



DAM SAFETY
POLICY MEMORANDUM #5

TO: Dam Owners, Operators, and Engineers

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

DATE: February 16, 2022

SUBJECT: Superwide Roadway/Railroad Embankments

Policy Statement

The Maryland Department of the Environment (the Department) recognizes that in some cases, the road or railway embankment is particularly wide in relation to a typical water-retaining embankment dam, while the volume of water impounded against the embankment is relatively small. For these certain configurations and geometries, it may be possible that the embankment bulk is sufficient to resist the erosive forces of the stored water volume. Therefore, an internal erosion process that progresses to failure is unlikely and these embankments will be deemed “superwide”.

This policy establishes the evaluation methodology to classify an embankment as “superwide” and design criteria for “superwide” embankment dams (including small ponds). This policy clarifies the “Special Embankment Criteria” found in Appendix B of USDA, Natural Resource Conservation Service, Maryland Conservation Practice, Standard Pond Code 378 (January, 2000).

Superwide Embankment Definition

The criteria for evaluating whether an embankment can be classified as superwide is provided below. Table 1 presents the minimum embankment width (W) necessary to classify an embankment as superwide as a function of embankment height (H) and maximum storage volume (V_w).

Embankment Height (H) is measured from the lowest point of embankment fill on the upstream slope of the embankment to the incipient point of overtopping.

Maximum Storage Volume (V_w) is the volume of water capable of being impounded at the incipient point of overtopping OR the volume of water impounded by the PMF, whichever is less.

The minimum embankment width (W) variable is measured based on crest width, perpendicular to embankment centerline one (1) foot below the point where overtopping begins. If the maximum water surface level for the probable maximum flood (PMF) is below the embankment crest elevation, W may be taken as the embankment width at the PMF elevation.

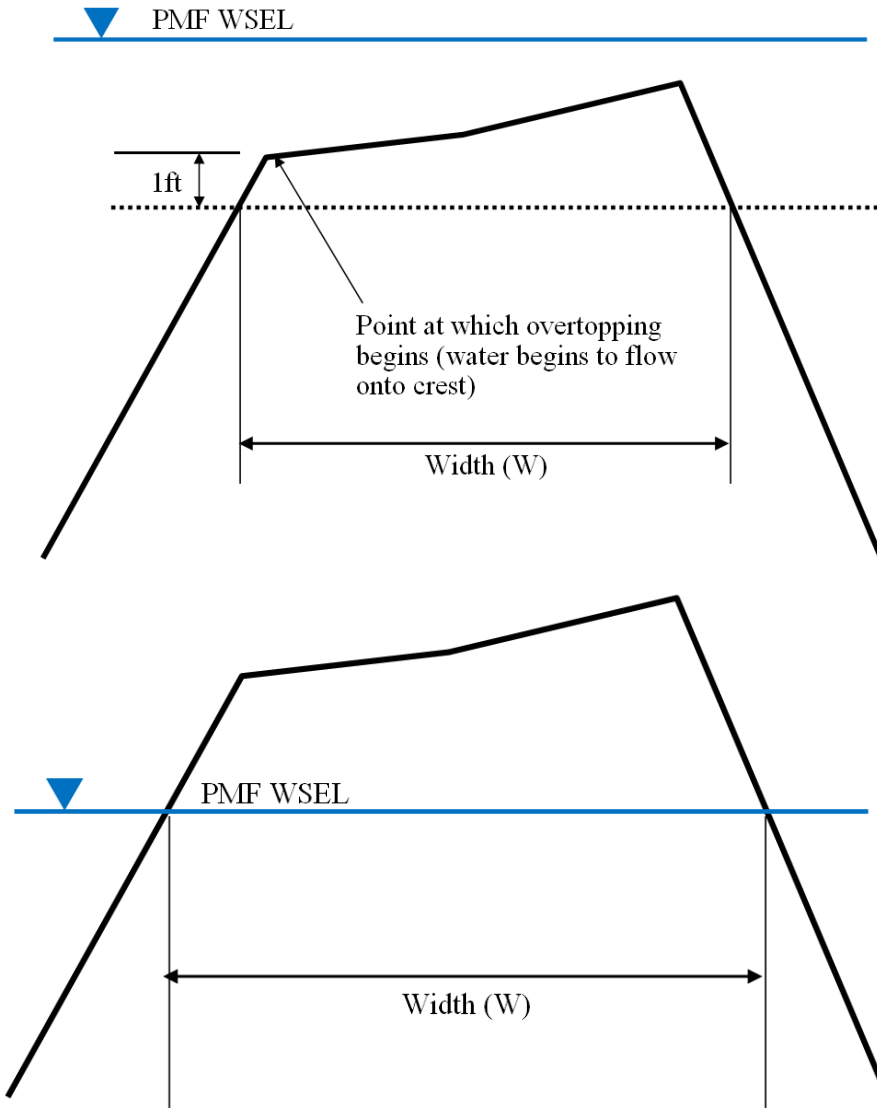


Table 1: Minimum Embankment Width (W), feet, Required to Classify Embankment as Superwide

