STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33395.1.1 (B-4028)	1	27

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33395.1.1	BRSTP-0011(9)	P.E.
		R/W & UTIL.

ID: B-4028

PROJECT: 33395.1.1

CONTENTS

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33395.1.1 (B-4028) F.A. PROJ. BRSTP-0011(9)

COUNTY BLADEN

PROJECT DESCRIPTION BRIDGE NO. 12 ON NC 11 OVER CAPE FEAR RIVER AT -L- STA. 29+02.5

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. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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PERSONNEL

CMW

MACTEC PERSONNEL

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE APRIL 2010

DRAWN BY: C.R. SUMNER, J.L. STONE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS 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.

NORTH CAROLINA LICENSED SEAL 2007 GEOLOGIST JOSEPH L. STONE 4/21/10

PROJECT REFERENCE NO.	SHEET NO.
B-4028	2 OF 27

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX		50 MX	25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
LIQUID LIMIT	6 MX		NP		40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX															
GROUP INDEX	0		0		0		4 MX	8 MX	12 MX	16 MX	No MX				
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND		SILTY OR CLAYEY GRAVEL AND SAND			SILTY SOILS		CLAYEY SOILS					
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR		UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY), MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

AR - AUGER REFUSAL	HI. - HIGHLY	w - MOISTURE CONTENT
BT - BORING TERMINATED	MED. - MEDIUM	V - VERY
CL. - CLAY	MICA. - MICACEOUS	VST - VANE SHEAR TEST
CPT - CONE PENETRATION TEST	MOD. - MODERATELY	WEA. - WEATHERED
CSE. - COARSE	NP - NON PLASTIC	γ - UNIT WEIGHT
DMT - DILATOMETER TEST	ORG. - ORGANIC	γ_d - DRY UNIT WEIGHT
DPT - DYNAMIC PENETRATION TEST	PMT - PRESSUREMETER TEST	
e - VOID RATIO	SAP. - SAPROLITIC	
F - FINE	SD. - SAND, SANDY	
FOSS. - FOSSILIFEROUS	SL. - SILT, SILTY	
FRAC. - FRACTURED, FRACTURES	SLI. - SLIGHTLY	
FRAGS. - FRAGMENTS	TCR - TRICONE REFUSAL	

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B- _
- [ ] BK-51
- [X] CME-550
- [X] CME-45B
- [ ] CME-750
- [ ] PORTABLE HOIST
- [ ] _
- [ ] _

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE _ " TUNG.-CARB.
- [ ] CORE BIT
- [ ] _

HAMMER TYPE:
- [X] AUTOMATIC
- [ ] MANUAL

CORE SIZE:
- [ ] -B _
- [X] -N X N Q
- [ ] -H _

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: (BL-3)-L- STA. 22+14, (BL-2)-L- STA. 17+37

ELEVATION: 50.9 & 14.3 FT.

NOTES:

REVISED 02/23/06

0	50	100
FEET		

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SITE PLAN

SKEW=90°

NOTE: END BENT AND INTERIOR BENTS 1 & 2 ARE ON A 70° SKEW.

NAD 83

25+00

WOODS

EB1 BENT LINE

B1 BENT LINE

B2 BENT LINE

B3 BENT LINE

B4 BENT LINE

EB1-A

B1-A

B1-B

B2-A

B2-B

B3-B

B4-A

-L-

10' SOIL

TO NC 87

16' SOIL

CAPE FEAR RIVER

WOODS

PROJECT REFERENCE NO.	SHEET
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SITE PLAN

0 50 100
FEET

SKEW=90°

NAD 83

30+00

35+00

WOODS

WOODS

WOODS

B5 BENT LINE

B6 BENT LINE

B7 BENT LINE

B8 BENT LINE

B9 BENT LINE

B10 BENT LINE

B11 BENT LINE

EB2 BENT LINE

B8-A

B10-A

EB2-A

-L-

8" SOIL

8" SOIL

B5-B

B6-B

B7-B

B9-B

B11-B

NC 11

TO SR 1539

PROJECT REFERENCE NO.	SHEET NO.
B-4028	5 OF 27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

VE = 2.5

EBI-A 22+64 30' LT

BI-B 24+21 6' RT

B2-B 25+47 3' RT

B3-B 26+84 25' RT

B4-A 27+79 30' LT

B5-B 28+74 25' RT

VERY LOOSE TO MEDIUM DENSE GRAY SAND, MOIST TO SAT. (UNDIVIDED COASTAL PLAIN)

STIFF TO VERY STIFF SANDY CLAY, WET

STIFF TO HARD SANDY SILT, WET

MEDIUM DENSE GRAY GREEN SAND, SAT.

(NORMAL) WATER ▼ SURFACE

TAN AND GRAY GREEN SILTY (PEEDEE FORMATION)

HARD GRAY GREEN (PEEDEE FORMATION)

AVERAGE STRATA REC = 100%
AVERAGE STRATA RQD = 100%

MEDIUM STIFF TO VERY STIFF GRAY GREEN SANDY CLAY, WET

LOOSE TO MEDIUM DENSE TO VERY DENSE GRAY SAND, SAT. AND VERY STIFF TO STIFF GRAY SANDY SILT, WET (PEEDEE FORMATION)

VERY SOFT TO MEDIUM STIFF TAN SILTY CLAY, WITH CLAYEY SANDY AND SANDY SILT, MOIST TO WET (ALLUVIAL)

VERY LOOSE TO MEDIUM DENSE GRAY SAND, SAT. (ALLUVIAL)

GRAY SILTY SANDY AND SANDY CLAYEY SAND, SAT. (PEEDEE FORMATION)

VERY DENSE GRAY SAND, SAT. (PEEDEE FORMATION)

HARD LIMESTONE (PEEDEE FORMATION)

✱ ARTESIAN HEAD ELEVATIONS:
B1-B= 7.1'
B2-B= 4.8'

Ⓐ MEDIUM STIFF TAN SANDY SILT, MOIST (UNDIVIDED COASTAL PLAIN)

Ⓑ SOFT TO HARD GRAY LIMESTONE AND CALCAREOUS MUDSTONE (PEEDEE FORMATION)

Ⓒ VERY STIFF GRAY SANDY SILT, WET (PEEDEE FORMATION)

Ⓓ LOOSE TAN SAND, MOIST (ALLUVIAL)

Ⓔ MEDIUM DENSE GRAY SAND, SAT. (PEEDEE FORMATION)

50 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110 -120 -130 -140

22+00 22+50 23+00 23+50 24+00 24+50 25+00 25+50 26+00 26+50 27+00 27+50 28+00 28+50 29+00

PROJECT REFERENCE NO.	SHEET NO.
B-4028	6 OF 27

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

VE = 2.5

B6-B
29+69
25' RT

B7-B
30+64
22' RT

B8-A
31+59
25' LT

B9-B
32+54
25' RT

B10-A
33+49
25' LT

B11-B
34+44
22' RT

EB2-A
35+39
25' LT

VERY SOFT TO MEDIUM STIFF TAN SILTY SANDY, SANDY SILTY, AND SILTY CLAY, WITH SANDY SILT AND CLAYEY SANDY SILT, MOIST TO WET (ALLUVIAL)

VERY LOOSE TO MEDIUM DENSE TAN AND GRAY SAND SAT.

(ALLUVIAL)

VERY SOFT TO HARD GRAY GREEN SILTY SANDY AND SANDY CLAY WITH SANDY SILT, WET (PEEDEE FORMATION)

LOOSE TO MEDIUM DENSE GRAY GREEN SAND, SAT. (PEEDEE FORMATION)

STIFF GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)

MEDIUM DENSE TO VERY DENSE GRAY SAND, SAT. (PEEDEE FORMATION)

STIFF TO HARD GRAY CLAY (PEEDEE FORMATION)

LOOSE TO MEDIUM DENSE GRAY GREEN SAND AND CLAYEY SAND, SAT. (PEEDEE FORMATION)

SAND AND CLAYEY SAND, SAT.

SANDY SILT, WET

MEDIUM DENSE TO DENSE GRAY CLAYEY SAND AND SAND, SAT. WITH STIFF TO HARD (PEEDEE FORMATION)

STIFF TO VERY STIFF GRAY SANDY CLAY AND SANDY SILT, WET (PEEDEE FORMATION)

ST-1

ST-2

Ⓐ LOOSE TO VERY DENSE GRAY GREEN SAND AND CLAYEY SAND, SAT. (PEEDEE FORMATION)

Ⓑ SOFT TO HARD LIMESTONE AND CALCAREOUS MUDSTONE (PEEDEE FORMATION)

Ⓒ MEDIUM DENSE TO DENSE GRAY SAND AND CLAYEY SAND, SAT. (PEEDEE FORMATION)

Ⓓ LOOSE TAN SAND, MOIST (ALLUVIAL)

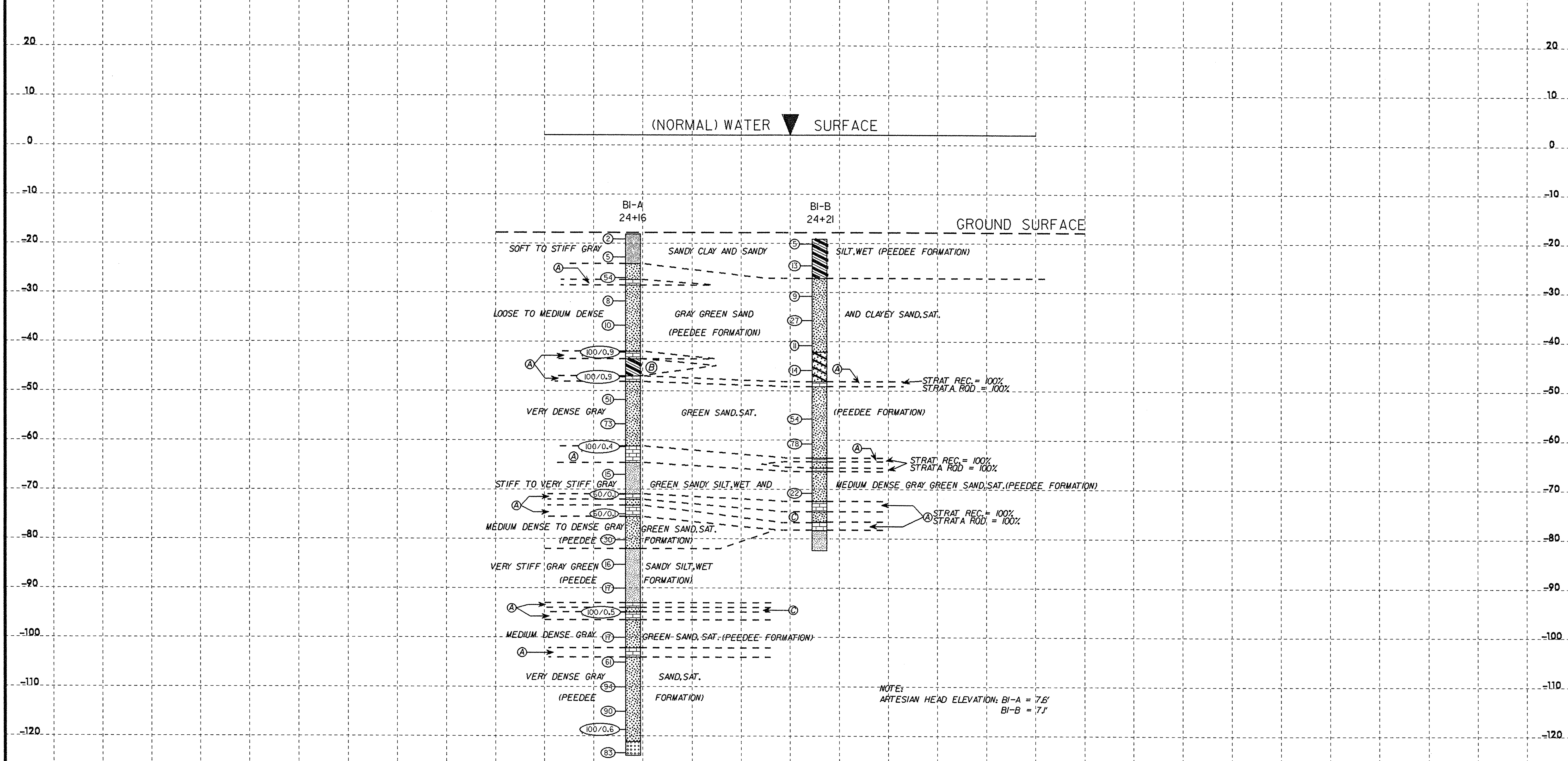
Ⓔ VERY STIFF TO HARD GRAY SANDY CLAY, WET (PEEDEE FORMATION)

29+00 29+50 30+00 30+50 31+00 31+50 32+00 32+50 33+00 33+50 34+00 34+50 35+00 35+50 36+00

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4028	7 OF 27

CROSS SECTION THROUGH BENT 1



Ⓐ SOFT TO HARD LIMESTONE AND CALCAREOUS MUDSTONE (PEEDEE FORMATION)

Ⓑ STIFF GRAY SANDY CLAY,WET (PEEDEE FORMATION)

Ⓒ MEDIUM DENSE TO DENSE GRAY GREEN SAND,SAT. (PEEDEE FORMATION)

24+15.00

-L-

20-APR-2010 13:16
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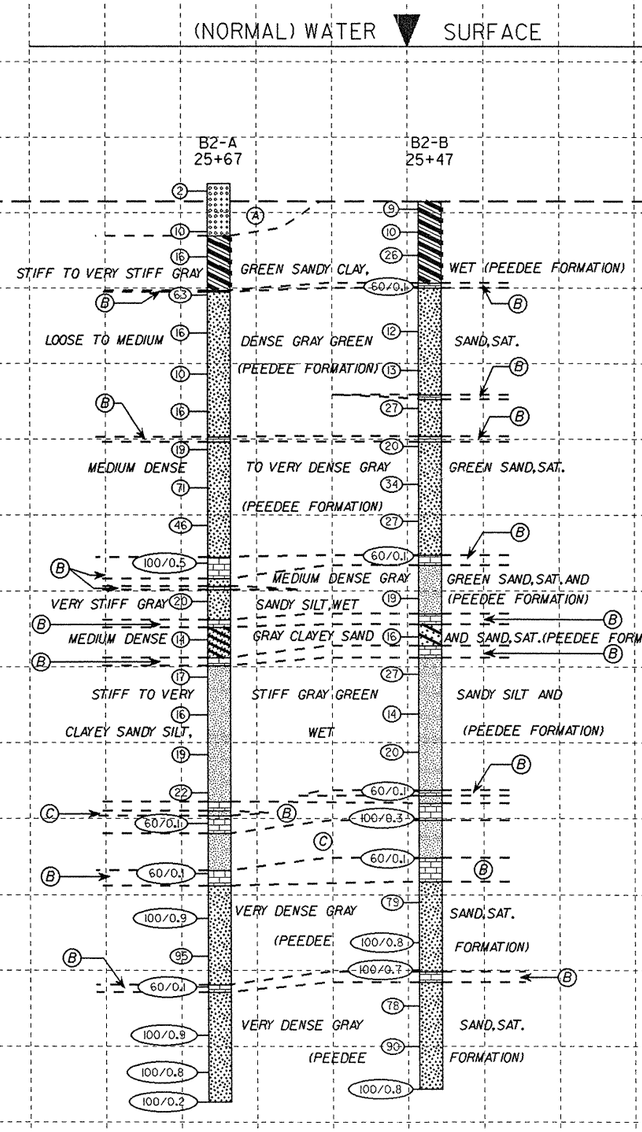
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	B-4028	8 OF 27

CROSS SECTION THROUGH BENT 2



NOTE:
ARTESIAN HEAD ELEVATION: B2-A = 4.0'
B2-B 4.8'

(A) VERY LOOSE TO LOOSE GRAY SAND,SAT.(ALLUVIAL)

(B) MODERATELY HARD TO HARD LIMESTONE AND CALCAREOUS MUDSTONE (PEEDEE FORMATION)

(C) VERY STIFF GRAY GREEN CLAYEY SANDY SILT,WET (PEEDEE FORMATION)

