STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

DATE: June 11, 2021

TO: Brian Hanks, P.E.
State Structures Engineer

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

DS JP

SUBJECT: Geotechnical Foundation Tables and *Piles* Provision

The Geotechnical Engineering Unit (GEU) has completed the new geotechnical foundation tables and *Piles* provision as well as associated revised standard foundation notes and load request memo templates to improve how foundation information is shown in the plans and implement pile order lengths for all prestressed concrete piles. Listed below are the items that are new or revised:

- Geotechnical Foundation Tables (new)
- *Piles* Provision (new)
- Standard Foundation Notes (revised)
- Load Request Memo Templates (revised)

These items are effective beginning with the October 2021 letting. The piles provision has been sent to the Contract Standards and Development Unit to be included in their 2018 Specifications and Provisions line-up.

For bridges that the GEU has previously finished, updated foundation recommendations and structure plan changes will generally only be required for bridges with prestressed concrete piles. The GEU will review projects with completed foundation recommendations that are centrally let in October 2021 and beyond and send new load request memos as needed. The new load request memos are necessary primarily because additional information consisting of pile numbers and cut-off elevations is needed for the new tables. Since loads are not requested for bridges with standard foundation loads, pile cut-off/top of pier elevations and pile/pier/spread footing numbering will be requested by email in the future for standard bridges.

As a result of the new tables, the number of standard foundation notes has been significantly reduced. For most bridges, the new tables will eliminate more than half of the previous foundation notes. In addition, the drilled pier and pile pay item forms are no longer needed so these forms will not be included with future foundation recommendations. The geotechnical design engineer will complete the foundation tables except for the PE seal information, sheet no. and total sheets in the title blocks and attach the tables to the foundation recommendations as a half-size PDF plan

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

Telephone: 919-707-6850
Fax: 919-250-4237
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

sheet(s). The electronic Excel file of the plan sheet will be stored with the Geotechnical project files for the structure design engineer to review and seal a full-size PDF plan sheet(s). Any discrepancies in the foundation tables such as differences in loads or elevations or the number of piles/piers should be resolved with the geotechnical design engineer before finalizing the plan sheet. Hard copies of items listed above have been attached to this memo for your reference and the foundation tables and load request memo templates are also on the GEU website. If there are any questions, please contact Scott Hidden, P.E. of the Geotechnical Engineering Unit at (919) 707-6856.

Attachments: New Geotechnical Foundation Tables
New *Piles* Provision
Revised Standard Foundation Notes
Revised Load Request Memo Templates

cc: Aaron Earwood, P.E., Regional Bridge Construction Engineer
Jeff Renn, P.E., State Proposals and Specifications Engineer
David Hering, L.G., P.E., Eastern Regional Geotechnical Manager
Eric Williams, P.E., Western Regional Geotechnical Manager

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 Lenth 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

*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.

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

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)
							1.00
							1.00
							1.00
							1.00
							1.00

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

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

*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.

SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates Required? YES or MAYBE	Steel Pile Points			Steel Pile Tips Required? YES
		Pipe Pile Cutting Shoes Required? YES	Pipe Pile Conical Points Required? YES	H-Pile Points Required? YES	
TOTAL QTY:					

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #-# (e.g., "Bent 1, Piers 1-3")	Factored Resistance per Pier TONS	Minimum Pier Tip (Tip No Higher Than) Elevation FT	Required Tip Resistance per Pier TSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier Lin FT	Drilled Pier Length per Pier Lin FT	Drilled Pier Length Not In Soil per Pier Lin FT	Drilled Pier Length In Soil per Pier Lin FT	Permanent Steel Casing Required? YES or MAYBE	Permanent Steel Casing Tip Elevation (Elev Not To Extend Casing Below) FT	Permanent Steel Casing Length* per Pier Lin FT

*Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation.

SUMMARY OF DRILLED PIER TESTING

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #-# (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) Required? YES or MAYBE	Crosshole Sonic Logging (CSL) Required?* YES or MAYBE	Total CSL Tube Length (For All Tubes) per Pier Lin FT	Shaft Inspection Device (SID) Required? YES or MAYBE	Pile Integrity Test (PIT) Required? MAYBE
TOTAL QTY:					

*CSL Tubes are required if CSL Testing is or may be required. The number of CSL Tubes per drilled pier is equal to one tube per foot of design pier diameter with at least 4 tubes per pier. The length of each CSL Tube is equal to the drilled pier length plus 1.5 ft.

