



DAM SAFETY
POLICY MEMORANDUM #20

TO: Dam Owners, Operators, and Engineers

FROM: Stormwater, Dam Safety, and Flood Management Program
Water and Science Administration

DATE: October 27, 2023

SUBJECT: Spillways Discharging to Storm Drain Networks

Policy Statement

It is the policy of the Maryland Department of the Environment (the Department) that the design of dam embankments must consider potential failure modes and incorporate defensive design measures as appropriate. The Department has observed an increasing number of dam and small pond designs that discharge directly into storm drain networks. This policy seeks to clarify the design considerations that must be taken into account when spillways are directly connected to a storm drain network.

General

In general, the embankment, spillways, and appurtenant works shall be designed based on the structure category (e.g., embankment or excavated), with the following additional conditions:

Spillway Design Criteria for New Construction

- Where a dam or small pond discharges to a storm drain system in new construction (e.g., greenfield development with no existing/legacy storm drain infrastructure), the storm drain system must be designed to accommodate the design storm discharge from the dam or pond.
- For embankment dams/small ponds, manholes must not be located within the embankment and are strongly discouraged from being located within a distance of twice the embankment height (measured vertically from the upstream toe to the crest) or within 15 feet from the downstream toe, whichever is greater.
 - Manholes, inlets and field connections that are located closer to the embankment than indicated above must be made fully watertight by means of specifically designed sealants/wraps that meet ASTM C-990, ASTM C-877, or AASHTO M-198.
- For excavated ponds, manholes are strongly discouraged from being located within a distance of twice the vertical height from the pond bottom to the top of the dam (measured from the reservoir rim) or within 15 feet from the reservoir rim, whichever is greater.

- Manholes that are located closer to the dam/pond than indicated above must be made fully watertight by means of specifically designed sealants/wraps.
- Pipes/conduits carrying the spillway discharge of the dam/pond shall be designed as spillway pipes (meeting the criteria of MD-378) for the distance of L horizontally downstream of the upstream toe of the pond, where $L = 10H + 20$ and H = height from the upstream toe to the crest of the dam. Where filtration media is present, the upstream toe is considered to be the bottom of the media.
- For embankment dams/small ponds, filter diaphragm discharge must be conveyed to an outfall beyond the toe of the dam. Discharge into a manhole is not acceptable if the design can result in flow backwards from the manhole into the filter diaphragm.
- For excavated dams/small ponds, seepage control (e.g., filter diaphragms, anti-seep collars) are not required, but may be incorporated in the design if determined appropriate by the design engineer or approval authority.

Spillway Design Criteria for Existing Construction

- Where a dam or small pond discharges to an existing storm drain system, the spillway and freeboard must be designed to account for a tailwater in the storm drain network for the respective design storm.
 - If the hydraulic gradient in the existing system is not easily determined because of the extensive downstream system, select the highest structure in the existing downstream system which will surcharge through the inlet throat or grate and assume a flooding condition at this structure. As the beginning hydraulic gradient elevation, use the hydraulic gradient at this structure using the grate or throat opening elevation plus an additional amount of surcharge of 2 feet to account for the downstream complexities.
- For embankment dams/small ponds, manholes must not be located within the embankment and are strongly discouraged from being located within a distance of twice the embankment height or within 15 feet from the downstream toe, whichever is greater.
 - Manholes, inlets and field connections that are located closer to the embankment than indicated above must be made fully watertight by means of specifically designed sealants/wraps that meet ASTM C-990, ASTM C-877, or AASHTO M-198.
- For excavated ponds, manholes are strongly discouraged from being located within a distance of twice the vertical height from the pond bottom to the top of the dam (measured from the reservoir rim) or within 15 feet from the reservoir rim, whichever is greater.
 - Manholes, inlets and field connections that are located closer to the embankment than indicated above must be made fully watertight by means of specifically designed sealants/wraps that meet ASTM C-990, ASTM C-877, or AASHTO M-198.
- Pipes/conduits carrying the spillway discharge of the dam/pond shall be designed as spillway pipes (meeting the criteria of MD-378) for the distance of L horizontally downstream of the upstream toe of the pond, where $L = 10H + 20$ and H = height from the upstream toe to the crest of the dam. Where filtration media is present, the upstream toe is considered to be the bottom of the media.
- For embankment dams/small ponds, filter diaphragm discharge must be conveyed to an outfall beyond the toe of the dam. Discharge into a manhole is not acceptable if the design can result in flow backwards from the manhole into the filter diaphragm.

- For excavated dams/small ponds, seepage control (e.g., filter diaphragms, anti-seep collars) are not required, but may be incorporated in the design if determined appropriate by the design engineer.

Additional Information

Questions about this policy or other items relating to ponds and dams can be directed to the Chief of the Dam Safety Permits Division at 410-537-3552.