



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

October 16, 2012

MEMORANDUM TO: C. E. (Neil) Lassiter, Jr., P.E.
Division 2 Engineer

ATTENTION: Lang Jones
Division Design Engineer

FROM: *CAK* K. J. Kim, Ph.D., P.E.
Eastern Regional Geotechnical Manager

STATE PROJECT: 17BP.2.R.20 (SF-510020)
FEDERAL PROJECT: N/A
COUNTY: Jones

DESCRIPTION: Bridge No. 20 on SR 1004 (Island Creek Rd.) over Island Creek

SUBJECT: Bridge Foundation Recommendations

The Geotechnical Engineering Unit has completed the subsurface investigation and has prepared the foundation design recommendations for the above structure and presents the following project data:

- Bridge Inventory (5) pages
- Foundation Design Recommendations (3) pages
- Design Calculations () pages
- Special Provisions () pages

Please call Majid Khazaei, P.E. or Chris Kreider, P.E. at (919) 662-4710 if there are any questions concerning this memorandum.

KJK/CAK/MK
Attachment

MAILING ADDRESS:
EASTERN REGIONAL OFFICE
GEOTECHNICAL ENGINEERING UNIT
1570 MAIL SERVICE CENTER
RALEIGH NC 27699-1570

TELEPHONE: 919-662-4710
FAX: 919-662-3095

WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
3301 JONES SAUSAGE RD., SUITE 100
GARNER, NC 27529-9489

FOUNDATION RECOMMENDATIONS

WBS: 17BP.2.R.20

DESCRIPTION : Bridge No. 20 on SR 1004 (Island Creek Rd.)

T.I.P. NO.: SF-510020

over Island Creek

COUNTY: Jones

STATION: 12+00.50 -L-

	INITIALS	DATE
DESIGN	MK	10/16/2012
CHECK	CAK	10/16/12
APPROVAL	CAK	10/16/12



BENT	STATION	FOUNDATION TYPE	FACTORED RESISTANCE	MISCELLANEOUS DETAILS
END BENT 1	11+66.88 ± -L-	Cap on HP 12x53 Steel Piles	80 tons/pile	Bottom of Cap El. = 13.0 ft ± Estimated Length of Pile = 50 ft ± Number of Piles = 7
END BENT 2	12+34.13 ± -L-	Cap on HP 12x53 Steel Piles	80 tons/pile	Bottom of Cap El. = 13.0 ft ± Estimated Length of Pile = 50 ft ± Number of Piles = 7

NOTES ON PLANS & COMMENTS

See Following Pages

FOUNDATION RECOMMENDATION NOTES ON PLANS

- 1) FOR PILES, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- 2) PILES AT END BENT NO. 1 AND 2 ARE DESIGNED FOR A FACTORED RESISTANCE OF 80 TONS PER PILE.
- 3) DRIVE PILES AT END BENT NO. 1 AND 2 TO A REQUIRED DRIVING RESISTANCE OF 135 TONS PER PILE.
- 4) STEEL H-PILE POINTS ARE REQUIRED FOR STEEL H-PILES AT BENT NO. 1 AND 2.
FOR STEEL PILE POINTS, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS.
- 5) IT HAS BEEN ESTIMATED THAT A HAMMER WITH AN EQUIVALENT RATED ENERGY IN THE RANGE OF 30 to 50 FT-KIPS PER BLOW WILL BE REQUIRED TO DRIVE PILES AT END BENT NO. 1 AND END BENT NO. 2. 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.
- 6) TESTING PILES WITH THE PDA DURING DRIVING, RESTRIKING OR REDRIVING MAY BE REQUIRED. THE ENGINEER WILL DETERMINE THE NEED FOR PDA TESTING. FOR PDA TESTING, SEE SECTION 450 OF THE STANDARD SPECIFICATIONS (AND FOR PILE DRIVING CRITERIA, SEE PILE DRIVING CRITERIA PROVISION).

FOUNDATION RECOMMENDATION COMMENTS

- 1) 1½:1 (H:V) SLOPE AT THE END BENTS ARE OK WITH SLOPE PROTECTION.
- 2) REINFORCED BRIDGE APPROACH FILLS ARE REQUIRED AT EACH END BENT.
- 3) NO WAITING PERIOD IS REQUIRED BEFORE BEGINNING ANY WORK FOR END BENT CONSTRUCTION AFTER COMPLETION OF THE EMBANKMENT AT EACH END BENT.

