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

February 15, 2007

Performed by:

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The Land Quality Section reviewed the program delegation to the Department of Transportation, Division of Highways (DOT) on September 13-15, 2006. This sixteenth annual review followed the same format as in previous years. The review and the results reported here are in accordance with requirements of the Sedimentation Control Commission (SCC) delegation to the DOT.

PROJECT REVIEWS

Eight contract construction projects and eight maintenance/force account projects were chosen as randomly as possible. As in previous years, the same criteria were used in the selection process. The projects selected were:

CONTRACT PROJECTS

DOT Division	TIP Number	Project Name	County	Project Length(miles)
1	R-2404A	US 17 Windsor Bypass	Bertie	8.7
3	R-2514A	US 17 Jacksonville Bypass	Onslow	6.1
4	B-3639	Cokey Swamp Bridge	Edgecombe	.18
6	R-2563C&D	NC-87	Bladen	9.9
13	I-4401	I-40 Design Build	Buncombe	1.6
14	R-4733	US 74-23 Slide Repair	Jackson	0.48
12	R-2911A	US 70	Iredell	4.6
10	B-4009	US 74 Bridge over Browns Crk.	Anson	0.62

MAINTENANCE/FORCE ACCOUNT PROJECTS

DOT Division	Project Number	Project Name	County
2	6.172063T	SR 1610 Walker Road	Craven
5	5C.092071	SR 2333 Glory Road	Wake
6	6C.043023	SR 2024 Covington Road	Harnett
6	6C.078076	SR 1967 Lee Britt Road	Robeson
13		SR 1139 Mill Spring Road	Polk
12		SR 1447 Henly Road	Lincoln
10		SR 1266 City Lake Drive	Stanly
8		SR 1146 Holly Grove Church Rd.	Richmond

OVERALL REVIEW CRITERIA

The Roadside Environmental Unit (REU) notified project construction management personnel of the review on Monday before the project reviews were conducted the following Wednesday. Each project review consisted of reviewing the erosion control plan for adequacy, inspecting the project for compliance, and examining the project files. LQS regional office personnel participated in the project inspections. Plans were available for review at all sites.

Contract Construction Projects Summary

Project	Plan		Measures		Ground Cover		Overall Effectiveness
Name	adequacy	implementation	installation	maintenance	timeliness	adequacy	
US 17 Windsor	Good	Good	Fair	Good	Good	Good	Good
US 17 Jacksonville	Good	Good	Good	Good	Good	Good	Good
Cokey Swamp Bridge	Good	Good	Good	Good	Good	Good	Good
NC-87	Good	Poor	Fair	Fair	Poor	Fair	Poor
I-40	Good	Fair	Good	Good	Good	Good	Good

US 74-23	Good	Fair	Fair	Fair	Good	Good	Fair
US 70	Good	Fair	Fair	Poor	Poor	Fair	Poor
US 74 Bridge	Good	Good	Good	Good	Good	Fair	Good

US 17 Windsor Bypass ---The plan for the project was adequate and had been revised to reflect field changes. The revisions had been reviewed by the REU. The overall effectiveness of the sedimentation and erosion control measures was good. There were several small areas on the project and in the borrow pit that needed stabilization but overall the groundcover was good. The site was in compliance.

US 17 Jacksonville Bypass ---The plan for the project was adequate. Revisions had been made to the plan and reviewed by the REU. The overall effectiveness of the sedimentation and erosion control measures was good. However, several measures needed maintenance. Groundcover was good. The
site was in compliance.

Cokey Swamp Bridge ---The plan for the project was adequate. Revisions had been made to the plan and reviewed by the REU. The overall effectiveness of the sedimentation and erosion control measures was good. Groundcover was good. The site was in compliance.

NC-87 ---The plan for the project was adequate. Revisions had been made to the plan and reviewed by the REU. The plan had not been implemented and measures were not effective in several places through out the project. Several measures needed maintenance. Groundcover was good but the shoulders had been redisturbed. The site was not in compliance.

