

NC STATE UNIVERSITY

Sediment and Erosion Control Guidelines & Technical Specifications



Stormwater Management

Environmental Health and Public Safety Center

North Carolina State University

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SECTION I INTRODUCTION

During the construction process, soil is highly vulnerable to erosion by wind and water. Eroded soil endangers water resources by reducing water quality and causing the siltation of aquatic habitat for fish and other desirable species. Eroded soil also necessitates repair of sewers and ditches and the dredging of lakes and ponds. In addition, clearing and grading activities during construction causes the loss of native vegetation necessary for terrestrial and aquatic habitat.

As a result, the purpose of these guidelines is to safeguard persons, protect property, and prevent damage to the environment at North Carolina State University. These requirements will also promote the public welfare by guiding, regulating, and controlling the design, construction, use, and maintenance of any development activity that disturbs or breaks the topsoil or results in the movement of earth on land on any North Carolina State University (NC State) campus.

Each project is responsible for obtaining all other applicable permits and approvals and providing adequate documentation, as necessary to NC State Stormwater Management for verification prior to beginning any construction activity.

The following Sediment and Erosion Control specifications apply to all projects for or located on NC State University that involve any type of land disturbing activities. These specifications modify and upgrade normal measures found in typical SEC Plans reviewed and approved by the North Carolina Department of Land Quality, and are generally more stringent than measures outlined in the “NC Erosion and Sediment Control Planning and Design Manual” and the “NC Erosion and Sediment Control Field Manual.”

SECTION II DEFINITIONS AND ACRONYMS

BMPs	Best Management Practices. Stormwater BMPs are designed to remove pollutants from urban runoff, improve water quality, and control quantity before the water reaches our streams and drinking water supply reservoirs.
Contractor	The person responsible for ensuring the proper installation and regular maintenance of sediment and erosion control measures and devices.
Clearing	Any activity that removes the vegetative surface cover.
De minimus Determination	Development projects with a total disturbed area of less than 0.10 acre (approximately 4,500 square feet) of land.
Development	Any activity that disturbs greater than 0.10 acre of land in order to establish, expand or modify a multifamily residential development, commercial, industrial or institutional facility.
DLR	Division of Land Resources
Drainage Way	Any channel that conveys surface runoff throughout the site.
Erosion Control	A measure that prevents erosion.
Grading	Excavation or fill of material, including the resulting conditions thereof.
LQS	Land Quality Section
NC DENR	North Carolina Department of Environment and Natural Resources
NCSU	North Carolina State University
Non-Structural BMPs	Non-structural BMPs may include such practices as minimizing impervious area for site development, providing vegetative buffers along all streams and waterways, promoting natural infiltration of runoff before it enters a receiving stream, pollution prevention practices such as regular sweeping of parking lots, and public environmental outreach programs.
Perimeter Control	A barrier that prevents sediment from leaving a site by filtering sediment-laden runoff or diverting it to a sediment trap or basin.
Phasing	Clearing a parcel of land in distinct phases, with the stabilization of each phase completed before the clearing of the next.
SEC	Sediment and Erosion Control

Sediment and Erosion Control Plan	A set of plans prepared by or under the direction of a licensed professional engineer indicating the specific measures and sequencing to be used to control sediment and erosion on a development site during and after construction.
Sediment Control	Measures that prevent eroded sediment from leaving the site.
Site	A parcel of land or contiguous combination thereof, where grading work is performed as a single unified operation.
Stabilization	The use of practices that prevent exposed soil from eroding.
Start of Construction	The first land-disturbing activity associated with a development, including land preparation such as clearing, grading, and filling; installation of streets and walkways; and excavations for footings or foundations.
Structural BMPs	Structural BMPs are permanent devices, which are designed, constructed, and maintained to remove pollutants from runoff.
Superintendent In-Charge	The person responsible for ensuring the proper installation and regular maintenance of sediment and erosion control measures and devices.
Watercourse	Any body of water, including, but not limited to lakes, ponds, rivers, streams, and bodies of water delineated by a Federal, State or University agent.
Waterway	A channel that directs surface runoff to a watercourse or to the public storm sewer system.

The following documents are referenced herein.

