



STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION

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 GOVERNOR

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STATE PROJECT: 34512.1.1 (R-2904)  
 FEDERAL PROJECT: STP-54(2)  
 COUNTY: Durham

DESCRIPTION: NC 54 from SR 1999 (Davis Drive) to SR 1959 (Miami Boulevard)

SUBJECT: Geotechnical Report - Inventory

**PROJECT DESCRIPTION**

The project consists primarily of widening of approximately 0.9 miles of existing NC 54 (-L- Stations 10+35 to 57+39). Vertical realignment is proposed near the end of the project (approximately -L- Station 47+00 and ahead).

A geotechnical investigation was conducted from May to December 2003, using CME-45C and CME-750, ATV-mounted, drill machines with automatic hammers. Standard Penetration Tests were performed at selected locations and additional borings were advanced using continuous flight augers. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the Materials and Tests Unit.

The following alignment, totaling 0.9 miles, was investigated.

<u>Line</u>	<u>Station</u>
-L-	10+35 to 57+39

**AREAS OF SPECIAL GEOTECHNICAL INTEREST**

1) Highly Plastic Soils: Highly plastic clays, with plasticity indices equal to or greater than 26, were found in the following areas.

<u>Line</u>	<u>Station</u>
-L-	11+25 to 11+75
-L-	15+75 to 16+25
-L-	21+75 to 22+25
-L-	33+25 to 37+25
-L-	47+75 to 48+25

2) Groundwater: The following sections were found to exhibit a high water table, seasonal high groundwater, or the potential for groundwater related construction problems.

<u>Line</u>	<u>Station</u>
-L-	31+60 to 34+40
-L-	43+75 to 56+75

3) Degradable Rock: Degradable rock is defined as rock material (including both weathered rock and non-crystalline rock) that exhibits high slaking characteristics when exposed to air and water. Degradable rock occurs as unclassified excavation in the following cut areas.

<u>Line</u>	<u>Station</u>
-L-	30+75 to 31+90
-L-	33+75 to 34+25
-L-	38+75 to 39+75
-L-	43+75 to 45+90
-L-	49+60 to 52+25
-L-	52+60 to 55+25

4) Non-crystalline Rock: Non-crystalline rock occurs above or within 6 feet below proposed grade at the following locations. Non-crystalline rock on this project is primarily Triassic sandstone, siltstone, and mudstone.

<u>Line</u>	<u>Station</u>
-L-	33+75 to 34+25
-L-	49+65 to 55+75

**PHYSIOGRAPHY AND GEOLOGY**

The project is in gently rolling terrain of the Piedmont Physiographic Province. Surface drainage is very good. The project corridor is wooded or in commercial land use. Triassic age, sedimentary rocks of the Durham Sub-basin underlie the area. They are mostly interbedded sandstone, mudstone, and siltstone. Most soils are residual, and have been derived by weathering of the underlying, sedimentary rocks. Alluvial soil, roadway embankment, and engineered, artificial fill are also present.