

# STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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SECRETARY

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STATE PROJECT: 8.1830503 (R-2206C) WBS # 34383.1.1

COUNTY:

Lincoln

**DESCRIPTION:** 

Bridges on NC 16 over Killian Creek between SR 1349

(Mundy Rd.) and NC 150

SUBJECT:

Geotechnical Report – Bridge Foundation Investigation

This is a proposed 4 lane dual structure on new location. The bridge is on proposed NC 16 (-L-) over Killian Creek. Each structure is comprised of 3 spans at lengths of 15.2, 18.3, and 15.2 meters. Skew angles for each bent are 90 degrees with recommended width of roadway at 41.6 meters. Each recommended structure will be constructed with 1143mm P/S concrete girders and utilize 1 ½: 1 (H:V) Class II Rip Rap slope protection.

Foundation test borings were performed with a CME-550 drill machine utilizing NW Casing, NXWL, hollow stem augers, and automatic drop hammer. The field investigation for this project was conducted in November and December of 2003.

### Physiography/Geology

Geologically this site is part of the Charlotte Belt and is underlain by granitic and metavolcanic rock. The topography at the bridge site is heavily wooded with Killian Creek surrounded by a flood plain approximately 60 to 70 meters in width. On the southeast side of the flood plain boundary the ground rises steeply away from the creek.

Alluvial soils up to 3.3 meters in depth were encountered in the floodplain of Killian Creek. Alluvium encountered by borings within the site consists of very soft to soft silty sandy clay (A-6), very soft to medium stiff clayey sandy silt (A-4), and very loose to loose micaceous sand (A-2-4, A-1-b) with gravel. Residual soils were noted in all boring locations and generally consist of medium dense to very dense micaceous silty sand (A-2-4), with stiff silty sandy clay (A-7-6) being encountered in End Bent 1 SBL borings. All borings encountered weathered rock at depth and terminated on or in hard rock.

sheet 3

(R-2206C) Killian Creek (Site 2)

## **Foundation Materials**

## End Bent 1:

This proposed bent is located southeast of Killian Creek on a moderately sloping residual hill. A total of four borings were performed at this bent location to encompass both north and south bound lanes. Residual soils beginning at the ground surface and extending to depths up to 5.0 meters consist of stiff red-brown-gray silty sandy clay (A-7-6), and medium dense to very dense gray-tan-white micaceous silty sand (A-2-4). Beneath residual soil lies weathered rock between elevation 250.39 and 254.52 meters. All borings achieved auger refusal on hard rock after penetrating through 0.25 to 2.04 meters of weathered rock.

#### Bent 1:

This proposed bent is located in the floodplain on the southeast side of Killian Creek. A total of four borings were performed at this bent location to encompass both north and south bound lanes. Alluvium was found at all boring locations and consists of 0.3 to 1.8 meters of very soft to soft brown-gray silty sandy clay (A-6) with gravel, and very loose to loose brown-black-gray silty sand (A-2-4). Beneath alluvium between elevation 251.53 and 252.99 meters residual soil is encountered. Residual soils consist of 0.15 to 1.52 meters of medium dense to very dense gray-tan-white silty sand (A-2-4). Underlying residual soil is weathered rock followed by hard rock. Weathered rock occurs between elevation 249.92 and 252.26 meters while the hard rock horizon occurs between elevation 248.24 and 252.26 meters. Hard rock was cored at all boring locations along this bent to evaluate its engineering properties.

#### Bent 2:

This proposed bent is located in the floodplain on the northwest side of Killian Creek. A total of four borings were performed at this bent location to encompass both north and south bound lanes. Alluvium was encountered at depths of approximately 2.0 meters at all boring locations and consists of very loose to loose gray-tan-white micaceous sand (A-2-4, A-1-b) with quartz gravel. Beneath alluvium at about elevation 250.0 meters lies residual dense to very dense brown-gray-tan micaceous silty sand (A-2-4). Residual sand extends in depth to approximate elevation 247.4 meters where a thin layer of weathered rock is encountered followed quickly by hard rock. Elevation to hard rock is fairly uniform across the entire bent at approximate elevation 247.0 meters. Hard rock was cored at all boring locations along this bent to evaluate its engineering properties.

#### End Bent 2:

This proposed bent is located in the floodplain on the northwest side of Killian Creek. A total of four borings were performed at this bent location to encompass both north and south bound lanes. Alluvial soils ranging up to 3.3 meters in depth were encountered and consist of very soft to medium stiff brown-gray clayey sandy silt (A-4), and very loose to loose gray-tan-white micaceous sand (A-1-b). Residual soils underlie alluvium between elevation 248.5 to 250.0 meters and consist of loose to very dense gray-brown-white micaceous silty sand (A-2-4, A-2-5). Beneath residual sand lies a small layer of