

# Soil Facts

## *North Carolina Erosion and Sedimentation Pollution Control Program*

While erosion is a natural process that has created the interesting landscapes we enjoy, a sudden alteration of the natural land surface can dramatically accelerate this process. The erosion rate from land disturbed at a construction site may be 1,000 times greater than the natural rate.

Accelerated erosion occurs whenever the soil surface is disturbed. Removing the vegetative cover, altering the natural topsoil, or changing the shape of the slope can increase the potential for erosion, increase runoff, and create more sediment in rivers and lakes. Erosion decreases the productive value of the soil as well as reducing the quality of the waters that receive the sediment. Sediments created by accelerated erosion clog streams, fill lakes, and often can carry pollutants to these waters. Concern about these potential damages provided the impetus for the North Carolina Sedimentation Pollution Control Act of 1973.

### **The Law**

The 1973 legislation (General Statutes 113A-50 to 113A-70) created the Sedimentation Control Commission to create and administer a program to reduce sedimentation resulting from erosion when people disturb the land. The legislation authorizes the North Carolina Department of Environment, Health, and Natural Resources to staff and manage this statewide program (Title 15A, North Carolina Administrative Code, Chapter 4). The law is performance oriented. It prohibits visible off-site sedimentation from construction sites but permits the land disturber to determine the most economical, effective methods for controlling erosion and sedimentation. This flexibility requires the builder to carefully plan construction activities and consider the erosion potential at each site. Construction plans must include measures to reduce erosion at the construction site as well as prevent off-site sedimentation.

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### **Who Is Affected**

The law governs all land-disturbing activities except those of agriculture, mining (which is regulated by the Mining Act of 1971), and forestry (if operations follow best management practices). Regardless of the size of the disturbed area, land developers and builders must plan and implement effective short-term and long-term measures to control accelerated erosion and prevent off-site sedimentation.

During construction, maintenance of the erosion and sedimentation control practices is shared by the landowner and the person financially responsible for site development. After construction is complete and the soil surface stabilized, responsibility passes to the landowner or the person managing the land.

### **Basic Mandatory Requirements**

The Act contains the following basic standards that provide the framework for erosion and sedimentation control practices.



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■ The law requires submission and approval of an erosion control plan before a land-disturbing activity begins that would uncover the soil by removing or disturbing the vegetation on more than an acre. The plan must be submitted 30 days before beginning the land disturbance.

■ A buffer zone is necessary along any natural watercourse or lake. The buffer strip must be wide enough to retain all visible sediment within the first 25 percent of the buffer zone nearest the disturbed area. Along trout streams, the buffer zone must be a minimum of 25 feet wide.

■ All disturbed areas must be able to be stabilized by vegetation or other suitable erosion control methods. Cut or fill slopes are of special concern. A disturbed soil area must be stabilized within 30 working days after completing any phase of land grading.

■ Off-site sedimentation must be prevented. A ground cover that prevents erosion must be established within 30 working days or 120 calendar days following completion of the construction phase, whichever is shorter.

## Performance Standards

The Act does not specify erosion control practices, devices, or techniques. Rather, a performance-based approach allows for innovation and site flexibility. The primary standard is that erosion and sedimentation control measures must provide protection from a rainfall event equivalent to the 10-year peak runoff. In areas with High Quality Waters, the design requirement is the 25-year storm. Control of run-off velocities is necessary. The peak runoff from a 10-year frequency storm occurring during or after construction must not damage the receiving stream channel at the discharge point. The law requires protection of the receiving channel if storm water run-off velocities are excessive.

## Penalties

The Sedimentation Pollution Control Act provides authority to the State or authorized local agencies to inspect land-disturbing activities and to prosecute violators. Citizens damaged by violations of the Act may also take action through the courts. Civil penalties, criminal penalties, injunction relief, and stop-work orders can be assessed.

■ Starting a land-disturbing activity without an approved erosion and sedimentation control plan can result in a \$500 per day penalty.

■ Civil penalties can carry a fine of up to \$500 per day for each violation and for each day a site is in violation.

■ Criminal penalties for knowing or willful violations are up to 90 days in jail or a \$5,000 fine.

■ An injunction to abate or prevent a violation can be brought to a superior court when the state or local program authorities believe a person is violating or threatening to violate the law.

