

# Kentucky Erosion Prevention and Sediment Control Guide

A guide to preventing erosion and controlling sediment from construction activities in Kentucky

## Stabilizing Drainage Ditches

Man-made drainage ditches with gently sloping bottoms (less than 3%) can be stabilized with thick grass seeding and erosion control blankets. **Natural (i.e., not “man-made”) drainage channels and creeks or streams cannot be cleared, re-routed, or otherwise altered without one of more permits from the U.S. Army Corps of Engineers and the Kentucky Division of Water.** Moderately sloping ditches (3%-6% slopes) will likely require turf reinforcement mats and perhaps some riprap if soils are silty. Steeply sloping ditches (greater than 10%) need heavier armoring with concrete, riprap, gabion baskets, geogrid, retaining walls, or other approved products.

### Drainage ditch slopes and soils

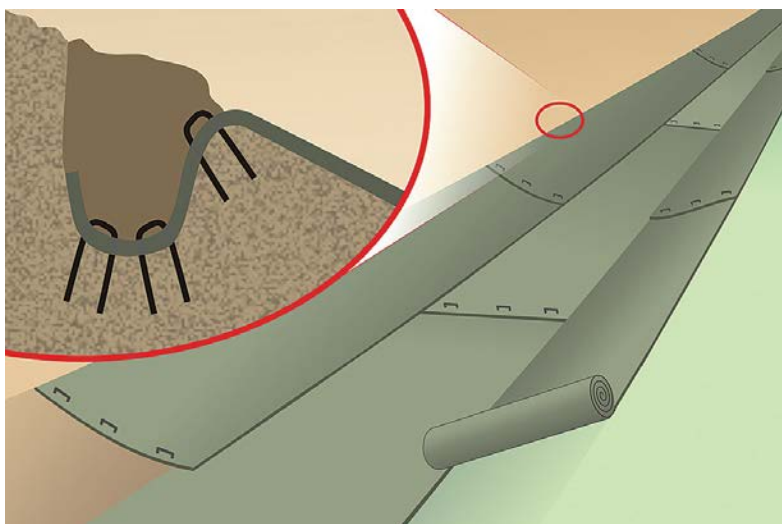
As noted in [Protecting Slopes to Prevent Gullies](#), silty soils are the most erodible and clay is the least erodible. Steeper ditches and those with highly erodible soils need more protection. Drainage ditch bank slopes must not exceed 2:1. If tractor mowers or other equipment will cross channels in the future, bank slopes must be 3:1 or flatter. The outlet must be installed, seeded, stabilized, and protected before the ditch receives incoming flows.

## Stabilization approaches for drainage ditches

Ditch Slope	Soil Type in Ditch		
	Sandy	Silty	Clays
Steep >10%	Concrete or riprap	Concrete or riprap	Riprap
Moderate 10%	Riprap with filter fabric	Riprap or turf mats & seeding	Riprap or turf mats & seeding
Slight 5%	Riprap or turf mats & seeding	Seeding & turf mats	Seeding & turf mats
Mostly flat <3%	Seeding & blankets	Seeding & mulching	Seeding & mulching

### Erosion control blanket and turf mat linings

All ditches steeper than 10% require rock, concrete, or other armored liners and/or grade control structures. Ditches of 10% or less can be stabilized with turf reinforcement mats or erosion control blankets if they are seeded quickly. See [Protecting Soils with Seed](#) and [Protecting Soils with Mulch or Other Products](#) for installation and other information on turf reinforcement mats, erosion control blankets, and seeding/mulching applications.



Lay in ditch blankets similar to roof shingles; start at the lowest part of the ditch, then work your way up. Uphill pieces lap over downhill sections. Staple through both layers around edges. Trench, tuck, and tamp down ends at the top of the slope. Do not stretch blankets or mats.

## Silt check dams of rock, brush, or other products

Drainage ditches need temporary silt check dams to capture sediment and reduce ditch bottom downcutting. Silt dikes or dams can be made of rock, stone-filled bags, fiber rolls, or brush. They are only effective when the drainage area is 10 acres or less.

Silt fencing and straw bales are not approved for use as silt check dams and must not be used in drainage ditches that carry flowing water. Also, do not place silt checks in creek or streams. Sediment must be intercepted before it reaches streams, lakes, rivers, or wetlands.

Seed ditches and install silt checks before excavating, filling, or grading uphill areas. Inspect, repair, and clean out sediment from upstream side of silt checks after each rainfall exceeding ½ inch. Remove temporary silt checks after the site is stabilized and vegetation is established. Placing filter fabric under the ditch check during installation will make removal much easier. Stone bag silt checks are easiest to remove and can be re-used.