25+65.00
-L-

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 22+64	**OFFSET** 30 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 46.8 ft	**TOTAL DEPTH** 64.6 ft	**NORTHING** 236,045	**EASTING** 2,220,772	**24 HR.** 20.9
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/05/10	**COMP. DATE** 01/06/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										46.8 GROUND SURFACE	0.0
	46.8	0.0	4	4	3	7	SS-1			**UNDIVIDED COASTAL PLAIN** TAN SANDY SILT, MOIST 44.8	2.0
	42.8	4.0	5	6	10	16	SS-2			**UNDIVIDED COASTAL PLAIN** TAN GRAY SAND AND CLAYEY SAND, MOIST TO SAT. 40.8	6.0
	38.7	8.1	4	6	7	13	SS-3				
	33.7	13.1	4	4	5	9				30.8	16.0
	28.7	18.1	4	7	7	14	SS-4				
	23.7	23.1	4	4	6	10					
	18.7	28.1	WOH	WOH	WOH	0				17.2	29.6
	13.7	33.1	5	7	8	15	SS-5			**COASTAL PLAIN** GRAY GREEN SILTY SANDY CLAY, WET (PEEDEE FORMATION)	
	8.7	38.1	5	7	7	14					
	3.7	43.1	20	60/0.1		60/0.1	SS-6			5.8	41.0
	-1.3	48.1	12	7	8	15				**COASTAL PLAIN** GRAY GREEN SANDY SILT, WET (PEEDEE FORMATION)	
	-6.3	53.1	5	5	8	13	SS-7			-4.2	51.0
	-11.3	58.1	6	8	9	17				**COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)	
	-16.3	63.1	6	9	10	19	SS-8			-14.2	61.0
										COASTAL PLAIN GRAY GREEN SANDY CLAY, WET (PEEDEE FOMRATION)	
										-17.8	64.6
										Boring Terminated at Elevation -17.8 ft IN VERY STIFF SANDY CLAY	

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 24+16	**OFFSET** 32 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. -18.1 ft	**TOTAL DEPTH** 105.8 ft	**NORTHING** 236,191	**EASTING** 2,220,817	**24 HR.** ART.
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/15/10	**COMP. DATE** 01/20/10	**SURFACE WATER DEPTH** 20.1ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
										WATER SURFACE (01/15/10)
-18.1		0.0	5	1	1	2	SS-55			GROUND SURFACE 0.0
										COASTAL PLAIN GRAY SANDY SILT, WET
-21.8		3.7	WOH	1	4	5				
-24.1		6.0								**COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-26.0		7.9	7	12	42	54	SS-56			
-27.4		9.3								LIMESTONE AND CALCAREOUS MUDSTONE
-28.5		10.4								**COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
-30.8		12.7	4	3	5	8				
-35.8		17.7	5	5	5	10	SS-57			
-40.8		22.7	4	4	96/0.4	100/0.9				
-42.0		23.9								LIMESTONE AND CALCAREOUS MUDSTONE
-43.5		25.4								**COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-45.8		27.7	5	9	91/0.4	100/0.9	SS-58			
-47.0		28.9								LIMESTONE AND CALCAREOUS MUDSTONE
-48.1		30.0								**COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
-50.8		32.7	20	25	26	51				
-55.8		37.7	14	37	36	73	SS-59			
-61.0		42.9	100/0.4			100/0.4				
-61.3		43.2								LIMESTONE AND CALCAREOUS MUDSTONE
-64.6		46.5								**COASTAL PLAIN** GRAY GREEN SANDY SILT, WET (PEEDEE FORMATION)
-66.0		47.9	6	7	8	15	SS-60			
-71.0		52.9	60/0.1			60/0.1				
-72.1		54.0								LIMESTONE AND CALCAREOUS MUDSTONE
-73.3		55.2								**COASTAL PLAIN**
-74.3		56.2				60/0.1				

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 24+16	**OFFSET** 32 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. -18.1 ft	**TOTAL DEPTH** 105.8 ft	**NORTHING** 236,191	**EASTING** 2,220,817	**24 HR.** ART.
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/15/10	**COMP. DATE** 01/20/10	**SURFACE WATER DEPTH** 20.1ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-75						Match Line				
			60/0.1							
-79.3		61.2								
			10	14	16	30	SS-61			
-84.3		66.2								
			6	7	9	16	SS-62			
-89.1		71.0								
			8	8	9	17				
-94.1		76.0								
			9	100/0.5		100/0.5	SS-63			
-99.1		81.0								
			8	8	9	17				
-104.1		86.0								
			16	25	36	61	SS-64			
-109.1		91.0								
			24	38	56	94				
-114.1		96.0								
			17	33	57	90	SS-65			
-117.6		99.5								
			28	82	18/0.1	100/0.6				
-122.4		104.3								
			21	33	50	83	SS-66			

-75.6			GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
-57.5			LIMESTONE AND CALCAREOUS MUDSTONE *(continued)*
			COASTAL PLAIN
-82.1		64.0	GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
			COASTAL PLAIN
			GRAY GREEN SANDY SILT, WET (PEEDEE FORMATION)
-93.1		75.0	
-94.1		76.0	LIMESTONE AND CALCAREOUS MUDSTONE
-95.0		76.9	
-96.6		78.5	**COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
			LIMESTONE AND CALCAREOUS MUDSTONE
-102.2		84.1	**COASTAL PLAIN**
-104.1		86.0	GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
			LIMESTONE AND CALCAREOUS MUDSTONE
			COASTAL PLAIN
			GRAY SAND, SAT. (PEEDEE FORMATION)
-121.1		103.0	
-123.9		105.8	Boring Terminated at Elevation -123.9 ft IN VERY DENSE SAND

ARTESIAN HEAD ELEVATION 7.6'

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 24+21	**OFFSET** 6 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. -19.1 ft	**TOTAL DEPTH** 63.3 ft	**NORTHING** 236,183	**EASTING** 2,220,855	**24 HR.** ART.
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/01/10	**COMP. DATE** 03/02/10	**SURFACE WATER DEPTH** 21.1ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
10											
5											
0										WATER SURFACE (03/01/10)	
-5											
-10											
-15											
-20	-19.1	0.0	WOH	2	3	5	SS-211			-19.1 GROUND SURFACE	0.0
-25	-23.5	4.4	4	5	8	13				**COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)	
-30	-29.8	10.7	3	4	5	9	SS-212			-27.1 **COASTAL PLAIN** GRAY SAND AND CLAYEY SAND, SAT. (PEEDEE FORMATION)	8.0
-35	-34.8	15.7	5	8	19	27	SS-213				
-40	-39.8	20.7	3	5	6	11					
-45	-44.8	25.7	6	7	7	14	SS-214			-42.1	23.0
-50							RS-1			-48.1 -49.1 SOFT TO HARD GRAY CALCAREOUS, FOSSILFEROUS SANDY MUDSTONE **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FOMATION)	29.0 30.0
-55	-54.8	35.7	19	23	31	54	SS-215				
-60	-59.8	40.7	13	21	57	78					
-65							RS-2			-63.7 -64.4 HARD GRAY VUGGY, SANDY, FOSSILFEROUS LIMESTONE WITH PHOSPHATE -65.7 -66.4 **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)	44.6 45.3 46.6 47.3
-70	-69.8	50.7									

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 24+21	**OFFSET** 6 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. -19.1 ft	**TOTAL DEPTH** 63.3 ft	**NORTHING** 236,183	**EASTING** 2,220,855	**24 HR.** ART.
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/01/10	**COMP. DATE** 03/02/10	**SURFACE WATER DEPTH** 21.1ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-70						Match Line				
-75			9	10	12	22	SS-216			-72.5 HARD GRAY VUGGY, SANDY, FOSSILFEROUS LIMESTONE WITH PHOSPHATE 53.4 **COASTAL PLAIN** -74.6 GRAY SAND, SAT. (PEEDEE FORMATION) *(continued)* 55.5 -76.7 HARD TO SOFT DARK GRAY 57.6 RS-3 -78.4 CALCAREOUS SANDY MUDSTONE 59.3 **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION) -82.4 **COASTAL PLAIN** HARD LIGHT GRAY, FOSSILFEROUS 63.3 SANDY LIMESTONE **COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION) Boring Terminated at Elevation -82.4 ft IN VERY STIFF SANDY SILT ARTESIAN HEAD ELEVATION 7.1'
-80										
-85										
-90										
-95										
-100										
-105										
-110										
-115										
-120										
-125										
-130										
-135										
-140										
-145										
-150										

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 24+21	**OFFSET** 6 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. -19.1 ft	**TOTAL DEPTH** 63.3 ft	**NORTHING** 236,183	**EASTING** 2,220,855	**24 HR.** ART.
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/01/10	**COMP. DATE** 03/02/10	**SURFACE WATER DEPTH** 21.1ft	
CORE SIZE NX/NQ	**TOTAL RUN** 17.9 ft			

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS
-48.1											Begin Coring @ 29.0 ft
-50	-48.1	29.0	4.4	1:32/1.0 1:16/1.0 1:05/1.0 0:32/1.0	(1.0) 23%	(1.0) 23%	RS-1	(1.0) 100%	(1.0) 100%		-48.1 (29.0) SOFT TO HARD GRAY CALCAREOUS, FOSSILFEROUS SANDY MUDSTONE -49.1 (30.0) **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
	-52.5	33.4		0:20/1.4							
-55				*N=54*			*SS-215*				
-60				*N=78*							
	-63.7	44.6									-63.7 (44.6)
-65			3.6	2:54/1.0 0:46/1.0 3:21/1.0 0:42/0.6	(1.4) 39%	(1.4) 39%	RS-2	(0.7) 100%	(0.7) 100%		-64.4 (45.3) HARD GRAY VUGGY, SANDY, FOSSILFEROUS LIMESTONE WITH PHOSPHATE -65.7 (46.6)
	-67.3	48.2						(0.7) 100%	(0.7) 100%		-66.4 (47.3) **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-70				*N=22*			*SS-216*				HARD GRAY VUGGY, SANDY, FOSSILFEROUS LIMESTONE WITH PHOSPHATE
	-72.5	53.4									-72.5 (53.4) **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-75			4.9	4:02/1.0 1:10/1.0 1:00/1.0 1:55/1.0	(2.7) 55%	(2.7) 55%		(2.1) 100%	(2.1) 100%		HARD TO SOFT DARK GRAY CALCAREOUS, SANDY MUDSTONE -74.6 (55.5)
	-77.4	58.3									-76.7 (57.6) **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-80			5.0	2:08/0.9 2:30/1.0 0:58/1.0 0:50/1.0 0:36/1.0	(1.0) 20%	(1.0) 20%	RS-3	(1.7) 100%	(1.7) 100%		-78.4 (59.3) **COASTAL PLAIN** HARD LIGHT GRAY, FOSSILFEROUS SANDY LIMESTONE
	-82.4	63.3		0:51/1.0							-82.4 (63.3) **COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION)
-85											Boring Terminated at Elevation -82.4 ft IN VERY STIFF SANDY SILT
-90											ARTESIAN HEAD ELEVATION 7.1'
-95											
-100											
-105											
-110											
-115											
-120											
-125											

NCDOT CORE DOUBLE BORINGS.GPJ NC_DOT.GDT 4/21/10

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 25+67	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. -16.1 ft	**TOTAL DEPTH** 121.2 ft	**NORTHING** 236,333	**EASTING** 2,220,870	**24 HR.** ART.
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/24/10	**COMP. DATE** 02/26/10	**SURFACE WATER DEPTH** 18.1ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										ELEV. (ft) DEPTH (ft)
	-16.1	0.0	WOH	1	1	2	SS-200			-16.1 GROUND SURFACE 0.0 **ALLUVIAL** GRAY SAND, SAT.
	-21.5	5.4	2	4	6	10				
	-24.9	8.8	4	5	11	16	SS-201			-23.1 7.0 **COASTAL PLAIN** GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
	-29.9	13.8	35	46	17	63				-30.3 14.2 -30.5 14.4 LIMESTONE AND CALCAREOUS MUDSTONE **COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
	-34.9	18.8	4	6	10	16	SS-202			
	-40.4	24.3	5	5	5	10				
	-45.4	29.3	5	7	9	16	SS-203			
	-50.4	34.3	11	9	10	19				-49.7 33.6 -50.4 34.3 LIMESTONE AND CALCAREOUS MUDSTONE **COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
	-55.4	39.3	25	32	39	71	SS-204			
	-60.4	44.3	18	25	21	46				
	-65.4	49.3	71	100/0.5		100/0.5	SS-205			-65.7 49.6 -68.4 52.3 -69.4 53.3 LIMESTONE AND CALCAREOUS MUDSTONE **COASTAL PLAIN** -69.9 53.8

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 25+67	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. -16.1 ft	**TOTAL DEPTH** 121.2 ft	**NORTHING** 236,333	**EASTING** 2,220,870	**24 HR.** ART.
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/24/10	**COMP. DATE** 02/26/10	**SURFACE WATER DEPTH** 18.1ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-70	-70.4	54.3	7	9	11	Match Line 20				GRAY GREEN SAND, SAT. (PEEDEE FORMATION) -73.8 57.7 LIMESTONE AND CALCAREOUS MUDSTONE -74.8 58.7
-75	-75.4	59.3	5	6	8	14	SS-206			**COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION) *(continued)*
-80	-80.4	64.3	8	8	9	17				-78.8 62.7 LIMESTONE AND CALCAREOUS MUDSTONE -79.9 63.8
-85	-85.4	69.3	6	8	8	16	SS-207			**COASTAL PLAIN** GRAY GREEN CLAYEY SAND, SAT. (PEEDEE FORMATION)
-90	-90.6	74.5	6	8	11	19				LIMESTONE AND CALCAREOUS MUDSTONE
-95	-95.6	79.5	7	9	13	22	SS-208			**COASTAL PLAIN** GRAY GREEN CLAYEY SANDY SILT AND SANDY SILT, WET (PEEDEE FORMATION)
-100	-100.6	84.5	60/0.1			60/0.1				-97.8 81.7 -99.0 82.9 LIMESTONE AND CALCAREOUS MUDSTONE -99.7 83.6
-105	-107.1	91.0	60/0.1			60/0.1				**COASTAL PLAIN** -102.0 85.9 GRAY GREEN CLAYEY SANDY SILT, WET (PEEDEE FORMATION)
-110	-112.1	96.0	33	50	50/0.4	100/0.9	SS-209			LIMESTONE AND CALCAREOUS MUDSTONE **COASTAL PLAIN** -106.8 90.7 GRAY GREEN CLAYEY SANDY SILT, WET (PEEDEE FORMATION) -108.8 92.7
-115	-117.1	101.0	63	39	56	95				LIMESTONE AND CALCAREOUS MUDSTONE **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-120	-122.1	106.0	60/0.1			60/0.1				-122.0 105.9 -122.9 106.8 LIMESTONE AND CALCAREOUS MUDSTONE
-125	-127.1	111.0	40	40	60/0.4	100/0.9	SS-210			**COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-130	-132.1	116.0	61	62	38/0.3	100/0.8				
-135	-137.1	121.0	100/0.2			100/0.2				-137.3 121.2 Boring Terminated at Elevation -137.3 ft IN VERY DENSE SAND ARTESIAN HEAD ELEVATION 4.0'
-140										
-145										
-150										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 25+47	**OFFSET** 3 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. -18.5 ft	**TOTAL DEPTH** 116.7 ft	**NORTHING** 236,305	**EASTING** 2,220,890	**24 HR.** ART.
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/11/10	**COMP. DATE** 01/14/10	**SURFACE WATER DEPTH** 25.7ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
10										
5										
0										
-5										
-10										
-15										
										WATER SURFACE (01/11/10)
	-18.5	0.0								-18.5 / 0.0 GROUND SURFACE
-20			3	4	5	9 10	SS-41A			COASTAL PLAIN GRAY SANDY CLAY, WET (PEEDEE FORMATION)
	-21.6	3.1								
-25	-24.7	6.2	3	5	5					
			4	11	15	26	SS-42			
-30	-29.7	11.2	60/0.1			60/0.1				-29.3 / 10.8 LIMESTONE / -30.0 / 11.5 COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)
-35	-34.7	16.2	5	5	7	12	SS-43			
-40	-39.9	21.4	5	6	7	13				
-45	-44.9	26.4	33	14	13	27	SS-44			-44.2 / 25.7 LIMESTONE / -44.8 / 26.3 COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)
-50	-49.9	31.4	22	9	11	20				-49.6 / 31.1 LIMESTONE / -50.3 / 31.8 COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)
-55	-54.9	36.4	WOH	15	19	34	SS-45			
-60	-59.9	41.4	11	13	14	27				
-65	-64.9	46.4	10	60/0.1		60/0.1	SS-46			-65.4 / 46.9 LIMESTONE / -66.7 / 48.2 COASTAL PLAIN GRAY SANDY SILT, WET (PEEDEE FOMATION)
-70	-70.0	51.5								