■ A stop-work order can be issued if a serious violation is found and the violation is knowing and willful.

■ Any citizen injured by a violation of the Act may bring civil action against the persons alleged to be in violation.

## Guiding Principles of Erosion and Sedimentation Control

Relatively simple and basic measures can establish effective erosion and sedimentation control. Keeping the soil surface protected from rain and wind is the first line of defense. Disturbing as small an area as possible is of major benefit in this respect. Since most construction requires some soil disturbance and exposure, practices for capturing the eroded material before it leaves the construction site

are usually needed. A comprehensive erosion and sediment control plan integrates these goals.

### *Fit the planned development to existing site conditions.*

Soil, slope, vegetation, and hydrologic characteristics at a previously undisturbed site represent a natural harmony that should be considered rather than forcing the land to conform to development needs. Maintaining natural slope contours will usually minimize soil disturbance (Figure 1).

### *Minimize the extent and duration of bare soil exposure.*

Planning construction activities in phases to reduce erosion potential is a key to effective control. Clearing vegetation in phases as construction proceeds will expose smaller areas, making it easier to control erosion and retain sediment. Scheduling should account for the season and weather forecasts. Stabilize disturbed areas quickly (Figure 2).

### *Protect disturbed areas from storm water runoff.*

Storm water runoff must be diverted from unstable disturbed areas or cut-and-fill slopes. Concentrations of run-off flow must be prevented. Installation and stabilization of water diversions, dikes, and waterways should be put in place early in the construction process. Water collected by such structures must be directed over well-protected surfaces (Figure 3).

### *Stabilize disturbed soil areas.*

Any land disturbance that removes the vegetative cover, alters the slope, decreases rainfall infiltration, or changes surface water flow can increase susceptibility to erosion. Install measures to stabilize soil areas quickly, whether permanent or temporary vegetation, mulches, or other protective practices or devices. Channels for concentrated water

flow must be protected through proper design and channel linings (Figure 4).

### ***Minimize run-off velocities.***

The initial planning stages should give priority to reducing the speed and concentration of storm water flow. Interrupting the length of slopes, increasing surface roughness, and maintaining soil infiltration capacity will reduce the volume and velocity of water flow. Reducing water flow volume and velocity decreases soil detachment, erosion, and sedimentation (Figure 5).

### ***Keep sediment on the site.***

Site clearing, preparation, and construction will always create some erosion. Sediment traps, basins, buffers, and barriers will retain sediment on site. Such collection devices need regular maintenance and removal of the accumulated sediment. Sediment capture devices should not be the primary line of protection against off-site damage. Erosion prevention at the outset remains the best alternative (Figure 6).

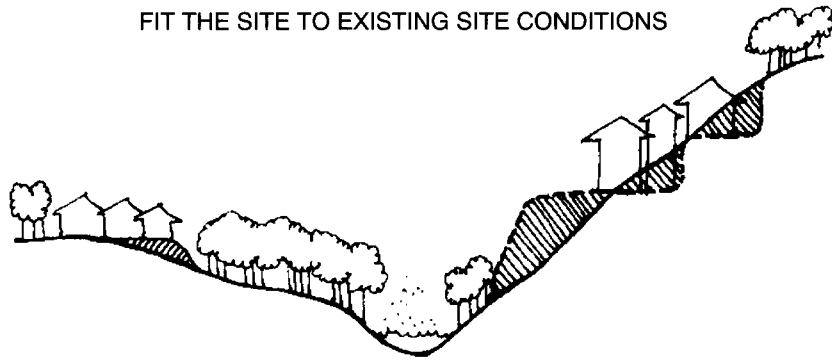
### ***Inspect and maintain control measures.***

The best erosion control plan will not be successful unless proper maintenance is provided for all control measures, including vegetative controls. Failing control measures can pose hazards for both people and property. Lack of maintenance may cause sudden release of all the sediment retained on site.