1. *North Carolina Sedimentation Pollution Control Act of 1973*

The superintendent in-charge or contractor is responsible for complying with all applicable provisions of the North Carolina Sedimentation Pollution Control Act of 1973.

2. *Provision of NC General Permit NC 010000*

The requirements of NC General Permit NC 010000 (NCG01) for Erosion and Sediment Control are a material part of these specifications.

3. *North Carolina Erosion and Sediment Control Planning and Design Manual*

All work must meet or exceed the standards found in the above-referenced manual.

SECTION IV PERMITS

- A) An approved Sediment and Erosion Control Plan must be obtained for any project or activity disturbing 0.10 acre or greater of land.
- B) Projects disturbing **greater than 0.10 acre but less than one (1) acre** are required to submit a SEC Plan to NC State Stormwater Management for review and approval. The SEC Plan for these types of projects must include, at a minimum all applicable components of Section VI and all design requirements found in Section VII of this document.
- C) Projects **one (1) acre or larger** shall follow the requirements outlined in Sections VI and VII of this document.

The Land Quality application plan checklist can be found at the end of this document or at the following website: <http://www.dlr.enr.state.nc.us/pages/sedimentforms.html>.

SECTION V
REVIEWS AND APPROVALS

- A) NC State Stormwater Management shall review and approve all SEC Plans for those projects disturbing **0.10 acre but less than one (1) acre** of land. After review, the Stormwater Program Manager shall provide to the Project Manager one of the following:
1. Plan Approval
 2. Plan Approve subject to such reasonable conditions as maybe necessary to secure substantially the objectives of this document; or
 3. Disapproval of the plan, indicating the reason(s) and procedure for submitting a revised SEC Plan.
- B) For those projects that disturb **greater than one (1) acre** of land, a formal submittal must be made the NC DENR – DLR, Land Quality Section.
- C) Any site modifications made by the superintendent in-charge or contractor that require adjustments to the approved Plan shall be approved by the Designer and the NC State Stormwater Program Manager, and shall meet NC DENR design requirements and/or NC State University technical specifications. In some cases, submittal of a revised plan to NC Division of Land Resources or the NC State Stormwater Manager may be required.

SECTION VI

SEDIMENT AND EROSION CONTROL PLANS

A Sediment and Erosion Control Plan must include the following:

- A) A narrative, which includes a general overview of the project and the name(s) and contact information of the superintendent in-charge, contractor, any consulting firm(s) retained and the NC State project manager.
- B) A natural resources map identifying soils, forest cover, and resources protected under other sections of this document.
- C) A sequence of construction of the development site, including stripping and clearing; rough grading; construction of utilities, infrastructure, and buildings; and final grading and landscaping. Sequencing shall identify the expected date on which clearing will begin, the estimated duration of exposure of cleared areas, areas of clearing, installation of temporary sediment and erosion control measures, and establishment of permanent vegetation.
- D) A statement that any land clearing, construction, or development involving the movement of earth shall be in accordance with the approved SEC Plan and that the superintendent in-charge or contractor shall be on site on all days when construction or grading activity takes place.
- E) All sediment and erosion control measures necessary to meet the objectives of this document throughout all phases of construction and after completion of development of the site.
- F) Techniques designed to prevent the blowing of dust or sediment from the site.
- G) Seeding mixtures and rates, types of sod, method of seedbed preparation, expected seeding dates, type and rate of lime and fertilizer application, and kind and quality of mulching for both temporary and permanent vegetative control measures.
- H) All design requirements in Section VII of this document.
- I) All items listed on the NC DENR Land Quality Section Erosion and Sedimentation Control Plan Application Checklist must be incorporated, when applicable into the SEC Plan.

SECTION VII DESIGN REQUIREMENTS

- A) Grading, erosion control practices, sediment control practices, and waterway crossings shall meet the design criteria set forth in the most recent version of the *NC DENR Erosion and Sediment Control Planning and Design Manual* or similar manual from the State of Maryland and the NC State University Technical Specifications.

Additional information can be found at the following website:

<http://www.dlr.enr.state.nc.us/pages/sedimentation.html>.

- B) Installation and maintenance of a properly designed construction entrance.

