



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

Michael F. Easley
GOVERNOR

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

Lyndo Tippet
SECRETARY

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STATE PROJECT: 8.2406201 (B-3375)
FEDERAL PROJECT: BRSTP-1375(2)
COUNTY: Wake

DESCRIPTION: Bridge No. 301 over Swift Creek and Bridge No. 471 over Lake Wheeler Spillway on SR 1375

SUBJECT: Geotechnical Report – Inventory

PROJECT DESCRIPTION

This project consists of the approaches to a new bridge to be constructed over the Lake Wheeler spillway on -L- (SR-1375, Lake Wheeler Road). The -L- alignment was investigated from Sta. 32+31 to 56+72, approximately 0.46 miles in length. In addition to the roadway, the Bridge No. 301 is to be replaced by a culvert at -L- Sta. 40+04.

The geotechnical field investigation was conducted in October, 2002. Borings were advanced using a BK-51 ATV-mounted drill machine with automatic hammer. Standard Penetration Tests were performed at selected locations and additional borings were advanced using continuous flight augers. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the Materials and Tests Unit.

AREAS OF SPECIAL GEOTECHNICAL INTEREST

- 1) Groundwater: The following area was found to exhibit a high water table, seasonal high groundwater, or the potential for groundwater-related construction problems:

<u>Alignment</u>	<u>CL Station</u>
-L-	38+25 to 41+45

- 2) Artificial Fill: Artificial fill soil occurs on the project at the following approximate locations:

<u>Alignment</u>	<u>Station</u>	<u>Offset</u>
-L-	34+00 to 38+50	LT
-L-	40+60 to 43+25	LT & RT

- 2) Artificial Fill (continued):

<u>Alignment</u>	<u>Station</u>	<u>Offset</u>
-L-	44+55 to 44+65	LT & RT

A discussion of the artificial fill soils is located below in the section titled: "Soil Properties".

- 3) Unconsolidated Alluvial Soils: Unconsolidated sediments occur on the project at the following location:

<u>Alignment</u>	<u>CL Station</u>
-L-	38+25 to 42+95

A discussion of the unconsolidated soils is located below in the section titled: "Soil Properties".

PHYSIOGRAPHY AND GEOLOGY

The project is located in the central Piedmont area of North Carolina approximately 5 miles south of Raleigh. Lake Wheeler Road (-L-) is located at the base of the Lake Wheeler dam, which was constructed on Swift Creek by the Army Corps of Engineers in 1956. The Swift Creek alluvial floodplain was approximately 450 feet wide at the base of the dam. The concrete spillway appears to have been constructed on a cut into the residual hillside adjacent to the floodplain. The southern approach to Bridge No. 471 includes the existing roadway and the adjacent wooded areas. The entrance to the City of Raleigh's Lake Wheeler Recreational Park is located 150 feet north of the spillway bridge. Scattered homes and businesses are located on Lake Wheeler Road from the park entrance northward to the end of the project.

The project occurs within the Raleigh Belt geologic province. The underlying bedrock consists of gneiss and slightly metamorphosed granitic intrusions.

SOIL PROPERTIES

Residual Soils: Residual soils consist primarily of clay, silt, and sand derived from the in-place weathering of the underlying gneiss and metamorphosed granite bedrock. These soils include stiff to hard, sandy clay (AASHTO soil classification A-7-5 and A-7-6), soft to very stiff sandy silt (A-4), and very loose to very dense silty sand (A-2-4). The residual soils grade into weathered rock with depth.

Artificial Fill Soils: The artificial fill soils on this project are related to the construction of the adjacent earthen dam and the concrete spillway. The fill soil underlying the proposed roadway from -L- Sta. 40+60 to 43+25 consists of medium to very stiff, sandy clay (A-6) and tan-brown, dense to very dense silty sand (A-2-4). Scattered cobble- to boulder-size rocks occur in the artificial fill in the vicinity of the spillway retaining wall. A small area of artificial fill soil occurs as backfill adjacent to the spillway retaining wall left and right of -L- Sta. 44+55 to 44+65. Soil adjacent to the retaining wall consists of loose silty sand (A-2-4) mixed with gravel-size rocks and concrete debris.