STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

May 22, 2023

MEMORANDUM TO:	Chad Kimes, P.E. Division Engineer
ATTENTION:	Derek Pielech, P.E. Division Bridge Program Engineer
FROM:	Thomas Santee, P.E. Assistant State Geotechnical Engineer – Eastern Region
STATE PROJECT:	BP3.R006.1 (SF-810085)
COUNTY:	SAMPSON
DESCRIPTION:	Bridge No. 85 on SR 1214 over Great Coharie Creek Overflow
SUBJECT:	Structure Foundation Recommendations

DocuSigned by: Tom Santee 5B0A0ECC194B4EE...
DS JYP

The Geotechnical Engineering Unit has completed and presents the subsurface investigation and foundation recommendations for the above referenced project.

- ☒ Structure Inventory (7) pages
- ☒ Foundation Design Recommendation (2) pages
- ☒ Geotechnical Foundation Tables (1) Sheet
- ☒ Design Scour Elevation Memo (1) pages

Please call Thein Tun Zan, P.E. or Jinyoung Park, Ph.D., P.E. at (984) 920-8900 if there are any questions concerning this memorandum.

Attachment

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
EASTERN REGIONAL OFFICE
1570 MAIL SERVICE CENTER
RALEIGH, NC 27699-1570

Telephone: (984) 920-8900
Customer Service: 1-877-368-4968
Website: www.ncdot.gov

Location:
3301 JONES SAUSAGE RD. SUITE 100
GARNER, NC 27529

FOUNDATION RECOMMENDATIONS

PROJECT BP3.R006.1

DESCRIPTION: Br. 85 on SR 1214

T.I.P. NO. SF-810085

over Great Coharie Creek Overflow

COUNTY SAMPSON

STATION 23+94.00 -L-

	INITIALS	DATE
DESIGN	DS TTZ	05/22/2023
CHECK	DS JYP	05/23/2023

NORTH CAROLINA PROFESSIONAL SEAL 30943 ENGINEER THEIN TUN ZAN

DocuSigned by: Thein Tun Zan
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05/22/2023

BENT NO.	STATION	FOUNDATION TYPE	FACTORED RESISTANCE	MISCELLANEOUS DETAILS
END BENT 1	23+52.81 ± -L-	Cap on HP 12x53 Steel Piles	55 Tons/Pile	Bottom of Cap Elevation = 71.6 ft. ± Estimated Pile Length = 40 ft. Number of Piles = 7 Vertical Piles
BENT 1	23+89.00 ± -L-	Cap on HP 14x73 Steel Piles	100 Tons/Pile	Bottom of Cap Elevation = 71.6 ft. ± Point of Fixity Elevation = 47 ft. ± Tip No Higher Than Elevation = 30 ft. Estimated Pile Length = 60 ft. Number of Piles = 8 Vertical Piles
END BENT 2	24+35.19 ± -L-	Cap on HP 12x53 Steel Piles	65 Tons/Pile	Bottom of Cap Elevation = 71.6 ft. ± Estimated Pile Length = 50 ft. Number of Piles = 7 Vertical Piles

NOTES & COMMENTS (Continue on Following Page)

NOTES ON PLAN

1. FOR PILES, SEE PILES PROVISION AND SECTION 450 OF THE STANDARD SPECIFICATIONS.

COMMENTS

1. USE VERTICAL PILES FOR ALL BENTS.

2. 1.5:1 (H:V) END SLOPE WITH SLOPE PROTECTION IS OK FOR BOTH END BENTS.