PROJECT NO. _____

_____ COUNTY

STATION: _____

NOTES:

1. The Pile and Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (PE seal name and #) on mm-dd-yyyy.
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, Pipe Pile Plates, Permanent Steel Casing, SPTs, CSL Testing, SID Inspections and PITs when these items may be required.

NORTH CAROLINA PROFESSIONAL SEAL PE # ENGINEER PE SEAL NAME

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE AND DRILLED PIER FOUNDATION TABLES

REVISIONS

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

SHEET NO.

TOTAL SHEETS

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 Lenth 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

*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

*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)
							1.00
							1.00
							1.00
							1.00
							1.00

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

SUMMARY OF PILE ACCESSORIES

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Pipe Pile Plates Required? YES or MAYBE	Steel Pile Points			Steel Pile Tips Required? YES
		Pipe Pile Cutting Shoes Required? YES	Pipe Pile Conical Points Required? YES	H-Pile Points Required? YES	
TOTAL QTY:					

PROJECT NO. _____

_____ COUNTY

STATION: _____

NOTES:

1. The Pile Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (PE seal name and #) on mm-dd-yyyy.
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 and Pipe Pile Plates when PDAs or plates may be required.

NORTH CAROLINA PROFESSIONAL SEAL PE # ENGINEER PE SEAL NAME

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PILE FOUNDATION TABLES

REVISIONS

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

SHEET NO.

TOTAL SHEETS

SUMMARY OF DRILLED PIER INFORMATION/INSTALLATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #-# (e.g., "Bent 1, Piers 1-3")	Factored Resistance per Pier TONS	Minimum Pier Tip (Tip No Higher Than) Elevation FT	Required Tip Resistance per Pier TSF	Scour Critical Elevation FT	Minimum Drilled Pier Penetration Into Rock per Pier Lin FT	Drilled Pier Length per Pier Lin FT	Drilled Pier Length Not In Soil per Pier Lin FT	Drilled Pier Length In Soil per Pier Lin FT	Permanent Steel Casing Required? YES or MAYBE	Permanent Steel Casing Tip Elevation (Elev Not To Extend Casing Below) FT	Permanent Steel Casing Length* per Pier Lin FT

*Permanent Steel Casing Length equals the difference between the ground line or top of drilled pier elevation, whichever is higher, and the permanent casing tip elevation.

SUMMARY OF DRILLED PIER TESTING

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pier(s) #-# (e.g., "Bent 1, Piers 1-3")	Standard Penetration Test (SPT) Required? YES or MAYBE	Crosshole Sonic Logging (CSL) Required?* YES or MAYBE	Total CSL Tube Length (For All Tubes) per Pier Lin FT	Shaft Inspection Device (SID) Required? YES or MAYBE	Pile Integrity Test (PIT) Required? MAYBE
TOTAL QTY:					

*CSL Tubes are required if CSL Testing is or may be required. The number of CSL Tubes per drilled pier is equal to one tube per foot of design pier diameter with at least 4 tubes per pier. The length of each CSL Tube is equal to the drilled pier length plus 1.5 ft.

NOTES:

1. The Drilled Pier Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (PE seal name and #) on mm-dd-yyyy.
2. The Engineer will determine the need for Permanent Steel Casing, SPTs, CSL Testing, SID Inspections and PITs when these items may be required.

PROJECT NO. _____

_____ COUNTY

STATION: _____

NORTH CAROLINA PROFESSIONAL SEAL PE # ENGINEER PE SEAL NAME

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

DRILLED PIER FOUNDATION TABLES

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				TOTAL SHEETS
2			4				

SUMMARY OF MICROPILE 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	Minimum Reinf Casing Tip (Tip No Higher Than) Elevation FT	Minimim Reinforcing Casing Penetration Into Rock per Pile Lin FT	Scour Critical Elevation FT	No Reinforcing Casing Joints Between Elevations FT - FT	Galvanizing Exposed Reinforcing Casing Required? YES

SUMMARY OF MICROPILE TESTING

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Pile(s) #-# (e.g., "Bent 1, Piles 1-5")	Demonstration Micropile(s) Required? YES	Load Testing			
		Proof Load Test(s) Required? YES	Verification Load Test(s) Required? YES	Factored Design Load (FDL) TONS	Permissible Total Vertical Movement at Top of Pile INCHES
TOTAL QTY:					

