



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

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SECRETARY

November 13, 2003

STATE PROJECT: 8.2407701 (B-3530)  
F.A. PROJECT: BRZ-2320 (2)  
COUNTY: Wake  
DESCRIPTION: Bridge No. 174 on -L- (SR 2320, Riley Hill Rd.) over Buffalo Creek at -L- Station 15+83.00.  
SUBJECT: Geotechnical Report - Structure Inventory

**Project Description**

A three-span bridge, 100 feet in length with a 90° skew, is proposed on -L- (SR 2320, Riley Hill Rd.) over Buffalo Creek to replace the existing structure. The new bridge will be 60 feet longer than the existing bridge. A dam is located approximately 50 feet north of the proposed bridge. The project is located in Wake County about 7 miles northeast of Knightdale.

The subsurface investigation was conducted during September and October of 2003 using a CME-550 drill machine with a manual hammer. Standard Penetration Test borings were performed at each of the three bent locations. All borings were advanced until crystalline rock was encountered. Interior bent borings B1-B and B2-A were cored using NQ core equipment to recover rock samples from crystalline rock. Representative soil samples were obtained for visual classification in the field and selected samples were sent to the Materials and Test Unit for laboratory analysis. Three rock core samples were also sent to the Materials and Test Unit to determine Unit Weight, Compressive Strength and Young's Modulus.

**Physiography and Geology**

The project is located in gently rolling terrain of the Piedmont Physiographic Province. Geologically, the site is located within the Raleigh Geologic Belt and is underlain by foliated to massive granitic rock. Buffalo Creek is a tributary of the Little River.

**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 2.3 to 7.5 feet. These soils consist predominantly of brown and orange-brown, moist, loose to medium dense, silty sand (A-2-4) and orange-brown and red-brown, moist, soft to medium stiff, silty clay (A-7-5). Embankment soils are underlain by alluvial soils.

Alluvial soils were encountered in all borings and range in thickness from 2.6 to 6.9 feet. Alluvial soils consist of gray to dark gray, brown to orange-brown, moist to wet, very loose to medium dense, coarse sand (A-1-b) and silty sand (A-2-4). Dark gray, moist to wet, soft to stiff, sandy silt (A-4) and sandy clay (A-6) are also present. The alluvial soils were deposited on residual soil and weathered rock or crystalline rock.

Residual soil was only found at the proposed B1-A bent location. This soil consist of white-gray, dry, very dense, silty sand (A-2-4). Weathered rock and/or crystalline rock underlie residual soils.

**Rock Properties**

Weathered rock was derived from the underlying granite and ranges in thickness from 0.3 to 16.6 feet. The top of weathered rock was encountered at elevations ranging from 309.6 at B2-A to 307.1 feet at EB1-A.

Crystalline rock was encountered at each boring location. The top of crystalline rock ranges in elevation from 310.2 at EB2-A to 290.5 feet at EB1-A. Rock core was obtained from two of the interior bent borings. Crystalline rock in borings B1-B and B2-A consists of black and white, slightly weathered to fresh, hard, closely to widely fractured, granite. Core recovery (REC) ranged from 89% in boring B1-B to 95% in boring B2-A. Rock Quality Designation (RQD) values ranged from 85% in boring B1-B to 88% in boring B2-A. More detailed rock descriptions can be found in the Core Boring Reports.

**Groundwater**

Groundwater was encountered at each bent location. Groundwater elevations ranged from 313.3 at EB1-B and B2-A to 312.3 feet at B1-A.

**Notice**

This Geotechnical foundation report is based on the bridge survey and hydraulic design report for bridge no. 174 on -L- (SR 2320, Riley Hill Rd.) over Buffalo Creek dated June 30, 2003. If significant changes are made in the design or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Joseph I. Milkovits, Jr." with a stylized flourish at the end.  
Joseph I. Milkovits, Jr.  
Project Geologist