## **Program Responsibility**

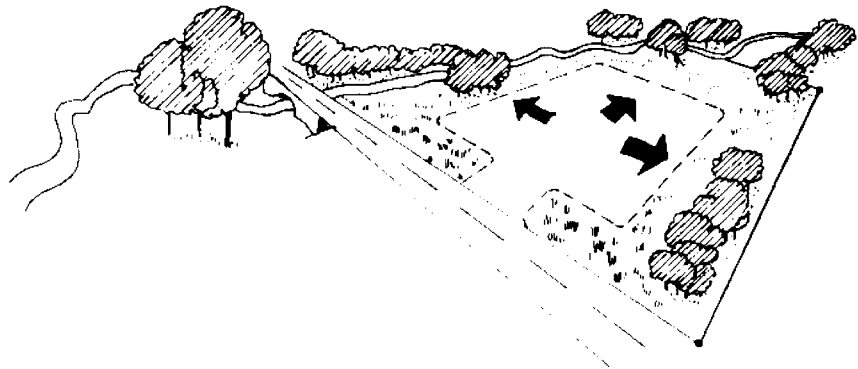
The 1973 Act created the Sedimentation Control Commission to oversee the erosion and sedimentation control program. The governor appoints the 12 members to represent a broad cross-section of natural resource interests. At the state level, the Land Quality Section of the North Carolina Department of Environmental and Natural Resources has the au-

### **FIT THE SITE TO EXISTING SITE CONDITIONS**



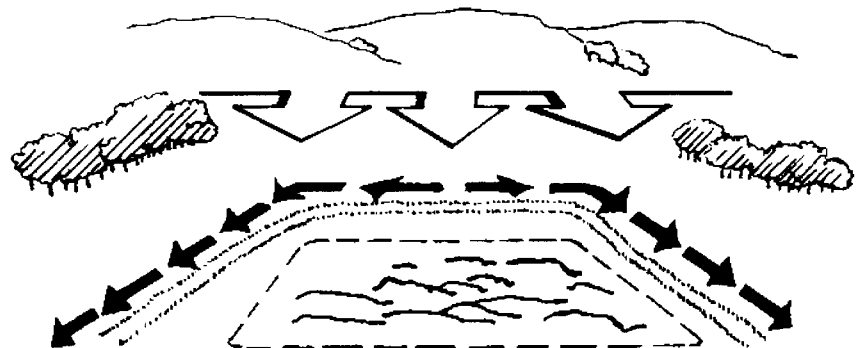
**Figure 1. Select a site that is suitable rather than forcing the terrain to conform to development needs. Steep slopes, areas subject to flooding, and highly erodible soils severely limit the site's use, while level, well-drained areas offer few restrictions. Any modification of drainage features or topography requires protection from erosion and sedimentation.**

### **MINIMIZE THE EXTENT AND DURATION OF EXPOSURE**



**Figure 2. Schedule construction activities to minimize the extent and duration of soil exposure. In scheduling, take into account the season and the weather forecast. Stabilize disturbed areas as quickly as possible.**

### **PROTECT AREAS TO BE DISTURBED FROM STORMWATER RUNOFF**



**Figure 3. Use dikes, diversions, and waterways to intercept runoff and divert it away from cut-and-fill slopes or other disturbed areas. To reduce on-site erosion, install these measures before clearing and grading.**

thority, under the Commissioner's direction, for administering the program. The Land Quality Section approves erosion and sedimentation control plans, inspects land-disturbing activities, and takes enforcement actions. It reports to the Sedimentation Control Commission on the status of the program.

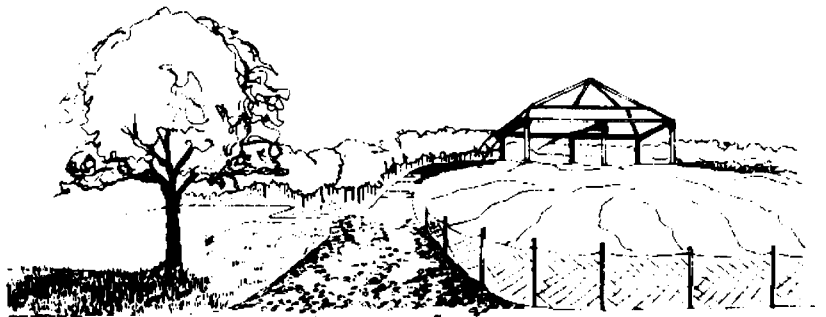
Authorized local governments or agencies may adopt, administer, and enforce their own ordinances with the approval and oversight of the Sedimentation Control Commission. Local (city or county) ordinances must meet or exceed the minimum state standards. The Land Quality Section of the North Carolina Department of Environment, Health, and Natural Resources reviews local programs periodically to ensure uniform enforcement of the Act and reports the status to the Sedimentation Control Commission. Today, 38 local programs are in effect.

