Maryland Trout Wateshed; Benthic Coldwater Macroinvertebrate watershed; or, Put and Grow Trout Watershed which is identified on the Maryland DNR Freshwater Fisheries – Coldwater Resource Mapping Tool below:

https://maryland.maps.arcgis.com/apps/webappviewer/index.html?id=dc5100c0266d4ce89df813f34678944a

[7]The link to NOAA Atlas 14 Rainfall Distribution is below:

https://hdsc.nws.noaa.gov/pfds/

APPENDIX 10

SIGNATURE BLOCKS TO BE PROVIDED ON PLANS

- SMALL POND APPROVAL SIGNATURE BLOCK
- SMALL POND AS-BUILT ACCEPTANCE SIGNATURE BLOCK

*All documents in WORD .docx format

CSCD SIGNATURE/APPROVAL BLOCK

The following signature/approval block must be placed on the plans where SMALL POND APPROVAL by Cecil Soil Conservation District is required:

SMALL POND APPROVAL
For _____(provide *pond labels*)_____
Cecil Soil Conservation District
Project No. __(YY###)__

_____

Approved Cecil SCD Date

_____

Technical Review Cecil SCD Date

Subject to Re-approval if Pond is not Constructed Within two (2) years of Approval Date.

Note: This approval applies to all 378 Ponds shown on this plan that fall under the review authority of Cecil Soil Conservation District.

CSCD AS-BUILT
SIGNATURE/ACCEPTANCE BLOCK

The following signature/acceptance block must be placed on the plans where SMALL POND APPROVAL by Cecil Soil Conservation District is required:

AS-BUILT ACCEPTANCE
For _____(provide *pond labels*)_____
Cecil Soil Conservation District
Project No. __(YY###)__

_____

As-Built Accepted By Cecil SCD Date

_____

As-Built Technical Review Cecil SCD Date

Note: This as-built acceptance applies to all 378 Ponds as noted above and fall under the review authority of Cecil Soil Conservation District.

APPENDIX 11

EXAMPLE TABLES TO BE PROVIDED ON PLANS

- EXAMPLE POND DESIGN CRITERIA TABLE
- EXAMPLE HYDROLOGIC CRITERIA TABLE

*All documents in EXCEL .XLSX format

EXAMPLE POND DESIGN CRITERIA	
POND LABEL	BASIN A
TYPE OF POND	INFILTRATION BASIN, I-2
DESIGN CRITERIA	MD-378
MANAGEMENT PROVIDED	ESD, 2-YR
TOTAL CONTRIBUTING DRAINAGE AREA (DA) TO POND (ACRES)	3.17
ELEVATION TOP OF SETTLED DAM (FT)	297.00
ELEVATION OF EMERGENCY SPILLWAY (FT)	296.50
STORAGE VOLUME AT TOP OF SETTLED EMBANKMENT (CF)	45,787
HEIGHT OF EMBANKMENT UPSTREAM (FT)	297.00-293.00=4.00
HEIGHT OF EMBANKMENT AT CL (TOP OF DAM - LOWEST POINT OF EXCAVATION) (FT)	297.00-290.56=6.44
HEIGHT OF EMBANKMENT DOWNSTEAM (FT)	297.00-291.00=6.00
WIDTH OF TOP OF EMBANKMENT (FT)	5
MD-378 STRUCTURE HAZARD CLASSIFICATION	A - LOW HAZARD
REQUIRED FREEBOARD (FT)	1.00
PROVIDED FREEBOARD (FT)	0.36
WATERSHED NAME	OCTORARO CREEK
MD 8 OR 12 DIGIT WATERSHED	02120203
STREAM USE CLASSIFICATION	CLASS III-P

EXAMPLE HYDROLOGIC CRITERIA TABLE

(PROVIDE ON POND SITE PLAN)

HYDROLOGIC CRITERIA												
STORM[1] (YR)	EX. CONDITIONS PEAK DISCHARGE (CFS) FROM SITE AT STUDY POINTS				PEAK INFLOW (CFS)	PEAK OUTFLOW (CFS)	PR. CONDITIONS PEAK DISCHARGE (CFS) FROM SITE AT STUDY POINTS				WSE IN POND	STORAGE IN POND (AC-FT)
	A	B	A+B	C	qi	qo	A	B	A+B	C		
Cpv											146.10	0.277
10	12.42	9.18	21.11	4.88	31.90	12.06	12.06	12.75	19.85	4.72	147.81	0.641
100	20.74	16.55	36.31	8.48	47.30	40.15	40.14	19.81	57.93	8.68	148.36	0.896

