



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

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STATE PROJECT: 8.1331801 B-4320
FEDERAL PROJECT: BRSTP-403(3)
COUNTY: Duplin/Wayne
DESCRIPTION: Bridge No. 24 on NC 403 over Northeast Cape Fear River
SUBJECT: Geotechnical Report - Bridge Foundation Investigation for Bridge No. 24 on NC 403 over Northeast Cape Fear River at -L- Station 16+47.5

Site Description

The proposed bridge site is located at the existing NC 403 bridge over Northeast Cape Fear River approximately 5 miles east of Mount Olive at the Duplin/Wayne county line. The replacement structure will be constructed along the existing alignment. Based on the proposed design, the new structure will have three spans having a total length of 115 feet. The bents will have a skew of 120 degrees.

One Standard Penetration Test (SPT) boring was made at/or near each proposed bent location to provide subsurface information relative to foundation design. The boring at EB1-B was made in September 2002 during a site assessment. The borings were made with ATV mounted CME 45B and CME 45C drill machines and advanced by rotary drill methods using bentonite drilling fluid.

The bridge site is located in the Coastal Plain Physiographic Province and is underlain by Recent alluvial deposits and Cretaceous age sediments of the Middendorf formation and the Black Creek Formation. The Northeast Cape Fear River is a slow flowing stream typically 45 to 60 feet wide and 5± to 12± feet deep. Topography along the project is nearly flat to gently sloping. Elevations at the site range from 93± feet along the stream bed to 110± feet along the existing NC 403 embankment. The existing approach embankments are bordered by a 1,100± foot wide flood plain lying at an elevation of 105± feet.

The bridge site is situated in an area characterized by artesian water levels. Artesian flow was noted in the end bent borings drilled at the site where the hydrostatic head was estimated to be 0.2 foot above the collar elevation. The true water levels will generally match the stream flow line. The water surface of Northeast Cape Fear River was measured near an elevation of 106± feet during this investigation. The end bent borings were sealed after completion. Artesian flow was not noted at the interior bent borings but they were also sealed as a precautionary measure.

Foundation Description

Surficial alluvial soils at the bridge site generally consist of 3 to 7 feet of very loose to loose silty fine to coarse sand (A-1-b) and organic sand (A-2-5) with wood. Soils belonging to the Cretaceous age Middendorf Formation underlie the alluvial deposits at elevations ranging from 95± to 100± feet. The Middendorf Formation primarily consist of 5 to 10 feet of very loose to dense fine to coarse sand (A-1-b, A-2-4, A-3). The Black Creek Formation underlies the Middendorf deposits at elevations ranging from 85± to 89± feet. Soils within this formation typically consist of more than 55 feet of granular sediments (A-1-b, A-2-4, A-3) of varying densities. Based on SPT blow counts, soils within this formation generally have a medium dense to very dense consistency. However, it was noted that between elevations of 45 to 65 feet, the granular deposits typically exhibit a very loose to medium dense compactness. Borings B1-A and B2-B were extended to near an elevation of 22± feet with no significant change in stratigraphy noted.

Based on the proposed design, the existing grade will be maintained at the bridge site. The existing fill at the end bents consists of 7± feet of very loose to loose fine to coarse sand (A-2-4). The proposed end bent slopes will be mainly constructed within the existing embankment. Some additional fill will be required for construction of the end bent and side slopes. Borrow meeting Coastal Plain criteria is available in nearby areas.

The Geotechnical foundation report is based on the bridge survey report for Northeast Cape Fear River dated January 14, 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,

Fred M. Wescott III
Project Engineering Geologist

FMW