I-40—This was a design-build widening project. There was no room to install the sediment basin shown on the plan once the high fill slope was built. Ground cover on slopes was good.

US 74-23—This was a slide repair on a large cut slope that was being laid back for stability. The haul road from the cut slope to the waste area was steep and bare. Runoff ran down a private gravel road and into a stream without adequate sediment control. The site was not in compliance.

US 70—Construction of a new highway included build high fill slopes as approaches to a bridge. Runoff was not being controlled coming down the roadbed. Slope drains were poorly installed and some were not receiving runoff. An overloaded slope drain had failed, resulting in a huge gully in the fill slope. The sediment basin below the slope had been overwhelmed and failed, resulting in off-site sedimentation. The site was not in compliance.

US 74 Bridge—This was a relatively small bridge project. The site was in fairly good shape though silt fence with holes needed to be replaced. The creek banks between the silt fence at the water's edge needed to be matted. The project had been blanketed with straw just before the review. The seeding equipment had left, but fresh straw was still floating in the slow moving creek.

Maintenance Projects Summary

Project	Plan		Measures		Ground Cover		Overall Effectiveness
Name	adequacy	implementation	installation	maintenance	timeliness	adequacy	
SR 1610	Good	Good	Good	Good	Good	Good	Good
SR 2333	Good	Good	Good	Good	Good	Good	Good
SR 2024	Good	Fair	Good	Poor	Good	Fair	Poor
SR 1967	Fair	Fair	Good	Good	Good	Good	Fair
SR 1139	Fair	Good	Good	Good	Good	Good	Good
SR 1447	Good	Good	Good	Good	Good	Good	Good
SR 1266	Good	Fair	Fair	Poor	Good	Good	Fair
SR 1146	Fair	Good	Good	Good	Good	Good	Good

SR 1610 Walker Road---The plan for the project was adequate. There were no field changes. The overall effectiveness of the sedimentation and erosion control measures was good. The site was adequately stabilized. The site was in compliance.

SR 2333 Glory Road---The plan for the project was adequate and had been revised to reflect field changes. The overall effectiveness of the sedimentation and erosion control measures was good. Groundcover was adequate. The site was in compliance.

SR 2024 Covington Road---The plan for the project was adequate and had been revised to reflect field changes. Several measures had not been installed but the measures that were installed were effective. The project had been seeded but not mulched. The site was not in compliance.

SR 1967 Lee Britt Road ---The plan for the project was adequate and had been revised to reflect field changes. Several measures had not been installed at one end of the project. However, an analysis performed by DOT indicated that at this stage of the project the measures were not needed (see attached report). Stabilization was adequate for a majority of the project. The project was not in compliance with the plan but had no offsite sedimentation.

SR 1139 Mill Spring Road—The project had effective measures with no significant problems. The project was in compliance.

SR 1447 Henly Road—The project had an adequate plan. Some measures had been omitted, and the

revisions noted on the plan. The measures were effective. A shortage of materials had resulted in red top grade stakes being used for silt fence posts. The project was in compliance.

SR 1266 City Lake Drive—The most notable feature of the project was a flock of black vultures picking the ribs of a deer carcass in a Type B Silt Basin. The site was not in compliance because one basin had been overloaded, resulting in significant sedimentation to a wetland area. Sediment removal was to be coordinated with the Division of Water Quality.

SR 1146 Holly Grove Church Road—This was a long widening and paving project that had excellent stage seeding. The project had been stabilized as work progressed, so that the first part of the project had permanent ground cover while active grading was still underway on the far end. The project was in compliance.

ADMINISTRATIVE REVIEW

The Roadside Environmental Unit is responsible for the erosion and sedimentation control plans prepared for DOT contract projects. The Hydraulics Unit designs channels and energy dissipation below culverts. The REU also prepares plans for the Bridge Maintenance Unit projects. The REU staff focuses on locating and sizing sediment fence, temporary rock silt checks, temporary silt basins, and temporary rock sediment dams.