### Spacing for silt check dams

Ditch slope	Silt check dam spacing	Additional information
30%	10 ft.	Calculated for 3' high silt check dams.
20%	15 ft.	
15%	20 ft.	
10%	35 ft.	Center of dam should be 6" lower than sides.
5%	55 ft.	
3%	100 ft.	
2%	150 ft.	
1%	300 ft.	Use 5"-10" rock, stone bags, or commercial products.
0.5%	600 ft.	

Silt check dams are spaced according to the slope of the ditch bottom. Extend the ends of the silt check to the top of the bank to prevent bypassing and sidecutting. Keep the middle

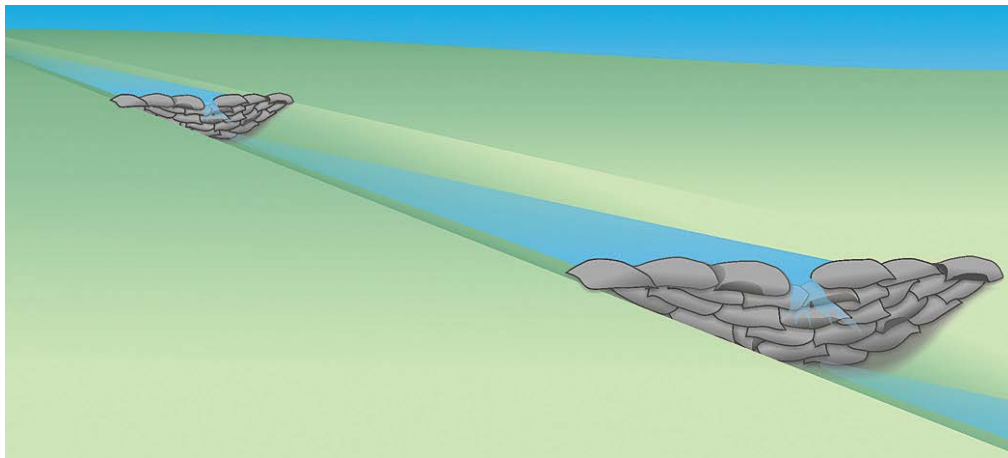
part lower and relatively flat so overflows aren't too concentrated, and bypasses are prevented.

### Lining steep ditches

Riprap is used to line sides and bottoms of steep ditches. Rock used in liners is mixed so the spaces between large rocks are filled with smaller rock.

### Rock sizing for ditch liners

Flow velocity	Average rock diameter
6 ft. per second	5 inches
8 ft. per second	10 inches
10 ft. per second	14 inches
12 ft. per second	20 inches



Silt check dams of rock, stone-filled bags, or commercial products must be installed before uphill excavation or fill activities begin. See table for correct silt check spacing for various channel slopes. Tied end of bag goes on downstream side.

As ditch depth and steepness increase, rock size must also increase. Line the bare ditch bottom and sides with non-woven filter fabric to prevent undercutting and washouts. If flows are 10 feet per second or more, use #2 rock as bottom liner, below the larger rock. Rock must be placed along ditch bottom first, then up the sides. Rock layer thickness should be 1 ½ times the average diameter of the largest fourth of the rocks.

Install a protected outlet first by excavating a 1½- to 2-foot trench at the toe of the slope and filling with riprap. See [Protecting Culvert and Ditch Inlets](#) and [Protecting Culvert and Ditch](#)

[Outlets](#) for details on outlet apron construction. Replace dislodged rock after storms as needed.



Good installation of temporary rock silt checks. Remember to tie sides of silt check to upper banks. Middle section should be lower. Clean out sediment as it accumulates. Remove silt checks after site and channel are stabilized with vegetation.



Good placement and spacing of fiber-roll silt checks. Coconut fiber rolls and other commercial products can be used where ditch slopes do not exceed three percent.



Poor application of commercial silt check product. Silt check needs to be longer (tied into banks). More are needed, at correct spacing for channel slope. Area needs to be re-seeded; ditch may need blanket liner.



Poor silt check dam installation. Straw bales are not approved as silt checks for ditch or channel applications due to rotting, installation difficulties, and high failure potential.



Poorly shaped rock check dam with mulch piled between the dams.



Good shaping of silt check dam. Note overflow at the top and width sufficient to cover all of ditch.



Aggregate too large and not appropriate width for channel. Channel poorly defined.

## Resources

[EPA Grass-lined Channels](#)

[EPA Check Dams](#)