		Embankment Height (H), feet										
		0 to 10	10.01 to 15	15.01 to 20	20.01 to 30	30.01 to 40	40.01 to 50	50.01 to 60	60.01 to 70	70.01 to 80	80.01 to 90	90.01 to 100
Maximum Storage Volume (Vw), acre-feet	5	50	50	50	50	50	50	50	50	50	50	50
	10	75	50	50	50	50	50	50	50	50	50	50
	20	125	75	50	50	50	50	50	50	50	50	50
	30	175	100	50	50	50	50	50	50	50	50	50
	50	250	150	100	50	50	50	50	50	50	50	50
	75	350	200	150	75	50	50	50	50	50	50	50
	100		250	175	100	50	50	50	50	50	50	50
	200			300	175	100	50	50	50	50	50	50
	300				225	150	100	50	50	50	50	50
	400				300	200	125	50	50	50	50	50
	500				350	225	150	100	75	50	50	50
1000						300	225	175	125	75	50	

The empirical relationships used to develop Table 1 assume that the embankment material meets the material gradation and compaction requirements of a typical earthen dam embankment. Embankments constructed as an uncontrolled fill, as a rockfill, or with debris, deleterious materials or other materials inconsistent with typical earthen dam or road/railway embankments do not qualify for superwide consideration.

Where an embankment qualifies as superwide as defined above, use Policy Memorandum No. 2 with the superwide criteria to determine if the embankment is a superwide culvert. Roadway culverts classified as superwide culverts are not subject to the below criteria.

Superwide embankments that are classified as dams must adhere to the requirements for dam design, construction, and operation defined in COMAR 26.17.04.05 and the Departments policies and procedures with the following clarifications:

1. Superwide embankments that are classified as dams will be categorized as low hazard. A dam breach analysis is not required.
2. Superwide embankment dams that meet the embankment height, drainage area, and storage volume requirements of a small pond may be reviewed and approved by the local Soil Conservation District (SCD) or the Department’s designee.
3. The requirement for an impervious core and cutoff trench may be waived for new or existing construction provided a licensed geotechnical engineer has evaluated the embankment and provided written documentation that the construction does not pose a risk of damaging or uncontrolled seepage.
4. New and existing embankments must be designed to safely pass the 24-hour 100-year storm event with two (2) feet of freeboard.
5. Trees must be removed from the upstream and downstream embankment slopes in accordance with Dam Safety Policy Memorandum No. 1.
6. Outfalls must be designed to be stable for the 24-hour, 100-year flow.

7. Manholes, inlets, field connections, utilities and other discontinuities are strongly discouraged within the embankment. Where constructed within the embankment (new or existing), all structures must be made watertight by cast-in-place construction, monolithic precast construction, or by employing the use of waterproofing methods at the joints (as deemed acceptable by the Department), and pipes/conduits must meet the requirements of Dam Safety Policy Memorandum No. 10.
8. The embankment materials, soil lift thickness, and compaction requirements for new or existing embankments must meet the applicable standards for roadway embankments (e.g., a State roadway must meet MDOT SHA specifications, a county road must meet the county requirements, a railroad embankment must meet the specifications of the railroad). In no cases will loose (uncompacted) lift thicknesses greater than 12-inches be allowed, and compaction must not be less than 95% of the Standard Proctor (92% Modified Proctor) at -2 to +4% of optimum moisture content.
9. Cross-culvert/spillway pipes in newly constructed dam embankments must be designed as a principal spillway. These pipes must be reinforced concrete, meet the requirements of ASTM C-361, and be founded on a concrete cradle. A filter diaphragm must be designed and constructed within the downstream 1/3 of the conduit length.
10. Cross-culvert/spillway pipes in existing dam embankments are assumed to not meet dam spillway conduit material requirements or specifications, unless supporting documentation is provided. In such cases, the entire length of the spillway conduit must be made watertight by lining and installing a filter diaphragm within the downstream 1/3 of the embankment.

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.