



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

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STATE PROJECT: 34357.1.1 (R-0977A)  
COUNTY: Cherokee  
DESCRIPTION: Bridge on EBL US-64 (Sta. 18+31.299 -LC1B2-) over -Y2-  
SUBJECT: Geotechnical Report – Foundation Investigation

This proposed bridge is located on revised alignment at Station Equation 18+31.299 -LC1B2-/14+36.403 -Y2-, on the EBL of US-64 over SR-1558 (Harshaw Road). Plans call for a single-span of 45.4 meters long with 13.2 meters of clear roadway and a skew of 130 degrees. The site lies on the extreme western edge of the Hiwassee River floodplain. End Bent One is in the floodplain and End Bent Two is on a hillside and includes a very small tributary stream. Two large water mains and a sewer are in the construction zone.

The investigation was carried out in December 2003. Two borings were made at each bent using a CME-550 drill. Borings were made with -N- casing tipped with an advancer. SPT's were conducted on 1.52 meter intervals. Rock core was taken in three borings.

**Foundation Materials**

Below thin cover soils, weathered rock is encountered at shallow depths across the site. Crystalline rock is shallow on the hillside and at slightly deeper and irregular depths in the floodplain.

Crystalline rock recovered by coring is light colored – tan to silver grey – and it shimmers in bright light. It is a recycled sedimentary rock; a lightly metamorphosed fine sandy silt with minor beds of silty fine sand which has been cooked barely enough to grow minuscule muscovite mica flakes. Bedrock here is classified as phyllite, or more

technically, a sericitic metapelite with minor metasandstone stringers. It would have been schist had it cooked more.

The rock is thinly laminated with slick films of mica along foliation making it easy to split and break up. Beds are tilted with a fairly steep plunge to the southeast. Foliation averaged 40 to 65 degrees with weathering trending along foliation. Core recovery rates were high; RQD values ranged from 24 to 66 percent.

Immediately southeast of the site and up section is a thick quartzite unit exposed in a long rock cut along Harshaw Road. Locally, the quartzite holds up river bluffs from erosion and blocks stream migration. Both the phyllite and quartzite are devoid of fossils. Even though these are the youngest rocks in the Blue Ridge they are too old to have fossils. Nothing was crawling around that far back. The grey graphitic ting to the rock is indicative of organic residue and may represent accumulations of algae or bacteria. Dry rock residue and dust has a slick greasy feel.

Overall, the phyllite is an inherently weak rock.

End Bent One

Less than a meter of soft sandy silt fill is present across End Bent One. This fill apparently washed down from the embankment slope along existing Harshaw Road. Underlying the fill are strata of alluvium, saprolite, weathered rock, and crystalline rock or bedrock. Alluvium consists of 1 to 1.6 meters of medium stiff sandy silt with basal sand and gravel. Below the alluvium is a thin rind (0.7 meters) of sandy silt saprolite which grades to weathered rock. Thickness of weathered rock varies across the bent and is reciprocal in depth to that of crystalline rock. Core of crystalline rock exhibited moderately weathering along foliation to a depth of 9.5 meters.

End Bent Two

End Bent Two straddles the toe of a hillside and part of a small creek bottom. Alluvium present across the EB2-B side of the bent consists of slightly more than a meter of soft sandy silt with basal sand and gravel. The hillside (EB2-A side) has less than a meter of residual medium stiff silty clay which grades downward to sandy silt with rock fragments. The residual soil appears to have crept down slope somewhat. Weathered rock underlies the residual and alluvial strata. Weathered rock has variable thickness and is thicker under the alluvium. Crystalline rock is present across the bent below 1.1 to 3.2 meters in depth. The crystalline rock exhibits moderate weathering on top with dimenishing weathering with depth. Weathering zones extend along foliation, degrading at least 15 percent of the crystalline rock to depths of 9+ meters at EB2-A.