



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

March 24, 2004

STATE PROJECT NO: 33262.1.1
TIP NO: B-3808
COUNTY: Avery
DESCRIPTION: Approaches to Bridge No. 58 on SR 1126 over Henson Creek
SUBJECT: Geotechnical Report – Inventory

Introduction

This project is located in western Avery County, on Henson Creek Road (SR 1126) approximately one mile from the Mitchell County line. Plans call for SR 1126 to be rebuilt as a 2-lane road on the same alignment -L- as the existing road. A retaining wall is to be constructed on the Left Side of -L- from Station 17+92 to Station 19+50. A temporary detour 750 feet long is to be constructed on alignment -DET- approximately 40 feet Right of -L-.

Henson Creek is a swift, turbulent stream with a steep gradient (\pm 200 ft/mi.) and a channel 10 to 15 feet wide. It is enclosed in a narrow valley that is, for the most part, heavily forested. Numerous rural home sites are clustered along the valley floor beside the road, which closely follows the creek.

The project is situated at the downstream end of a colluvial fan that enters the valley from the Right Side upstream of the project. The creek, with the road beside it, is incised into the distal margin of the fan. The surface of the fan stands 20-30 feet above the creek and the road on the Right Side. The detour will require a cut face approximately 30 feet high in colluvium on the Right Side.

A steep residual slope borders the road on the Left Side downstream of the bridge, where the retaining wall is to be constructed.

A subsurface investigation was carried out in December, 2003 and January, 2004 by Trigon Engineering Consultants, Inc., as directed by the Geotechnical Engineering Unit. Four auger borings were made for the retaining wall, 2 auger borings were made on alignment -L- upstream of the bridge, and 2 borings were made in deep colluvium on alignment -DET-, using a rotary bit casing advancer. An HQ, diamond bit coring tool was used to penetrate hard boulders. All borings were done with a Mobile B-57 power drilling machine.

Standard Penetration Tests (SPT's) were conducted in all borings. Twenty-two SPT soil samples were submitted to a DOT laboratory for quality tests.

Soils and Rock Properties

Colluvium is the principal material encountered on the upstream approach to the bridge and on the proposed detour. It is composed chiefly of loose to medium dense, silty sand and gravel with variable concentrations of cobbles and boulders (A-1-b). Some of the material is very bouldery. There are, however, lenses or beds of silty sand (A-2-4), and clay (A-7-6, A-7-5), particularly in the upper layers of the colluvial deposit. The depth of colluvium on -L- is 10 to 15 feet. The base of the colluvium on the Right Side of -DET- was not found after 33.5 and 42.8 feet of drilling in two borings.

About 3 feet of artificial fill has been placed over the colluvium in a small area on the Right Side of -L- upstream of the bridge. It is composed of medium stiff, sandy, clayey silt (A-4).

Materials on -L- downstream of the bridge consist of colluvium on the Right Side and hard rock with a thin soil cover on the Left Side. Borings in that area were positioned so as to investigate foundation conditions for the proposed wall. The borings were located in the ditch line of the existing road; whereas the wall is to be located farther left, along a line on the existing cut slope, where much hard rock is exposed.

Areas of Special Geotechnical Interest

Wet Cut in Soil

The static water table was found at an elevation approximately 12 feet above the proposed ditch line in a boring on the Right Side of -DET- at Station 17+11. Another boring on the Right Side of -DET- at Station 16+61 caved before the depth to water could be measured. Those findings indicate that ground water may be encountered as much as 12 feet above the ditch line in the proposed cut in colluvium around Station 17+00.

Ground Water Within 6 Feet of Grade

Static ground water was found at depths of approximately 3 feet in borings on the upstream approach to the bridge. Ground water can be expected above the proposed ditch line on the Right Side and within 2 to 6 feet of finished grade through most of the