SECTION 4000
SOIL EROSION, SEDIMENTATION CONTROL AND STABILIZATION

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4010 SCHEDULING

Temporary and permanent erosion control measures shall be provided for all land disturbing work in accordance with an erosion control plan approved by Cary. A grading permit shall be obtained from Cary prior to beginning site work. Temporary measures shall be installed and inspected by Cary for compliance prior to any land disturbing activity. All permanent erosion control measures shall be incorporated into the work at the earliest practical time. All temporary measures shall be maintained until the permanent measures have taken effect or approved by the Stormwater Field Services Technician. Temporary and permanent measures shall be coordinated to provide effective and continuous erosion control throughout the construction and post-construction period to minimize siltation of streams, lakes, reservoirs, and other impoundments, ground surfaces, and other property. These measures shall remain in effect until Final Approval is given by Cary.

4020 TEMPORARY MEASURES

Temporary Crossings shall be installed in accordance with an approved engineered design. Temporary Bridges are encouraged for higher flow streams. (Detail 4000.11: Sheets 1 of 3, 2 of 3, or 3 of 3)

Silt Fence shall be installed in accordance with the details at the toe of all fill slopes and any other necessary locations as directed by Cary. (Detail 4000.01)

Diversion Ditches shall be installed in accordance with the details at the top of cut and fill slopes and any other necessary locations as directed by Cary. (Detail 4000.09)

Construction Entrances shall be installed at all points of access to construction sites in accordance with the details. Any access point which does not have a construction entrance shall be barricaded to prevent its use. (Detail 4000.07 or 4000.08)

Sediment Skimmer or Filter Basins shall be installed in accordance with the details at all points where accumulated runoff is released to natural drainage channels, and any other necessary locations as directed by Cary. All sediment basins shall be sized according to NC Erosion and Sediment Control Planning and Design Manual, which includes a surface area calculation. (Detail 4000.02, 4000.03, 4000.04 or 4000.05)

Temporary Seeding is the use of rapid growing annual grasses, small grains or legumes to provide initial, temporary cover for erosion control on disturbed areas

for less than 12 months. Seed bed preparations and soil amendments shall be in accordance with the method described under "Seeding and Mulching".

Seeding and Mulching shall be done immediately following land disturbing activities. All disturbed areas shall be dressed to a depth of 8 inches. The top 3 inches shall be pulverized to provide a uniform seedbed. Agricultural lime shall be applied at the rate of 95 lb/1000 sq. ft. immediately before seed bed preparation. Grass seed shall be applied at the rates outlined in Tables 4100 and 4200. In areas where maintenance will eventually be assumed by Cary under heavy vehicular traffic situations (i.e., right of ways, medians) consultation shall be made with the Stormwater Field Services Technician as to the requirements and use of alternate lawn-type grass.

TABLE 4100

SHOULDERS, SIDE DITCHES, SLOPES (For Slopes Between 2:1 and 3:1)

Date	Type	Planting Rate
Mar 1 - Apr 15	Tall Fescue or	120 lbs./acre
Mar 1 - June 30	Add German or Browntop Millet or	10 lbs./acre
Mar 1 - June 30	Add Hulled Common Bermudagrass	25 lbs./acre
June 1 - Sept 1	***Tall Fescue and ***Browntop Millet	120 lbs./acre 35 lbs./acre
Sept 1 - Mar 1	Tall Fescue	120 lbs./acre
Nov 1 - Mar 1	Add Rye Grain	25 lbs./acre

TABLE 4200

SHOULDERS, SIDE DITCHES, SLOPES (For Slopes 3:1 and Flatter)

Date	Type	Planting Rate
Aug 15 - Nov 1	Tall Fescue	300 lbs./acre
Nov 1 - Mar 1	Tall Fescue and Abruzzi Rye	300 lbs./acre
Mar 1 - Apr 15	Tall Fescue	300 lbs./acre
Apr 15 - June 30	Hulled Common Bermudagrass	25 lbs./acre
July 15 - Aug 15	Tall Fescue and ***Browntop Millet	35 lbs./acre

Notes:
Consult Stormwater Operations Manager or Natural Resources Conservation Service (NRCS) for additional information concerning other alternatives for vegetation of denuded areas. The above vegetation rates are those which do well under local conditions; other seeding rate combinations may be possible but must be approved by the Stormwater Operations Manager.

***Temporary - Reseed according to optimum season for desired permanent vegetation. Do not allow temporary cover to grow over 6 inches in height before mowing to keep fescue from being shaded out.

