



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. 24+60.5 -LC1B-)
Over Martin Creek

SUBJECT: Geotechnical Report – Foundation Investigation

The proposed EBL bridge is located on revised alignment at Station 24+60.5 -LC1B-. The Bridge Survey and Hydraulic Design Report plans dated 9/10/03 call for two 83.5 meter spans with a skew of 60 degrees and a roadway width of 11.4 meters. The bridge deck will be approximately 12 meters above normal water level. The EBL bridge will carry two-way traffic until the future WBL lanes are added.

The site is located in an entrenched goose neck of lower Martin Creek. End Bent One lies near the base of the rocky canyon wall on the west side of Martin Creek. Bent One straddles residual and alluvial ground near the creek. End Bent Two lies on a gently descending ridge on the inside of a long bend in the creek. The area is forested with towering short leaf and white pines and has an understory of hemlock, rhododendron, laurel and dog hobble. It has the look of virgin forest.

The investigation was carried out in late January to early February 2003. A total of four borings were made at Bent One and End Bent Two using a CME-550 drill. Three SPT core borings were made with -N- casing tipped with an advancer. One hollow stem SPT was also made. End Bent One was not accessible as it is located on a steep rocky slope. When rough grading is done it will be possible to access End Bent One with a drill rig.

Foundation Materials

Bedrock is a low grade metamorphic product of marine silts and fine sands identified as a phyllite belonging to the Mineral Bluff Formation of the Murphy Belt. Geologic structure of the area features a regional syncline or down warping. The bridge location is to on the west limb of the syncline.

Crystalline rock is encountered below shallow cover soils and weathered rock of varying thickness. Crystalline rock is exposed in the creek bed and canyon walls. This rock is of one of the weakest, least competent rocks in the Blue Ridge.

The phyllite is composed dominantly of very small, clear muscovite mica scales with a mineral ground mass, all layered parallel to bedding. The light colored rock breaks easily along thin bedding planes which plunge to the southeast at an average of 52 degrees. Dip direction is nearly parallel to centerline, line ahead. Very thin pyrite coatings were seen on broken bedding plains in some of the core.

End Bent One

End Bent One lies near the base of a natural 48 meter high cut bank. A thin skim of topsoil and float (rock not in place) that is found in patches on the rocky slope supports vegetation across the bent. Crystalline rock (phyllite) is exposed intermittently along the bent, to the right, left, above, and below it. Evidence of block failure of the bedrock is also visible on each side of the proposed foundation location. Dip of bedrock here has the worst possible aspect to accept the load of the bridge abutment. Moving EB1 back a few meters back from the edge would greatly reduce the potential of block failure for this exposed rock slope. Conversely, the deep approach cut will have optimum bedding orientation for slope stability.

Borings were not made here at this time.

Bent One

Bent One is located low ground near the creek and rests on both alluvial and residual soils. The boring at B1-A encountered less than a meter of residual silty clay with rock fragments overlying less than 3 meters of weathered rock which grades to crystalline rock at a depth of 3.5 meters. The crystalline rock is generally hard and fresh with some very thin pyrite growths visible along machine breaks on bedding planes. Alluvial soil encountered in the boring at B1-B consists of less than a meter of loose sandy silt underlain by 1.5 meters of weathered rock which grades to the freshest rock encountered on the project. Recovery and RQD across Bent One is very high.

End Bent Two

Layer cake stratification of soil and rock is present at End Bent Two. A this horizon of medium stiff residual silty clay with rock fragments grading to silty sand overlies 5.5 to 6.5 meters of weathered rock with clay seams. Crystalline rock is inclined slightly down