Minimum requirements:

- Material: Geotextile fabric to stabilize foundation. Washed railroad ballast or surge stone only. It is not acceptable to use #5 or #57 stone.
- Thickness: 6 inches minimum
- Width: 12 feet minimum or full width of exit roadway, whichever is greater.
- Length: 50 feet minimum

NOTE: If slope toward road exceeds 2%, a diversion ridge must be constructed 6 to 8 inches high with 3:1 side slopes, approximately 15 feet from entrance.

- C) Proper installation and maintenance of silt fencing in areas subject to erosion.

NOTE: Use of reinforced standard strength filter fabric with wire fence and metal posts is required. The bottom of the silt fencing must be buried at least 8 inches deep.

- D) Proper installation and maintenance of protection at all affected inlets.

NOTE: Measures must be in place to keep both sediment and protection materials out of the inlet. Sediment must be removed from protection devices following a storm. Existing inlets down-gradient from the site may require protection.

- E) Stockpiles should be seeded, mulched, and tacked. Silt fence should be installed around the bottom of the stockpile.

NOTE: The silt fence should be several feet from the toe of stockpile.

- F) Temporary seeding, mulch and a tacking substance must be applied to exposed slopes and other denuded areas within 15 working days or 30 calendar days (whichever is shorter) after any completed phase of grading.

- G) Permanent seeding, mulch and a tacking substance must be applied within 15 working days or 90 calendar days (whichever is shorter) after completion of construction.

NOTE: Sediment and Erosion Control measures must be maintained until permanent groundcover is well established.

- H) Any area used as a staging or lay-down area must be devoid of all gravel, rip rap and debris prior to final seeding. The topsoil should be loosened, re-graded, and if necessary amendments added, before applying seed and mulch.

- I) Installation and maintenance of additional measures as directed by NC State Stormwater Management necessary to ensure adequate erosion and sediment control.
- J) All erosion and sedimentation control devices and stormwater discharge outfalls must be inspected at least once (twice, if on 303(d) listed stream for construction related parameters) per seven calendar days **and** within 24 hours of a rainfall of 0.5 inches per 24 hours. Superintendent-In charge must keep a record of inspections (see Section IX Forms for report log form).
- K) Clearing and grading of natural resources, such as forests, riparian buffers and wetlands, shall not be permitted except when in compliance with all other approved and verified permits.
- L) Clearing, except that necessary to establish sediment and erosion control devices, shall not begin until all temporary sediment and erosion control devices and measures have been stabilized.

SECTION VIII RESPONSIBILITIES

Superintendent In-charge or Contractor

The superintendent in-charge or contractor is responsible for each of the following:

- A) Properly installing all sediment and erosion control measures and devices in accordance with the approved plan.
- B) Properly maintaining all sediment and erosion control measures and devices and implementing corrective actions as necessary.
- C) Conduct inspections of all sediment and erosion control measures and devices and stormwater discharge outfalls. The inspect shall occur at least once per seven calendar days and within 24 hours of a rainfall of 0.5 inches per 24 hours.
- D) Completing the Stormwater Inspection Form on a weekly basis. A copy of the Inspection Form can be found in Section XI of this document.
- E) Corrective actions shall be executed within **24 hours** from the time of notification. A written summary of all corrective actions should be submitted to NC State Stormwater Management within 2 days.
- F) If, after 24 hours from written or verbal notice, the contractor has not remedies any SEC deficiencies note by the Designer or the Owner, the Owner maintains the right to immediately contract with a third party contractor to correct the deficiencies.
- G) Records of inspections, maintenance and corrective actions shall be kept on file in the construction site trailer for the duration of the project.
- H) Removing all temporary sediment and erosion control measures and devices, as well as any other retained debris and properly dispose of the materials off-site once the site has been accepted as complete by the Stormwater Program Manager.
- I) Restoring to the original condition or replacing with adequate groundcover existing impervious surfaces that were damaged during construction.

University Project Manager

The University Project Manager (PM) is responsible for each of the following:

- A) Ensuring that the superintendent in-charge or contractor is consistently implementing the requirements and conditions of the approved SEC Plan and other permits applicable to the project.
- B) Providing written responses to the Stormwater Program Manager addressing corrective actions required in the Monthly Site Evaluation Report.
- C) Maintaining all permits, approvals and accompanying documentation on file for a minimum of three (3) years.

