STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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STATE PROJECT: 8.1830503 (R-2206C) WBS # 34383.1.1
COUNTY: Catawba
DESCRIPTION: Bridge(s) on NC 16 Bypass over Reed Creek between SR 1855 and NC 16

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 Reed Creek. Each structure is comprised of 3 spans at lengths of 16.8, 19.8, and 16.8 meters. Skew angles for each bent are 90 degrees with recommended bridge deck widths of 11.74 meters per structure. Each proposed structure will be constructed with 1143mm AASHTO Type III PCG 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, Tri-cone roller bit and automatic drop hammer. The field investigation for this project was conducted between December 2003 and January 2004.

Physiography/Geology

Geologically this site is part of the Kings Mountain Belt and is underlain by granite and Kings Mountain Schist. The topography at the bridge site is wooded with Reed Creek surrounded by a flood plain approximately 60 meters in width. On the south side of the flood plain boundary the ground rises steeply away from the creek.

Alluvial soils up to 4.6 meters in depth were encountered in the floodplain of Reed Creek. Alluvium encountered by borings within the site consists of stiff tan silty sandy clay (A-6), very loose to medium dense silty clayey sand with quartz gravel (A-1-b, A-1-a, A-2-4), and medium stiff clayey sandy silt (A-4). Residual soil of various thicknesses were noted at all boring locations and generally consist of medium stiff to hard sandy silty clay (A-7-5, A-6), medium dense to very dense clayey silty sand (A-2-4) , and medium stiff to very stiff clayey sandy silt (A-4). With the exception of boring EB1-B SBL all borings encountered weathered rock at depth and terminated on or in hard rock.

Foundation Materials

End Bent 1:
This proposed bent is located on a large hill to the south of Reed Creek. A total of 4 borings were performed at this bent location to encompass both north and south bound lanes. The hill slopes moderately at the NBL location and much steeper along portions of the SBL section. Alluvium was encountered at the lowest point along this bent in boring EB1-B NBL. Alluvial soils are found overlying residual soil at this location. Alluvium consists of 3.5 meters of stiff tan silty sandy clay (A-6) with the alluvial residual boundary located at elevation 278.02 meters. At all other boring locations along the bent residual soils are encountered at the ground surface and range in thickness from 2.5 meters at EB1-A SBL to 13.15 meters at boring EB1-A NBL. Residual soils are comprised of stiff to hard red-brown sandy silty clay (A-7-5), medium dense to very dense tan-white clayey silty sand (A-2-4), dense tan-white clayey sand with gravel (A-1-b), and medium stiff to very stiff tan-gray clayey sandy silt (A-4). Weathered rock / hard rock was encountered in 3 of 4 boring locations that are denoted as follows:

Location:	Weathered Rock Elevation	Tri-Cone Refusal Elevation on Rock
EB1-A SBL	285.68 (meters)	284.35 (meters)
EB1-B SBL	Weathered Rock / Hard Rock not encountered	
EB1-A NBL	270.12 (meters)	268.65 (meters)
EB1-B NBL	268.90 (meters)	267.11 (meters)

Bent 1:
This proposed bent is located south of Reed Creek. A total of 3 borings were performed at this bent location to encompass both north and south bound lanes. Boring B1-A SBL could not be obtained due to steeply dipping and uneven terrain at the proposed hole location. Alluvial soils were encountered in both NBL borings with the lateral boundary extending to approximately the -L- centerline. Alluvial soils are comprised of 4.5 meters of loose to medium dense tan-brown silty sand with quartz gravel (A-1-a, A-1-b). The alluvial residual boundary for NBL borings is approximate elevation 276 meters. Residual soils begin at the ground surface left of proposed -L- centerline and extend under alluvial soils at the proposed NBL structure location. Residual soils, at 1 meter in thickness, are shallow at the proposed SBL structure but extend to 6 meters in thickness below NBL boring locations. Residual soils are comprised of loose to very dense tan-brown clayey silty sand (A-2-4). Weathered rock and hard rock were encountered in all boring locations. Hard rock was cored in all three boring instances to ascertain rock properties for engineering purposes. Weathered rock and hard rock elevations are denoted as follows:

Location:	Weathered Rock Elevation	Top of Hard Rock Elevation (Begin Core)
Bent 1 SBL	N/A	281.09 (meters)
B1-A NBL	273.46 (meters)	272.72 (meters)
B1-B NBL	269.56 (meters)	269.39 (meters)