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
-70						Match Line				
			7	9	10	19	SS-47			-73.0 / 54.5 LIMESTONE / -74.4 / 55.9 COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)
-75	-75.0	56.5								
			7	7	9	16	SS-48			-77.2 / 58.7 LIMESTONE / -78.8 / 60.3 COASTAL PLAIN GRAY SANDY SILT, WET (PEEDEE FOMATION)
-80	-80.0	61.5								
			9	11	16	27				
-85	-85.3	66.8								
			7	6	8	14	SS-49			
-90	-89.6	71.1								
			10	9	11	20				
-95	-94.6	76.1								
			9	10	60/0.1	60/0.1	SS-50			-95.6 / 77.1 LIMESTONE / -96.9 / 78.4 COASTAL PLAIN GRAY SANDY SILT, WET (PEEDEE FOMATION) / -97.9 / 79.4 LIMESTONE / -100.0 / 81.5 COASTAL PLAIN GRAY SANDY SILT, WET (PEEDEE FOMATION)
-100	-99.6	81.1	100/0.3			100/0.3				
-105	-104.6	86.1								
			6	60/0.1		60/0.1	SS-51			-105.1 / 86.6 LIMESTONE / -108.2 / 89.7 COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)
-110	-109.9	91.4								
			22	29	50	79				
-115	-114.9	96.4								
			29	42	58/0.3	100/0.8	SS-52			-120.1 / 101.6 LIMESTONE / -121.5 / 103.0 COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)
-120	-119.6	101.1								
			26	42	58/0.2	100/0.7				
-125	-123.6	105.1								
			23	38	40	78	SS-53			
-130	-128.6	110.1								
			23	29	61	90				
-135	-133.9	115.4								
			16	29	71/0.3	100/0.8	SS-54			-135.2 / 116.7 Boring Terminated at Elevation -135.2 ft IN VERY DENSE SAND ARTESIAN HEAD ELEVATION 4.8'
-140										
-145										
-150										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 26+84	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 14.2 ft	**TOTAL DEPTH** 85.6 ft	**NORTHING** 236,428	**EASTING** 2,220,952	**24 HR.** 5.3
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/22/10	**COMP. DATE** 01/25/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
15	14.2	0.0	2	3	2	5	SS-79			14.2 / 0.0 GROUND SURFACE **ALLUVIAL** TAN SILTY SANDY CLAY, MOIST TO WET
10	10.2	4.0	WOH	WOH	WOH	0				
5	5.2	9.0	WOH	WOH	WOH	0	SS-80			7.2 / 7.0 **ALLUVIAL** TAN GRAY CLAYEY SANDY AND SANDY SILT, WET
0	0.2	14.0	WOH	2	1	3	SS-81			-2.8 / 17.0 **ALLUVIAL** GRAY SAND, SAT.
-5	-4.8	19.0	3	6	3	9	SS-82			
-10	-9.8	24.0	3	3	5	8				-11.8 / 26.0
-15	-14.8	29.0	3	3	3	6	SS-83			-16.8 / 31.0 **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-20	-19.8	34.0	8	9	11	20	SS-84			
-25	-25.0	39.2	11	6	7	13				-23.7 / 37.9 -24.8 / 39.0 LIMESTONE **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-30	-30.0	44.2	6	16	26	42	SS-85			
-35	-35.0	49.2	5	5	6	11				-38.6 / 52.8 -39.1 / 53.3 LIMESTONE **COASTAL PLAIN** GRAY CLAYEY SAND, SAT. (PEEDEE FORMATION)
-40	-40.0	54.2	5	6	6	12	SS-86			
-45	-45.0	59.2	5	6	7	13				-43.4 / 57.6 -44.6 / 58.8 LIMESTONE **COASTAL PLAIN** GRAY CLAYEY SAND, SAT. (PEEDEE FORMATION)
-50	-50.0	64.2	16	23	34	57	SS-87			-47.2 / 61.4 -47.4 / 61.6 LIMESTONE **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-55	-55.0	69.2	7	13	12	25				-53.8 / 68.0 -54.2 / 68.4 LIMESTONE **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-60	-60.0	74.2	35	23	77/0.4	100/0.9	SS-88			-61.0 / 75.2 -61.5 / 75.7 LIMESTONE **COASTAL PLAIN** -63.6 / 77.8 -64.7 / 78.9 GRAY SAND, SAT. (PEEDEE FORMATION)
-65	-65.0	79.2								

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 26+84	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 14.2 ft	**TOTAL DEPTH** 85.6 ft	**NORTHING** 236,428	**EASTING** 2,220,952	**24 HR.** 5.3
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/22/10	**COMP. DATE** 01/25/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-65	-70.0	84.2	8	10	13	Match Line 23	SS-89			LIMESTONE -67.3 / 81.5 **COASTAL PLAIN** -67.5 / 81.7 GRAY SAND, SAT. (PEEDEE FORMATION) *(continued)*
-70			6	8	92/0.4	100/0.9				LIMESTONE -71.3 / 85.5 **COASTAL PLAIN** -71.4 / 85.6 GRAY SAND, SAT. (PEEDEE FORMATION) LIMESTONE Boring Terminated at Elevation -71.4 ft IN HARD LIMESTONE
-75										
-80										
-85										
-90										
-95										
-100										
-105										
-110										
-115										
-120										
-125										
-130										
-135										
-140										
-145										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 27+79	**OFFSET** 30 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 16.1 ft	**TOTAL DEPTH** 85.5 ft	**NORTHING** 236,536	**EASTING** 2,220,928	**24 HR.** 5.4
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/26/10	**COMP. DATE** 01/26/10	**SURFACE WATER DEPTH** N/A	

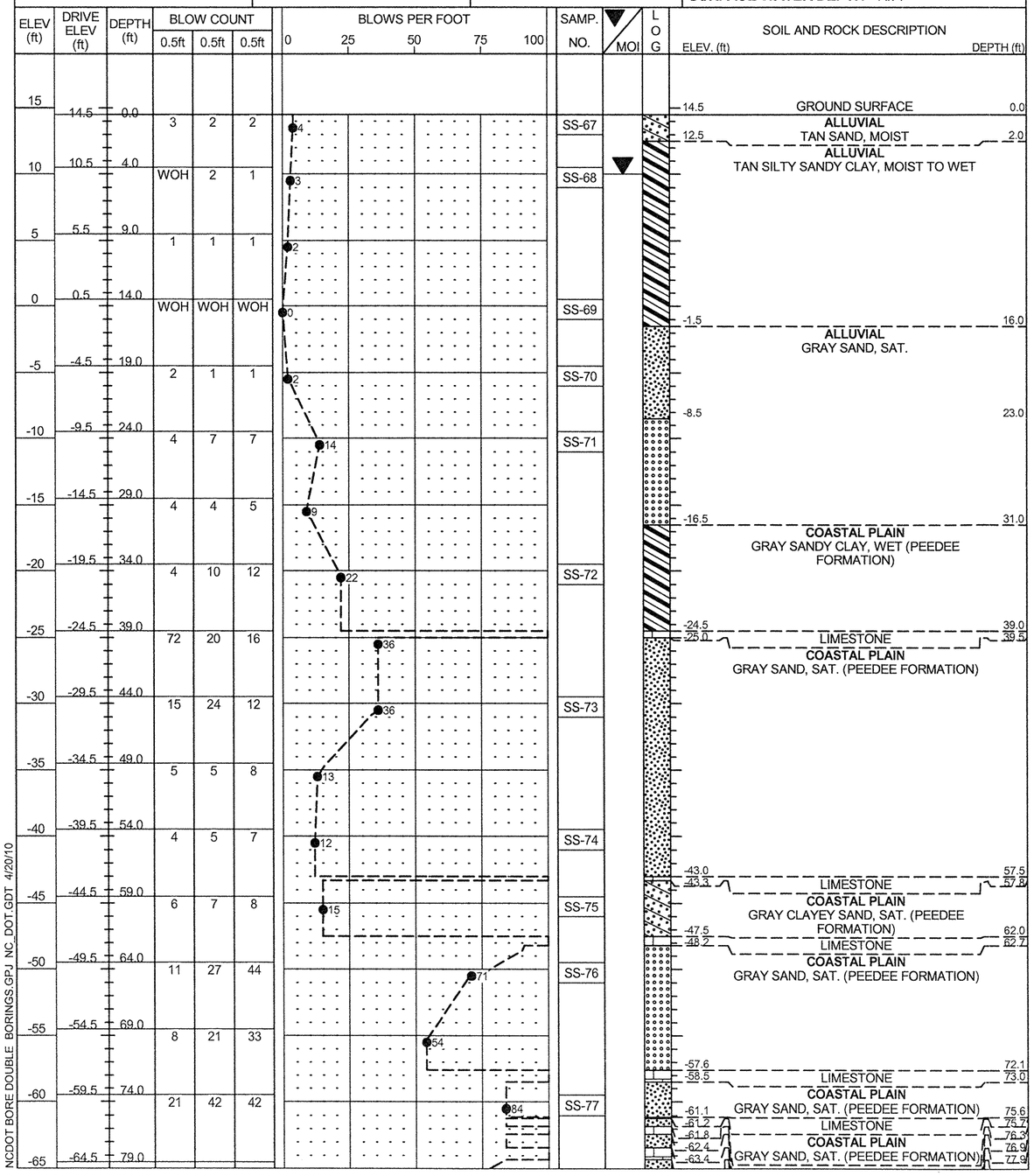
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
20										
	16.1	0.0								16.1 / 0.0 GROUND SURFACE
15			3	2	4	6	SS-90			**ALLUVIAL** TAN SANDY SILTY AND SILTY SANDY CLAY, WET
	12.1	4.0								
10			2	2	1	3				
	7.1	9.0								
5			WOH	WOH	WOH	0	SS-91			
	2.1	14.0								9.1 / 7.0
0			WOH	1	1	2				
	-2.9	19.0								-0.9 / 17.0 **ALLUVIAL** GRAY SAND, SAT.
-5			1	4	4	8	SS-92			
	-7.9	24.0								
-10			4	5	7	12				
	-12.9	29.0								-10.9 / 27.0 **COASTAL PLAIN** GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
-15			4	6	6	12	SS-93			
	-17.9	34.0								
-20			13	13	16	29				
	-22.9	39.0								-22.1 / 38.2 LIMESTONE (PEEDEE FORMATION) / -22.7 / 38.8 **COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
-25			4	5	6	11	SS-94			
	-27.9	44.0								
-30			12	9	8	17				
	-32.9	49.0								-30.9 / 47.0
-35			5	5	6	11	SS-95			
	-37.9	54.0								
-40			6	7	10	17				
	-42.9	59.0								-41.4 / 57.5 LIMESTONE (PEEDEE FORMATION) / -41.7 / 57.8 **COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION) / -44.6 / 60.7 LIMESTONE (PEEDEE FORMATION) / -45.2 / 61.3 **COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
-45			5	6	9	15	SS-96			
	-47.9	64.0								
-50			12	20	37	57	SS-97			
	-52.9	69.0								-51.2 / 67.3 LIMESTONE (PEEDEE FORMATION) / -51.3 / 67.4 **COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
-55			11	12	17	29				
	-57.9	74.0								
-60			28	43	55	98	SS-98			-58.9 / 75.0 LIMESTONE (PEEDEE FORMATION) / -59.5 / 75.6

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B4-A	**STATION** 27+79	**OFFSET** 30 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 16.1 ft	**TOTAL DEPTH** 85.5 ft	**NORTHING** 236,536	**EASTING** 2,220,928	**24 HR.** 5.4
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/26/10	**COMP. DATE** 01/26/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-60						Match Line				
	-62.9	79.0	17	12	11	23				
-65										
	-67.9	84.0								
-70			8	10	16	26	SS-99			-61.5 / 77.6 **COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION) *(continued)* / -62.1 / 78.2 LIMESTONE (PEEDEE FORMATION) **COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
-75										
										-69.4 / 85.5 Boring Terminated at Elevation -69.4 ft IN MEDIUM DENSE SAND
-80										
-85										
-90										
-95										
-100										
-105										
-110										
-115										
-120										
-125										
-130										
-135										
-140										

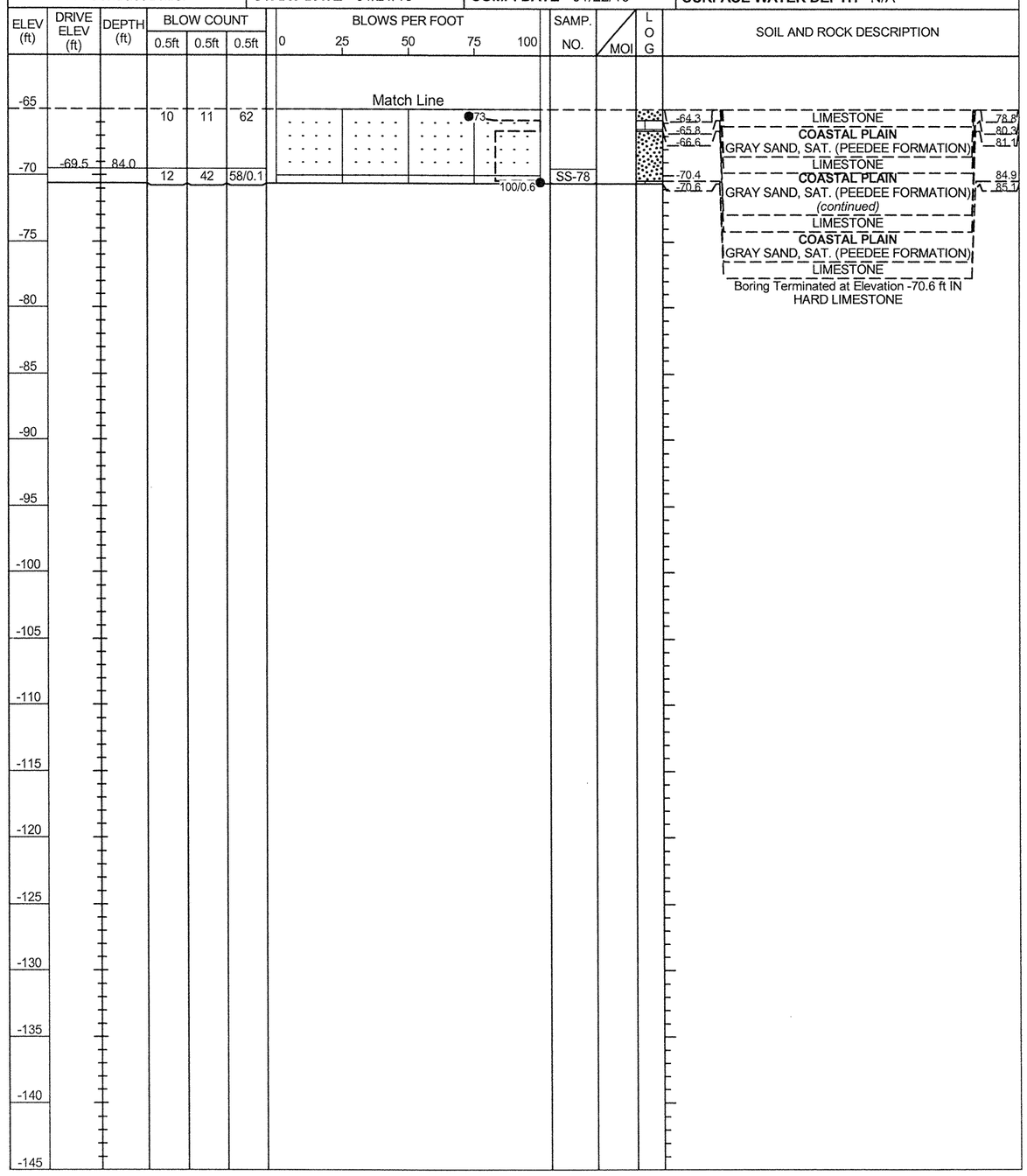
NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B5-B	**STATION** 28+74	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 14.5 ft	**TOTAL DEPTH** 85.1 ft	**NORTHING** 236,609	**EASTING** 2,221,010	**24 HR.** 4.5
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/21/10	**COMP. DATE** 01/22/10	**SURFACE WATER DEPTH** N/A	



NCDOT BORE DOUBLE BORINGS.GPJ NC_DOT.GDT 4/20/10

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B5-B	**STATION** 28+74	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 14.5 ft	**TOTAL DEPTH** 85.1 ft	**NORTHING** 236,609	**EASTING** 2,221,010	**24 HR.** 4.5
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/21/10	**COMP. DATE** 01/22/10	**SURFACE WATER DEPTH** N/A	