PILE PAY ITEMS

(Revised 8/15/12)

WBS ELEMENT 17BP.2.R.20

TIP NO. SF-510020

COUNTY Jones

STATION 12+00.50 -L-

DATE 10/16/2012

DESIGNED BY MK

CHECKED BY CAK

DESCRIPTION Bridge No. 20 on SR 1004 (Island Creek Rd.)
over Island 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						PDA Testing (per each)
	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)		
					In Soil	Not In Soil	
End Bent # 1	yes						X
End Bent # 2	yes						
TOTALS			0	0	0	0	1

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.



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

October 11, 2012

Memorandum to: O.R. Azizi, P.E.
Structures Management Project Engineer

Project: 17BP.2.R.20 (SF-510020)
F. A. Project: N/A
County: Jones
Description: Bridge No. 20 on SR 1004 over Island Creek

Subject: Design Scour Elevation

Based on site flooding history, historical scour depth and geologic conditions at the site, the Geotechnical Engineering Unit agrees with the Hydraulic Unit's 100 yr. theoretical scour elevation proposed in the Bridge Survey and Hydraulic Report.

Location	Design Scour Elevation	Does DSE impact end bents?
Channel Bed	-0.7± feet	Yes

The subsurface investigation at the site revealed soft cohesive alluvial soils to an elevation of 0.4± feet. Geotechnical analysis indicates a low resistance to scour. Very soft limestone belonging to the River Bend Formation was encountered below the alluvial soils. The design scour elevation impacts both end bents; however, these impacts are not significant.

Dean N. Argenbright, L.G.
Regional Geological Engineer
Geotechnical Engineering Unit

cc: David Chang, P.E., Hydraulics Unit
Njoroge Wainaina, P.E., Geotechnical Engineering Unit
Chris Kreider P.E., Geotechnical Engineering Unit

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.2.R.20 (SF-510020) F.A. PROJ. _____
 COUNTY JONES
 PROJECT DESCRIPTION BRIDGE NO. 20 ON SR 1004 (ISLAND CREEK ROAD) OVER ISLAND CREEK AT -L- STA. 12+00.50

CONTENTS
SHEET

<u>DESCRIPTION</u>
1 TITLE SHEET
2 LEGEND
3 SITE PLAN
4 PROFILE
5 BORE LOGS

STATE	STATE PROJECT REFERENCE NO.	SHEET	TOTAL SHEETS
N.C.	SF-510020	1	5

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THROUGH FIELD BORING LOGS, ROCK CORES, AND SOIL TESTS AT AVAILABLE BOREHOLE LOCATIONS, THE BIDDING ENGINEERING UNIT AT (919) 707-6800, NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS DO NOT CONSIDER THE EFFECTS OF LONG-TERM CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS AND REPORTS ARE NOT TO BE USED AS A BASIS FOR CONSTRUCTION. THE SUBSURFACE PLANS AND REPORTS, INCLUDING THE FIELD BORING LOGS AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR DESIGNING OR CONSTRUCTING THE PROJECT UNDER THE CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

C.M. WRIKE

R.E. SMITH

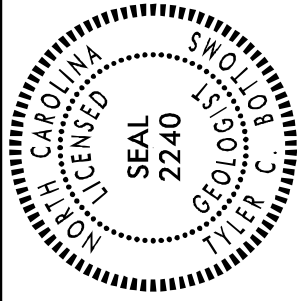
D.G. PINTER

INVESTIGATED BY I.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE OCTOBER 2012



NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

DRAWN BY: C.P. TURNER

ID: SF-510020

PROJECT: 17BP.2.R.20

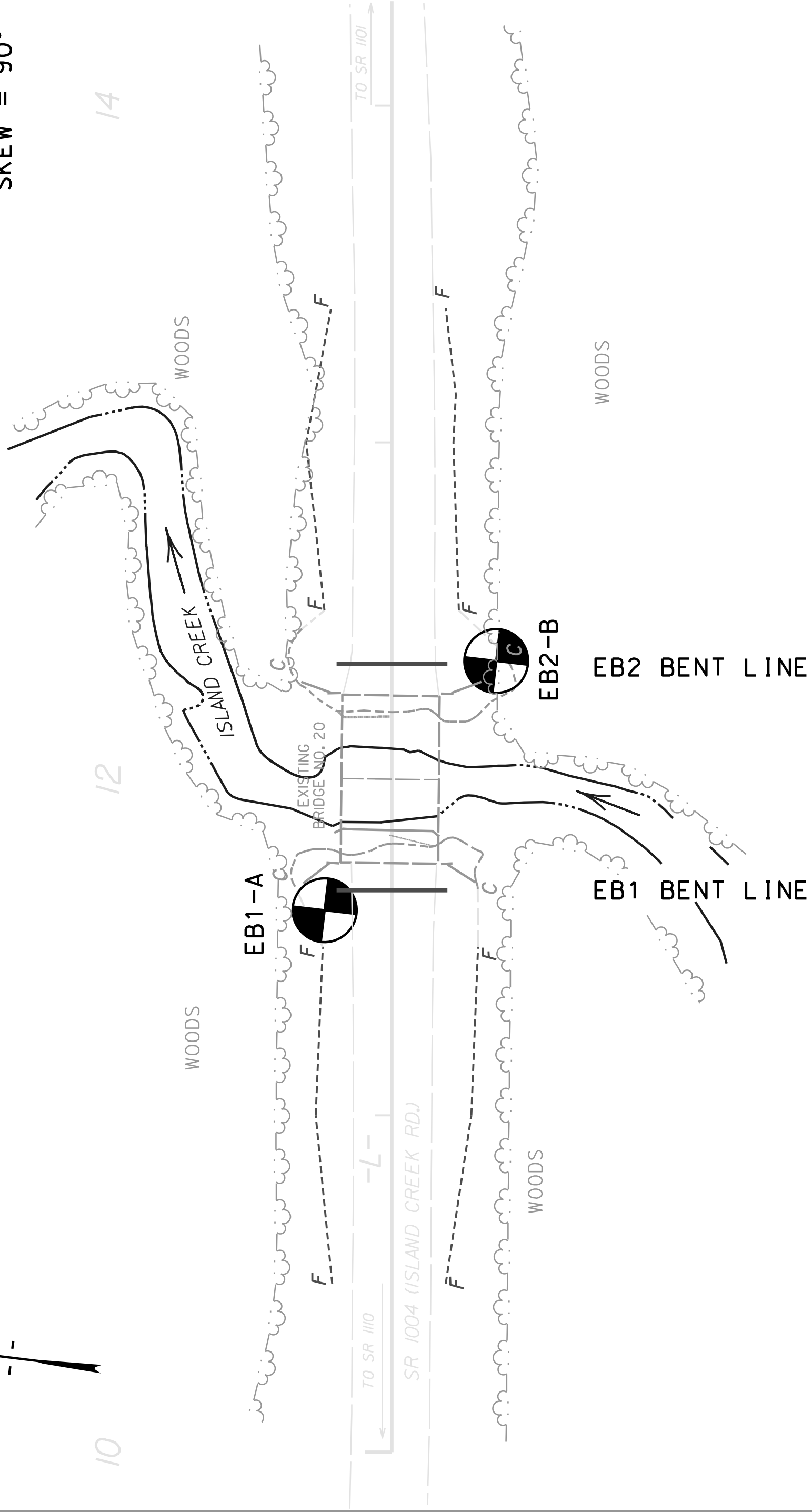
SKEW = 90°



10

12

14



EB2 BENT LINE

EB1 BENT LINE

PROFILE THROUGH BORINGS PROJECTED ALONG -L-

PROJECT REFERENCE NO. **SF-50020** SHEET NO. **4 OF 5**
 ROADWAY DESIGN ENGINEER
 HYDRAULICS ENGINEER

