

## Chapter 5 Erosion and Sediment Control

Sedimentation involves three basic geologic processes: erosion, transportation, and deposition. These are natural geologic phenomena; however, land development activities may initiate severe, highly undesirable and damaging alterations in the natural sedimentation cycle by drastically accelerating the erosion and transportation process. Receiving waters are the final destination for sediment transport and deposition. However, natural streams and lakes are not capable of handling the excessive sediments created by this accelerated cycle. Therefore, excessive sediment loads result in turbid waters and heavy deposition over the substrate. The impact of these events directly affects the propagation of aquatic life which relies on clear substrates and water to feed and reproduce. Sediment laden waters affect human activities through the degradation of waters used for aquatic recreation and sport fishing and complicate water treatment processes. Consequently, minimizing the occurrence of erosion and effective control of sediment transport is imperative to all.

### 5.1 Sedimentation Cycle

Soil erosion is usually caused by the impact force of raindrops and by the sheer stress of runoff flowing in rills and streams. Raindrops falling on bare or sparsely vegetated soil detach soil particles; runoff, in the form of sheet flow along the ground, picks up and carries these particles to surface waters. As the runoff gains velocity and concentration, it detaches more soil particles, cuts deeper rills and gullies into the surface of the soil, and adds to its own sediment load. Coalescing rivulets produce streams which have a larger volume and usually an increased velocity. These increasing streams have a greater capacity to remove sediment and transport it downstream. The further the runoff runs uncontrolled, the greater its erosive force and the greater the resulting damage. As the distance and volume of uncontrolled flow increase, the control becomes increasingly difficult. At some point, the energy in the stream dissipates to level that can no longer support the transport of the sediment. At this time, the sediment falls out of the water column and deposits. Over time the sediment will either be incorporated into the substrate or be re-suspended for further transport.

### 5.2 Factors Influencing Erosion

The erosion potential of a site is principally determined by the soil type, vegetative cover, topography, climate, and season. These factors contribute to the detachment of soil particles and their transport off-site.

- **Soil Type** – Erodibility, the amount of energy needed to break down soil structure, is dependent on soil composition and texture. Soils with high erodibility require less energy to detach soil particles.
- **Vegetative Cover** – Vegetation shields soils from the impact energy of raindrops and traps suspended sediment from runoff.
- **Topography** – Steeper and longer slopes generate runoff with more velocity and energy to erode and transport more sediment.
- **Climate** – Rainfall frequency and intensity cumulatively contribute energy in the form of raindrop impact and runoff volume to detach and transport soil particles.
- **Season** – Seasonal variations in wind, temperature, humidity, and rainfall may create more ideal conditions for erosion.

### 5.3 Concepts of Erosion and Sedimentation Control

Principles of erosion and sedimentation control are based on minimizing the effects of the soil and climatologic factors just discussed. None of the following concepts provide a singular solution for controlling

those factors, nor can they all be performed at every site. However, the integration of as many concepts as possible provides the most effective erosion and sedimentation control:

- A. Compatible Site Planning
  - Minimize development within sensitive areas (e.g. highly erosive soils).
  - Limit the length and steepness of the designed slopes.
  - Maintain natural vegetative cover when possible.
- B. Disturbed Areas Reduction
  - Minimize the extent of the disturbed area and the duration of exposure.
  - Phase or stage development so that only the areas that are actively being developed are disturbed.
  - Minimize large or critical area grading during the season of maximum erosion potential.
- C. Disturbed Areas Protection
  - Complete grading as quickly as possible.
  - Establish permanent vegetation as soon as possible on disturbed areas.
  - Divert runoff from disturbed areas.
- D. Sediment Retention within Site Boundaries
  - Filter runoff as it flows from a disturbed area.
  - Impound sediment-laden runoff temporarily so that the soil particles are deposited onsite.

The NPDES Phase II storm water regulations enacted by the Clean Water Act of 1972 and promulgated by Stormwater Phase II Final Rule (1999) require that any activity disturbing an acre or greater of land, or a smaller project part of a larger common plan for development or sale, obtain NPDES construction permit coverage. This regulation differs somewhat from the South Carolina state regulations relating to areas of disturbance. Any land disturbing activity in the *<local jurisdiction>* that meets the aforementioned criteria of one acre or more of disturbance will need to will comply with the state process for permitting. Application and issuance of an approved permit under the South Carolina state regulations for erosion and sedimentation control will meet the requirements for coverage under NPDES Phase II as well (DHEC, 2012).

#### 5.4 General Criteria

All construction site activities must adhere the SCDHEC General Permit SC0010000 for Large and Small Site Construction Activities. In addition, the *<local jurisdiction>* will require as a minimum, implementation of the following Construction Site BMPs:

##### **Single Family Development, not part of a larger common plan of development:**

1. Silt Fencing buried a minimum of 6 inches below disturbed grade, where applicable;
2. In areas where more than two feet of fill material has been placed or in areas adjacent to all wetlands, silt fencing meeting the requirements of SCDOT must be used;
3. Temporary gravel driveways a minimum of 15 feet by 10 feet, where applicable; and
4. Sediment barriers surrounding all catch basins or drop inlets on site and sediment socks on all catch basins or drop inlets adjoining to the site.

##### **Single Family and Multi-Family Development, part of a larger common plan of development, and Non-residential Development:**

1. Silt Fencing buried a minimum of 6 inches below disturbed grade;

2. Temporary gravel driveways a minimum of 15 feet by 10 feet;
3. Sediment barriers surrounding all catch basins or drop inlets on site and sediment socks on all catch basins or drop inlets adjoining to the site;
4. Flow dissipation devices, such as check dams, in all swales and ditches;
5. Temporary seeding shall be placed within 7 days of the end of a land disturbance activity;
6. Floating pump suction for all temporary or permanent ponds or pumping of excavations;
7. Discharge velocities shall be reduced to provide non-erosive flows from dewatering for all temporary or permanent ponds or pumping of excavations;
8. Continuous nephelometric turbidity (NTU) monitoring during qualifying events on all receiving water(s) and stormwater outfall discharge(s);
9. No more than 25 nephelometric turbidity units (NTU) difference between upstream and downstream monitoring sites for surface water(s) receiving stormwater discharge(s). Stormwater discharge(s) not directly received by a surface water shall have a value of no more than 25 NTUs;
10. Site inspections must be performed by a CEPSCI individual. Copies of inspection reports shall be provided to the <local jurisdiction> within 7 days of inspection;
11. Temporary stockpile areas and appropriate BMPs to be identified on plans; and
12. Two rows of silt fence are required between land disturbing activities and adjacent wetlands.

## 5.5 References

South Carolina Department of Health and Environmental Control (DHEC). 2012. NPDES General Permit for Stormwater Discharges from Construction Activities SCR100000.

<https://www.scdhec.gov/sites/default/files/docs/Environment/docs/CGP-permit.pdf>

## Chapter 6 Enforcement and Violations

[Section Reserved for <local jurisdiction> requirements]

DRAFT