SUMMARY OF SPREAD FOOTING INFORMATION

(Blank entries indicate item is not applicable to structure)

End Bent/ Bent No, Footing(s) #-# (e.g., "Bent 1, Footings 1-2")	Factored Bearing Resistance TSF	Footing Dimensions (Length x Width) FT x FT	Required Bearing Resistance TSF	Scour Critical Elevation FT	Minimum Bottom of Footing (Footing No Higher Than) Elevation FT

NOTE:

1. The Micropile and Spread Footing Foundation Tables are based on the bridge substructure design and foundation recommendations sealed by a North Carolina Professional Engineer (PE seal name and #) on mm-dd-yyyy.

PROJECT NO. _____

_____ COUNTY

STATION: _____

NORTH CAROLINA PROFESSIONAL SEAL PE # ENGINEER PE SEAL NAME

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

MICROPILE AND SPREAD FOOTING FOUNDATION TABLES

REVISIONS							SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:		
1			3				TOTAL SHEETS
2			4				

PILES:

Revise the *2018 Standard Specifications* as follows:

Page 4-65, Article 450-1 DESCRIPTION, lines 14-16, replace the third paragraph with the following:

The estimated pile lengths shown in the plans are sufficient for the minimum required pile embedment or penetration and are estimates of the pile lengths needed for required driving resistance. Use estimated pile lengths for pile order lengths for prestressed concrete production piles or the Engineer will provide pile order lengths based on testing prestressed concrete piles with the pile driving analyzer (PDA). For bridges with staged construction and pile order lengths based on testing prestressed concrete piles with the PDA, order lengths for latter stages will not be provided until pile driving for previous stage of construction is complete.

Page 4-66, Article 450-3(C) Pile Accessories, line 14, insert the following as the second, third and fourth sentence of the first paragraph:

Steel pile points for steel pipe piles include pipe pile cutting shoes and conical points. Use "inside fit" pipe pile cutting shoes, i.e., cutting shoes with an outside diameter equal to the pipe pile diameter. Use pipe pile plates with a diameter equal to the pipe pile diameter.

Page 4-66, Article 450-3(D) Driven Piles, lines 37-39, replace the fourth paragraph with the following:

Redrive piles raised or moved laterally due to driving adjacent piles. For initial drive of prestressed concrete piles below a depth of 10 ft or 20% of pile length, whichever is greater, drive each pile continuously except to pause driving for one hour or less to change pile cushions and remove templates. Design and construct templates so prestressed concrete piles can be driven to pile cut-off without exceeding the one-hour time limit. When a prestressed concrete pile attains the required resistance and pile embedment or penetration, do not drive the pile any further to avoid cutting off the pile. If a prestressed concrete pile does not have the minimum required driving resistance when the pile head is 1 ft above pile cut-off, stop driving the pile.

Page 4-68, Article 450-3(D)(3) Required Driving Resistance, lines 10-11, replace the second paragraph with the following:

Stop driving piles if “refusal” is reached. Refusal occurs at 240 blows per foot (20 blows per inch) or any equivalent set (maximum set of 1/2 inch in 10 blows) with the required stroke as per the pile driving criteria.

Page 4-68, Article 450-3(D)(4) Restriking and Redriving Piles, lines 13-15, replace the first sentence of the first paragraph with the following:

If piles do not attain the required resistance with the estimated or order lengths, the Engineer may require the Contractor to stop driving piles, wait and restrike or redrive piles to attain the required

resistance.

Page 4-69, Article 450-3(F) Pile Driving Analyzer, lines 16-18, replace the second sentence of the second paragraph with the following:

Provide piles for PDA testing with lengths shown in the plans.

Page 4-71, Article 450-4 MEASUREMENT AND PAYMENT, lines 27-28, replace the second sentence of the third paragraph with the following:

Steel piles will be measured as the pile length before installation minus any pile cut-offs. Prestressed concrete piles will be measured as the pile length before installation.

Page 4-71, Article 450-4 MEASUREMENT AND PAYMENT, lines 40-45, replace the fifth paragraph with the following:

After steel piles attain the required resistance and pile penetration and at the Contractor's option, drive piles to grade instead of cutting off steel piles provided the remaining portions of piles do not exceed 5 ft and steel piles can be driven without damage or exceeding the maximum blow count or refusal. When this occurs, the additional pile length driven will be measured and paid at the contract unit prices for ____ *Steel Piles* and ____ *Galvanized Steel Piles*.