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B6-B	**STATION** 29+69	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 12.9 ft	**TOTAL DEPTH** 90.9 ft	**NORTHING** 236,700	**EASTING** 2,221,038	**24 HR.** 4.0
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/09/10	**COMP. DATE** 02/10/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
15											
	12.9	0.0	1	2	2	4	SS-132			12.9 GROUND SURFACE	0.0
10										ALLUVIAL TAN SANDY SILTY CLAY, MOIST TO WET	
	8.4	4.5	WOH	1	2	3					
5										5.9	7.0
	3.5	9.4	WOH	WOH	1	1	SS-133			ALLUVIAL TAN SAND, SAT.	
0										0.9	12.0
	-1.5	14.4	WOH	WOH	WOH	0	SS-134			ALLUVIAL GRAY CLAYEY SANDY SILT, WET	
-5										-4.1	17.0
	-6.5	19.4	2	4	8	12	SS-135			ALLUVIAL GRAY SAND, SAT.	
-10											
	-11.5	24.4	3	5	5	10					
-15										-14.1	27.0
	-17.0	29.9	4	7	10	17	SS-136			COASTAL PLAIN GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)	
-20											
	-21.5	34.4	9	9	11	20					
-25										-25.5	38.4
	-26.5	39.4	4	5	6	11	SS-137			-26.0 LIMESTONE -38.9 COASTAL PLAIN GRAY GREEN SAND, SAT. (PEEDEE FORMATION)	
-30											
	-31.5	44.4	4	6	7	13	SS-138				
-35											
	-36.5	49.4	4	5	10	15					
-40										-39.1	52.0
	-41.5	54.4	4	6	9	15	SS-139			COASTAL PLAIN GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)	
-45										-43.9 LIMESTONE -44.2	56.8 57.1
	-46.5	59.4	4	5	7	12				-45.3 COASTAL PLAIN -45.7	58.2 58.6
-50										GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)	
	-51.5	64.4	13	19	18	37	SS-140			-48.6 LIMESTONE -49.2	61.5 62.1
-55										COASTAL PLAIN GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)	
	-56.5	69.4	12	32	34	66				-53.9 LIMESTONE -54.1	66.8 67.0
-60										COASTAL PLAIN GRAY GREEN SAND, SAT. (PEEDEE FORMATION)	
	-61.5	74.4	6	15	27	42	SS-141			LIMESTONE -59.8 COASTAL PLAIN -60.4	72.7 73.3
-65										-61.2 GRAY GREEN SAND, SAT. (PEEDEE -61.5 FORMATION) -64.1	74.1 74.4
										LIMESTONE COASTAL PLAIN	77.0

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B6-B	**STATION** 29+69	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 12.9 ft	**TOTAL DEPTH** 90.9 ft	**NORTHING** 236,700	**EASTING** 2,221,038	**24 HR.** 4.0
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/09/10	**COMP. DATE** 02/10/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-65						Match Line				
	-66.5	79.4	4	7	9	16	SS-142			GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
-70										LIMESTONE -68.9
	-71.5	84.4	41	13	12	25				-69.3 COASTAL PLAIN 81.8 82.2 GRAY SAND, SAT. (PEEDEE FORMATION)
-75										COASTAL PLAIN GRAY SANDY CLAY, WET (PEEDEE FORMATION) *(continued)*
	-76.5	89.4	8	9	16	25	SS-143			-74.1 LIMESTONE 87.0
-80										COASTAL PLAIN GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-85										-78.0 COASTAL PLAIN 90.9 GRAY SAND, SAT. (PEEDEE FORMATION)
-90										Boring Terminated at Elevation -78.0 ft IN MEDIUM DENSE SAND
-95										
-100										
-105										
-110										
-115										
-120										
-125										
-130										
-135										
-140										
-145										

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PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B7-B	**STATION** 30+64	**OFFSET** 22 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 11.5 ft	**TOTAL DEPTH** 90.6 ft	**NORTHING** 236,791	**EASTING** 2,221,064	**24 HR.** 3.7
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/08/10	**COMP. DATE** 01/08/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
15										
	11.5	0.0								11.5 / 0.0 GROUND SURFACE
10			4	3	3	6	SS-31			**ALLUVIAL** TAN SILTY SANDY CLAY, MOIST TO WET
	7.5	4.0								
5			3	2	2	4				
	2.5	9.0								4.5 / 7.0 **ALLUVIAL** TAN SAND, SAT.
0			WOH	1	2	3	SS-32			
	-2.5	14.0								
-5			1	1	1	2	SS-33			
	-7.5	19.0								
-10			3	2	6	8				-10.5 / 22.0
	-12.6	24.1								
-15			3	3	2	5	SS-34			-15.5 / 27.0 **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
	-17.6	29.1								
-20			4	6	7	13	SS-35			
	-22.6	34.1								
-25			7	10	9	19				
	-27.6	39.1								-24.5 / 36.0 **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-30			4	6	7	13	SS-36			
	-32.6	44.1								
-35			6	6	6	12	SS-37			
	-37.6	49.1								
-40			6	6	10	16				
	-42.6	54.1								-39.5 / 51.0 **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-45			5	6	8	14	SS-38			
	-47.6	59.1								
-50			6	5	7	12				
	-52.6	64.1								-50.5 / 62.0 LIMESTONE / 51.1 / 62.6 **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-55			16	22	27	49	SS-39			
	-57.6	69.1								
-60			11	23	26	49				
	-62.6	74.1								-59.5 / 71.0 **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-65			6	7	10	17	SS-40			

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B7-B	**STATION** 30+64	**OFFSET** 22 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 11.5 ft	**TOTAL DEPTH** 90.6 ft	**NORTHING** 236,791	**EASTING** 2,221,064	**24 HR.** 3.7
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/08/10	**COMP. DATE** 01/08/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-65						Match Line				
	-67.6	79.1	60/0.1			60/0.1				-67.6 / 79.1 LIMESTONE
-70										-69.2 / 80.7 **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
	-72.6	84.1	100/0.4			100/0.4				-70.6 / 82.1 -71.1 / 82.6 -72.3 / 83.8 LIMESTONE
-75										-73.7 / 85.2 **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
	-77.6	89.1	9	10	13	23	SS-41			LIMESTONE
-80										-79.1 / 90.6 **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION) Boring Terminated at Elevation -79.1 ft IN DENSE SAND
-85										
-90										
-95										
-100										
-105										
-110										
-115										
-120										
-125										
-130										
-135										
-140										
-145										

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PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B8-A	**STATION** 31+59	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 11.5 ft	**TOTAL DEPTH** 91.0 ft	**NORTHING** 236,896	**EASTING** 2,221,048	**24 HR.** 1.8
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/04/10	**COMP. DATE** 02/08/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
15										
10	11.5	0.0	2	3	4	7	SS-121			11.5 / 0.0 GROUND SURFACE ALLUVIAL 9.5 / 2.0 TAN SANDY SILTY CLAY, MOIST TO WET ALLUVIAL TAN GRAY SAND, SAT.
5	6.7	4.8	2	1	2	3	SS-122			
0	2.0	9.5	WOH	WOH	1	1				
-5	-3.0	14.5	WOH	1	1	2	SS-123			
-10	-8.0	19.5	2	3	3	6				-10.5 / 22.0
-15	-13.0	24.5	3	4	6	10	SS-124			-15.5 / 27.0 COASTAL PLAIN GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
-20	-18.0	29.5	4	5	7	12	SS-125			
-25	-23.0	34.5	10	14	13	27				
-30	-28.0	39.5	3	4	5	9	SS-126			-26.9 / 38.4 LIMESTONE -27.5 / 39.0 COASTAL PLAIN GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
-35	-33.0	44.5	4	6	7	13	SS-127			
-40	-38.0	49.5	4	7	8	15				-40.5 / 52.0 COASTAL PLAIN GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
-45	-43.0	54.5	4	5	9	14	SS-128			
-50	-48.0	59.5	5	6	7	13				-47.1 / 58.6 LIMESTONE -47.7 / 59.2 COASTAL PLAIN GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
-55	-53.0	64.5	6	16	20	36	SS-129			-50.0 / 61.5 -51.5 / 63.0 LIMESTONE COASTAL PLAIN GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
-60	-58.0	69.5	39	37	48	85				
-65	-63.0	74.5	6	8	10	18	SS-130			

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-65						Match Line				
-70	-68.0	79.5	100/0.4			100/0.4				
-75	-73.0	84.5	100/0.3			100/0.3				
-80	-78.0	89.5	7	11	16	27	SS-131			-67.6 / 79.1 -67.9 / 79.4 LIMESTONE -68.3 / 79.8 -69.5 / 81.0 COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION) LIMESTONE -73.3 / 84.8 -74.4 / 85.9 COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION) LIMESTONE COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION) -79.5 / 91.0 Boring Terminated at Elevation -79.5 ft IN MEDIUM ENSE SAND
-85										
-90										
-95										
-100										
-105										
-110										
-115										
-120										
-125										
-130										
-135										
-140										
-145										

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B8-A	**STATION** 31+59	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 11.5 ft	**TOTAL DEPTH** 91.0 ft	**NORTHING** 236,896	**EASTING** 2,221,048	**24 HR.** 1.8
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/04/10	**COMP. DATE** 02/08/10	**SURFACE WATER DEPTH** N/A	

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PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B9-B	**STATION** 32+54	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 11.0 ft	**TOTAL DEPTH** 90.6 ft	**NORTHING** 236,972	**EASTING** 2,221,125	**24 HR.** 6.5
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/07/10	**COMP. DATE** 01/07/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft)
15										
	11.0	0.0								11.0 GROUND SURFACE 0.0
10			1	2	2	4	SS-21			**ALLUVIAL** TAN SAND, MOIST
	7.0	4.0								9.0 2.0
5			2	2	4	6	SS-22			**ALLUVIAL** TAN SILTY CLAY, MOIST TO WET
	2.0	9.0								4.0 7.0
0			WOH	2	2	4	SS-23			**ALLUVIAL** TAN GRAY SAND, SAT.
	-3.0	14.0								
-5			2	1	2	3				-5.0 16.0
	-8.0	19.0								
-10			4	5	8	13	SS-24			
	-12.9	23.9								-15.0 26.0
-15			2	4	6	10				
	-17.9	28.9								
-20			3	4	3	7	SS-25			
	-22.9	33.9								-21.0 32.0
-25			8	13	19	32	SS-26			**COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION)
	-28.1	39.1								-24.3 35.3
-30			41	21	17	38				LIMESTONE
	-33.1	44.1								-28.6 39.6
-35			6	6	7	13	SS-27			**COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
	-38.1	49.1								
-40			5	4	6	10				-40.0 51.0
	-43.1	54.1								**COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-45			4	5	7	12	SS-28			
	-48.1	59.1								-46.5 57.5
-50			5	6	6	12				LIMESTONE 47.5 58.5
	-53.1	64.1								**COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-55			6	10	16	26	SS-29			-51.0 62.0
	-58.1	69.1								LIMESTONE 51.6 62.6
-60			6	8	9	17				**COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
	-63.1	74.1								
-65			6	7	8	15	SS-30			-61.0 72.0

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B9-B	**STATION** 32+54	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 11.0 ft	**TOTAL DEPTH** 90.6 ft	**NORTHING** 236,972	**EASTING** 2,221,125	**24 HR.** 6.5
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/07/10	**COMP. DATE** 01/07/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-65						Match Line				
	-68.1	79.1	6	32	20	52				
-70										
	-73.1	84.1	100/0.4			100/.04				
-75										
	-78.1	89.1	8	11	11	22				
-80										-72.0 83.0
										LIMESTONE
-85										-76.0 87.0
										COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)
-90										-79.6 90.6
										Boring Terminated at Elevation -79.6 ft IN MEDIUM DENSE SAND
-95										
-100										
-105										
-110										
-115										
-120										
-125										
-130										
-135										
-140										
-145										

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PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B10-A	**STATION** 33+49	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 8.7 ft	**TOTAL DEPTH** 101.0 ft	**NORTHING** 237,077	**EASTING** 2,221,106	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/04/10	**COMP. DATE** 02/04/10	**SURFACE WATER DEPTH** 1.1ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
10										WATER SURFACE (02/04/10)
	8.7	0.0								GROUND SURFACE
			1	2	2	4	SS-110			**ALLUVIAL** TAN SILTY CLAY, WET
5	3.5	5.2								
			WOH	1	2	3				
0	-0.8	9.5								
			WOH	WOH	WOH	0	SS-111			
-5	-5.8	14.5								
			WOH	1	1	2	SS-112			
-10	-10.8	19.5								
			4	4	6	10	SS-113			
-15	-15.8	24.5								
			4	6	6	12				
-20	-20.8	29.5								
			WOH	WOH	1	1	SS-114			
-25	-25.8	34.5								
			3	6	11	17				
-30	-30.8	39.5								
			3	3	6	9	SS-115			
-35	-35.8	44.5								
			5	5	7	12				
-40	-40.8	49.5								
			3	5	7	12	SS-116			
-45	-45.8	54.5								
			4	5	8	13				
-50	-50.8	59.5								
			3	6	8	14	SS-117			
-55	-55.8	64.5								
			6	8	10	18				
-60	-60.8	69.5								
			6	7	9	16	SS-118			
-65	-65.8	74.5								
			7	8	12	20				
-70										

8.7	0.0		GROUND SURFACE
1.7	7.0		**ALLUVIAL** GRAY SAND, SAT.
-4.3	13.0		**ALLUVIAL** GRAY SANDY SILT, WET
-8.3	17.0		**ALLUVIAL** GRAY SAND, SAT.
-18.3	27.0		**COASTAL PLAIN** GRAY SILTY SANDY CLAY, WET (PEEDEE FORMATION)
-27.5	36.2		LIMESTONE
-28.7	37.4		**COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-48.5	57.2		LIMESTONE
-48.9	57.6		**COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-58.3	67.0		
-63.3	72.0		
-69.1	77.8		LIMESTONE
-69.9	78.6		

PROJECT NO. 33395.1.1	ID. B-4028	COUNTY BLADEN	GEOLOGIST Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				GROUND WTR (ft)
BORING NO. B10-A	STATION 33+49	OFFSET 25 ft LT	ALIGNMENT -L-	0 HR. N/A
COLLAR ELEV. 8.7 ft	TOTAL DEPTH 101.0 ft	NORTHING 237,077	EASTING 2,221,106	24 HR. N/A
DRILL MACHINE CME-550	DRILL METHOD Mud Rotary		HAMMER TYPE Automatic	
DRILLER Contract Driller	START DATE 02/04/10	COMP. DATE 02/04/10	SURFACE WATER DEPTH 1.1ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-70						Match Line				
	-70.8	79.5	8	23	15	38	SS-119			**COASTAL PLAIN** GRAY CLAYEY SAND, SAT. (PEEDEE FORMATION) *(continued)*
-75	-75.8	84.5	7	8	12	20				
-80	-80.8	89.5	6	7	8	15	SS-120			
-85	-85.8	94.5	6	14	18	32				
-90	-90.8	99.5	6	8	10	18				
-95										
-100										
-105										
-110										
-115										
-120										
-125										
-130										
-135										
-140										
-145										
-150										

-73.5	82.2		**COASTAL PLAIN** GRAY CLAYEY SAND, SAT. (PEEDEE FORMATION) *(continued)*
-74.6	83.3		LIMESTONE
			COASTAL PLAIN GRAY SANDY SILT, WET (PEEDEE FORMATION)
-87.8	96.5		LIMESTONE
-88.2	96.9		**COASTAL PLAIN** GRAY SANDY SILT, WET (PEEDEE FORMATION)
-92.3	101.0		Boring Terminated at Elevation -92.3 ft IN STIFF SANDY SILT

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B11-B	**STATION** 34+44	**OFFSET** 22 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 10.5 ft	**TOTAL DEPTH** 100.5 ft	**NORTHING** 237,153	**EASTING** 2,221,180	**24 HR.** 1.4
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/06/10	**COMP. DATE** 01/07/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
15										
10	10.5	0.0	3	2	3	5	SS-9			10.5 GROUND SURFACE 0.0
	6.5	4.0								8.5 **ALLUVIAL** TAN SILTY SANDY AND SILTY CLAY, MOIST TO WET 2.0
5			WOH	WOH	1	1	SS-10			
	1.5	9.0								
0			WOH	2	2	4				
	-3.5	14.0								-1.5 **ALLUVIAL** TAN SANDY SILT, WET 12.0
-5			WOH	WOH	WOH	0	SS-11			
	-8.5	19.0								-6.5 **ALLUVIAL** GRAY SAND, SAT. 17.0
-10			3	3	5	8	SS-12			
	-13.5	24.0								
-15			5	5	8	13				
	-18.5	29.0								
-20			5	5	6	11	SS-13			-20.5 31.0
	-23.5	34.0								
-25			4	4	6	10	SS-14			
	-28.5	39.0								-26.5 **COASTAL PLAIN** GRAY GREEN SAND AND CLAYEY SAND, SAT. (PEEDEE FORMATION) 37.0
-30			3	4	6	10	SS-15			
	-33.5	44.0								
-35			5	6	6	12				
	-38.5	49.0								-36.5 47.0
-40			5	6	8	14	SS-16			
	-43.5	54.0								
-45			5	5	7	12				
	-48.5	59.0								
-50			25	13	14	27				
	-53.5	64.0								-51.5 **COASTAL PLAIN** 62.0
-55			7	8	12	20	SS-17			
	-58.5	69.0								
-60			6	6	10	16				
	-63.5	74.0								-61.5 GRAY CLAY AND SANDY CLAY, WET (PEEDEE FORMATION) 72.0
-65			6	8	10	18	SS-18			

