



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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STATE PROJECT: 8.1711401 (B-4010)
COUNTY: Ashe
DESCRIPTION: Approaches to Bridge No. 7 on NC-163 over South Fork New River
SUBJECT: Geotechnical Report – Inventory

Site Description

This project is located in the southern part of Ashe County, approximately 8 miles south of the city of West Jefferson. NC Highway 163 crosses the South Fork of the New River on a tight, horseshoe bend of the river. The river at this point is approximately 125 feet wide. The south bank, on the outside of the bend, lies at the foot of a high hill with rock outcrops near the base. Topographic relief on that side of the river is about 150 feet. The north side of the river consists of an active floodplain about 50 feet wide adjacent to a broad floodplain terrace that extends to the end of the project. Topographic relief on that side of the river is about 40 feet in all.

The surrounding countryside is predominantly rural, supporting a mix of woodland, pasture, and residential sites; however, within the immediate vicinity of proposed construction are commercial, industrial and cemetery sites along the left side of the existing highway.

Plans call for construction of new approaches on the right side of the existing highway. Construction is to begin on alignment -L- at Station 11+00 and extend to Station 30+50. Plans include a right side cut 35 feet deep at ditch line, on the south side of the river. That cut will result in 100 feet or less of exposed cut face height. The maximum height of proposed embankments is about 12 feet on the south side of the river and 25 feet on the north side.

A subsurface investigation was conducted in March 2003. Drilling was carried out by Florence and Hutcheson, Inc, under the field supervision of a DOT Project Geologist. Ten soil auger borings and 3 rock core borings were made with a CME-45C power drilling machine using

8-inch hollow-stem augers and NXWL diamond bit coring equipment. Standard Penetration Tests (SPT) were made at 5-foot intervals, and soil samples were submitted to a DOT laboratory for quality testing.

Soil and Rock Characteristics

Soils on this project are chiefly saprolite to weathered rock in the cut areas and alluvial in the fill areas. The principal material to be encountered in the large cut is hard rock. There are minor, surficial occurrences of colluvial and residual soils. Embankment soils of the existing highway were not investigated.

Alluvial soils are found in three areas: on the floor of a small valley near the beginning of the project, on the floodplain of the New River, and on the floodplain terrace.

Alluvial soils in the small valley consist of brown, very loose, silty sand (A-2-4) overlying yellow, very soft, sandy clay-silt (A-4), overlying basal, loose sand and gravel (A-1-b). Near the north edge of this area, however, the entire alluvial deposit consists of about 4 feet of saturated, very soft, micaceous silty clay (A-7-5).

Alluvial soils on the river floodplain consist of brown, loose, silty sand (A-2-4) overlying a thin layer of basal, loose sand and gravel (A-1-b). That natural alluvial sequence is overlain by 3 feet of orange, soft clay-silt (A-4) that may have washed onto the site after eroding off the adjacent floodplain terrace or from the existing embankment during its construction.

Alluvial soils on the floodplain terrace are composed of a variety of orange, yellow, or dark brown, medium stiff clay (A-7-5) and clayey to sandy silt (A-4), and loose silty sand (A-2-4) overlying basal, loose sand and gravel (A-1-b). The lower margin of the terrace is overlain by 3 feet of orange, soft silt similar to the surficial orange silt that overlies floodplain soil described above.

Saprolite soils consist primarily of brown and gray to yellow or reddish brown, moist to dry, medium stiff to hard, micaceous, sandy silt (A-4) grading in some places to loose, silty sand (A-2-4, or A-2-5). Where saprolite is found in low areas beneath alluvial soil it may be wet and soft or very loose.

A thin cap of residual, non-saprolitic soil, may be found overlying saprolite at the ground surface. It is composed of gray-brown, moist, soft, sandy clay-silt (A-4).

A thin, surficial layer of colluvial soil has accumulated at some places on the hill slope south of the river. It is composed of 2 feet or less of brown or yellow-brown, moist, soft, sandy clay or silt (A-6, A-4) with a few rock chips.

The hard rock at this site is composed of gray, thick bedded, quartzo-feldspathic mica gneiss and lesser amounts of mica schist. Both the gneiss and the schist have a well-developed foliation that dips southeast at 35 to 55 degrees. Those lithologies are part of the Alligator Back Formation as shown on the Geologic Map of North Carolina, 1985.

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