STANDARD FOUNDATION NOTES ON PLANS (LRFD) **(10-19-21)**

(Choices/optional note modifications are in parentheses.)

DRILLED PIERS

L 001 FOR DRILLED PIERS, SEE SECTION 411 OF THE STANDARD SPECIFICATIONS.
H 001 *** (LRFD) REVISED GEOTECH 6/17 ***

L 002 INSTALL PERMANENT STEEL CASINGS AT BENT NO. ___ BY VIBRATING, SCREWING OR DRIVING PERMANENT CASINGS BEFORE EXCAVATING OR DISTURBING ANY MATERIAL BELOW ELEVATION _____ FT.
H 002 *** REVISED GEOTECH 3/10 ***

L 003 DO NOT USE MULTIPLE TEMPORARY STEEL CASINGS IN A TELESCOPED ARRANGEMENT TO STABILIZE DRILLED PIER EXCAVATIONS AT BENT NO. ___.
H 003 *** REVISED GEOTECH 3/10 ***

L 004 DO NOT DEWATER DRILLED PIER EXCAVATIONS AT BENT NO. ___. CLEAN THE BOTTOM OF EXCAVATIONS WITH A SUBMERSIBLE PUMP OR AN AIRLIFT. WET PLACEMENT OF CONCRETE IS REQUIRED.
H 004 *** REVISED GEOTECH 11/07 ***

L 005 DO NOT USE SLURRY CONSTRUCTION FOR DRILLED PIERS AT BENT NO. ___.
H 005 *** REVISED GEOTECH 7/06 ***

L 006 SLURRY CONSTRUCTION IS REQUIRED FOR DRILLED PIERS AT BENT NO. ___.
H 006 *** REVISED GEOTECH 11/07 ***

L 007 DO NOT USE POLYMER SLURRY FOR DRILLED PIERS AT BENT NO. ___.
H 007 *** REVISED GEOTECH 7/06 ***

L 008 POLYMER SLURRY IS REQUIRED FOR DRILLED PIERS AT BENT NO. ___.
H 008 *** REVISED GEOTECH 11/07 ***

L 009 DRILLED PIER EXCAVATIONS AT BENT NO. ___ WILL EXTEND INTO MATERIAL THAT DETERIORATES WHEN EXPOSED TO THE ELEMENTS. CHECK FIELD CONDITIONS FOR THE REQUIRED TIP RESISTANCE AND PLACE CONCRETE IMMEDIATELY AFTER THE EXCAVATION IS COMPLETED.
H 009 *** (LRFD) GEOTECH 9/08 ***

END BENT EMBANKMENTS/MSE ABUTMENT WALLS/PILE SLEEVES

L 010 SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS FOR THE (SETTLEMENT GAUGES AND SURCHARGE or SETTLEMENT GAUGES or SURCHARGE) REQUIRED AT END BENT NO. ___.

H 010 *** REVISED GEOTECH 6/17 ***

L 011 OBSERVE A ___ MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO WITHIN 2 FT OF FINISHED GRADE BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO.___. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.
H 011 *** REVISED GEOTECH 6/17 ***

L 012 OBSERVE A ___ MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT, END BENT AND REINFORCED BRIDGE APPROACH FILL, IF APPLICABLE, BEFORE BEGINNING APPROACH SLAB CONSTRUCTION AT END BENT NO. ___. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.
H 012 *** REVISED GEOTECH 6/17 ***

L 013 OBSERVE A ___ MONTH WAITING PERIOD AFTER CONSTRUCTING THE EMBANKMENT TO THE BOTTOM OF CAP ELEVATION BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. ___. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.
H 013 *** REVISED GEOTECH 6/17 ***

L 014 OBSERVE A ___ MONTH WAITING PERIOD AFTER CONSTRUCTING THE MECHANICALLY STABILZED EARTH (MSE) ABUTMENT WALL TO WITHIN 1 FT OF THE BOTTOM OF CAP ELEVATION BEFORE BEGINNING END BENT CONSTRUCTION AT END BENT NO. ___. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.
H 014 *** GEOTECH 6/17 ***