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. B11-B	**STATION** 34+44	**OFFSET** 22 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 10.5 ft	**TOTAL DEPTH** 100.5 ft	**NORTHING** 237,153	**EASTING** 2,221,180	**24 HR.** 1.4
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/06/10	**COMP. DATE** 01/07/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-65						Match Line				GRAY CLAY AND SANDY CLAY, WET (PEEDEE FORMATION) *(continued)*
	-68.5	79.0	7	7	7	14				
-70										
	-73.5	84.0	56	17	17	34	SS-19			-73.5 84.0
-75										-74.0 LIMESTONE 84.5
	-78.5	89.0	100/0.4			100/0.4				**COASTAL PLAIN** GRAY CLAYEY SAND, SAT. (PEEDEE FORMATION)
-80										-77.5 88.0
	-83.5	94.0	7	10	90/0.3	100/0.8	SS-20			-79.5 LIMESTONE 90.0
-85										**COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
	-88.5	99.0	7	8	10	18				-84.5 95.0
-90										LIMESTONE
-95										-86.5 97.0
										COASTAL PLAIN GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-100										-90.0 100.5
										Boring Terminated at Elevation -90.0 ft IN VERY STIFF SANDY CLAY
-105										
-110										
-115										
-120										
-125										
-130										
-135										
-140										
-145										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 35+39	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.9 ft	**TOTAL DEPTH** 101.1 ft	**NORTHING** 237,258	**EASTING** 2,221,164	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/03/10	**COMP. DATE** 02/03/10	**SURFACE WATER DEPTH** 0.9ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
15										
10	9.9	0.0								WATER SURFACE (02/03/10)
										GROUND SURFACE 9.9 0.0
			WOH	2	2	4	SS-100			**ALLUVIAL** TAN SILTY CLAY, WET
5	5.2	4.7								
			WOH	WOH	WOH	0				
0	0.2	9.7								
			WOH	1	2	3	SS-101			
-5	-4.7	14.6								
			WOH	WOH	WOH	0				
-10	-9.7	19.6								-10.7 20.6
			1	1	3	4				**ALLUVIAL** GRAY SAND, SAT.
-15	-14.7	24.6								
			6	7	10	17	SS-102			
-20	-19.7	29.6								
			3	3	4	7				
-25	-24.7	34.6								-23.1 33.0
			WOH	4	7	11	SS-103			**COASTAL PLAIN** GRAY GREEN SAND AND CLAYEY SAND, SAT. (PEEDEE FORMATION)
-30	-29.7	39.6								
			3	3	5	8	SS-104			
-35	-34.7	44.6								
			3	7	9	16				
-40	-39.7	49.6								-37.1 47.0
			9	8	8	16	SS-105			
-45	-44.7	54.6								
			4	7	7	14				
-50	-49.7	59.6								-46.9 56.8 LIMESTONE
			3	5	7	12	SS-106			-48.4 58.3 **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-55	-54.7	64.6								
			5	7	9	16				
-60	-59.7	69.6								
			5	7	8	15	SS-107			-61.6 71.5 LIMESTONE 62.2 72.1
-65	-64.7	74.6								

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 12 ON -L- (NC 11) OVER THE CAPE FEAR RIVER				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 35+39	**OFFSET** 25 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.9 ft	**TOTAL DEPTH** 101.1 ft	**NORTHING** 237,258	**EASTING** 2,221,164	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/03/10	**COMP. DATE** 02/03/10	**SURFACE WATER DEPTH** 0.9ft	

ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-65					Match Line				
		4	7	13	20				**COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION) *(continued)*
-70	-69.7 79.6								-69.7 79.6
		100/0.2			100/0.2				LIMESTONE -70.9 80.8
-75	-74.7 84.6								-71.5 81.4 **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION) -72.9 82.8
		6	8	13	21	SS-108			LIMESTONE **COASTAL PLAIN** GRAY CLAYEY SAND, SAT. (PEEDEE FORMATION)
-80	-79.7 89.6								-79.7 89.6
		60/0.1			60/0.1				-80.8 90.7 LIMESTONE **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-85	-84.7 94.6								-85.2 95.1
		20	100/0.2		100/0.2	SS-109			-86.4 96.3 LIMESTONE **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-90	-89.7 99.6								-91.2 101.1
		6	6	7	13				Boring Terminated at Elevation -91.2 ft IN STIFF SANDY CLAY
-95									Other Samples: ST-1 (6.2 - 8.2) ST-2 (11.2 - 13.2)
-100									
-105									
-110									
-115									
-120									
-125									
-130									
-135									
-140									
-145									

NCDOT BORE DOUBLE BORINGS.GPJ NC_DOT.GDT 4/20/10

BRIDGE NO. 12 OVER CAPE FEAR RIVER ON NC 11

SOIL TEST RESULTS EB1-A

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	30 LT	22+64	1.0- 1.5	A-4(0)	19	3	14.8	37.7	35.3	12.2	100	92	56	-	-
SS-2	30 LT	22+64	4.0- 5.5	A-2-6(2)	39	23	35.8	32.4	2.4	29.4	100	81	33	-	-
SS-3	30 LT	22+64	8.1- 9.6	A-3(0)	24	NP	71.6	20.7	1.6	6.1	100	71	8	-	-
SS-4	30 LT	22+64	18.1- 19.6	A-1-b(0)	23	NP	84.6	10.8	1.6	3.0	99	43	5	-	-
SS-5	30 LT	22+64	33.1- 34.6	A-7-6(26)	50	33	0.6	31.8	27.0	40.6	100	100	80	-	-
SS-6	30 LT	22+64	43.1- 43.7	A-4(0)	25	9	35.5	33.6	14.7	16.2	99	84	37	-	-
SS-7	30 LT	22+64	53.1- 54.6	A-2-6(0)	26	12	42.3	30.2	9.2	18.3	100	83	29	-	-
SS-8	30 LT	22+64	63.1- 64.6	A-6(3)	31	16	23.9	34.3	11.4	30.4	100	92	44	-	-

SOIL TEST RESULTS B1-A

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-55	32 LT	24+16	1.0- 1.5	A-4(0)	19	1	25.3	44.0	20.6	10.1	100	90	43	-	-
SS-56	32 LT	24+16	7.9- 9.3	A-2-4(0)	22	6	24.7	44.4	14.8	16.1	100	92	34	-	-
SS-57	32 LT	24+16	17.7- 19.2	A-2-4(0)	24	NP	3.1	80.2	5.6	11.1	100	99	19	-	-
SS-58	32 LT	24+16	27.7- 28.9	A-6(3)	35	19	22.4	43.1	13.4	21.1	100	94	40	-	-
SS-59	32 LT	24+16	37.7- 39.2	A-2-4(0)	21	NP	28.6	60.5	5.8	5.0	100	97	13	-	-
SS-60	32 LT	24+16	47.9- 49.4	A-4(0)	30	6	2.9	65.6	15.4	16.1	100	99	41	-	-
SS-61	32 LT	24+16	61.2- 62.7	A-2-4(0)	28	NP	2.5	79.8	7.6	10.1	100	99	25	-	-
SS-62	32 LT	24+16	66.2- 67.7	A-4(4)	40	9	0.2	66.5	11.2	22.1	100	100	56	-	-
SS-63	32 LT	24+16	76.0- 76.9	A-2-4(0)	32	9	4.0	68.3	11.6	16.1	100	98	33	-	-
SS-64	32 LT	24+16	86.0- 87.5	A-2-4(0)	20	NP	53.9	32.7	5.4	8.0	85	61	13	-	-
SS-65	32 LT	24+16	96.0- 97.5	A-2-4(0)	21	NP	56.7	31.9	5.4	6.0	98	76	13	-	-
SS-66	32 LT	24+16	104.3- 105.8	A-3(0)	20	NP	79.8	13.3	2.9	4.0	97	57	8	-	-

SOIL TEST RESULTS B1-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-211	6 RT	24+21	1.0- 1.5	A-6(2)	30	15	22.8	41.3	11.6	24.4	100	91	38	-	-
SS-212	6 RT	24+21	10.7- 12.2	A-2-4(0)	25	9	31.6	42.4	8.7	17.3	100	88	29	-	-
SS-213	6 RT	24+21	15.7- 17.2	A-2-4(0)	23	NP	4.9	81.9	4.1	9.1	100	99	15	-	-
SS-214	6 RT	24+21	25.7- 27.2	A-2-6(1)	32	14	20.5	49.7	8.4	21.3	92	84	33	-	-
SS-215	6 RT	24+21	35.7- 37.2	A-2-4(0)	21	NP	21.7	64.4	6.7	7.1	98	96	16	-	-
SS-216	6 RT	24+21	50.7- 52.2	A-2-4(0)	29	6	3.7	72.5	10.7	13.2	98	97	30	-	-

SOIL TEST RESULTS B2-A

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-200	25 LT	25+67	1.0- 1.5	A-3(0)	25	NP	56.6	41.9	1.5	0.0	100	96	2	-	-
SS-201	25 LT	25+67	8.8- 10.3	A-6(2)	30	15	23.5	36.4	12.0	28.1	99	90	42	-	-
SS-202	25 LT	25+67	18.8- 20.3	A-2-4(0)	24	NP	10.8	70.7	5.5	13.1	100	97	20	-	-
SS-203	25 LT	25+67	29.3- 30.8	A-2-4(0)	26	1	3.0	77.9	6.0	13.1	100	99	24	-	-
SS-204	25 LT	25+67	39.3- 40.8	A-2-4(0)	21	NP	25.6	64.0	5.3	5.0	100	99	12	-	-
SS-205	25 LT	25+67	49.3- 49.6	A-2-4(0)	21	NP	6.4	81.3	8.2	4.0	99	98	15	-	-
SS-206	25 LT	25+67	59.3- 60.8	A-2-6(0)	29	11	11.7	59.5	8.7	20.1	99	93	32	-	-
SS-207	25 LT	25+67	69.3- 70.8	A-4(1)	33	6	0.6	76.2	9.1	14.1	100	100	53	-	-
SS-208	25 LT	25+67	79.5- 81.0	A-4(0)	30	7	3.1	65.9	9.8	21.1	100	99	37	-	-
SS-209	25 LT	25+67	96.0- 97.4	A-2-4(0)	19	NP	49.1	40.0	5.8	5.0	99	88	13	-	-
SS-210	25 LT	25+67	111.0- 112.4	A-2-4(0)	23	NP	24.4	59.7	7.8	8.0	98	97	18	-	-

SOIL TEST RESULTS B2-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-41A	3 RT	25+47	1.0- 1.5	A-6(6)	35	21	19.0	33.7	14.9	32.3	100	93	49	-	-
SS-42	3 RT	25+47	6.2- 7.7	A-6(1)	27	13	25.9	37.6	14.3	22.2	98	88	39	-	-
SS-43	3 RT	25+47	16.2- 17.7	A-2-4(0)	25	NP	8.2	75.4	4.3	12.1	100	98	18	-	-
SS-44	3 RT	25+47	26.4- 27.9	A-2-4(0)	25	10	28.2	42.6	12.0	17.2	82	71	27	-	-
SS-45	3 RT	25+47	36.4- 37.9	A-2-4(0)	22	NP	26.7	61.4	4.8	7.1	98	97	13	-	-
SS-46	3 RT	25+47	46.4- 46.9	A-2-4(0)	21	NP	19.8	63.2	8.9	8.1	76	71	14	-	-
SS-47	3 RT	25+47	51.5- 53.0	A-4(0)	29	3	2.8	69.0	13.0	15.2	100	99	37	-	-
SS-48	3 RT	25+47	56.5- 58.0	A-2-6(0)	31	11	13.7	60.4	6.7	19.2	97	91	28	-	-
SS-50	3 RT	25+47	66.8- 68.3	A-4(2)	37	9	0.5	69.5	10.8	19.2	100	100	45	-	-
SS-51	3 RT	25+47	86.1- 86.6	A-4(0)	28	8	15.3	55.8	10.8	18.2	99	92	39	-	-
SS-52	3 RT	25+47	96.4- 97.7	A-2-4(0)	20	NP	39.8	43.5	7.6	9.1	99	91	19	-	-
SS-53	3 RT	25+47	105.1- 106.6	A-2-4(0)	24	NP	20.0	61.8	6.1	12.1	97	96	19	-	-
SS-54	3 RT	25+47	115.4- 116.7	A-2-4(0)	20	NP	66.2	21.8	2.9	9.1	98	71	13	-	-

SOIL TEST RESULTS B3-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-79	25 RT	26+84	1.0- 1.5	A-6(7)	39	18	31.4	19.5	25.0	24.1	100	75	53	-	-
SS-80	25 RT	26+84	9.0- 10.5	A-4(3)	30	9	3.0	43.4	29.4	24.1	100	100	61	-	-
SS-81	25 RT	26+84	14.0- 15.5	A-4(0)	24	2	7.2	55.9	18.8	18.1	100	100	41	-	-
SS-82	25 RT	26+84	19.0- 20.5	A-3(0)	24	NP	73.0	22.1	2.9	2.0	100	86	6	-	-
SS-83	25 RT	26+84	29.0- 30.5	A-1-b(0)	26	NP	82.5	13.6	1.9	2.0	84	24	4	-	-
SS-84	25 RT	26+84	34.0- 35.5	A-6(2)	28	14	26.9	33.7	13.4	26.1	98	88	41	-	-
SS-85	25 RT	26+84	44.2- 45.7	A-2-4(0)	23	NP	8.6	75.8	5.5	10.1	100	97	18	-	-
SS-86	25 RT	26+84	54.2- 55.7	A-2-6(1)	32	15	24.9	46.9	7.0	21.1	97	87	31	-	-
SS-87	25 RT	26+84	64.2- 65.7	A-2-4(0)	19	NP	29.4	56.1	5.5	9.1	94	90	16	-	-
SS-88	25 RT	26+84	74.2- 75.2	A-2-4(0)	24	NP	4.9	82.1	3.8	9.1	100	100	15	-	-
SS-89	25 RT	26+84	79.2- 80.7	A-2-4(0)	25	NP	4.6	75.1	8.2	12.1	99	97	25	-	-

SOIL TEST RESULTS B4-A

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-90	30 LT	27+79	1.0- 1.5	A-7-6(20)	51	24	14.1	7.7	29.7	48.5	97	85	79	-	-
SS-91	30 LT	27+79	9.0- 10.5	A-6(11)	37	17	0.6	37.2	31.9	30.3	100	100	71	-	-
SS-92	30 LT	27+79	19.0- 20.5	A-2-4(0)	22	NP	19.2	60.2	8.5	12.1	100	100	24	-	-
SS-93	30 LT	27+79	29.0- 30.5	A-6(3)	30	17	20.6	37.6	9.5	32.3	100	92	44	-	-
SS-94	30 LT	27+79	39.0- 40.5	A-2-6(0)	26	11	19.6	49.1	7.1	24.2	100	98	34	-	-
SS-95	30 LT	27+79	49.0- 50.5	A-2-4(0)	24	2	8.2	73.5	4.1	14.1	100	97	22	-	-
SS-96	30 LT	27+79	59.0- 60.5	A-2-6(0)	30	14	39.5	37.4	4.9	18.2	96	83	26	-	-
SS-97	30 LT	27+79	64.0- 65.5	A-3(0)	19	NP	41.1	49.5	2.3	7.1	97	87	10	-	-
SS-98	30 LT	27+79	74.0- 75.0	A-2-4(0)	20	NP	22.5	66.3	4.1	7.1	98	97	13	-	-
SS-99	30 LT	27+79	84.0- 85.5	A-2-4(0)	27	8	18.9	59.1	4.8	17.2	91	84	22	-	-