On projects that will be maintained by Cary, verification of soil amendments and seeding rates may be required, and changes to these rates may be requested by Cary during the plan review process. Reuse of topsoil and/or other measures to assure final soil conditions are conducive to rapid establishment of vegetation cover is required.

10-10-10 (Fall) / 5-10-10 (Spring) fertilizer shall be applied to all disturbed areas at a rate of 2 tons/acre and mulching shall consist of small grain straw applied at a rate of 1-2 tons/acre. Mulched areas shall be tacked either with asphalt at a rate of 435 gallons per acre, or other approved method sufficient to hold the straw in place.

If active construction ceases, meaning no substantial or significant progress is made in any area for more than 14 days, all disturbed areas must be seeded, mulched, and tacked unless written approval is granted by the Stormwater Field Services Technician. Incidental grading shall not constitute substantial or significant progress in construction activity.

4030 PERMANENT MEASURES

Permanent Ground Cover is the establishment of perennial vegetation cover for periods longer than 12 months. All disturbed areas shall receive a permanent ground cover. Permanent seeding and temporary seeding differ only in the type of seed to be used (i.e., annual versus perennial). Seed bed preparations and soil amendments shall be in accordance with Section 4020 "Seeding and Mulching". As a part of permanent seeding, maintenance may be required to maintain vegetation for 12 months (including mowing and watering). This maintenance shall be considered a part of establishing permanent ground cover. In areas where maintenance will eventually be assumed by Cary under heavy vehicular traffic situations (i.e., right of ways, medians) consultation shall be made with the Stormwater Field Services Technician as to the requirements of acceptable soil conditions and use of alternate lawn-type grass or ornamental landscaping.

Riprap Dissipation Pads and Riprap Protection

All stormwater release points shall be protected by riprap dissipation pads designed to reduce discharge velocities to non-erosive levels. Dissipation pads shall be designed and constructed with an engineering fabric barrier between the pad and the natural ground. Calculations shall be furnished to indicate the sufficiency of the dissipation pads specified. Riprap pad design shall be in accordance with NYDOT or NRCS methods. Filter fabric shall be used on all sediment basins, riprap dissipaters, and channels. (Detail 4000.20, 4000.21)

Stabilization Under Bridges and Boardwalks

Permanent stabilization including matting, riprap or other approved measures shall be designed and installed to control erosion and sediment loss beneath the footprint of the entire span for all bridges and boardwalks.

4040 COMPUTATIONS

Erosion and Sediment Control

All computations and assumptions used to formulate an erosion control plan shall be reviewed by Cary. Erosion and sedimentation control measures, structures, and devices shall be planned, designed, and constructed to control the calculated peak runoff from a 10-year frequency storm. Runoff rates shall be calculated using the USDA Soil Conservation Service Method, the Rational Method, or other acceptable calculation procedures. Runoff computations shall be based on rainfall data published by the National Weather Service for this area.

Bridge and Boardwalk Scour Analysis

All pier footings shall be designed by a licensed NC Professional Engineer and the assumptions provided in the footing design shall be included on the plans. At a minimum, the footing design shall include: 1) the allowable soil bearing capacity, 2) design concrete compressive strength, 3) plan for reinforcing steel with sizing and location of bars, 4) force diagram including buoyant forces, stream velocity impacts 5) depth of installation to prevent frost heaving, and 6) bedding design to prevent differential settlement and subbase scour. At locations inundated by the 100-year design storm shall include foundation anchor design.

4050 CONSTRUCTION SEQUENCE

A detailed and site-specific construction sequence shall be provided for all stages of construction. At a minimum, the construction sequence on projects shall be as follows:

1. Request preconstruction meeting.
2. Obtain grading permit.
3. Install all erosion and sediment control measures per the plans. Disturb only as necessary to install the measures.
4. Obtain certificate of compliance through on-site inspection by Stormwater Field Services Technician.
5. Proceed with land disturbing activities.
6. Clean sediment basins when one-half full.
7. Seed and mulch denuded area within 14 calendar days after any phase of grading.
8. Maintain soil erosion control measures until permanent ground cover is established.

9. Temporary erosion and sediment control devices shall be converted to the permanent Stormwater Control Measures (SCM) with approval from the Stormwater Field Services Technician.
10. Remove any remaining temporary soil erosion and sediment control measures and stabilize these areas.
11. Request final approval to close the grading permit from the Stormwater Field Services Technician.

END OF SECTION 4000