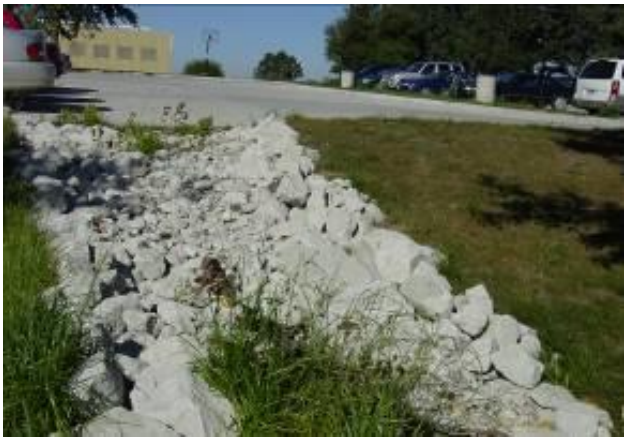
Rock Chutes and Flumes



BENEFITS

	L	M	H
Flow Control	■	■	
Erosion Control	■	■	■
Sediment Control			
Runoff Reduction			
Flow Diversion			

Description: Rock chutes and flumes are devices used to convey concentrated flows down an embankment or slope to a lower level without causing erosion.

Typical Uses: Commonly used as a permanent feature at the release point where runoff enters a ditch, stream, or lake. They are also used as a temporary measure to stabilize the inlet slope to a sediment trap or basin.

Advantages:
- Stabilizes slopes and areas where high flow volumes occur.
- Prevents further erosion at entrance to sediment removal devices, reducing the required cleanout frequency.

Limitations:
- May not be considered aesthetically pleasing for permanent installations.
- May be a relatively expensive measure for temporary structures.
- Requires careful construction practices.
- Difficult to maintain level, especially through freeze-thaw cycles.

Longevity: Permanent

SUDAS Specifications: Refer to Section 9040, 2.09 and 3.13

A. Description/Uses

Rock chutes are devices used to stabilize the inlet slopes to sediment traps, sediment basins, rivers, ponds, lakes, and other drainage structures. The chutes consist of a rock-lined channel constructed on a steep slope.

Proper construction of the rock chute is imperative to its performance. The chute must be carefully notched into the ground to the thickness of the rock, to ensure positive drainage into the chute from the edges. If drainage into the chute from the edges is not provided, runoff will flow along the top of the chute, creating the potential for scouring under the chute.

After constructing the chute to the appropriate cross-section, a layer of engineering fabric is usually placed to protect the underlying soils. Crushed stone of the size or weight specified is then placed over the fabric, creating a stable surface to transport large flows down steep grades.

B. Design Considerations

The design of a rock chute is dependent on several factors including: the steepness of the slope; the shape of the channel; the volume and velocity of the water; the size of the rip rap material; and the downstream tailwater.

In order to simplify the process of designing and sizing a rock chute, a spreadsheet has been developed by the Iowa Division of the National Resource Conservation Service (NRCS). This spreadsheet is available on the internet and may be accessed from the following address: https://www.nrcs.usda.gov/wps/portal/nrcs/ia/technical/engineering/nrcs142p2_008213/.

For permanent structures, an articulated or modular block system may also be considered. These products may be more aesthetically pleasing than a rock chute. Many can be vegetated to hide or mask the underlying armoring. Design information for these products is available from their respective manufacturers.

Installation of a turf reinforcement mat (TRM) might also be considered as an alternative to a rock chute (see Section 7E-18)

C. Application

Rock chutes should be considered at all locations where an elevation drop may create flow velocities that exceed the ability of the existing ground surface (bare or vegetated) to prevent erosion.

D. Maintenance

If designed and installed properly, maintenance of rock chutes is normally minimal. If the chute is left over a winter, it should be inspected in the spring to ensure that it is level. Any movement caused by freeze-thaw should be corrected.