SOIL TEST RESULTS B5-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-67	25 RT	28+74	1.0- 1.5	A-2-6(1)	39	15	67.7	6.6	11.6	14.1	95	39	26	-	-
SS-68	25 RT	28+74	4.0- 5.5	A-6(4)	31	11	0.4	48.2	27.2	24.1	100	100	61	-	-
SS-69	25 RT	28+74	14.0- 15.5	A-6(6)	33	13	2.2	39.6	30.1	28.1	100	100	64	-	-
SS-70	25 RT	28+74	19.0- 20.5	A-2-4(0)	23	NP	12.8	65.7	10.5	11.1	100	99	24	-	-
SS-71	25 RT	28+74	24.0- 25.5	A-3(0)	26	NP	66.8	27.8	3.3	2.0	100	84	6	-	-
SS-72	25 RT	28+74	34.0- 35.5	A-6(1)	26	12	26.3	38.8	12.8	22.1	100	90	38	-	-
SS-73	25 RT	28+74	44.0- 45.5	A-2-4(0)	24	NP	6.5	76.6	5.9	11.1	100	98	20	-	-
SS-74	25 RT	28+74	54.0- 55.5	A-2-4(0)	26	4	5.9	74.5	7.5	12.1	100	98	23	-	-
SS-75	25 RT	28+74	59.0- 60.5	A-2-6(2)	33	20	33.8	35.0	10.2	21.1	98	88	34	-	-
SS-76	25 RT	28+74	64.0- 65.5	A-3(0)	22	NP	29.7	61.7	4.5	4.0	100	94	10	-	-
SS-77	25 RT	28+74	74.0- 75.5	A-2-4(0)	18	NP	65.8	25.2	4.9	4.0	100	92	11	-	-
SS-78	25 RT	28+74	84.0- 85.1	A-2-4(0)	28	8	19.1	57.3	7.5	16.1	89	81	23	-	-

BRIDGE NO. 12 ON NC 11 OVER CAPE FEAR RIVER

SOIL TEST RESULTS B6-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-132	25 RT	29+69	1.0- 1.5	A-7-6(17)	50	23	20.6	6.1	29.0	44.4	98	82	73	-	-
SS-133	25 RT	29+69	9.4- 10.9	A-2-4(0)	24	NP	10.3	72.0	6.6	11.1	100	100	20	-	-
SS-134	25 RT	29+69	14.4- 15.9	A-4(0)	25	5	4.8	59.3	15.6	20.2	100	100	42	-	-
SS-135	25 RT	29+69	19.4- 20.9	A-3(0)	24	NP	42.2	51.1	3.7	3.0	100	93	8	-	-
SS-136	25 RT	29+69	29.9- 31.4	A-6(2)	31	16	22.0	39.0	12.8	26.2	99	90	41	-	-
SS-137	25 RT	29+69	39.4- 40.9	A-2-4(0)	26	9	21.0	50.3	8.6	20.2	100	97	32	-	-
SS-138	25 RT	29+69	44.4- 45.9	A-2-4(0)	25	NP	1.4	79.2	6.3	13.1	100	100	23	-	-
SS-139	25 RT	29+69	54.4- 55.9	A-7-6(16)	50	33	0.6	51.5	13.6	34.3	100	100	58	-	-
SS-140	25 RT	29+69	64.4- 65.9	A-3(0)	22	NP	33.2	58.3	4.4	4.0	97	87	9	-	-
SS-141	25 RT	29+69	74.4- 75.9	A-2-4(0)	21	NP	39.0	48.6	5.3	7.1	95	85	14	-	-
SS-142	25 RT	29+69	79.4- 80.9	A-6(7)	39	24	11.3	46.4	14.0	28.3	97	93	48	-	-
SS-143	25 RT	29+69	89.4- 90.9	A-2-4(0)	26	NP	3.7	81.1	5.0	10.1	100	100	18	-	-

SOIL TEST RESULTS B7-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-31	22 RT	30+64	1.0- 1.5	A-7-6(14)	55	29	30.2	7.9	23.6	38.3	92	72	58	-	-
SS-32	22 RT	30+64	9.0- 10.5	A-2-4(0)	21	2	20.8	52.5	12.6	14.1	100	100	29	-	-
SS-33	22 RT	30+64	14.0- 15.5	A-2-4(0)	22	NP	25.7	59.6	5.6	9.1	100	99	16	-	-
SS-34	22 RT	30+64	24.1- 25.6	A-1-b(0)	25	NP	84.0	11.4	1.6	3.0	100	49	5	-	-
SS-35	22 RT	30+64	29.1- 30.6	A-6(3)	32	17	23.4	37.8	11.6	27.2	100	90	41	-	-
SS-36	22 RT	30+64	39.1- 40.6	A-2-4(0)	25	9	20.8	49.0	10.1	20.2	100	98	34	-	-
SS-37	22 RT	30+64	44.1- 45.6	A-2-4(0)	27	NP	1.8	80.1	5.9	12.1	100	100	21	-	-
SS-38	22 RT	30+64	54.1- 55.6	A-7-6(14)	48	30	0.6	51.8	15.3	32.3	99	99	57	-	-
SS-39	22 RT	30+64	64.1- 65.6	A-2-4(0)	20	NP	46.2	43.3	4.4	6.0	96	81	12	-	-
SS-40	22 RT	30+64	74.1- 75.6	A-7-6(8)	46	27	10.5	45.8	15.5	28.2	93	88	46	-	-
SS-41	22 RT	30+64	89.1- 90.6	A-2-4(0)	27	NP	3.9	80.4	4.5	11.1	98	97	17	-	-

SOIL TEST RESULTS B8-A

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-121	25 LT	31+59	1.0- 1.5	A-7-6(20)	49	22	6.1	15.8	35.5	42.6	100	96	83	-	-
SS-122	25 LT	31+59	4.8- 6.3	A-2-4(0)	23	NP	20.3	62.5	7.1	10.1	100	100	19	-	-
SS-123	25 LT	31+59	14.5- 16.0	A-2-4(0)	23	NP	18.0	64.1	6.8	11.2	100	100	21	-	-
SS-124	25 LT	31+59	24.5- 26.0	A-3(0)	24	NP	83.1	13.3	0.6	3.0	100	61	5	-	-
SS-125	25 LT	31+59	29.5- 31.0	A-6(3)	30	17	22.5	38.3	8.7	30.4	100	90	42	-	-
SS-126	25 LT	31+59	39.5- 41.0	A-2-4(0)	23	8	23.0	47.4	11.4	18.2	100	97	32	-	-
SS-127	25 LT	31+59	44.5- 46.0	A-2-4(0)	27	NP	1.1	80.5	5.2	13.1	100	100	22	-	-
SS-128	25 LT	31+59	54.5- 56.0	A-7-6(8)	44	23	0.8	60.5	10.4	28.3	98	98	49	-	-
SS-129	25 LT	31+59	64.5- 66.0	A-2-4(0)	28	8	15.1	61.6	6.2	17.2	97	93	24	-	-
SS-130	25 LT	31+59	74.5- 76.0	A-2-4(0)	24	NP	8.3	72.5	6.2	13.1	90	87	20	-	-
SS-131	25 LT	31+59	89.5- 91.0	A-2-4(0)	27	NP	3.6	82.9	3.3	10.1	100	100	15	-	-

SOIL TEST RESULTS B9-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-21	25 RT	32+54	1.0- 1.5	A-2-6(1)	36	17	61.3	8.2	11.4	19.2	94	52	29	-	-
SS-22	25 RT	32+54	4.0- 5.5	A-7-6(25)	48	23	0.6	7.1	44.0	48.4	100	100	95	-	-
SS-23	25 RT	32+54	9.0- 10.5	A-2-4(0)	26	7	10.3	57.7	13.9	18.1	100	100	35	-	-
SS-24	25 RT	32+54	19.0- 20.5	A-3(0)	24	NP	48.3	45.2	3.5	3.0	100	97	7	-	-
SS-25	25 RT	32+54	28.9- 30.4	A-1-b(0)	23	NP	86.0	10.5	2.5	1.0	84	19	4	-	-
SS-26	25 RT	32+54	33.9- 35.3	A-4(0)	25	10	25.0	40.2	13.6	21.2	99	90	38	-	-
SS-27	25 RT	32+54	44.1- 45.6	A-6(3)	38	17	6.3	57.9	9.7	26.2	91	89	41	-	-
SS-28	25 RT	32+54	54.1- 55.6	A-2-4(0)	26	NP	1.5	80.0	6.4	12.1	100	100	22	-	-
SS-29	25 RT	32+54	64.1- 65.6	A-7-6(5)	42	24	27.1	30.5	10.1	32.3	94	84	41	-	-
SS-30	25 RT	32+54	74.1- 75.6	A-6(4)	36	19	10.9	50.4	12.5	26.2	98	93	43	-	-

SOIL TEST RESULTS B10-A

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-110	25 LT	33+49	1.0- 1.5	A-7-6(33)	59	31	3.7	6.5	35.1	54.8	100	98	92	-	-
SS-111	25 LT	33+49	9.5- 11.0	A-2-4(0)	23	NP	4.3	64.7	15.8	15.2	100	100	34	-	-
SS-112	25 LT	33+49	14.5- 16.0	A-4(0)	33	5	8.7	54.2	18.9	18.3	100	99	42	-	-
SS-113	25 LT	33+49	19.5- 21.0	A-3(0)	25	NP	25.2	69.2	1.6	4.1	100	100	7	-	-
SS-114	25 LT	33+49	29.5- 31.0	A-6(5)	30	12	8.9	36.1	26.6	28.4	96	91	60	-	-
SS-115	25 LT	33+49	39.5- 41.0	A-2-4(0)	26	8	21.3	52.1	8.3	18.3	99	94	29	-	-
SS-116	25 LT	33+49	49.5- 51.0	A-2-4(0)	29	8	22.9	55.2	4.7	17.2	98	90	25	-	-
SS-117	25 LT	33+49	59.5- 61.0	A-7-6(26)	66	52	21.5	21.1	12.8	44.6	100	93	59	-	-
SS-118	25 LT	33+49	69.5- 71.0	A-6(8)	39	21	0.4	52.1	17.0	30.4	100	100	55	-	-
SS-119	25 LT	33+49	79.5- 81.0	A-2-6(1)	32	14	13.4	54.2	8.1	24.3	95	87	34	-	-
SS-120	25 LT	33+49	89.5- 91.0	A-4(0)	32	5	1.0	77.9	4.9	16.2	98	98	42	-	-

SOIL TEST RESULTS B11-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-9	22 RT	34+44	1.0- 1.5	A-6(6)	37	16	37.1	9.9	20.5	32.5	100	81	54	-	-
SS-10	22 RT	34+44	4.0- 5.5	A-7-6(24)	51	25	10.5	4.3	26.4	58.8	100	94	86	-	-
SS-11	22 RT	34+44	14.0- 15.5	A-4(0)	26	7	5.1	55.2	19.5	20.3	100	100	44	-	-
SS-12	22 RT	34+44	19.0- 20.5	A-3(0)	28	NP	20.7	72.4	3.9	3.0	100	100	8	-	-
SS-13	22 RT	34+44	29.0- 30.5	A-3(0)	24	NP	85.4	11.2	1.4	2.0	100	68	4	-	-
SS-14	22 RT	34+44	34.0- 35.5	A-1-b(0)	26	NP	88.8	8.1	2.0	1.0	96	18	4	-	-
SS-15	22 RT	34+44	39.0- 40.5	A-2-6(0)	27	11	21.2	48.4	10.1	20.3	100	97	33	-	-
SS-16	22 RT	34+44	49.0- 50.5	A-2-4(0)	25	2	10.2	70.0	5.6	14.2	100	97	24	-	-
SS-17	22 RT	34+44	64.0- 65.5	A-7-6(80)	109	84	6.1	10.8	14.2	69.0	100	96	86	-	-
SS-18	22 RT	34+44	74.0- 75.5	A-6(4)	38	22	13.6	48.8	12.4	25.2	92	86	40	-	-
SS-19	22 RT	34+44	84.5- 85.5	A-2-6(2)	36	20	26.1	43.5	9.2	21.2	92	81	31	-	-
SS-20	22 RT	34+44	94.0- 95.0	A-6(5)	40	15	0.6	64.9	12.3	22.2	100	100	50	-	-

SOIL TEST RESULTS EB2-A

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-100	25 LT	35+39	1.0- 1.5	A-7-6(24)	52	25	9.5	4.9	30.8	54.8	100	95	86	-	-
SS-101	25 LT	35+39	9.7- 11.2	A-7-6(24)	48	25	2.6	11.8	36.9	48.7	100	99	90	-	-
SS-102	25 LT	35+39	24.6- 26.1	A-3(0)	27	NP	34.2	59.9	1.8	4.1	100	99	7	-	-
SS-103	25 LT	35+39	34.6- 36.0	A-2-4(0)	29	9	51.5	23.1	9.1	16.2	81	46	23	-	-
SS-104	25 LT	35+39	39.6- 41.1	A-2-4(0)	26	9	22.3	48.7	4.7	24.3	99	94	32	-	-
SS-105	25 LT	35+39	49.6- 51.1	A-2-6(0)	31	11	25.6	49.5	2.6	22.3	98	87	27	-	-
SS-106	25 LT	35+39	59.6- 61.1	A-7-6(14)	57	42	30.8	22.9	7.7	38.5	99	88	48	-	-
SS-107	25 LT	35+39	69.6- 71.1	A-7-6(15)	51	32	0.4	50.1	13.0	36.5	100	100	57	-	-
SS-108	25 LT	35+39	84.6- 86.1	A-2-6(0)	31	12	32.0	45.4	2.2	20.3	96	82	24	-	-
SS-109	25 LT	35+39	94.6- 95.1	A-7-6(10)	42	22	8.1	52.1	13.4	26.4	94	88	58	-	-

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 33395.1.1 TIP: B-4028 COUNTY: BLADEN

DESCRIPTION(1): BRIDGE NO. 12 ON NC 11 OVER CAPE FEAR RIVER

EXISTING BRIDGE

Information from: Field Inspection X Microfilm ____ (reel ____ pos: ____)
Other (explain) BSR REPORT, BRIDGE MAINT. DATABASE

Bridge No.: 12 Length: 1236' Total Bents: 11 Bents in Channel: 24 Bents in Floodplain: 22
Foundation Type: BATTERED CONCRETE PIERS (BENTS 1&2 , 5-23) FOOTING ON PILES (BENTS 3 AND 4)
STEEL CRUTCH BENTS AT BENTS 10 AND 20

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: NONE NOTED

Interior Bents: SCOUR ALONG BASE OF BENT 3

Channel Bed: NONE NOTED

Channel Bank: SIGNIFIGANT EVIDENCE OF SCOUR ALONG CUT BANK SLOPE ALONG END BENT 1 SIDE OF BRIDGE (SOUTH BANK)

EXISTING SCOUR PROTECTION

Type(3): CONCRETE END AND SIDE SLOPES AT END BENT 2, BOULDER SIZE RIP RAP AT B3

Extent(4): ENTIRE SLOPE TO 27' OUTSIDE EDGE OF BRIDGE, AROUND BASE OF BENT 3

Effectiveness(5): EFFECTIVE AT EB2, SOMEWHAT EFFECTIVE AT B3

Obstructions(6): NONE NOTED

INSTRUCTIONS

1 Describe the specific site's location, including route number and body of water crossed.
2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
3 Note existing scour protection (e.g. rip rap).
4 Describe extent of existing scour protection.
5 Describe whether or not the scour protection appears to be working.
6 Note obstructions such as dams, fallen trees, debris at bents, etc.
7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
10 Determine the approximate floodplain width from field observation or a topographic map.
11 Describe the material covering the floodplain (e.g. grass, trees, crops).
12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoritical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): SAND AND CLAY

Channel Bank Material(8): CLAY AND SILT ALONG NORTH BANK, LITHIFIED COASTAL PLAIN ALONG SOUTH BANK

Channel Bank Cover(9): TREES

Floodplain Width(10): 3500'

Floodplain Cover(11): TREES

Stream is(12): Aggrading X Degrading ____ Static ____

Channel Migration Tendency(13): HIGH TOWARDS END BENT 1 (SOUTH)

Observations and Other Comments: ____

DESIGN SCOUR ELEVATIONS(14) Feet X Meters ____

BENTS

B1	B2	B3	B4	B4	B5	B6	B7	B8	B9	B10
-17.0	-24.5	11.0	11.0	11.0	11.0	9.0	9.0	8.0	7.0	7.0
B11										
7.0										

Comparison of DSE to Hydraulics Unit theoretical scour:
THE GEU AGREES WITH ALL BUT 2 (BENT 1 & 2)OF THE MAXIMUM THEORETICAL SOUR ELEVATIONS AS OUTLINED IN THE BSR REPORT DATED 12/3/09.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

