STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

October 8, 2014

MEMORANDUM TO: Lisa Gilchrist, E.I.
Division Bridge Program Manager

FROM: for John L. Pilipchuk, L.G., P.E.
State Geotechnical Engineer

STATE PROJECT: 17BP.5.R.59 (SF-920089)
COUNTY: Warren
DESCRIPTION: Bridge No. 89 on SR 1510 (Mat Nelson Rd.) over Little Fishing Creek

SUBJECT: Geotechnical Report - Design and Construction Recommendations

I. Slope/Embankment Stability
   A. Slope Design
      Recommend that all slopes be constructed at a ratio of 2:1 (H:V) or flatter.

   B. Undercut
      A quantity of 100 cubic yards of undercut for embankment stability should be included in the project contract as a contingency item to be used at the discretion of the Engineer.

   C. Geotextile for Soil Stabilization
      A quantity of 100 square yards of geotextile for soil stabilization should be included in the project contract as a contingency item to be used at the discretion of the Engineer.

II. Subgrade Stability
   A. Subgrade Undercut
      Recommend a quantity of 200 cubic yards of subgrade undercut be included in the project contract as a contingency item for areas of unsuitable subgrade soil to be used at the discretion of the Engineer.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
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1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

TELEPHONE: 919-250-4088
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LOCATION:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

B. Geotextile for Soil Stabilization
Recommend a quantity of 200 square yards of geotextile for soil stabilization be included in the project contract as a contingency item to be used at the discretion of the Engineer.

III. Borrow Specifications

A. Select Granular Material
Select Granular Material for embankment construction on geotextile for soil stabilization shall meet the criteria outlined in Standard Specification, Article 1016-3 Class II or Class III. Include 300 cubic yards of this material in the project contract as a contingency item. The backfill material should be placed on geotextile for soil stabilization to a height not less than three (3) feet above geotextile for soil stabilization.

B. Shrinkage Factor
A shrinkage factor of 20 percent is recommended in the calculation of all earthwork quantities. This is to compensate for loss of soils due to erosion, clearing and grubbing of fill areas, and an increase in embankment quantities required due to consolidation of underlying soils and other factors.

IV. Miscellaneous

A. Reduction of Unclassified Excavation – Clearing and Grubbing
No significant loss of unclassified excavation is anticipated due to clearing and grubbing.

B. Reduction of Unclassified Excavation – Unsuitable Unclassified
Unclassified excavation will be derived from cut slope, ditch, and abutment embankment excavation. It is anticipated that 100 percent of unclassified excavation is suitable for embankment construction.

Prepared by,

NORTH CAROLINA PROFESSIONAL SEAL 30943 ENGINEER THEIN TUN ZAN

10/8/14

Thien T. Zan, PE
Geotechnical Engineer

Prepared by,

NORTH CAROLINA LICENSED SEAL 2124 GEOLOGIST NATHAN DANIEL MOHS

10/8/14

Nathan Mohs, LG
Transportation Engineering Geologist

JLP/JRB/NDM/TTZ

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
Summary of Quantities

WBS Number: 17BP.5.R.59 County: Warren Project Engineer: TTZ

TIP Number: N/A Field Office: Raleigh Project Geologist: NDM

Description: Bridge No. 89 on SR 1510 (Mat Nelson Rd.) over Little Fishing Creek

Pay Item No.	Pay Item/ Quantity Adjustment	Spec Book Section No. or Special Provision (SP) Reference	Report Section	Alignment	Begin Station	End Station	Quantity	Units / %
0036000000-E	Undercut Excavation	225 - Roadway Excavation	I. B	Contingency	N/A	N/A	100	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	II. A	Contingency	N/A	N/A	200	CY
						Total Quantity of Undercut Excavation =	**300**	**CY**
0195000000-E	Select Granular Material	265 - Select Granular Material	III. A	Contingency	N/A	N/A	300	CY
						Total Quantity of Select Granular Material =	**300**	**CY**
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	I. C	Contingency	N/A	N/A	100	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. B	Contingency	N/A	N/A	200	SY
						Total Quantity of Geotextile for Soil Stabilization =	**300**	**SY**

These Items Only Impact Earthwork Totals								
N/A	Shrinkage Factor	235 - Embankments	III. B	N/A	N/A	N/A	20	%

FOUNDATION RECOMMENDATIONS

PROJECT 17BP.5.R.59

T.I.P. NO. SF-920089

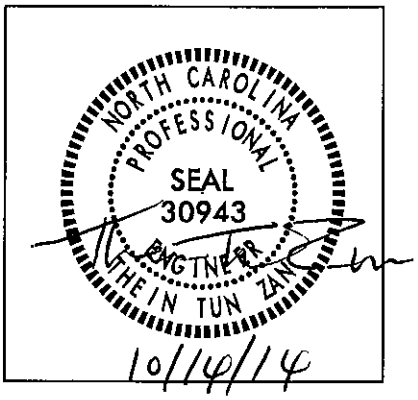
COUNTY WARREN

STATION 15+47.00 -L-

DESCRIPTION Bridge No. 89 on SR 1510

over Little Fishing Creek

	INITIALS	DATE
DESIGN	TEZ	10/13/14
CHECK	JRB	10/14/14
J.R.B.	JRB	10/14/14



BENT NO.	STATION	FOUNDATION TYPE	FACTORED RESISTANCE	MISCELLANEOUS DETAILS
END BENT 1	15+11.85 -L-	Cap on HP 12 x 53 Steel Piles	85 Tons/Pile	Bottom of Cap Elevation = 226.5 ft. ± Estimated Pile Length = 25 ft. ± (Lt.) & 20 ft. ± (Rt.) Number of Piles = 7
END BENT 2	15+81.85 -L-	Cap on HP 12 x 53 Steel Piles	85 Tons/Pile	Bottom of Cap Elevation = 225.5 ft. ± Estimated Pile Length = 20 ft. ± Number of Piles = 7

NOTES ON PLAN:

1. FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
2. PILES AT END BENT NO. 1 AND END BENT NO. 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 85 TONS PER PILE.
3. DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2 TO A REQUIRED DRIVING RESISTANCE OF 145 TONS PER PILE.
4. STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT END BENT NO. 1 AND END BENT NO. 2. FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.

