



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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STATE PROJECT: 32930.1.1 B-3205
FEDERAL PROJECT: BRSTP-209(1)
COUNTY: Madison
DESCRIPTION: Bridge 30 over Spring Creek on NC-209
SUBJECT: Geotechnical Report – Inventory

PROJECT DESCRIPTION

This project consists of replacement of Madison County Bridge No. 30 on NC 209 (-L-), a detour bridge, approaches for both bridges and relocation of a short section of NC 63 (-Y1-).

A Geotechnical Investigation was conducted during April of 2004 using a CME-550 ATV-mounted drill machine. Four Standard Penetration Tests were performed at bridge End Bent locations only. Coring was necessary to distinguish boulders from bedrock. Access to the largest cut was restricted by an uncooperative absentee landowner (Merkantile Properties).

The following lines were investigated.

<u>Line</u>	<u>Station</u>
-DRI-	5+00 - 7+66
-L-	10+00 - 20+00
-DET-	11+63 - 14+58
-Y1-	10+00 - 15+08

AREAS OF SPECIAL GEOTECHNICAL INTEREST

Unstable & Wet Cut: A colluvial mass (landslide deposit in this case) mostly to the left of the entire length of -Y1- (NC 63) rests in an area of proposed cut. At the time of this investigation, the ditch between NC 63 and the existing road cut had a good flow of spring water seeping into it from the colluvium.

Borings were not made in the cut section of the colluvial mass during this investigation, as the property owner would not allow access. It appears that the entire cut will be in the toe of the colluvium. Portions of the proposed cut left of -Y1- include a 1.5:1 slope, which exceeds the existing slope of the colluvium. Slope failure is a concern.

Septic Tank Failure: Evidence of effluent surfacing in the gravel pavement near EB1 of the detour bridge was observed.

PHYSIOGRAPHY AND GEOLOGY

Spring Creek valley is a young landscape. Red clay rich soils are uncommon, steep slopes with colluvial aprons and rocky cliffs are common. Spring Creek is undergoing rapid headward erosion, a result of which are immature, boulder rich alluvial soils and colluvial masses which have a silty soil matrix dominated by boulders and cobbles, and perhaps most telling, is the steep gradient and narrow valley.

The bridge site is located in a pinch point in the valley just downstream from the confluence of Friezeland Creek with Spring Creek where a large bouldery colluvial mass originating from Cedar Knob - about 1000 feet higher up and 0.75 mile north east of the bridge - has plugged the valley and deflected Spring Creek to the west creating a rock cliff downstream of the bridge.

Alluvium, dominated by boulders with some sands, is from 4 to 10 feet deep. In places alluvium is capped by colluvium or overlain by embankment excavated from colluvial or alluvial deposits.

Bedrock is the Spring Creek Granitoid Gneiss of Middle Proterozoic age (over a billion years old) and is identified on older geologic maps as Cranberry Gneiss. It is definitely in the basement. Originally a granitic intrusion, its structure has been obscured by multiple deformations and now has a weak metamorphic fabric. It is thickly layered to massive with weak foliation and is coarse grained. Foliation trends NE/SW and dips steeply from 60 to 80 degrees SE. A joint set present nearby has NNE/SSW orientation with dips of about 40 degrees to the SE. The course of Spring Creek appears to be controlled by joints and not the foliation.

GROUNDWATER

Throughout the project groundwater is present within 3 to 6 feet of the surface of alluvial soils.