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State Project: 8.2625001 (U-3837)
Federal Project: STP-3153(1)
County: Forsyth
Description: Winston-Salem – SR 3153 (Hanes Mall Blvd) From Kester Mill Road to West of Westgate Center Drive
Subject: Geotechnical Report - Inventory

Project Description

This is a report of an English-units geotechnical investigation for an improvement project on a 0.8mi section of SR 3153 that will include widening bridge No. 436 over I-40, curb and gutter construction and installation of a retaining wall along part of SR 3153. The following lines were investigated:

-L-	10+00 to 56+45	4,645 ft	
-Y-	10+00 to 12+24	224 ft	(Paving& Marking)
-Y2-	10+00 to 11+14	114 ft	
-L-	51+50 to 56+45	495 ft	(Retaining Wall)
		Total 4645 + ft	

Topics of Special Geotechnical Interest

Previous Work

This area was previously examined in 1985 during the investigation of the I-40 relocation project. A search of archived files in the Matthews office, and the NCDOT database in Raleigh discovered the original bridge borings for the Hanes Mall Blvd Bridge over I-40. It was also discovered that at some time the original Vestmill road has been relocated and renamed Hanes Mall Boulevard and the SR number changed from SR1126 to SR 3153. As part of the current effort, a retaining wall report has been completed.

Highly Plastic Soil

Highly plastic residual A-7 soil was found at the original surface of the residual cap clay where it was exposed and also where it was buried by fill.

High Groundwater

In the floodplain and part of the retaining wall area, groundwater is near the surface.

Construction Issues

The Hanes Mall Blvd. Bridge approaches will be widened on both sides. On the right side, at the toe, an alluvial clay layer could provide a zone of weakness or glide plain for horizontal displacement. Vane shear tests of this area do not indicate a problem with this soil. A retaining wall at the end of the project will be located on wet weak soil; holding back wet weak fill.

Drainage Issues

From –L-45+00, @elevation 787, to –L- 35+00 @elevation 776, the road is in a cut section with no water outlet other than the gutters.

Physiography and Geology

The project is within the Piedmont physiographic province in the Milton litho-tectonic belt. It is mapped on the 1985 Geologic Map of North Carolina as: Czbg, Biotite Gneiss. This is consistent with the descriptions of the residual soil recorded during this investigation.

Topographic Setting

The topography of the project area is typical of the upper piedmont. There is about 100 feet of relief, and other than floodplains, there is very little flat ground. The ridge-tops within a half-mile of the major stream are at an elevation of about 800 to 850, and the intervening streams are at an elevation of about 740'. A typical stream gains or loses 40' in elevation over a mile. The construction of I-40 and the development of a nearly continuous strip mall on Hanes Mall Boulevard has modified the topography of the project area. I-40 is on 40 to 45 feet of fill where it crosses the Little Creek drainage at an elevation of 785'. Hanes Mall Blvd crosses over I-40 at an elevation of about 810, and crosses the Little Creek culvert on nearly 60 feet of fill.

Surface Drainage and Geomorphology

The project area is drained by Little Creek, a third order stream, that flows nearly south in the project area, at an elevation of about 740 feet. For at least 600 feet upstream of the project, Little Creek is in a triple barrel 8x10 box culvert. Various drops, funnels, and buried pipes drain the water from the commercial development along Hanes Mall Blvd, from both sides of I-40, and from the bridge. Stream levels in the area probably change very rapidly during a rain event. Tributaries to Little Creek flow in east-west valleys south of the east-west ridge that carries Hanes Mall Boulevard.

Geology

The Project Area is in the Milton litho-tectonic belt. The 1985 Geologic Map of North Carolina shows Czbg, biotite gneiss under the entire project area. This is consistent with our investigation except for the possible identification of a small diabase or gabbro body. The residual soil layer is well developed, and up to 50 feet thick, even in the eroded flanks of the Little Creek valley. Below highly plastic cap clay, the residual soil is all micaceous to highly micaceous.

FOUNDATION MATERIALS

Soils Properties

Alluvial, residual and fill soils are all found on this project. A general description follows immediately below.

Fill Soil

Two areas of fill soil are on the project: 1). Roadway fill associated with the Hanes Mall Blvd Bridge over I-40, and 2.) Fill associated with a proposed retaining wall towards the end of the project. Though the road in area 2.) is also on fill, no change in grade is anticipated and the road foundation was not specifically tested.

Fill associated with the Hanes Mall Blvd Bridge

One boring in this round of drilling at –L- 20 +35, 65 left, found stiff A-7 fill with PI's of less than 20 in a non structural area. The logs from the original bridge borings that penetrated the I-40 fill found Stiff silt fill soil. Access problems prevented testing the existing fill but no indications of failure were discovered.

Fill Associated with the Strip Mall Retaining Wall

A retaining wall report for this area was completed and covers the subsurface in detail. The parking lot fill was closely sampled and found to be of variable composition, and probably derived from adjoining cut sections. The fill soil is finely micaceous and dominantly clay. PI's range from Non Plastic, (NP), to 26, with the bulk of the results falling around PI =15. The samples from borings B-1 through B-3 have Liquid Limit (L.L.) values in the mid 40's, with