L 015 INSTALL PILE SLEEVES BEFORE CONSTRUCTING THE MECHANICALLY STABILIZED EARTH (MSE) ABUTMENT WALL AT END BENT NO. ___. OBSERVE A ___ MONTH WAITING PERIOD AFTER CONSTRUCTING THE MSE ABUTMENT WALL TO WITHIN 1 FT OF THE BOTTOM OF CAP ELEVATION. THEN, INSTALL PILES THROUGH THE CORRUGATED STEEL PIPES AND FILL PIPES WITH LOOSE UNCOMPACTED SAND BEFORE CONSTRUCTING END BENT CAPS. FOR PILE SLEEVES, SEE MSE RETAINING WALL PLANS AND PROVISION. FOR BRIDGE WAITING PERIODS, SEE ROADWAY PLANS AND SECTION 235 OF THE STANDARD SPECIFICATIONS.
H 015 *** (LRFD) GEOTECH 10/21 ***

PILES

L 016 FOR PILES, SEE PILES PROVISION AND SECTION 450 OF THE STANDARD SPECIFICATIONS.
H 016 *** (LRFD) REVISED GEOTECH 10/21***

L 017 AT THE CONTRACTOR'S OPTION, SUBSTITUTE STEEL PILES FOR PRESTRESSED CONCRETE PILES AT BENT NO. ___ WITH THE FOLLOWING CONDITIONS:
H 017
L 018 1) SUBMIT STEEL PILE TYPE AND SIZE FOR APPROVAL.
H 018
L 019 2) SUBSTITUTE GALVANIZED STEEL PILES IN ACCORDANCE WITH SECTION 450 OF THE STANDARD SPECIFICATIONS FOR INTERIOR BENT PRESTRESSED CONCRETE PILES WITHOUT CALCIUM NITRITE CORROSION INHIBITOR.
H 019
L 020 3) SUBSTITUTE METALLIZED STEEL PILES WITH AN 8 MIL THICK 1350 ALUMINUM (W-AL-1350) THERMAL SPRAYED COATING AND A 0.5 MIL THICK SEAL COAT IN ACCORDANCE WITH THE THERMAL SPRAYED COATINGS (METALLIZATION) PROVISION FOR ALL PRESTRESSED CONCRETE PILES WITH CALCIUM NITRITE CORROSION INHIBITOR.
H 020
L 021 4) REGARDLESS OF THE TYPE, SIZE OR QUANTITY OF STEEL PILES SUBSTITUTED, PAYMENT FOR STEEL PILES WILL BE MADE FOR THE PLAN QUANTITY OF PRESTRESSED CONCRETE PILES AT THE CONTRACT UNIT PRICE FOR THE PRESTRESSED CONCRETE PILES. NO ADDITIONAL PAYMENT WILL BE MADE FOR STEEL PILE QUANTITIES IN EXCESS OF THE PLAN QUANTITY OF PRESTRESSED CONCRETE PILES REPLACED.
H 021
L 022 5) NO ADDITIONAL PAYMENT WILL BE MADE FOR CORROSION PROTECTION (GALVANIZING OR METALLIZING), STEEL PILE POINTS OR PIPE PILE PLATES. THESE ITEMS WILL BE CONSIDERED INCIDENTAL TO THE CONTRACT UNIT PRICE FOR THE PRESTRESSED CONCRETE PILES.
H 022 *** (LRFD) REVISED GEOTECH 4/11 ***

L 023 INSTALL PRESTRESSED CONCRETE AND STEEL H-PILE SECTIONS OF COMPOSITE PILES AT BENT NO. ___ TO TIP ELEVATIONS NO HIGHER THAN _____ FT AND _____ FT, RESPECTIVELY.
H 023 *** REVISED GEOTECH 4/11 ***

L 024 IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF ____ FT-LBS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT BENT NO. ___. THIS ESTIMATED ENERGY RANGE DOES NOT RELEASE THE CONTRACTOR FROM PROVIDING DRIVING EQUIPMENT IN ACCORDANCE WITH SUBARTICLE 450-3(D)(2) OF THE STANDARD SPECIFICATIONS.
H 024 *** (LRFD) REVISED GEOTECH 4/11 ***