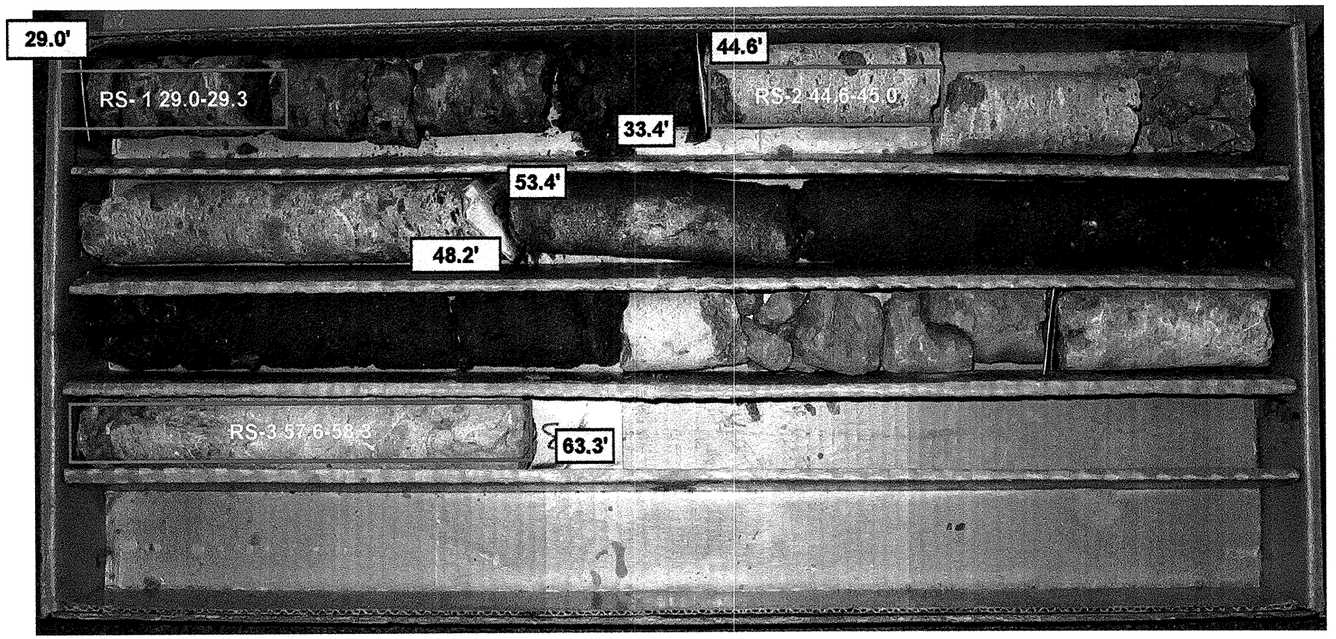
Bed or Bank							
Sample No.							
Retained #4							
Passed #10							
Passed #40							
Passed #200							
Coarse Sand							
Fine Sand							
Silt							
Clay							
LL							
PI							
AASHTO							
Station							
Offset							
Depth							

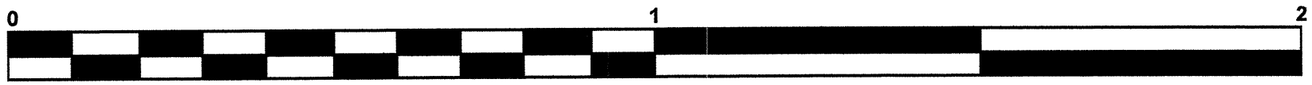
See Sheet 24 AND 25
"Soil Test Results",
for samples:
SS- 200 & 211 (CHANNEL BED)
SS- 79 & 81 (CHANNEL BANK)

Template Revised 02/07/06

Reported by: ____ Date: 3/18/2010

CORE PHOTOGRAPH
B1-B
Box 1 of 1 (29.0' to 33.4', 44.6' to 48.2', and 53.4' to 63.3')





ID: B-4028

PROJECT: 33395.1.1

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33395.1.1 (B-4028) F.A. PROJ. BRSTP-0011(9)

COUNTY BLADEN

PROJECT DESCRIPTION BRIDGE NO. 18 OVER CAPE FEAR RIVER OVERFLOW ON NC 11 AT -L- STA. 46+85.5

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33395.1.1 (B-4028)	1	11

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33395.1.1	BRSTP-0011(9)	P.E.
		R/W & UTIL.

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. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. 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 MAY VARY CONSIDERABLY WITH TIME ACCORDING TO 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 ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING 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 ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

CMW

MACTEC PERSONEL

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE MARCH 2010

NORTH CAROLINA LICENSED SEAL 20087 GEOLOGIST JOSEPH L. STONE 3/22/10

DRAWN BY: C.R. SUMNER, J.L. STONE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS 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.

PROJECT REFERENCE NO.	SHEET NO.
B-4028	2 OF 11

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX												
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY), MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-__
- [ ] BK-51
- [X] CME-550
- [ ] CME-750
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 15/16 " STEEL TEETH
- [ ] TRICONE ____ " TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC
- [ ] MANUAL

CORE SIZE:
- [ ] -B-____
- [ ] -N-____
- [ ] -H-____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-5 -BL- STA. 39+69

ELEVATION: 24.8 FT.

NOTES:

REVISED 02/23/06

PROJECT REFERENCE NO.	SHEET
B-4028	3 OF 11

SITE PLAN

0 50 100 FEET

NAD 83

SKEW= 90°

45

50

WOODS

EB1 BENT LINE

B1 BENT LINE

B2 BENT LINE

B3 BENT LINE

B4 BENT LINE

EB2 BENT LINE

N 17° 39' 31.7" E

EB1-A

EB2-B

-L-

B1-B

B2-B

B3-B

B4-B

TO NC 87

TO NC 41

EXISTING BRIDGE #18

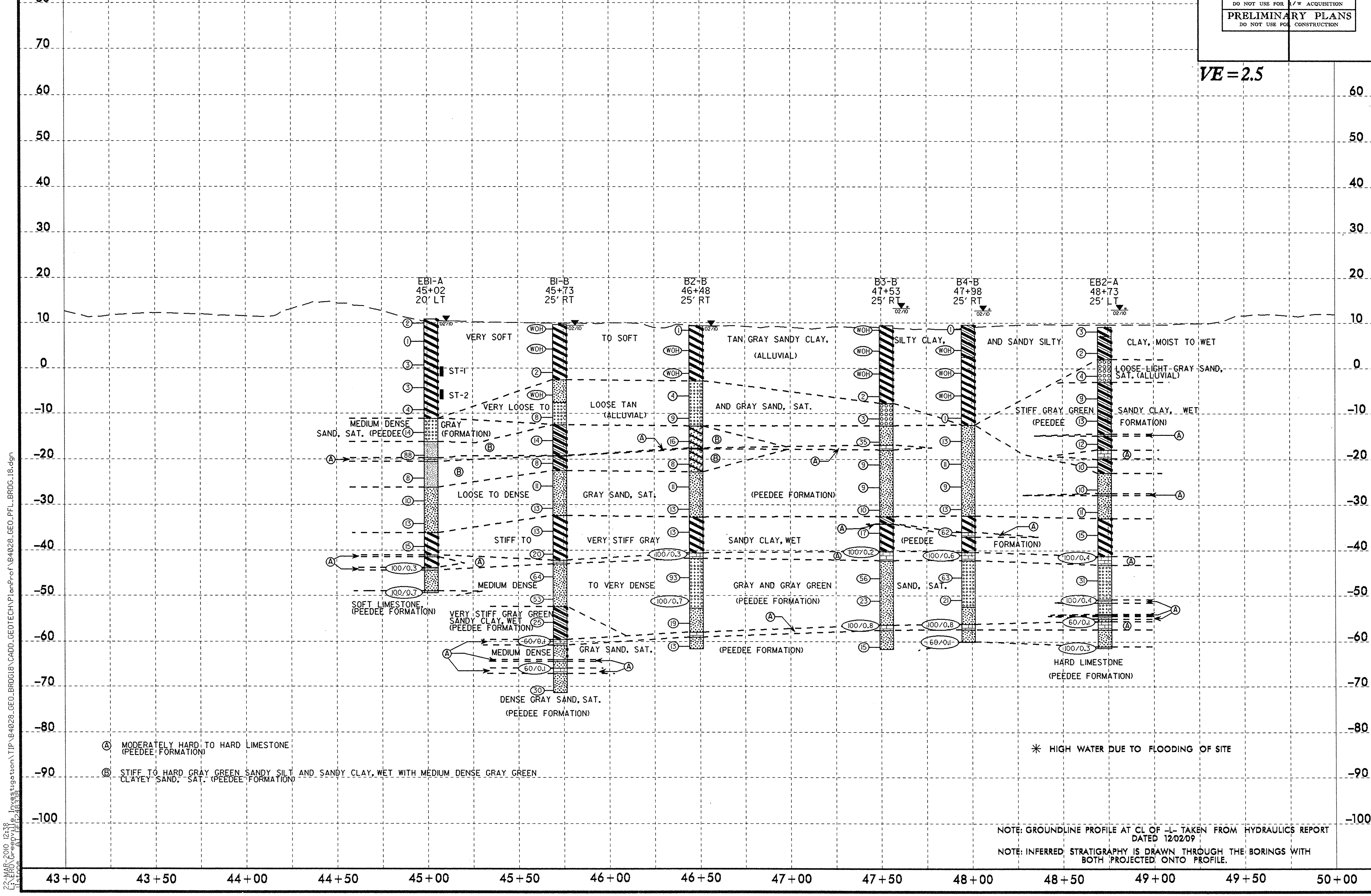
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROFILE THROUGH BORINGS PROJECTED ALONG -L-

VE = 2.5



80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
EB1-A 45+02 20' LT
B1-B 45+73 25' RT
B2-B 46+48 25' RT
B3-B 47+53 25' RT
B4-B 47+98 25' RT
EB2-A 48+73 25' LT
VERY SOFT
TO SOFT
TAN, GRAY SANDY CLAY,
(ALLUVIAL)
SILTY CLAY,
AND SANDY SILTY
CLAY, MOIST TO WET
LOOSE LIGHT GRAY SAND, SAT. (ALLUVIAL)
ST-1
ST-2
VERY LOOSE TO
LOOSE TAN
(ALLUVIAL)
AND GRAY SAND, SAT.
STIFF GRAY GREEN
SANDY CLAY, WET
(PEEDEE
FORMATION)
MEDIUM DENSE
GRAY
SAND, SAT. (PEEDEE
(FORMATION)
LOOSE TO DENSE
GRAY SAND, SAT.
(PEEDEE FORMATION)
STIFF TO
VERY STIFF GRAY
SANDY CLAY, WET
(PEEDEE
FORMATION)
MEDIUM DENSE
TO VERY DENSE
GRAY AND GRAY GREEN
SAND, SAT.
(PEEDEE FORMATION)
SOFT LIMESTONE
(PEEDEE FORMATION)
VERY STIFF GRAY GREEN
SANDY CLAY, WET
(PEEDEE FORMATION)
MEDIUM DENSE
GRAY SAND, SAT.
(PEEDEE FORMATION)
HARD LIMESTONE
(PEEDEE FORMATION)
DENSE GRAY SAND, SAT.
(PEEDEE FORMATION)
Ⓐ MODERATELY HARD TO HARD LIMESTONE (PEEDEE FORMATION)
Ⓑ STIFF TO HARD GRAY GREEN SANDY SILT AND SANDY CLAY, WET WITH MEDIUM DENSE GRAY GREEN CLAYEY SAND, SAT. (PEEDEE FORMATION)
✳ HIGH WATER DUE TO FLOODING OF SITE
NOTE: GROUNDLINE PROFILE AT CL OF -L- TAKEN FROM HYDRAULICS REPORT DATED 12/02/09
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.
43+00
43+50
44+00
44+50
45+00
45+50
46+00
46+50
47+00
47+50
48+00
48+50
49+00
49+50
50+00

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5/14/99

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 18 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 45+02	**OFFSET** 20 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 10.8 ft	**TOTAL DEPTH** 60.2 ft	**NORTHING** 238,174	**EASTING** 2,221,461	**24 HR.** 0.5
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/23/10	**COMP. DATE** 02/23/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
										10.8 GROUND SURFACE	0.0
	10.8	0.0	WOH	1	1	2	SS-44			ALLUVIAL TAN GRAY SILTY AND SANDY SILTY CLAY, MOIST TO WET	
	6.8	4.0	WOH	WOH	1	1					
	1.7	9.1	1	1	2	3	SS-45	32%			
	-3.3	14.1	WOH	1	2	3					
	-8.2	19.0	WOH	2	2	4	SS-46				
	-11.2										22.0
	-13.2	24.0	2	6	8	14	SS-47			COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)	
	-16.2										27.0
	-18.2	29.0	3	8	80	88	SS-48	23%		COASTAL PLAIN GRAY GREEN SANDY SILT, WET (PEEDEE FORMATION)	
	-19.7										30.5
	-20.5									MODERATELY HARD TO HARD LIMESTONE	31.3
	-23.2	34.0	4	4	4	8				COASTAL PLAIN GRAY GREEN SANDY SILT, WET (PEEDEE FORMATION)	
	-26.2										37.0
	-28.2	39.0	4	5	5	10	SS-49			COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)	
	-33.2	44.0	5	5	8	13					
	-36.2										47.0
	-38.2	49.0	4	7	8	15	SS-50			COASTAL PLAIN GRAY SANDY CLAY, WET (PEEDEE FORMATION)	
	-41.1										51.9
	-41.5									MODERATELY HARD TO HARD LIMESTONE	52.3
	-43.2	54.0	47	100/0.3		100/0.3					
	-43.8										54.6
	-44.4									COASTAL PLAIN GRAY SANDY CLAY, WET (PEEDEE FORMATION)	55.2
	-48.2	59.0	21	61	39/0.2	100/0.7	SS-51			MODERATELY HARD TO HARD LIMESTONE	
	-49.0										59.8
	-49.4									COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)	60.2
										COASTAL PLAIN SOFT LIMESTONE, (PEEDEE FORMATION)	
										Boring Terminated at Elevation -49.4 ft ON SOFT LIMESTONE	

Other Samples:
ST-1 (10.6 - 12.5)
ST-2 (15.6 - 17.6)

NCDOT BORE DOUBLE BORINGS.GPJ NC_DOT.GDT 3/18/10

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 18 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 45+73	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.5 ft	**TOTAL DEPTH** 80.9 ft	**NORTHING** 238,228	**EASTING** 2,221,525	**24 HR.** 0.2
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/19/10	**COMP. DATE** 02/23/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
10										
	9.5	0.0	WOH	WOH	WOH	0	SS-34			9.5 / 0.0 GROUND SURFACE
5	5.2	4.3	WOH	WOH	WOH	0				ALLUVIAL GRAY SILTY AND SANDY SILTY CLAY, WET
0	0.1	9.4	1	1	1	2	SS-35			
-5	-4.9	14.4	WOH	WOH	WOH	0	SS-36			-2.5 / 12.0 ALLUVIAL TAN GRAY SAND, SAT.
-10	-9.9	19.4	3	3	5	8	SS-37			-7.5 / 17.0
-15	-14.9	24.4	6	7	7	14	SS-38			-12.5 / 22.0 COASTAL PLAIN GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
-20	-19.9	29.4	3	3	5	8				-19.2 / 28.7 MODERATELY HARD TO HARD LIMESTONE -19.3 / 28.8
-25	-24.9	34.4	5	6	5	11	SS-39			-22.5 / 32.0 COASTAL PLAIN GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
-30	-29.9	39.4	5	6	7	13				COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)
-35	-34.9	44.4	4	5	8	13	SS-40			-32.5 / 42.0 COASTAL PLAIN GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-40	-39.9	49.4	11	10	10	20				
-45	-44.9	54.4	30	30	34	64	SS-41			-42.2 / 51.7 MODERATELY HARD TO HARD LIMESTONE -43.0 / 52.5 COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)
-50	-49.9	59.4	25	25	28	53				
-55	-54.9	64.4	12	13	12	25	SS-42			-52.5 / 62.0 COASTAL PLAIN GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
-60	-59.9	69.4	60/0.1			60/0.1				-59.6 / 69.1 MODERATELY HARD TO HARD LIMESTONE -60.8 / 70.3
-65	-64.9	74.4	6	14	60/0.1	60/0.1	SS-43			-64.0 / 73.5 COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION) -64.4 / 73.5 MODERATELY HARD TO HARD LIMESTONE -65.9 / 75.4
-70	-69.9	79.4								-67.1 / 76.6 COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION) MODERATELY HARD TO HARD