INCOMPLETE PLANS
 DO NOT USE FOR ACQUISITION

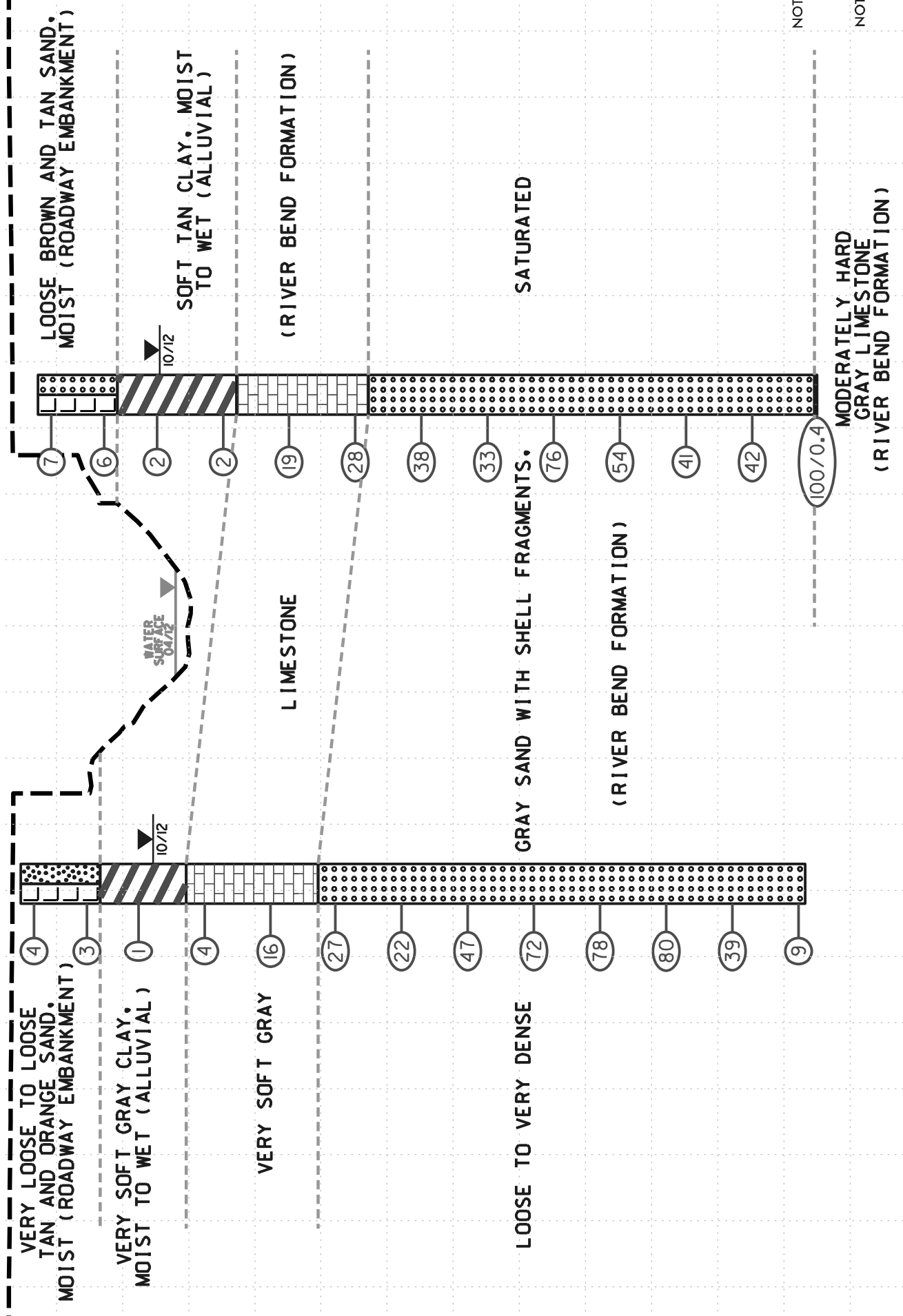
PRELIMINARY PLANS
 DO NOT USE FOR CONSTRUCTION

VE = 2.0 35

EBI-A 11+61 20' LT
 EB2-B 12+35 31' RT

50 45 40 35 30 25 20 15 10 5 0 -5 -10 -15 -20 -25 -30 -35 -40 -45 -50

11+00 11+50 12+00 12+50 13+00 13+50



NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT PROVIDED.

NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.2.R.20		TIP SF-510020		COUNTY JONES		GEOLOGIST Wrike, C. M.		
SITE DESCRIPTION BRIDGE NO. 20 ON -L (SR 1004) OVER ISLAND CREEK								
BORING NO. EB1-A		STATION 11+61		OFFSET 20 ft LT		ALIGNMENT -L-		
COLLAR ELEV. 17.7 ft		TOTAL DEPTH 59.3 ft		NORTHING 470.047		EASTING 2,558,320		
DRILL RIG/HAMMER EFF./DATE		GFO1042 CME-550 91% 05/23/2012		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER Smith, R. E.		START DATE 10/02/12		COMP. DATE 10/02/12		SURFACE WATER DEPTH N/A		
ELEV (ft)	DEPTH (ft)	BLOW COUNT		BLOWS PER FOOT		SAMP. NO.	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
		0.5ft	0.5ft	0	25				50	75	100
20	17.7	1	2	2	.....	.....	GROUND SURFACE	0.0
15	13.7	1	2	2	.....	.....	ROADWAY EMBANKMENT TAN AND ORANGE SAND, MOIST	6.0
10	9.8	WOH	WOH	1	.....	.....	ALLUVIAL GRAY SANDY CLAY, MOIST TO WET	11.7
5	4.8	4	2	2	.....	.....	COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)	12.5
0	-0.2	5	4	12	.....	.....	COASTAL PLAIN GRAY SAND WITH SHELL FRAGMENTS, (RIVER BEND FORMATION)	22.5
-5	-5.1	6	11	16	.....	.....
-10	-10.1	6	9	13	.....	.....
-15	-15.1	11	15	32	.....	.....
-20	-20.1	11	21	51	.....	.....
-25	-25.1	22	26	52	.....	.....
-30	-30.1	27	44	36	.....	.....
-35	-35.1	14	15	24	.....	.....
-40	-40.1	4	4	5	.....	.....
	-41.6							59.3
								Boring Terminated at Elevation -41.6 ft in Loose Sand

WBS 17BP.2.R.20		TIP SF-510020		COUNTY JONES		GEOLOGIST Wrike, C. M.		
SITE DESCRIPTION BRIDGE NO. 20 ON -L (SR 1004) OVER ISLAND CREEK								
BORING NO. EB2-B		STATION 12+35		OFFSET 31 ft RT		ALIGNMENT -L-		
COLLAR ELEV. 16.4 ft		TOTAL DEPTH 58.9 ft		NORTHING 470,005		EASTING 2,558,400		
DRILL RIG/HAMMER EFF./DATE		GFO1042 CME-550 91% 05/23/2012		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic		
DRILLER Smith, R. E.		START DATE 10/01/12		COMP. DATE 10/01/12		SURFACE WATER DEPTH N/A		
ELEV (ft)	DEPTH (ft)	BLOW COUNT		BLOWS PER FOOT		SAMP. NO.	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
		0.5ft	0.5ft	0	25				50	75	100
20	16.4	2	4	3	.....	.....	GROUND SURFACE	0.0
15	12.4	3	3	3	.....	.....	ROADWAY EMBANKMENT TAN AND BROWN SAND, MOIST	16.4
10	8.4	1	1	1	.....	.....	ALLUVIAL TAN SANDY CLAY, MOIST TO WET	10.4
5	3.4	WOH	WOH	2	.....	.....	COASTAL PLAIN GRAY LIMESTONE (RIVER BEND FORMATION)	15.0
0	-1.6	7	9	10	.....	.....	COASTAL PLAIN GRAY SAND WITH SHELL FRAGMENTS, (RIVER BEND FORMATION)	25.0
-5	-6.6	15	16	12	.....	.....
-10	-11.6	16	17	21	.....	.....
-15	-16.6	12	14	19	.....	.....
-20	-21.6	17	32	44	.....	.....
-25	-26.6	15	24	30	.....	.....
-30	-31.6	6	13	28	.....	.....
-35	-36.6	11	16	26	.....	.....
-40	-41.6	12	100/0.4		.....	.....
	-42.3							58.7
	-42.5							58.9
								COASTAL PLAIN MODERATELY HARD GRAY LIMESTONE (RIVER BEND FORMATION) Boring Terminated at Elevation -42.5 ft in Moderately Hard Limestone