Stormwater Program Manager

NC State Stormwater Management is responsible for each of the following:

- A) Conduct inspections on a monthly basis. A Site Evaluation Report will be generated and distributed via e-mail to the NC State project manager, the Director of Construction Management and NC DENR. The reports shall contain detailed information based on the visual inspection of the site and all required documentation.
- B) Conduct a final inspection of the site to determine if all sediment and erosion control and stormwater-related issues have been adequately addressed, fully implemented and completed. Written notification will be provided to the PM regarding the status of the project.
- C) Request “close out” from NC DENR Division of Land Resources, Land Quality Section.
- D) Attend Pre-Bid meetings and/or Pre-construction meetings to answer questions and provide informational materials that describe the University environmental program.
- E) Provide guidance during the preparation of environmental permits, notices or other documents.
- F) Provide technical expertise for the evaluation or resolution of environmental issues.

**SECTION IX
SEPARABILITY**

The provision of this document shall be deemed to be separate, and the invalidity of any portion of this document shall not affect the validity of the remainder.

1. North Carolina Department of Environment and Natural Resources, Land Quality Section
Sediment and Erosion Control Plan Application Checklist
2. Stormwater Inspections for General Permit NCG 010000 – Land Disturbing Activities

**NORTH CAROLINA DEPARTMENT OF ENVIRONMENT & NATURAL RESOURCES
LAND QUALITY SECTION**

EROSION & SEDIMENTATION CONTROL PLAN APPLICATION CHECKLIST

The following items shall be incorporated with respect to specific site conditions, in an erosion & sediment control plan:

LOCATION INFORMATION

- _____ Project location (roads, streets, landmarks)
- _____ North arrow and scale

GENERAL SITE FEATURES (Plan elements)

- _____ Legend: North arrow, scale, etc.
- _____ Property lines
- _____ Existing contours (topographic lines)
- _____ Proposed contours
- _____ Limits of disturbed area (provide acreage total, delineate limits, and label)
- _____ Planned and existing building locations and elevations
- _____ Planned & existing road locations & elevations
- _____ Lot and/or building numbers
- _____ Geologic features: rock outcrops, seeps, springs, wetland and their limits, streams, lakes, ponds, dams, etc.
- _____ Easements and drainageways
- _____ Profiles of streets, utilities, ditchlines, etc.
- _____ Stockpiled topsoil or subsoil locations
- _____ If the same person conducts the land-disturbing activity & any related borrow or waste activity, the related borrow or waste activity shall constitute part of the land-disturbing activity unless the borrow or waste activity is regulated under the Mining Act of 1971, or is a landfill regulated by the Division of Solid Waste Management. If the land-disturbing activity and any related borrow or waste activity are not conducted by the same person, they shall be considered separate land-disturbing activities and must be permitted either thru the Sedimentation Pollution Control Act as a **one-use borrow site** or through the Mining Act.
- _____ Stream disturbance over 150 linear feet may require 401 Water Quality certification via the Division of Water Quality

EROSION CONTROL MEASURES (on plan)

- _____ Legend
- _____ Location of temporary measures
- _____ Location of permanent measures
- _____ Construction drawings and details for temporary and permanent measures
- _____ Maintenance requirements of measures
- _____ Contact person responsible for maintenance

SITE DRAINAGE FEATURES

- _____ Existing and planned drainage patterns (include off-site areas that drain through project)
- _____ Method of determination of and calculations for Acreage of land being disturbed
- _____ Size and location of culverts and sewers
- _____ Soil information: type, special characteristics
- _____ Soil information below culvert storm outlets
- _____ Name and classification of receiving water course or name of municipal operator (only where stormwater discharges are to occur)