The Sedimentation Control Commission can delegate other state agencies to administer an erosion and sedimentation control program. The Department of Transportation (DOT) has the responsibility for approval of erosion control plans for all land-disturbing activities under their purview. The Commission receives regular reviews and reports on the status of the transportation department's program.

## Magnitude of the Program

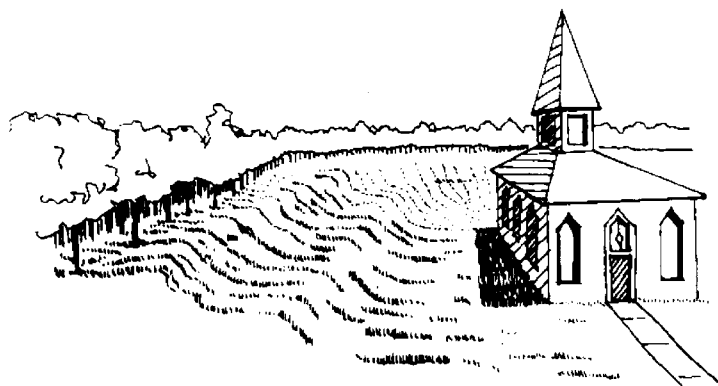
The Land Quality Section of the Department of Environment, Health, and Natural Resources administers the program through seven regional offices. (See map on the following page.) Contact your Regional Engineer for assistance in complying with the requirements of the program. The staff reviews over 3,100 erosion control plans and conducts approximately 12,000 inspections each year. At the local level, the 38 city and county programs annually review about 2,500 plans and make over 60,000 inspections. The Department

### STABILIZE DISTURBED AREAS



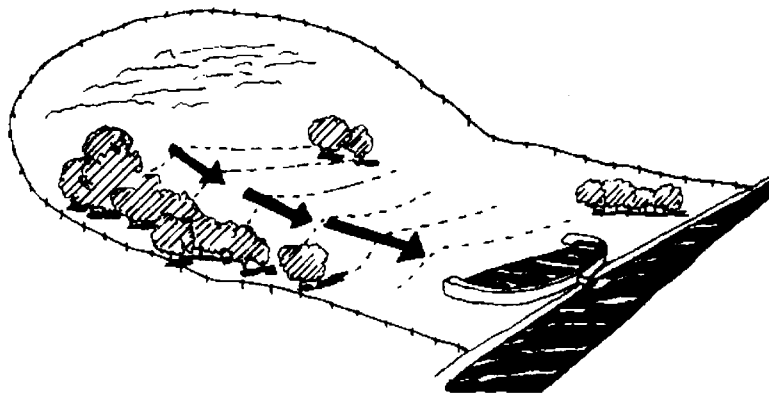
**Figure 4. Apply stabilizing measures as soon as possible after the land is disturbed. Use temporary or permanent vegetation, mulches, or other protective practices.**

### KEEP RUN-OFF VELOCITIES LOW



**Figure 5. Use measures that break the slopes to reduce the problems associated with concentrated flow volumes and run-off velocities. Practical ways to reduce velocities include conveying storm water runoff away from steep slopes to stabilized outlets, preserving natural vegetation where possible, and mulching and vegetating exposed areas immediately after construction.**

### RETAIN SEDIMENT ON THE SITE



**Figure 6. Even with careful planning some erosion is unavoidable. The resulting sediment must be trapped on the site. Protect areas below disturbed soils by building barriers to collect sediment. Whenever possible, plan and construct sediment traps and basins before other land-disturbing activities.**

# North Carolina Erosion and Sedimentation Pollution Control Program

of Transportation (DOT) annually reviews about 130 erosion control plans on contract construction. It has over 1,000 plans prepared for its own maintenance work and projects by DOT personnel.

