

MN6-9 Spillway Outlet

A structure outlet (cantilever outlet, slotted flume, or energy dissipater) should be provided for all conduit spillways 24 inches in diameter or larger that have an exit velocity of over 10 ft/sec. The outlet should be a cantilever or slotted flume if an unstable grade exists in the outlet channel. The outlet used should conform to the details shown in approved standard drawings.

6-9.1 Cantilever Outlet

Slope of conduit: An elbow should be used on all pipes above 30 inches in diameter in order to flatten the slope of the conduit as it passes over the outlet support whenever the slope on the conduit exceeds:

- 20% on structures with a watershed of 250 acres or less, and
- 10% if the watershed is more than 250 acres.
When an elbow is used, the invert at the elbow should be 0.5 foot to 1.0 foot above the conduit outlet invert.

Outlet clearance: The outlet invert should be located within a range of $D + 1$ foot to $D - 1$ foot above the outlet channel grade, where D is the diameter of the conduit. In no case shall the outlet clearance be less than 1 foot above the outlet channel bottom grade.

Location: The outlet support should be located at or downstream from the point where the downstream fill slope intersects with the outlet channel bottom grade.

Stilling basin: A stilling basin is required for all conduit spillways with cantilever outlets when the conduit is 36 inches in diameter or more. The stilling basin location and dimensions should be according to Figure 6-9.1. The shape of the stilling basin may be square or circular.

Consideration should be given to lining the stilling basin with heavy riprap in erosive soils (ML, SM, and stratified sands and silts). Design Note No. 6 gives a method to use in the design of riprap lined stilling basins.

6-9.2 Slotted Flume

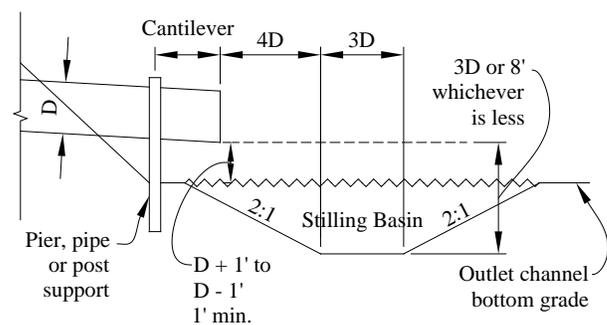
The slotted flume outlet is a corrugated metal pipe exposed on the surface of the embankment. The upper portions of alternative pipe sections are cut away. This outlet was originally developed for use where the outlet channel was expected to silt full and submerge the flume. This may be used where it is necessary to carry water down a long slope before it is released.

6-9.3 Energy Dissipaters

Impact basin: The layout and design of impact basins should conform to approved standard drawings. A stable grade is necessary but tailwater conditions are not.

SAF basin: The layout and design of SAF basins should conform to the recommendations given in the National Engineering Handbook, Section 14. The structural design should conform to Technical Release 54 and Technical Release 54, Amendment 1.

Figure 6-9.1 Stilling Basin Location and Dimensions



THIS PAGE INTENTIONALLY LEFT BLANK