

Water Quality Engineering

Environmental Fact Sheet



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Soil Erosion And Sediment Control On Construction Sites

Soil erosion, although a natural process, can be greatly accelerated by improper construction practices. Because of the climate in New Hampshire and the general nature of our topography, eroded soils can be quickly transported to either a wetland, stream or lake. The New Hampshire Department of Environmental Services (DES) regulates major construction activities to minimize impacts upon these resources. A properly conducted construction project should not cause significant soil erosion. This fact sheet discusses general procedures to prevent erosion and identifies resources for additional information and technical assistance.

Soil becomes vulnerable to erosion when construction activity removes or disturbs the vegetative cover. Vegetative cover and its root system play an extremely important role in preventing erosion by: (1) Shielding the soil surface from the impact of falling rain drops; (2) Reducing the velocity of runoff; (3) Maintaining the soil's capacity to absorb water, and (4) Holding soil particles in place.

Because of the vegetation's ability to minimize erosion, limiting and phasing of its removal can significantly reduce soil erosion. In addition, decreasing the area and duration of exposure of disturbed soils is also effective in limiting soil erosion. **The designer must give special consideration to the phasing of a project so that only those areas actively under construction have exposed soils.** Other factors influencing soil erosion are: (1) Soil types, (2) Land slope, (3) Amount of water flowing onto the site from up-slope, and (4) Time of year of disturbance.

Besides phasing and sequencing the construction to limit the exposure of soils, there are many structural erosion control measures that can be used. The principal measures are:

- **Mulching.** This practice is the application of plant material such as hay and straw to the soil surface. This reduces erosion by shielding the soil from the force of raindrop impact and reducing the velocity of runoff flowing over the soil. Hay and straw mulch should be applied at the rate of one-and-one-half to two tons per acre, or until the soil surface is not visible through the mulch. Mulch can also aid in seed growth by conserving moisture and shielding the young plants from extremes of heat, cold, or dry conditions. Mulch may need to be held in place by sprayed on tackifiers or netting.
- **Matting.** This practice is similar to mulching except that a manufactured product is used. The matting may be made from jute, coconut fiber, or a combination of natural and synthetic fibers. Matting should be used in areas where mulch would wash off such as channels and long and/or steep slopes. Wire staples are used to hold the matting in place. This practice, like mulching, is an excellent erosion control measure.
- **Diversions.** This is a practice in which the contractor constructs an earth channel and/or

berm up-slope of the work area with a supporting ridge on the lower side across the slope. Diversions intercept and divert clean water before it flows onto the construction site. It is important to only expose the site to water falling directly onto it.

- **Vegetated Filter Strip.** This practice consists of a well-vegetated strip through which the runoff flows before leaving the work area. Vegetated filter strips remove sediment by filtering the water as it flows through the vegetation and slowing the velocity of flow allowing the sediment to settle. Strips should be a minimum of 50 to 75 feet wide. Vegetated filter strips on slopes more than 15 % are less effective.
- **Temporary Seeding.** This practice is the seeding of grass or small grains on a disturbed area for a limited period. The seeding will replace the vegetation removed and will provide similar erosion control benefits. Temporary seeding is not effective until the vegetation is well established. Establishment of the vegetation usually takes a full growing season, therefore it is frequently used with mulching.
- **Silt Fence/Hay Bale Barrier.** These are the most common types of erosion control measures and are often improperly applied, installed and/or maintained. These devices function by slowing the water velocity allowing the sediment to settle behind the device. They should only be used on small drainage areas. They should be installed along the contour so as not to concentrate runoff. The barriers should have their ends turned up the slope to prevent runoff from flowing around them.
- **Temporary Grade Stabilization Structures.** These are hay bales or similar measures installed in ditches and swales. In this application they function by slowing the velocity of water in the ditch, making it non-erosive. These structures may also be constructed of rock or timber. The spacing between them should be such that the top of the downstream structure is at the same elevation as the toe of the immediate upstream structure.
- **Sediment Trap.** This is a small temporarily ponded area with a stable outlet. The sediment trap intercepts sediment laden runoff from small disturbed areas and detains it long enough for most of the sediment to settle out. The sediment trap must have a minimum volume of 1,800 cubic feet for each acre of drainage area. The surface area of the sediment trap should be as large as possible to improve performance. A sediment trap should not be used for drainage areas of more than five acres.

Additional information can be found in the publication entitled "Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire" from which much of the information in this fact sheet was taken. This publication is available from DES or the Rockingham County Conservation District. Additional information may be obtained by calling the Wastewater Engineering Bureau of DES at (603) 271-3503. Additionally the appropriate County Conservation District can be contacted for detailed technical assistance. The Districts in New Hampshire are as follows:

Belknap County Conservation District, Laconia Office, (603)528-8713
 Carroll County Conservation District, Conway Office, (603)447-2771
 Cheshire County Conservation District, Keene Office, (603)352-3602
 Coos County Conservation District, Lancaster Office, (603)788-4651
 Grafton County Conservation District, Woodsville Office, (603)747-2001
 Hillsborough County Conservation District, Milford Office, (603)673-2409
 Merrimack County Conservation District, Concord Office, (603)225-6401
 Rockingham County Conservation District, Brentwood Office, (603)679-2790
 Strafford County Conservation District, Dover Office, (603)749-3037
 Sullivan County Conservation District, Claremont Office, (603)542-6681