## Information and Assistance

The Sediment Control Commission sponsors an educational program that includes workshops for engineers, erosion control plan preparers, and local program enforcement officials. Publications and videotapes provide

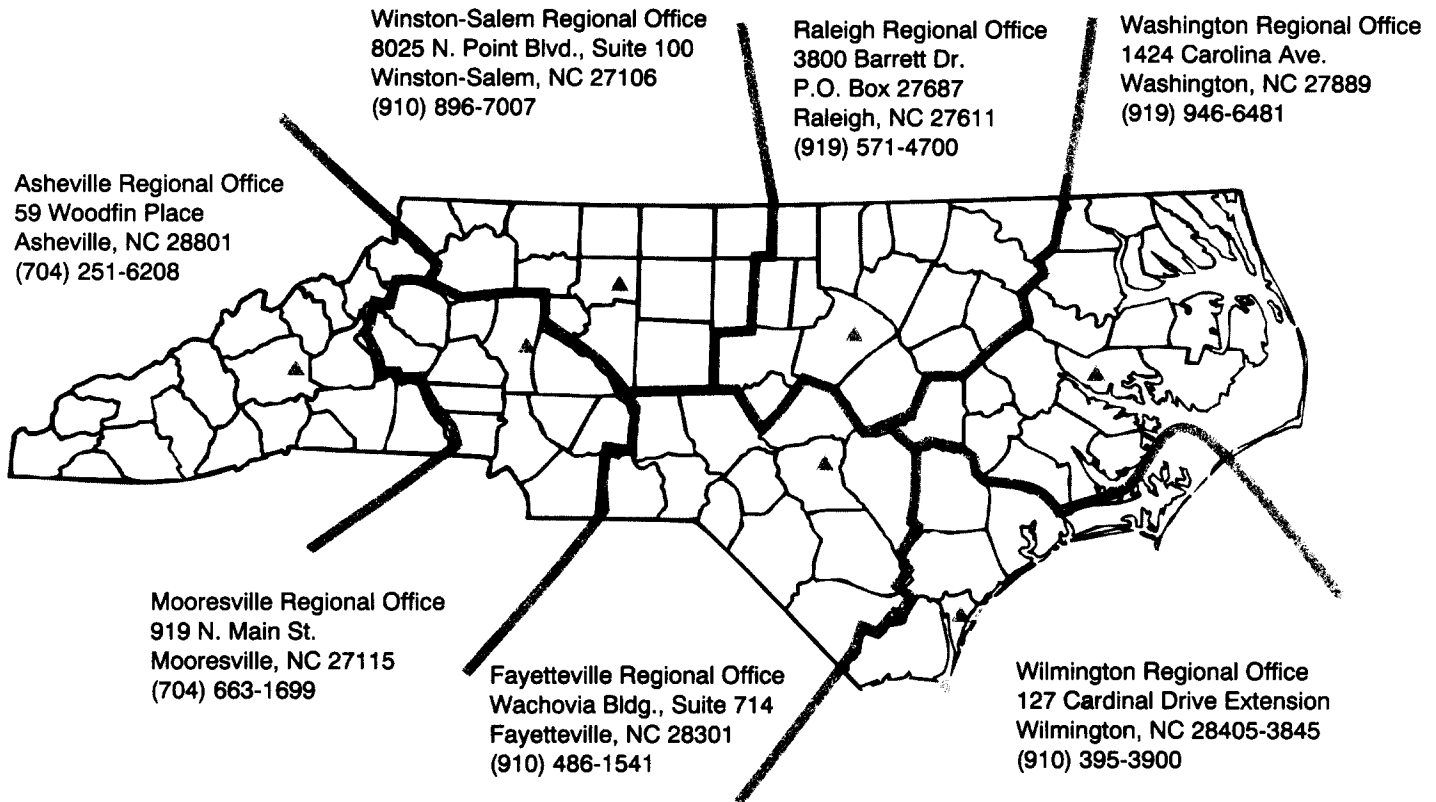
information on controlling erosion and sedimentation pollution at all levels of land-disturbing activity. These include a comprehensive *Erosion and Sediment Control Planning and Design Manual*, a *Field Manual*, and an *Inspectors Guide*.

For more information, contact:

- Land Quality Section  
Department of Environment,  
Health, and Natural Resources  
P.O. Box 27687  
Raleigh, NC 27611  
919 733-4574

For local assistance, contact your regional office of the North Carolina Department of Environment, Health, and Natural Resources. Also check to see if your city or county has an erosion and sediment control program.

## Regional Offices of the Land Quality Section of the Department of Environment, Health, and Natural Resources



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