L 025 DO NOT BEGIN WORK AT BENT NO. ___ UNTIL FILL HAS BEEN PLACED.
H 025 *** REVISED GEOTECH 6/05 ***

L 026 THE CONTRACTOR MAY CHOOSE TO CONSTRUCT BENT NO. ___ BEFORE PLACING FILL. PLACE FILL IN ACCORDANCE WITH ARTICLE 410-8 OF THE STANDARD SPECIFICATIONS.
H 026 *** REVISED GEOTECH 11/07 ***

L 027 THE QUANTITY SHOWN FOR FOUNDATION EXCAVATION IS BASED ON PLACING FILL BEFORE CONSTRUCTING BENT NO. ___. IF THE CONTRACTOR CHOOSES TO CONSTRUCT THE BENT(S) BEFORE PLACING FILL, THE QUANTITY FOR FOUNDATION EXCAVATION WILL BE MEASURED FROM THE GROUND LINE AT THE TIME OF BENT CONSTRUCTION.
H 027 *** REVISED GEOTECH 11/07 ***

L 028 BEFORE FILLING HOLES FOR PILE EXCAVATION AT BENT NO. ___, DRIVE PILES TO THE REQUIRED DRIVING RESISTANCE.
H 028 *** (LRFD) GEOTECH 10/21 ***

L 0296 FILL HOLES FOR PILE EXCAVATION AT BENT NO. ___ WITH CONCRETE OR GROUT.
H 029 *** REVISED GEOTECH 10/21 ***

L 030 FILL THE BOTTOM 3 FT OF HOLES FOR PILE EXCAVATION AT BENT NO. ___WITH CONCRETE OR GROUT AND THE REST OF HOLES WITH CLASS II OR III SELECT MATERIAL THAT MEETS SECTION 1016 OF THE STANDARD SPECIFICATIONS.
H 030 *** (LRFD) REVISED GEOTECH 10/21 ***

L 031 SPUDDING MAY BE USED INSTEAD OF PREDRILLING AT BENT NO. ___.
H 031 *** REVISED GEOTECH 4/11 ***

L 032 TEMPORARY STEEL CASINGS ARE REQUIRED FOR PREDRILLING (AND SPUDDING) AT BENT NO. ___.
H 032 *** GEOTECH 3/10 ***

L 033 PIER SCOUR PROTECTION IS REQUIRED FOR FOOTINGS AT BENT NO. ___. DO NOT PLACE RIP RAP ABOVE THE STREAM BED.
H 033 *** REVISED GEOTECH 7/06 ***

SPREAD FOOTINGS

L 034 (KEY or CARRY IN) SPREAD FOOTINGS AT BENT NO. ___ AT LEAST 12" INTO ROCK WITH MINIMUM THICKNESS AS SHOWN ON THE PLANS.
H 034 *** REVISED GEOTECH 11/07 ***

L 035 PIER SCOUR PROTECTION IS REQUIRED FOR SPREAD FOOTINGS AT BENT NO. ___. DO NOT PLACE RIP RAP ABOVE THE STREAM BED.
H 035 *** REVISED GEOTECH 7/06 ***

L 036 FOR BLASTING ADJACENT TO HIGHWAY STRUCTURES, SEE ARTICLE 410-9 OF THE STANDARD SPECIFICATIONS.
H 036 *** REVISED GEOTECH 4/11 ***

L 371 FOOTING EXCAVATIONS AT BENT NO. ___ WILL EXTEND INTO MATERIAL THAT DETERIORATES WHEN EXPOSED TO THE ELEMENTS. CHECK FIELD CONDITIONS FOR THE REQUIRED RESISTANCE AND PLACE CONCRETE IMMEDIATELY AFTER THE EXCAVATION IS COMPLETED.
H 037 *** (LRFD) GEOTECH 9/08 ***

CULVERT FOOTINGS

L 038 CONSTRUCT THE REINFORCED CONCRETE BOX CULVERT AT STATION _____ WITH ____" OF CAMBER TO ACCOUNT FOR ANTICIPATED SETTLEMENT.
H 038 *** REVISED GEOTECH 11/07 ***

L 039 BACKFILL WITH SELECT MATERIAL, CLASS _____ MEETING THE REQUIREMENTS OF SECTION 1016 OF THE STANDARD SPECIFICATIONS.
(Geotechnical Engineering Unit will determine select material class.)
H 039 *** REVISED GEOTECH 11/07 ***

L 040 (KEY or CARRY IN) FOOTINGS FOR THE REINFORCED BOX CULVERT AT STATION _____ AT LEAST 12" INTO ROCK WITH A MINIMUM THICKNESS AS SHOWN ON THE PLANS.
H 040 *** REVISED GEOTECH 11/07 ***

