



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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STATE PROJECT: 33465.1.1 (B-4110)
F.A. PROJECT: BRZ-1616(5)
COUNTY: Durham
DESCRIPTION: Bridge No. 5 on -L- (SR 1616) over Mountain Creek at
Station 17+42
SUBJECT: Geotechnical Report – Structure Inventory

Project Description

A two-span bridge, 150-feet in length with a 105° skew, is proposed on -L- (SR 1616) over Mountain Creek to replace the existing structure. The new bridge will be 98 feet longer than the existing structure. Also, the centerline along -L- will be shifted approximately 10.5 right of the existing centerline. The project is located in north central Durham County near the town of Bahama.

The subsurface investigation was conducted during May of 2005 using an ATV-mounted CME-550 drill machine. Two Standard Penetration Test borings were performed at each of the three bent locations and B1-A was cored using NXWL core equipment. All borings were advanced until crystalline rock was encountered. Representative soil samples were obtained for visual classification in the field and selected samples were sent to the Materials and Tests Unit for laboratory analysis. One rock core sample was submitted to the Materials and Tests Unit to determine Unit Weight and Compressive Strength.

Physiography and Geology

The project is located in gently rolling terrain of the Piedmont Physiographic province. The area is rural, with single-family homes and some pastures. The area along Mountain Creek is wooded. Geologically, the project is located within the Carolina Slate Belt and is underlain by metavolcanic tuff.

Soil Properties

Soils encountered at the project site include roadway embankment, alluvial, and residual soils.

Roadway embankment soils are present at all bent locations and range in thickness from 6.0 to 10.4 feet. At End Bent 1, these soils consist of orange-brown, medium stiff to hard, moist, sandy, silty clay (A-7-6). The interior bent embankment soils consist of orange, very soft to medium stiff, moist, sandy, silty clay (A-7-6).

At End Bent 2, embankment soils consist of orange, medium stiff to stiff, moist, silty clay (A-7-6). Embankment soils are underlain by residual soils at End Bent 1 and alluvial soils at Bent 1 and End Bent 2.

Alluvial soils range from 4.5 to 8.0 feet in thickness. These soils predominantly consist of gray and brown, soft to medium stiff, moist, silty and sandy clay (A-6). Other alluvial soils present are gray and tan, very soft to medium stiff, moist, sandy silt (A-4), green and brown, medium dense to dense, moist to wet, coarse sand (A-1-b) with weathered rock fragments, and gray, medium dense, moist, clayey, coarse sand (A-2-6). The alluvial soils were deposited on residual soil, weathered rock and crystalline rock.

Residual soils were encountered at End Bent 1 and Bent 1. They range from 3.0 to 7.0 feet in thickness. The residual soils consist of orange-brown and tan-green, very stiff to hard, dry to moist, sandy silt (A-4) and tan-brown, loose, moist, coarse sand (A-1-b). The residual soils are underlain by weathered rock.

Rock Properties

Weathered rock was derived from the underlying metavolcanic tuff, and ranges in thickness from 3.3 feet to as much as 16.8 feet along End Bent 1. Weathered rock was encountered in each of the borings except for EB2-A. The top of weathered rock ranges in elevation from 367.2 feet at B1-B to 378.2 feet at EB1-B.

Crystalline rock was encountered at each boring location, and at the Bent 1 location consists of light gray, slightly to very slightly weathered, moderately hard, closely fractured, metavolcanic tuff. Rock core Recovery (REC) values at B1-A range from 68% to 100%, and Rock Quality Designation (RQD) values range from 12% to 40%. More detailed rock descriptions can be found in the Core Boring Report. The top of crystalline rock ranges in elevation from 359.2 feet at EB2-B to 372.2 feet at EB1-A.

Groundwater

Groundwater was encountered in all of the borings. The groundwater elevations range from 373.2 feet at EB2-A to 376.7 feet at EB1-A. Surface water in Mountain Creek was at elevation 373.7 feet (1-2-04).

Notice

This Geotechnical foundation report is based on the bridge survey report for Mountain Creek dated April 15, 2005 and the Preliminary General Drawing dated April 27, 2005. If significant changes are made in the design or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

Prepared by,
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