



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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STATE PROJECT: 8.1442601 U-0620
FEDERAL PROJECT: STP-0622(2)
COUNTY: Cumberland
DESCRIPTION: Hope Mills Bypass from SR 1141 (Bingham Drive) to SR 1132
(Legion Road) at SR 1363 (Elk Road)
SUBJECT: Geotechnical Report - Bridge Foundation Investigation for
Dual Structures on Hope Mills Bypass over CSX Railroad at
-L- Station 161+95.29

Site Description

The bridge site is located north of Hope Mills on the alignment of the proposed Hope Mills Bypass at the CSX Railroad. The project consists of left and right lane structures with two spans having overall lengths of 258.5± feet along both the left and right lanes. Skews of the bents vary from 115° 52' 42" at EB-1 (Rt. Ln.) to 110° 7' 54" at EB-2 (Lt. Ln.). In addition, a proposed 257± foot long MSE wall to be constructed parallel to and in front of End Bent 2 is included in the project.

Two Standard Penetration Test (SPT) borings were made at or near each bent location and along the proposed MSE wall to provide subsurface information relative to foundation design. The borings for End Bent 1 and Bent 1 were made by NCDOT Geotechnical Engineering Unit personnel. However, due to the close proximity of the CSX Railroad to the location of End Bent 2 and the MSE wall, the End Bent 2 and MSE wall borings were contracted to S&M Engineers, Inc. The Geotechnical Engineering Unit borings were made with an ATV mounted CME-45C drill machine and advanced by rotary drilling methods using bentonite drilling fluid. The S&ME borings were made with an ATV mounted CME-45 drill machine, but were advanced with hollow stem augers and washed out by rotary drilling methods using water as a drilling fluid.

The bridge site is located in the Sand Hills region of the Upper Coastal Plain Physiographic Province. Geology at the site generally consists of a veneer of granular Coastal Plain sediments underlain by interbedded deltaic sand and clay sediments belonging to the Black Creek Formation of Upper Cretaceous age. Topography at the bridge site is typically gently sloping to nearly level with elevations ranging from 151 to 157± feet above sea level. Water levels in the bore holes were measured at elevations of 148 to 153± feet above sea level from mid May to early July, 2003 during a period of above average rainfall conditions.

Foundation Description

Subsurface conditions at the site are generally uniform. Surficial soils typically consist of 10 to 15± feet of very loose to loose fine to coarse sand (A-2-4, A-3). A thin indurated layer occurring at End Bent 1 is probably due to iron cementation at a former ground water level. Sediments belonging to the Black Creek Formation underlie the surficial sand deposit at an elevation of 135 to 142± feet. The Black Creek Formation at the bridge site generally consists of interbedded layers of loose to very dense fine to coarse sand or clayey sand (A-2-4, A-2-6, A-1-b) and medium stiff to hard silty to sandy clay (A-6, A-7-5, A-7-6). A typical sample of medium stiff silty clay (A-7-6) taken at boring EB1-A (Lt. Ln.) was tested at a moisture content of 41 percent.

Based on the proposed design, fill heights at the end bents range from 27 to 38± feet. Borrow meeting Coastal Plain criteria should be available in nearby areas.

The Geotechnical Foundation report is based on a Revised Preliminary drawing for Bridge over CSX Railroad on Hope Mills Bypass between SR 1003 and SR 1132 (Right and Left Lanes) dated June 13, 2003. If significant changes are made in the design or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

Respectfully submitted,

E. A. Witort

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Project Geologist

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