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

(Memo Date)

MEMORANDUM TO: (Structure Design Project Engineer)
Structures Management Project Engineer
(or consultant group receiving load request)

FROM: (Geotechnical Engineer)
Geotechnical Design Engineer

STATE PROJECT: WBS Number (TIP Number)
FEDERAL PROJECT: (Federal Project Number - if applicable)
COUNTY: (County)
DESCRIPTION: (Description of project)

SUBJECT: Request for Pile and Drilled Pier Loading Information

Design Scour Elevations, Maximum Factored Resistance, and Preliminary Point of Fixity Elevations are as follows for the Bents listed below. Based on the information available at the time of this request, the assumed site class is __.
(Choose Site Class based on AASHTO Section 3.10.3.1 and 3.10.3.1-1. The site class should be assumed based on the information available at the time of the load request. It is not necessary to perform additional or deeper borings, or additional laboratory or field testing in order to determine the site class. The assumed site class should only be based on the subsurface information obtained for the foundation design.)

Bent Number	Foundation Type	Design Scour Elevation	Maximum Factored Resistance	Preliminary Point of Fixity Elevation

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

Telephone: 919-707-6850
Fax: 919-250-4237
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

*** (Use this note if drilled-in piles will be used. Indicate which bent number will have drilled-in piles by placing an asterisk in in the "Foundation Type" column next to the pile description.) Piles must be installed vertically, due to the need for drilled-in piles (pile excavation). If drilled-in piles are required for an integral end bent, only the bottom 3 ft of holes will be filled with concrete or grout. The rest of the holes will be filled with Class II or III select material to allow for horizontal pile movement.**

Please provide the following information so we may consider the use of piles and drilled piers for the project referenced above.

Piles

1. The elevation of the bottom of cap for each end bent or interior bent and the elevation of the bottom of footing for each bent using a footing on piles foundation.

2. The number, spacing, and arrangement of piles for each bent. The type of pile assumed for computing loads (i.e. single or double row, battered or plum).

3. The pile number of every pile at each bent and the footing number for bents with a footing on piles foundation.

4. The pile cut-off elevation for each pile.

5. For bents with fully supported piles (i.e. End Bents), the maximum factored load at the top of the pile.

6. For bents with piles that are not fully supported, a sketch of the piles showing the following factored loads at the top of the pile

    a. Maximum axial load (P) with the associated longitudinal shear and longitudinal moment.
    b. Maximum longitudinal shear load (V_L) with the associated axial load and longitudinal moment.
    c. Maximum transverse shear load (V_T) with the associated axial load and transverse moment.

Drilled Piers

1. The elevation of the bottom of cap for each end bent or interior bent and the bottom of footing for each bent using a footing on piers foundation.

2. A sketch of the piers showing the following factored loads at the top of the column.

    a. Maximum axial load (P) with the associated longitudinal shear and longitudinal moment.
    b. Maximum longitudinal shear load (VL) with the associated axial load and longitudinal moment.
    c. Maximum transverse shear load (VT) with the associated axial load and transverse moment.

3. The number and spacing of columns for each bent and the diameter of column and pier assumed for computing loads.

4. The pier number of every pier at each bent and the footing number for bents with a footing on piers foundation.

5. The elevation of the construction joint between the column and pier if the column diameter is different from the pier and any other cold joint elevations.

In order to keep the project on schedule, we will need to receive this information by (Memo Date + 6 weeks). If you have any questions, please call (Design Engineer) or (Project Engineer) at (Phone Number).

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

(Memo Date)

MEMORANDUM TO: (Structure Design Project Engineer)
Structures Management Project Engineer
(or consultant group receiving load request)

FROM: (Geotechnical Engineer)
Geotechnical Design Engineer

STATE PROJECT: WBS Number (TIP Number)
FEDERAL PROJECT: (Federal Project Number - if applicable)
COUNTY: (County)
DESCRIPTION: (Description of project)

SUBJECT: Request for Pile Loading Information

Design Scour Elevations, Maximum Factored Resistance, and Preliminary Point of Fixity Elevations are as follows for the Bents listed below. Based on the information available at the time of this request, the assumed site class is __.
(Choose Site Class based on AASHTO Section 3.10.3.1 and 3.10.3.1-1. The site class should be assumed based on the information available at the time of the load request. It is not necessary to perform additional or deeper borings, or additional laboratory or field testing in order to determine the site class. The assumed site class should only be based on the subsurface information obtained for the foundation design.)