STORMWATER CALCULATIONS

- _____ Pre-construction runoff calculations for each outlet from the site (at peak discharge points)
- _____ Design calculations for peak discharges of runoff (including the construction phase & the final runoff coefficients of the site)
- _____ Design calcs of culverts and storm sewers
- _____ Discharge and velocity calculations for open channel and ditch flows (easement & right-of-ways)
- _____ Design calcs of cross sections and method of stabilization of existing and planned channels (include temporary linings)
- _____ Design calcs and construction details of energy dissipators below culvert and storm sewer outlets (diameters & apron dimensions)
- _____ Design calcs and dimension of sediment basins
- _____ Surface area and settling efficiency information for proposed sediment traps and/or basins

VEGETATIVE STABILIZATION

- _____ Area & acreage to be vegetatively stabilized
- _____ Method of soil preparation
- _____ Seed type & rates (temporary & permanent)
- _____ Fertilizer type and rates
- _____ Mulch type and rates

NOTE: Plan should include provisions for groundcover on exposed slopes within 15 working days or 30 calendar days (whichever is shorter), following completion of any phase of grading; permanent groundcover for all disturbed areas within 15 working days or 90 calendar days (whichever is shorter) following completion of construction or development.

FINANCIAL RESPONSIBILITY/OWNERSHIP FORM

- _____ Completed, signed & notarized FR/O Form
- _____ Accurate application fee (\$50.00 per acre rounded up the next acre with no ceiling amount)
- _____ Certificate of assumed name, if the owner is a partnership
- _____ Name of Registered Agent (if applicable)
- _____ Copy of the most current Deed for the site

NOTE: For the Express Permitting Option, inquire at the local Regional Office for availability.

NARRATIVE AND CONSTRUCTION SEQUENCE

- _____ Narrative describing the nature & purpose of the construction activity
- _____ Construction sequence related to erosion and sediment control (including installation of critical measures prior to the initiation of the land-disturbing activity & removal of measures after areas they serve are permanently stabilized)
- _____ Bid specifications related only to erosion control

STORMWATER INSPECTIONS FOR GENERAL PERMIT NCG010000 – LAND DISTURBING ACTIVITIES

PROJECT: _____ MONITORING FOR THE WEEK BEGINNING: _____

All erosion and sedimentation control facilities and stormwater discharge outfalls must be inspected at least once (twice, if on 303(d) listed stream for construction related parameters*) per seven calendar days and within 24 hours of a rainfall of 0.5 inches per 24 hours. Permittee must keep a record of inspections.

RAINFALL: Gauge must be maintained on site

Date Of Rain	Amount (inches)	Name

By this signature, I certify (in accordance with Part II Section B, 10 of the NCG010000 permit) that this report is accurate and complete to the best of my knowledge:

(Signature of Permittee or Designee)

EROSION AND SEDIMENTATION CONTROL FACILITIES INSPECTED: Identification of all facilities may require additional pages.

Facility Identification (all measures)	Date of inspection	Time of inspection	Name of inspector	Operating Properly (Y/N)	Describe corrective actions taken (may need to attach additional information)

E. OBSERVATIONS OF RUNOFF AT STORMWATER DISCHARGE OUTFALLS: Take immediate corrective action to control the discharge of sediments outside the **F. disturbed limits of the site.** May require additional pages.

Stormwater E. Disc harg e Outfall Identification	Date of inspection	Time of inspection	Name of inspector	Clarity (1-10)	Floating solids (1-10)	Suspended Solids (1-10)	Oil sheen (Y/N)	Other obvious indicators of stormwater pollution (list & describe)	Visible sediment leaving the site? (Y/N)	If yes, describe actions taken to prevent future releases (may need to attach additional information)	Describe measures taken to clean up sediment outside of the disturbed limits (may need to attach additional information)

Clarity: Choose the number which best describes the clarity of the discharge where 1 is clear and 10 is very cloudy
 Floating Solids: Choose the number which best describes the amount of floating solids in the discharge where 1 is no solids and 10 the surface is covered in floating solids
 Suspended Solids: Choose the number which best describes the amount of suspended solids in the discharge where 1 is no solids and 10 is extremely muddy

Has all land disturbing construction been completed? _____ (Y/N) Has the final permanent ground cover been completed & established? _____ (Y/N)

* 303(d) listed streams for construction related parameters – The latest approved list may be obtained from the Division of Water Quality, or from the following website location:
<http://h2o.enr.state.nc.us/su/construction303d>