DOT Internal Inspection Process

REU Field Operations staff inspects all DOT projects. Each project is evaluated on a scale of 1-10 for installation of measures, maintenance of measures, effectiveness of measures, plan implementation and overall project evaluation. A score of 6 or less results in the issuance of an "Immediate Corrective Action" report (ICA). Land Quality receives a copy of each ICA and follow-up inspections. Where REU staff are readily issuing ICA's , they are an effective tool to achieve compliance without action by Land Quality. Project files contained monthly inspection reports from the REU.

Education Efforts

NC DOT has contracted with N. C. State University to train and certify contractors and staff in the design, management and installation of sedimentation and erosion control practices. Levels I and II have been implemented, and Level III curriculum has been presented for comment. NC DOT is also funding extensive research on innovative sedimentation and turbidity control measures. Interim reports on the research are furnished to Land Quality for comment.

Mountain Slopes

Secondary road projects in the mountains are often built with 1.5:1 fill slopes and 1:1 cut slopes.
The Roadside Environmental Unit photographed a large number of these projects last year, and concluded that adequate permanent ground cover was being established with conventional seeding methods. Some of the slopes had required repeated seeding.

Plans and Specifications

Plan Preparation

The Roadside Environmental Unit staff prepares plans for contract construction projects. Topographic elevation contours are now available on plans. New contract construction has basins sized for surface area.

The last two annual reviews have specifically mentioned the varied and inadequate standards for sizing basins on maintenance projects. Reviewing a number of the plans proposed for work in trout buffer zones has revealed very poor quality plans. The projects in High Quality Watersheds were not designed to the standards specified in 15A NCAC 04B .0124, Design Standards In Sensitive Watersheds. One of the HQW projects disturbed about 15 acres and should have required a SEPA document before construction. The project has been constructed except for the portions in the trout buffer zone.

Sediment control measures are not sized with adequate surface area or sediment storage volume. Many measures are shown on the plans as symbols without any dimensions specified. Type B Silt basins are the chief sediment control measure used on the maintenance projects. While they are useful in ditches, they have inadequate surface area to settle sediment. Better measures are needed adjacent to streams and wherever runoff is turned off the project. When roads are widened, the width of the existing roadbed is excluded from the calculation of disturbed area, even though road cross-sections show the existing roadbed being regraded. This results in underestimation of disturbed area and required sediment storage volume.

Field Modification to Construction Plans

Field revisions to sedimentation and erosion control plans are being marked on the plans with consistency. Design calculations to check the adequacy of revised dimensions are not documented. Combining basins or changing dimensions should only be done if the revised measures meet design standards.

Land Quality Section Evaluations of DOT Projects

LQS staff continues to schedule DOT project inspections along with all other public and private construction. The LQS Regional Engineers were given the discretion of scheduling these inspections

by their respective staffs based upon workloads and other priorities within their respective offices.

CONCLUSIONS

1. Of the sixteen projects reviewed, ten were in good condition, three were in fair condition and three were in poor condition.

2. Record keeping and documentation were good on most projects.

3. Sedimentation and erosion control plans for maintenance projects vary greatly in quality. Some of the plans submitted this past year for work in trout buffer zones were inadequate in all aspects of sedimentation and erosion control.

RECOMMENDATIONS

1. NC DOT should update training to include the new standards in the *Erosion and Sediment Control Planning and Design Manual*, as well techniques used to model soil loss.

2. Roadside Environmental staff should jointly develop plans in HQW waters with District Maintenance staff and *critically* review 50 percent of all plans prepared by District Maintenance staff in all other areas.

3. NC DOT should continue to develop better methods of sediment and erosion control for secondary road construction, based on ongoing research.

4. NC DOT sedimentation and erosion control standards should be as protective as the practices and standards in the *Erosion and Sediment Control Planning and Design Manual*, revised June, 2006.

5. The use of modeling of soil loss to develop project specific requirements is encouraged.

6. NC DOT projects must be conducted in accordance with their sedimentation and erosion control plans.

7. An effort should be made to insure that plans are followed in the field. If changes are needed, the changes should be reflected on the plans and reviewed by REU or the Division designer.