



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

July 31, 2009

MEMORANDUM TO: Division Engineers

FROM: Jon Nance, PE
Chief Engineer – Operations

SUBJECT: Enhanced Sediment Settling required by the Department
of Environment and Natural Resources (DENR)

In recent years, DENR's Sedimentation Control Commission (SCC) has directed NCDOT to integrate larger and more efficient erosion and sediment control practices on its non-TIP activities such as secondary road construction projects. As you are aware, this is problematic for secondary road construction projects due to topographical constraints, right of way limitations, and cost issues. As a result, NCDOT asked the SCC to authorize NCDOT's use of RUSLE2 (Revised Universal Soil Loss Equation, version 2) to model sediment storage requirements for our secondary road construction program and projects of similar scope. Its use is helpful because RUSLE2 predicts site specific storage volumes and minimizes the requirement to obtain easements for large sediment basins derived from statewide regulatory design criteria. However, RUSLE2 does not achieve the regulatory design criteria for basin surface area that aids in sediment settling efficiency. Therefore in the SCC's November 2008 report to the Department, the Commission directed that "enhanced sediment settling with flocculants should be integrated with traditional practices when adequate surface area cannot be provided for measures; this should be implemented immediately on all maintenance projects as well as contract construction."

From a pro-active standpoint, the Department had already begun using flocculants and fiber check dams on all trout and high quality water projects for our secondary road construction program beginning in early 2008. We also integrated flocculants on our TIP projects with similar water quality classifications during the same time period. Research efforts and cost analysis indicate that use of flocculants and fiber check dams reduces turbidity considerably and may be more economical than traditional basin and rock device practices for secondary road applications.

Please begin use of flocculants on projects unless your right of way allows installation of basins meeting surface area requirements. Implement on applicable projects that will initiate construction beginning September 2009 forward. Your division design staff will be able to identify those projects requiring the use of flocculants.

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The recommended flocculant, APS 705, is a granular polyacrylamide (PAM) approved for use by the Division of Water Quality.

<http://h2o.enr.state.nc.us/ws/documents/MicrosoftWord-Polyacrylamide.pdf>

PAM can be applied on fiber check dams or wrapped rock dams. The following guides provide information on rates of application and proper installation of these enhanced BMPs:

Fiber Check Dam:

<http://www.ncdot.gov/doh/operations/dp%5Fchief%5Feng/roadside/fieldops/downloads/Files/WattleInstallationGuide.pdf>

Materials:

<http://www.ncdot.gov/doh/operations/dp%5Fchief%5Feng/roadside/fieldops/downloads/Files/MaterialsNeededforWattle.pdf>

Wrapped Rock Dam:

<http://www.ncdot.org/doh/operations/dp%5Fchief%5Feng/roadside/fieldops/downloads/Files/RockWrappedInstallationGuide.pdf>

Materials:

<http://www.ncdot.org/doh/operations/dp%5Fchief%5Feng/roadside/fieldops/downloads/Files/MaterialsNeededforRockWrappedInstallation.pdf>

Your Roadside Environmental Field Ops Engineer can provide information on product availability and guidance on installation methods to meet the enhanced sediment settling requirements. Please ensure your operations are in compliance with this directive.

Attachments

CC: Terry Gibson, PE; Ellis Powell, PE; Lacy Love, PE; Don G. Lee, CPESC

***Review of
Erosion and Sedimentation Program
Delegation to the North Carolina Department
of Transportation, Division of Highways***

November 20, 2008

Performed by:

***T. Gray Hauser, Jr., P.E.
State Sedimentation Specialist***

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***NCDENR
North Carolina Department of Environment
and Natural Resources
Division of Land Resources
Land Quality Section***

The Land Quality Section reviewed the program delegation to the Department of

condition if inspected 2 days earlier. As noted earlier, the projects in the western portion of the state received 4 to 6 inches of rain during the review. Measures on NC DOT maintenance projects normally are not sized to handle the 10-year design storm due to right-of-way constraints, and the measures observed during the review were overwhelmed by water and sediment from the aggregate base course.

The failure of the skimmer sediment basins on the US 421 rest area project is a concern. It appeared they failed along the barrel pipe of the skimmer, possibly due to poor embankment compaction. The basins were long and narrow, without a wide cross-section or large surface area.

Cut slopes or road banks on the backside of ditches were poorly stabilized on some maintenance projects in both the east and the west. NC DOT reseeds these projects repeatedly until ground cover is established. REU inspects these projects for 2-3 growing seasons. It appears that an adequate seedbed is achieved in the mountains after several freeze-thaw cycles loosen the soil. Leaving slopes at a reasonable angle and making an effort at initial seedbed preparation would appear to be a more efficient course. There remains a gap in the responsibilities and capabilities of the grading crews and the landscape crews to prepare a seedbed on cut banks. (While seedbed preparation is normally the responsibility of the landscape crew, they do not have the equipment to scarify the cut banks.)

The different standards for environmental review of secondary road projects between NC DENR and NC DOT were discussed in the February 2008 review. Land Quality and REU staff have identified projects in sensitive watersheds and plan to look at the impacts of completed projects in sensitive watersheds in the coming year and report back to the Commission.

RECOMMENDATIONS

1. Enhanced sediment settling with flocculants should be integrated with traditional practices when adequate surface area cannot be provided for measures. This should be implemented immediately on all maintenance projects as well as contract construction.
2. County maintenance forces and landscaping crews need to coordinate which unit will prepare steep back slopes or cut banks for seeding.
3. Failures of skimmer sediment basins should be evaluated to determine if construction or design flaws can be identified and eliminated.
4. Sediment controls should be kept in place until ground cover sufficient to restrain erosion is established rather than being removed for the convenience of the seeding contractor. (Silt fence had been removed on the Long Shoals Road project despite the forecast of heavy rain.)
5. The Land Quality Section and NC DOT need to continue to evaluate the need for environmental review of projects in High Quality Waters and Trout Waters, and be consistent in their level of environmental protection.