3.0 SCOPE OF INVESTIGATION

3.1 FIELD TESTING

A reference survey was performed at the site by an NCDOT survey crew. The reference points located by the survey crew were used by Trigon as reference to establish the as-drilled locations for the soil test borings. Elevations for each of the reference points were surveyed by the survey crew. Elevations at the as-drilled boring locations, along the existing ground surface at the end bent locations, and along the structure profile were surveyed by personnel from Trigon using the elevations at the reference points established by the NCDOT survey crew. As-drilled boring locations are shown on the Boring Identification Diagram (Drawing No. 2) included in Appendix A.

The subsurface exploration for the proposed bridge was conducted between December 22 and 29, 2003. This exploration consisted of four soil test borings, two at each of the proposed bent locations. The borings were drilled using an ATV-mounted Mobile B-57 drilling machine equipped with a 140-pound manual hammer. The borings were drilled utilizing 0.33-foot tricone/wash-drilling techniques, and creek water alone was used as the drilling fluid. Boring EB2-B was offset in from the end of the proposed bent due to the fill slope drop-off at the proposed location.

Standard Penetration Tests were performed in the soil and weathered rock materials in general accordance with NCDOT guidelines. In conjunction with this testing, split-barrel soil and weathered rock samples were recovered for visual classification and potential laboratory testing.

Rock coring was performed at all of the borings in order to evaluate the nature of the weathered rock/crystalline rock. The cored weathered rock/crystalline rock was returned to our laboratory for further classification and possible testing. The rock coring was performed with an HQ size hollow double-tube core barrel. Creek water alone was used as the drilling fluid.

3.2 LABORATORY TESTING

Laboratory soil testing was performed on thirteen representative split-barrel samples and two grab samples from the stream bank to aid in the assessment of AASHTO soil classification and to provide data for evaluation of engineering properties. The laboratory testing on the samples consisted of Atterberg Limit testing and grain size analysis with hydrometer. In addition, two Unconfined Compressive Strength (Qu only) tests were performed on selected samples of the recovered rock core. Laboratory tests were performed in general accordance with AASHTO and NCDOT specifications. The results of the soil laboratory tests are included in

Appendix A. A Summary of Rock Test Data table is also included in Appendix A. Laboratory results of the rock testing are also included under separate cover in Appendix B.

3.3 SITE GEOLOGY

The site of the proposed project is located in the Blue Ridge Belt of the Blue Ridge Physiographic Province of North Carolina. According to The Geology of the Carolinas published by the Carolina Geological Society in 1991, the Blue Ridge "consists of a series of crystalline thrust sheets, each with different tectonic histories". Also according to The Geology of the Carolinas, the stratigraphy of the Blue Ridge in North Carolina consists of "continental basement rocks and a series of clastic sequences reflecting events of late Precambrian continental rifting and subsequent development of early Paleozoic continental platform".

According to the 1985 Geologic Map of North Carolina, the site is located in an area generally consisting of layered biotite-granite gneiss, biotite-hornblende gneiss, amphibolite, and calc-silicate rock. The existing Henson Creek Road cuts through a large biotite gneiss outcrop south of the existing bridge on the left side of the road between approximately Stations 17+70 and 19+10. Measurements taken of the rock structure visible in the cut indicate dip angles ranging from 40° to 50° and dip directions ranging from 130° to 142°.

The crystalline rock encountered in our test borings generally consisted of moderately severely to very slightly weathered biotite-mica gneiss, biotite-hornblende gneiss, and biotite gneiss. The crystalline rock cored ranged in quality from very poor to very good. The overlying residual soils at the site are the product from the physical and chemical weathering of the underlying crystalline rock.

3.4 FOUNDATION MATERIALS

The generalized subsurface conditions indicated by the borings are described below. For soil descriptions and general stratification at a particular boring location, the respective Boring Log should be reviewed. For rock descriptions and stratification at a particular boring location, the respective Coring Log should be reviewed. The Boring Identification Diagram, Boring Logs, Coring Logs, and Core Photographs are included in Appendix A. Representative subsurface cross-sections at each drilled bent location and a subsurface profile along the structure are also included in Appendix A. The subsurface properties for the project site are described below.

Foundation materials encountered at the site included roadway embankment fill, colluvial soils, residual soils, weathered rock, and crystalline rock.