

CHAPTER 7

ENERGY DISSIPATION

7.2 Design Criteria

7.2.1 General Criteria

Energy Dissipator shall be employed whenever the velocity of flows leaving a stormwater management facility exceeds the erosion velocity of the downstream channel system.

7.2.2 Erosion Hazards

Erosion problems at culverts or the outlet from detention basins are common. Determination of the flow conditions, scour potential, and channel erosion resistance, shall be standard procedure for all designs. The only safe procedure is to design on the basis that erosion at a culvert outlet and the downstream channel is to be expected.

Standard practice is to use the same headwall treatment at the culvert entrance and exit. It is important to recognize that the inlet is designed to improve culvert capacity or reduce headloss while the outlet structure should provide a smooth flow transition back to the natural channel or into an energy dissipator. Outlet structures should provide uniform redistribution or spreading of the flow without excessive separation and turbulence. Figure 7.3.2-1 on the next page provides the riprap size recommended for use downstream of energy dissipators.

7.2.3 Recommended Dissipators

For many designs, the following outlet protection and energy dissipators provide sufficient protection at a reasonable cost.

- Riprap
- Riprap outlet basins
- Baffled outlets

This chapter will focus on these measures. The reader is referred to the Federal Highway Administration Hydraulic Engineering Circular No. 14 entitled, Hydraulic Design of Energy Dissipators For Culverts And Channels, for the design procedures of the other energy dissipators.

END OF SECTION 7.2