3. USE TYPE II – MODIFIED BRIDGE APPROACH FILLS (2018 STANDARD DRAWING 422.02) AT BOTH END BENTS.

4. NO WAITING PERIOD IS REQUIRED FOR END BENT CONSTRUCTION AFTER COMPLETION OF EMBANKMENT.

5. THE DESIGN SCOUR ELEVATION FOR BENT NO. 1 IS ELEVATION 56 FT.

6. THE DESIGN SCOUR ELEVATIONS DO NOT IMPACT END BENTS.

Prepared by: DS TTZ
Date: 05/22/2023

Checked by: DS JYP
Date: 05/23/2023

SUMMARY OF PILE INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Resistance per Pile TONS	Pile Cut-Off (Top of Pile) Elevation FT	Estimated Pile Length per Pile FT	Scour Critical Elevation FT	Driven Piles			Predrilling for Piles*			Drilled-In Piles		
					Min Pile Tip (Tip No Higher Than) Elev FT	Required Driving Resistance (RDR)** per Pile TONS	Total Pile Redrives Quantity EACH	Predrilling Length per Pile Lin FT	Predrilling Elevation (Elev Not To Predrill Below) FT	Maximum Predrilling Dia INCHES	Pile Excavation (Bottom of Hole) Elev FT	Pile Exc Not In Soil per Pile Lin FT	Pile Exc In Soil per Pile Lin FT
End Bent 1 (Piles 1-7)	55	72.59	40			95							
Bent 1 (Piles 1-8)	100	72.64	60	53	30.0	170							
End Bent 2 (Piles 1-7)	65	72.56	50			110	11						

*Predrilling for Piles is required for end bents/bents with a predrilling length and at the Contractor's option for end bents/bents with predrilling information but no predrilling length.

$$^{**}RDR = \frac{Factored\ Resistance + Factored\ Downdrag\ Load + Factored\ Dead\ Load}{Dynamic\ Resistance\ Factor} + Nominal\ Downdrag\ Resistance + \frac{Nominal\ Scour\ Resistance}{Scour\ Resistance\ Factor}$$

SUMMARY OF PDA/PILE ORDER LENGTHS

(Blank entries indicate item is not applicable to structure)

Pile Driving Analyzer (PDA)				Pile Order Lengths	
End Bent/ Bent No	PDA Testing Required? YES or MAYBE	PDA Test Pile Length FT	Total PDA Testing Quantity EACH	End Bent/ Bent No(s)	Pile Order Length Basis* EST or PDA
End Bent 1 (Piles 1-7)	MAYBE	45			
Bent 1 (Piles 1-8)	MAYBE	65			
End Bent 2 (Piles 1-7)	MAYBE	55	1		

*EST = Pile order lengths from estimated pile lengths; PDA = Pile order lengths based on PDA testing. For groups of end bents/bents with pile order lengths based on PDA testing, the first end bent/bent no. listed for each group is the representative end bent/bent with the PDA.

PILE DESIGN INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #(-#) (e.g., "Bent 1, Piles 1-5")	Factored Axial Load per Pile TONS	Factored Downdrag Load per Pile TONS	Factored Dead Load* per Pile TONS	Dynamic Resistance Factor	Nominal Downdrag Resistance per Pile TONS	Nominal Scour Resistance per Pile TONS	Scour Resistance Factor (Default = 1.00)
End Bent 1 (Piles 1-7)	55			0.60			
Bent 1 (Piles 1-8)	100			0.60		6	1.00
End Bent 2 (Piles 1-7)	61			0.60			

*Factored Dead Load is factored weight of pile above the ground line.

PROJECT NO. BP3.R006.1 (SF-810085)

SAMPSON COUNTY

STATION: 23+94.00 -L-

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (Thein Tun Zan, PE seal #30943) on 05-22-2023.
2. Total Pile Driving Equipment Setup quantity (not shown in Pile Foundation Tables) equals the number of driven piles, i.e., the number of piles with a Required Driving Resistance.
3. The Engineer will determine the need for PDA Testing when PDAs or may be required.
4. For Piles, see piles provision and the section 450 of the Standard Specifications.

NORTH CAROLINA PROFESSIONAL SEAL PE # ENGINEER PE SEAL NAME

SIGNATURE DATE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE FOUNDATION TABLES

SHEET NO.

TOTAL SHEETS

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

REVISIONS

NO.	BY:	DATE:	NO.	BY:	DATE:
1			3		
2			4		