Bent Number	Foundation Type	Design Scour Elevation	Maximum Factored Resistance	Preliminary Point of Fixity Elevation

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

Telephone: 919-707-6850
Fax: 919-250-4237
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

*** (Use this note if drilled-in piles will be used. Indicate which bent number will have drilled-in piles by placing an asterisk in in the "Foundation Type" column next to the pile description.) Piles must be installed vertically, due to the need for drilled-in piles (pile excavation). If drilled-in piles are required for an integral end bent, only the bottom 3 ft of holes will be filled with concrete or grout. The rest of the holes will be filled with Class II or III select material to allow for horizontal pile movement.**

Please provide the following information so we may consider the use of piles for the project referenced above.

1. The elevation of the bottom of cap for each end bent or interior bent and the elevation of the bottom of footing for each bent using a footing on piles foundation.

2. The number, spacing, and arrangement of piles for each bent. The type of pile assumed for computing loads (i.e. single or double row, battered or plum).

3. The pile number of every pile at each bent and the footing number for bents with a footing on piles foundation.

4. The pile cut-off elevation for each pile.

5. For bents with fully supported piles (i.e. End Bents), the maximum factored load at the top of the pile.

6. For bents with piles that are not fully supported, a sketch of the piles showing the following factored loads at the top of the pile

    a. Maximum axial load (P) with the associated longitudinal shear and longitudinal moment.
    b. Maximum longitudinal shear load (V_L) with the associated axial load and longitudinal moment.
    c. Maximum transverse shear load (V_T) with the associated axial load and transverse moment.

In order to keep the project on schedule, we will need to receive this information by (Memo Date + 6 weeks). If you have any questions, please call (Design Engineer) or (Project Engineer) at (Phone Number).

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J. ERIC BOYETTE
SECRETARY

(Memo Date)

MEMORANDUM TO: (Structure Design Project Engineer)
Structures Management Project Engineer
(or consultant group receiving load request)

FROM: (Geotechnical Engineer)
Geotechnical Design Engineer

STATE PROJECT: WBS Number (TIP Number)
FEDERAL PROJECT: (Federal Project Number - if applicable)
COUNTY: (County)
DESCRIPTION: (Description of project)

SUBJECT: Request for Drilled Pier Loading Information

Preliminary Point of Fixity Elevations and Design Scour Elevations are as follows for the Bents listed below. Based on the information available at the time of this request, the assumed site class is __.

(Choose Site Class based on AASHTO Section 3.10.3.1 and 3.10.3.1-1. The site class should be assumed based on the information available at the time of the load request. It is not necessary to perform additional or deeper borings, or additional laboratory or field testing in order to determine the site class. The assumed site class should only be based on the subsurface information obtained for the foundation design.)

Bent Number	Foundation Type	Design Scour Elevation	Maximum Factored Resistance	Preliminary Point of Fixity Elevation

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT
1589 MAIL SERVICE CENTER
RALEIGH NC 27699-1589

Telephone: 919-707-6850
Fax: 919-250-4237
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
CENTURY CENTER COMPLEX
ENTRANCE B-2
1020 BIRCH RIDGE DRIVE
RALEIGH NC

Please provide the following information so we may consider the use of drilled piers for the project referenced above.

1. The elevation of the bottom of cap for each end bent or interior bent and the bottom of footing for each bent using a footing on piers foundation.

2. A sketch of the piers showing the following factored loads at the top of the column.

    a. Maximum axial load (P) with the associated longitudinal shear and longitudinal moment.
    b. Maximum longitudinal shear load (V_L) with the associated axial load and longitudinal moment.
    c. Maximum transverse shear load (V_T) with the associated axial load and transverse moment.

3. The number and spacing of columns for each bent and the diameter of column and pier assumed for computing loads.

4. The pier number of every pier at each bent and the footing number for bents with a footing on piers foundation.

5. The elevation of the construction joint between the column and pier if the column diameter is different from the pier and any other cold joint elevations.

In order to keep the project on schedule, we will need to receive this information by (Memo Date + 6 weeks). If you have any questions, please call (Design Engineer) or (Project Engineer) at (Phone Number).