



**FROEHLING & ROBERTSON, INC.**  
 GEOTECHNICAL • ENVIRONMENTAL • MATERIALS  
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 "OVER ONE HUNDRED YEARS OF SERVICE"

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June 2, 2005


Mr. Njoroge Wainaina, P.E.  
 State Geotechnical Engineer  
 North Carolina Department of Transportation  
 PO Box 25201  
 Raleigh, North Carolina 27611-5201


Re: Bridge Foundation Investigation  
 State Project: 33656.1.1  
 TIP No.: B-4319  
 F.A. Number: BRSTP-222(2)  
 County: Wayne  
 Description: Bridge No. 21 over Great Swamp on NC 222

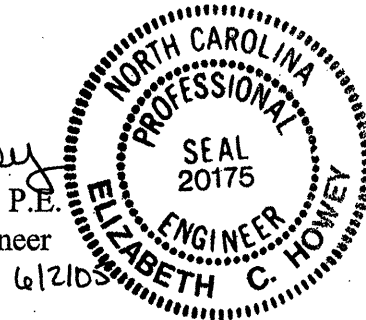
Dear Mr. Wainaina:

The Raleigh, North Carolina office of Froehling & Robertson, Inc. (F&R) is pleased to submit the accompanying Bridge Foundation Investigation Report. The work was performed in general accordance with F&R's Proposal 0666-021G dated May 5, 2005. Please contact us at your earliest convenience to discuss any comments regarding this report or our services in general.

Sincerely,

  
 Christopher R. Baldwin  
 Staff Geologist

  
 Elizabeth C. Howey, L.G., P.E.  
 Project Geotechnical Engineer



**SITE DESCRIPTION**

The proposed construction will involve a new single-span bridge to replace an existing three-span bridge on NC Highway 222 over Great Swamp. The existing bridge is 52.5 feet long supported by timber piles; some of the piles are encased in concrete. The proposed replacement bridge is a single span, 33 inch box beam structure with a length of 90 feet. The proposed skew angle is 90 degrees.

**METHOD OF EXPLORATION**

A subsurface investigation was conducted in May, 2005. Four borings were advanced at the proposed end bent locations to depths ranging from 33.5 to 43.6 feet with a CME-550 drill rig with a 140-pound automatic hammer, utilizing 2-1/4 inch inside diameter hollow stem augers. Standard penetration tests (SPT) were performed, in general accordance with ASTM D-1586, at all boring locations to aid in foundation analysis. Representative soil samples were obtained for visual classification in the field and returned to our office for potential laboratory analysis. Six samples were selected and subjected to grain size, Atterberg Limits, and natural moisture content testing in accordance with AASHTO T-87, T-88, T-89, and T-90 as modified by NCDOT. Two samples of the alluvial strata obtained were subjected to grain size analysis; the grain size curves are attached. One Shelby tube was obtained within the area of Hydraulic Scour and provided to NCDOT for Erosion Function Apparatus (EFA) testing.

Elevations were surveyed using Benchmark #2, a Railroad spike in a 30" oak at -BL- Station 14+55, 27 feet left with an elevation of 109.22 feet.

**GEOLOGY**

Based on review of the *Geologic Map of North Carolina* (1985), the project site is situated at the western edge of the Yorktown Coastal Plain deposits. However, no Coastal Plain deposits were encountered in our borings; these sediments have apparently been eroded in this area to expose the underlying Eastern Slate Belt material. The weathered rock and non-crystalline rock