[1]Storm events shown in example are for reference only - Design Engineer to provide storm events that are required by governing jurisdiction regulations

APPENDIX 12

COLDWATER RESOURCE WATERSHEDS

- Dam and Small Pond Approval Guidelines in Coldwater Resource Watersheds, August 2023

August 2023

Dam and Small Pond Approval Guidelines in Coldwater Resource Watersheds

Coldwater resources provide a unique and important function for Maryland's ecosystems and economy. Certain species of fish and benthic macroinvertebrates are sensitive to thermal impacts. In Maryland, the aquatic organisms typically associated with coldwater streams include the fish species brook trout, brown trout, and rainbow trout and the benthic macroinvertebrates *Tallaperla* and *Sweltsa* (coldwater obligate stoneflies). Because water temperatures above the water quality criterion (68°F) for Use Class III (or III-P) streams can limit coldwater obligate species' ability to survive, protecting these coldwater resources from thermal pollution is critical.

Nontidal cold waters that have the potential or are suitable for the growth and propagation of self-sustaining trout populations and other coldwater species are referred to as Use Class III (or III-P) waters. To protect surface water quality, the Code of Maryland Regulations (COMAR) Section 26.08.02 requires that waters of the state be designated a Use Class. The Use Class determines the water quality criteria that must be maintained to support those uses.

In addition to the Use Class III waters, the Maryland Department of Natural Resources (MDNR) has identified those 12-digit watersheds where wild trout or coldwater obligate benthic macroinvertebrate taxa are present (see here: MDNR Freshwater Fisheries - Coldwater Resources Mapping Tool). These watersheds should also be protected from potential thermal impacts. This includes the potential impacts that dams and small ponds may have on these resources.

Dams and small ponds collect and store water, increasing the surface area exposed to sunlight and thereby its temperature. Therefore, proper design and construction is necessary to prevent stream warming and habitat degradation for coldwater aquatic life. The cumulative, thermal impact of ponding on receiving coldwater resources is a primary concern. Therefore, if a dam or small pond is to be considered in a coldwater resource watershed (Including Use III/III-P), the following are some of the requirements to minimize any thermal impacts to receiving waters:

1. New small ponds located within the flow path of perennial and intermittent streams are prohibited in mapped coldwater watersheds.
2. Direct discovered groundwater outflows to the nearest receiving stream through an underground conveyance.
3. New dams and small ponds with wet pools are prohibited in mapped coldwater watersheds.
4. New dams and small dry ponds are acceptable in mapped coldwater watersheds. However, forebays and micropools shall be dewatered within 12 hours.
5. New or existing small pond extended detention times should be limited to 12 hours.
6. For all repairs or retrofits to existing small wet ponds:
    a. *In the pond*
        - No more than 50% of springflow shall be captured by the pond;

- Minimize the surface area of permanent pools;
- Avoid ponding in forebays and micropools;
- Maximize shading for pools, channels, and impervious surfaces;
- Maintain existing forested buffers and consider opportunities for new forested areas; and,
- Replace existing water release infrastructure with appropriate cooling design features (see: Guidance for Reviewing Stormwater Management Practices in Use III and IV Watersheds. https://dnr.maryland.gov/fisheries/Documents/UseIIISWMGuidance_2021.pdf).

b. *At the pond outlet*
   - Minimize tree clearing along the downstream channel;
   - Reestablish any lost forested riparian zone;
   - Use rip-rap only in steep locations prone to soil erosion where vegetation is lacking; if feasible, use a deep rock trench in situations requiring rip-rap; and,
   - Reseeding, with appropriate erosion control blankets, of disturbed soils should occur immediately once site construction is complete.

7. Considerations for sediment basins and traps during construction
   a. Sediment basins and traps in place for erosion and sediment control during site construction have the potential to cause a thermal pulse when dewatered. The following guidelines shall be considered to mitigate the heating of water from a sediment trap or pond prior to entering a receiving stream:
      - Stored water shall be released at a rate to allow for treatment of sediment and prevent thermal impacts and erosion downstream;
      - Dewatering of heated surface water should not occur in warm weather at all unless avoidance of heating downstream reaches is assured (i.e. infiltrated, spray irrigated, discharge very gradually before the natural stream occurs, or removed from site);
      - Sediment basins should be converted to a final stormwater management pond as early as possible; and,
      - Use deep rock trenches between sediment traps and receiving streams.

END