COMMENTS

1. 1.5:1 (H:V) SLOPES FOR END BENTS WITH SLOPE PROTECTION ARE OKAY.
2. VERTICAL PILES MAY BE USED AT END BENT NO. 1 AND END BENT NO. 2.
3. PILE REDRIVES WILL NOT BE NEEDED.
4. BRIDGE APPROACH DETAIL FOR SUBREGIONAL TIER SHOULD BE USED AT END BENT NO. 1 AND END BENT NO. 2.
5. NO WAITING PERIOD IS REQUIRED FOR END BENT CONSTRUCTION AFTER COMPLETION OF EMBANKMENT.
6. DESIGN SCOUR ELEVATION (DSE) IS 207.5 FEET AT BOTH END BENTS. DSE DOES NOT AFFECT END BENTS.
7. BOTTOM OF CAP ELEVATIONS FOR END BENTS WERE ESTIMATED BASED ON BRIDGE SURVEY REPORT (BSR).

Prepared by: EEZ
Date: 10/14/14

Checked by: JRB
Date: 10/14/14

PILE PAY ITEMS

(Revised 8/15/12)

WBS ELEMENT 17BP.5.R.59 DATE 10/14/14

TIP NO. SF-920089 DESIGNED BY TCE

COUNTY WARREN CHECKED BY JRB

STATION 15+47.00 -L- 10/14/14

DESCRIPTION BRIDGE NO. 89 ON SR 1510 OVER LITTLE FISHING CREEK

NUMBER OF BENTS WITH PILES

NUMBER OF PILES PER BENT

NUMBER OF END BENTS WITH PILES

NUMBER OF PILES PER END BENT

Only required for "Predrilling for Piles" & "Pile Excavation" pay items

Bent # or End Bent #	PILE PAY ITEM QUANTITIES						
	Steel Pile Points (yes/no)	Pipe Pile Plates (yes/no/maybe)	Predrilling For Piles (per linear ft)	Pile Redrives (per each)	Pile Excavation (per linear ft)		PDA Testing (per each)
					In Soil	Not In Soil	
End Bent #1	YES						
End Bent #2	YES						
TOTALS			0	0	0	0	

Notes:

Blanks or "no" represent quantity of zero.

If steel pile points are required, calculate quantity of "Steel Pile Points" as equal to the number of steel piles.

If pipe pile plates are or may be required, calculate the quantity of "Pipe Pile Plates" as equal to the number of pipe piles.

Show quantity of "PDA Testing" on the plans as total only.

If quantity of "PDA Testing" is 3 or less, reference "Pile Driving Criteria" provision in PDA notes on plans and include "Pile Driving Criteria" provision in the contract.

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October 2, 2014

STATE PROJECT: 17BP.5.R.59 (SF-920089)
COUNTY: Warren

DESCRIPTION: Bridge No. 89 on SR 1510 (Mat Nelson Rd.) over Little Fishing Creek

SUBJECT: Geotechnical Report – Inventory

The Geotechnical Engineering Unit has completed a subsurface investigation for this project and presents the following inventory. No plans, profiles, or cross-sections will be submitted for this roadway project.

Project Description

The project consists of the replacement of Bridge No. 89 on SR 1510 (Mat Nelson Rd.) over Little Fishing Creek. The total length of the roadway portion of the project is 0.2 miles. Bore logs from the bridge subsurface investigation in September 2014 were referenced for this project.

Physiography & Geology

The project is located in rolling terrain of central Warren County. Little Fishing Creek is part of the Tar River Basin. Geologically the site is characterized by sands, silts, and clays associated with mica schist of the Raleigh Belt.

Soil Properties

Soils encountered at the site are roadway embankment, alluvial, and residual soils. The soils consist of granular and cohesive materials.

Roadway embankment soils consist of soft to medium stiff, silty clay (A-7). This material varies in depth up to 9.5 feet at the bridge approaches. Alluvial soils deposited by Little Fishing Creek consist primarily of medium stiff, sandy clay, and loose, silty sand (A-6 and A-2-4). Residual soils consist of moist to wet, loose to medium dense, silty sand (A-2-4), and stiff, sandy silt (A-4).

Groundwater

Groundwater is not expected to cause any problems during construction.

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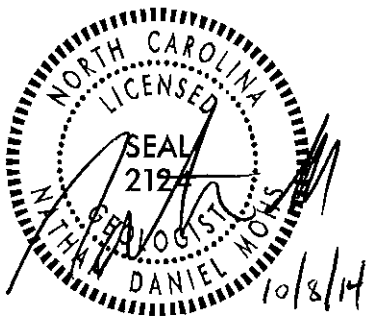
Prepared by,



Nathan Mohs,
Project Geological Engineer

JLP/NTR/NDM