Appendix 8A-1 Definitions and Abbreviations

Definitions:

Culvert — A structure which is usually designed hydraulically to take advantage of submergence to increase hydraulic capacity.

A structure used to convey surface runoff through embankments.

A structure, as distinguished from bridges, which is usually covered with embankment and is composed of structural material around the entire perimeter, although some are supported on spread footings with the streambed serving as the bottom of the culvert.

A structure which is 20 ft or less in centerline length between extreme ends of openings for multiple boxes. However, a structure designed hydraulically as a culvert is treated as a culvert in this chapter, regardless of length.

Critical Depth — Critical depth is the depth at which the specific energy of a given flow rate is at a minimum. For a given discharge and cross-section geometry there is only one critical depth. Appendix 8C contains critical depth charts for different shapes.

Flow Type — The USGS has established seven culvert flow types which assist in determining the flow conditions at a particular culvert site. Diagrams of these flow types are provided in the design methods section.

Free Outlet — A free outlet has a tailwater equal to or lower than critical depth. For culverts having free outlets, lowering of the tailwater has no effect on the discharge or the backwater profile upstream of the tailwater.

Improved Inlet — An improved inlet has an entrance geometry, which contracts the flow as it enters the barrel thus increasing the capacity of culvert. These inlets are referred to as either side- or slope-tapered (walls or walls and bottom tapered).

Normal Flow — Normal flow occurs in a channel reach when the discharge, velocity and depth of flow do not change throughout the reach. The water surface and channel bottom will be parallel. This

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type of flow will exist in a culvert operating on a constant slope provided the culvert is sufficiently long.

Slope — A steep slope occurs where critical depth is greater than normal depth. A mild slope occurs where critical depth is less than normal depth.

Submerged — A submerged outlet occurs when the tailwater elevation is higher than the crown of the culvert. A submerged inlet occurs when the headwater is greater than 1.2D where D is the culvert diameter or barrel height.

Abbreviations:

AASHTO	American Association of State Highway and Transportation Officials
BLM	Bureau of Land Management
DCR	Department of Conservation and Recreation
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
NRCS	National Resource Conservation Service; formerly Soil Conservation Service (SCS)
HDS	Hydraulic Design Series
HEC	Hydraulic Engineering Circular
HIRE	Highways in the River Environment
HW	Headwater
NFIA	National Flood Insurance Act
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
RDM	Road Design Manual
TVA	Tennessee Valley Authority
TW	Tailwater
USBR	United States Bureau of Reclamation
USCOE/USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
VDOT	Virginia Department of Transportation