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 18 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 45+73	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.5 ft	**TOTAL DEPTH** 80.9 ft	**NORTHING** 238,228	**EASTING** 2,221,525	**24 HR.** 0.2
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/19/10	**COMP. DATE** 02/23/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-70						Match Line				
			13	13	17	30				-71.4 / 80.9 LIMESTONE COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION) *(continued)*
-75										Boring Terminated at Elevation -71.4 ft IN DENSE SAND
-80										
-85										
-90										
-95										
-100										
-105										
-110										
-115										
-120										
-125										
-130										
-135										
-140										
-145										
-150										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 18 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 46+48	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.2 ft	**TOTAL DEPTH** 70.8 ft	**NORTHING** 238,300	**EASTING** 2,221,548	**24 HR.** 0.0
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/18/10	**COMP. DATE** 02/19/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
10	9.2	0.0								9.2 GROUND SURFACE	0.0
			WOH	1	WOH	1	SS-26			ALLUVIAL GRAY SANDY AND SILTY CLAY, WET	
5	4.9	4.3									
			WOH	WOH	WOH	0					
0	-0.1	9.3									
			WOH	WOH	WOH	0	SS-27				
-5	-5.1	14.3								-2.8 ALLUVIAL GRAY SAND, SAT.	12.0
			1	1	3	4	SS-28				
-10	-10.1	19.3									
			2	4	5	9					
-15	-15.1	24.3								-12.8 COASTAL PLAIN GRAY GREEN CLAYEY SAND, SAT (PEEDEE FORMATION)	22.0
			3	7	9	16	SS-29				
-20	-20.1	29.3									
			3	3	5	8					
-25	-25.1	34.3									
			4	6	5	11	SS-30				
-30	-30.1	39.3									
			5	5	8	13					
-35	-35.1	44.3									
			5	5	8	13	SS-31				
-40	-40.1	49.3									
			45	100/0.3		100/0.3					
-45	-45.1	54.3									
			20	43	50	93	SS-32				
-50	-50.1	59.3									
			36	68	32/0.2	100/0.7					
-55	-55.1	64.3									
			6	9	10	19	SS-33				
-60	-60.1	69.3									
			5	6	7	13					
-65											
-70											

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 18 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B3-B	**STATION** 47+53	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.3 ft	**TOTAL DEPTH** 71.0 ft	**NORTHING** 238,400	**EASTING** 2,221,580	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/18/10	**COMP. DATE** 02/18/10	**SURFACE WATER DEPTH** 3.9ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION WATER SURFACE (02/18/10) ELEV. (ft)	DEPTH (ft)
10	9.3	0.0								9.3 GROUND SURFACE	0.0
			WOH	WOH	WOH	0	SS-18			ALLUVIAL GRAY SANDY AND SILTY CLAY, WET	
5	4.8	4.5									
			WOH	WOH	WOH	0					
0	-0.2	9.5									
			WOH	WOH	WOH	0	SS-19				
-5	-5.2	14.5									
			WOH	1	1	2					
-10	-10.2	19.5					SS-20			-7.7 ALLUVIAL LIGHT GRAY SAND, SAT.	17.0
			WOR	WOR	3	3					
-15	-15.2	24.5								-12.7 COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)	22.0
			3	10	25	35	SS-21				
-20	-20.2	29.5								-16.9 MODERATELY HARD TO HARD LIMESTONE	26.2
			4	4	5	9				-18.0 COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)	27.3
-25	-25.2	34.5									
			5	4	5	9	SS-22				
-30	-30.2	39.5									
			5	5	5	10					
-35	-35.2	44.5									
			3	7	10	17	SS-23				
-40	-40.2	49.5									
			100/0.2			100/0.2					
-45	-45.2	54.5									
			10	14	42	56	SS-24				
-50	-50.2	59.5									
			5	13	10	23					
-55	-55.2	64.5									
			7	8	92/0.3	100/0.8	SS-25				
-60	-60.2	69.5									
			5	5	10	15					
-65											
-70											

ELEV (ft)	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
-56.4	MODERATELY HARD TO HARD LIMESTONE	65.7
-57.6	COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)	66.9
-61.7	Boring Terminated at Elevation -61.7 ft IN MEDIUM DENSE SAND	71.0

ELEV (ft)	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
-32.7	COASTAL PLAIN GRAY SANDY CLAY, WET (PEEDEE FORMATION)	42.0
-34.2	MODERATELY HARD TO HARD LIMESTONE	43.5
-34.3	COASTAL PLAIN GRAY SANDY CLAY, WET (PEEDEE FORMATION)	43.6
-40.2	MODERATELY HARD TO HARD LIMESTONE	49.5
-42.3	COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)	51.6

ELEV (ft)	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
-32.8	COASTAL PLAIN GRAY SANDY CLAY, WET (PEEDEE FORMATION)	42.0
-40.6	MODERATELY HARD TO HARD LIMESTONE	49.8
-41.8	COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)	51.0
-52.8	COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)	62.0
-58.0	MODERATELY HARD TO HARD LIMESTONE	67.2
-59.1	COASTAL PLAIN GRAY SAND, SAT. (PEEDEE FORMATION)	68.3
-61.6	Boring Terminated at Elevation -61.6 ft IN MEDIUM DENSE SAND	70.8

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 18 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B4-B	**STATION** 47+98	**OFFSET** 25 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.5 ft	**TOTAL DEPTH** 69.6 ft	**NORTHING** 238,443	**EASTING** 2,221,593	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/17/10	**COMP. DATE** 02/18/10	**SURFACE WATER DEPTH** 3.2ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										WATER SURFACE (02/17/10)
10	9.5	0.0								9.5 GROUND SURFACE 0.0
			WOH	WOH	1	1	SS-10			**ALLUVIAL** GRAY SANDY, SILTY, AND SILTY SANDY CLAY, WET
5	5.0	4.5	WOH	WOH	WOH	0				2.5 7.0
0	0.0	9.5	WOH	WOH	WOH	0	SS-11			
-5	-5.0	14.5	WOH	WOH	WOH	0				
-10	-10.0	19.5	WOH	WOH	1	1	SS-12			-12.5 22.0 **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-15	-15.0	24.5	4	5	8	13	SS-13			
-20	-20.0	29.5	3	5	6	11				
-25	-25.0	34.5	4	4	5	9	SS-14			
-30	-30.0	39.5	4	5	8	13				-32.5 42.0 **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-35	-35.0	44.5	6	9	53	62	SS-15			-36.0 45.5 -37.1 46.6 SOFT LIMESTONE **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-40	-40.0	49.5	32	44	56/0.1	100/0.6				-40.4 49.9 MODERATELY HARD TO HARD LIMESTONE -42.2 51.7 **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-45	-45.0	54.5	12	23	40	63	SS-16			
-50	-50.0	59.5	5	9	12	21				-52.5 62.0 **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-55	-55.0	64.5	7	12	88/0.3	100/0.8	SS-17			-56.2 65.7 MODERATELY HARD TO HARD LIMESTONE -57.4 66.9 **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION) -60.0 69.5
-60	-60.0	69.5	60/0.1			60/0.1				-60.1 69.6 HARD LIMESTONE Boring Terminated at Elevation -60.1 ft ON HARD LIMESTONE
-65										
-70										

NCDOT BORE DOUBLE BORINGS.GPJ NC_DOT.GDT 3/18/10

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 18 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 48+73	**OFFSET** 20 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.0 ft	**TOTAL DEPTH** 70.4 ft	**NORTHING** 238,528	**EASTING** 2,221,573	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/17/10	**COMP. DATE** 02/17/10	**SURFACE WATER DEPTH** 3.9ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
15											
10	9.0	0.0								WATER SURFACE (02/17/10)	
			WOH	2	1	3	SS-1			9.0 GROUND SURFACE	0.0
5	4.4	4.6								7.0 **ALLUVIAL** GRAY SANDY CLAY, WET	2.0
			WOH	1	1	2	SS-2			2.0	7.0
0	-0.6	9.6								**ALLUVIAL** LIGHT GRAY SAND, SAT.	
			2	2	2	4	SS-3			-3.0	12.0
-5	-5.6	14.6								**COASTAL PLAIN** GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)	
			3	4	5	9	SS-4				
-10	-10.6	19.6									
			3	6	7	13					
-15	-15.6	24.6								-14.4 MODERATELY HARD TO HARD LIMESTONE	23.4
			3	5	7	12	SS-5			-14.8 **COASTAL PLAIN**	23.8
-20	-20.6	29.6								-17.9 GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)	26.9
			5	4	6	10				-19.8 **COASTAL PLAIN**	28.8
-25	-25.6	34.6								MODERATELY HARD TO HARD LIMESTONE	
			5	5	5	10	SS-6			-23.0 **COASTAL PLAIN**	32.0
-30	-30.6	39.6								GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)	
			4	5	6	11				-27.5 **COASTAL PLAIN**	36.5
-35	-35.6	44.6								-27.9 GRAY SAND, SAT. (PEEDEE FORMATION)	36.9
			4	6	9	15	SS-7			MODERATELY HARD TO HARD LIMESTONE	
-40	-40.6	49.6								-33.0 **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)	42.0
			13	100/0.4		100/0.4				**COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)	
-45	-45.6	54.6								-41.3 MODERATELY HARD TO HARD LIMESTONE	50.3
			8	13	18	31	SS-8			-43.2 **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)	52.2
-50	-50.6	59.6									
			100/0.4			100/0.4				-50.9 MODERATELY HARD TO HARD LIMESTONE	59.9
-55	-55.6	64.6								-51.6 **COASTAL PLAIN** GRAY SAND SAT. (PEEDEE FORMATION)	60.6
			60/0.1			60/0.1				-54.0	63.0
-60	-60.6	69.6								-54.2 MODERATELY HARD TO HARD LIMESTONE	63.2
			4	100/0.3		100/0.3	SS-9			-54.5 **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)	63.5
-65										-55.1 MODERATELY HARD TO HARD LIMESTONE	64.1
										-55.6 **COASTAL PLAIN** GRAY SAND SAT. (PEEDEE FORMATION)	64.6
										-57.4	66.4
										-61.1 MODERATELY HARD TO HARD LIMESTONE	70.1
										-61.4 **COASTAL PLAIN** GRAY SAND SAT. (PEEDEE FORMATION)	70.4

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO. 18 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 48+73	**OFFSET** 20 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.0 ft	**TOTAL DEPTH** 70.4 ft	**NORTHING** 238,528	**EASTING** 2,221,573	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 02/17/10	**COMP. DATE** 02/17/10	**SURFACE WATER DEPTH** 3.9ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-65						Match Line				
-70										MODERATELY HARD TO HARD LIMESTONE
										COASTAL PLAIN
-75										GRAY SAND, SAT. (PEEDEE FORMATION)
										MODERATELY HARDTO HARD LIMESTONE
-80										Boring Terminated at Elevation -61.4 ft ON HARD LIMESTONE
-85										
-90										
-95										
-100										
-105										
-110										
-115										
-120										
-125										
-130										
-135										
-140										
-145										

BRIDGE NO. 18 OVER CAPE FEAR RIVER

OVERFLOW ON NC 11

SOIL TEST RESULTS EB1-A

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-44	25 LT	45+02	1.0-1.5	A-7-5(26)	55	24	4.6	5.2	33.9	56.3	100	98	91	-	-
SS-45	25 LT	45+02	9.1-10.6	A-7-6(25)	49	24	3.2	6.8	41.7	48.2	100	99	92	32.0	-
SS-46	25 LT	45+02	19.0-20.5	A-7-6(19)	45	25	10.7	12.9	28.2	48.2	100	93	78	-	-
SS-47	25 LT	45+02	24.0-25.5	A-3(0)	26	NP	76.8	19.5	2.7	1.0	98	58	4	-	-
SS-48	25 LT	45+02	29.0-30.5	A-4(0)	23	8	23.5	43.0	15.4	18.1	98	91	37	23.0	-
SS-49	25 LT	45+02	39.0-40.5	A-2-4(0)	27	NP	9.0	74.0	4.9	12.1	100	97	20	-	-
SS-50	25 LT	45+02	49.0-50.5	A-7-6(13)	50	29	3.2	49.6	15.0	32.2	100	98	57	-	-
SS-51	25 LT	45+02	59.0-60.2	A-2-4(0)	21	NP	25.6	62.7	5.6	6.0	99	95	14	-	-

SOIL TEST RESULTS B3-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-18	25 RT	47+53	1.0-1.5	A-7-6(12)	45	21	31.1	4.3	19.8	44.8	97	76	63	-	-
SS-19	25 RT	47+53	9.5-11.0	A-7-6(31)	56	27	3.5	1.2	32.2	63.1	100	98	96	-	-
SS-20	25 RT	47+53	19.5-21.0	A-1-b(0)	23	NP	87.9	9.1	1.0	2.0	96	45	3	-	-
SS-21	25 RT	47+53	24.5-26.0	A-2-4(0)	21	6	27.7	41.5	12.5	18.3	91	83	31	-	-
SS-22	25 RT	47+53	34.5-36.0	A-2-4(0)	25	3	15.3	65.9	6.6	12.2	98	92	23	-	-
SS-23	25 RT	47+53	44.5-46.0	A-7-6(21)	55	38	1.4	46.8	17.2	34.6	100	99	62	-	-
SS-24	25 RT	47+53	54.5-56.0	A-2-4(0)	23	NP	55.6	32.3	3.9	8.1	95	79	13	-	-
SS-25	25 RT	47+53	64.5-65.7	A-2-4(0)	26	4	9.4	67.5	10.9	12.2	99	97	27	-	-

SOIL TEST RESULTS B1-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-34	25 RT	45+73	1.0-1.5	A-7-6(17)	48	23	19.9	3.9	27.4	48.8	98	85	75	-	-
SS-35	25 RT	45+73	9.4-10.9	A-7-6(23)	50	25	1.8	7.3	31.8	59.0	94	93	86	-	-
SS-36	25 RT	45+73	14.4-15.9	A-2-4(0)	26	7	12.4	55.3	13.9	18.3	100	99	35	-	-
SS-37	25 RT	45+73	19.4-20.9	A-3(0)	22	NP	74.3	19.0	4.7	2.0	98	52	8	-	-
SS-38	25 RT	45+73	24.4-25.9	A-6(0)	27	11	27.4	39.6	12.8	20.2	99	90	36	-	-
SS-39	25 RT	45+73	34.4-35.9	A-2-4(0)	25	NP	3.8	80.7	5.3	10.1	100	99	19	-	-
SS-40	25 RT	45+73	44.4-45.9	A-7-6(10)	42	22	1.0	56.3	12.4	30.3	100	100	59	-	-
SS-41	25 RT	45+73	54.4-55.9	A-2-4(0)	23	NP	25.5	62.1	5.3	7.0	99	96	15	-	-
SS-42	25 RT	45+73	64.4-65.9	A-6(1)	35	13	3.8	65.1	9.9	21.1	99	98	36	-	-
SS-43	25 RT	45+73	74.4-75.4	A-2-4(0)	31	9	11.4	65.3	4.2	19.1	96	92	25	-	-

SOIL TEST RESULTS B4-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-10	25 RT	47+98	1.0-1.5	A-6(3)	35	14	42.9	12.0	14.5	30.5	96	78	45	-	-
SS-11	25 RT	47+98	9.5-11.0	A-7-5(30)	57	27	2.4	1.6	32.9	63.1	96	95	93	-	-
SS-12	25 RT	47+98	19.5-21.0	A-7-6(11)	41	21	14.6	22.8	32.0	30.5	94	87	63	-	-
SS-13	25 RT	47+98	24.5-26.0	A-2-4(0)	25	10	34.2	36.4	11.1	18.3	98	87	31	-	-
SS-14	25 RT	47+98	34.5-36.0	A-2-4(0)	24	2	9.0	72.2	6.6	12.2	99	96	23	-	-
SS-15	25 RT	47+98	44.5-45.5	A-7-6(21)	55	38	1.8	45.6	18.0	34.6	98	97	63	-	-
SS-16	25 RT	47+98	54.5-56.0	A-3(0)	19	NP	60.3	30.6	4.0	5.1	97	80	10	-	-
SS-17	25 RT	47+98	64.5-65.7	A-2-4(0)	25	2	10.0	68.1	8.7	13.2	94	91	21	-	-

SOIL TEST RESULTS B2-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-26	25 RT	46+48	1.0-1.5	A-7-6(8)	46	20	40.3	5.5	19.6	34.6	96	67	53	-	-
SS-27	25 RT	46+48	9.3-10.8	A-7-6(22)	44	23	1.4	9.8	31.8	57.0	98	97	89	-	-
SS-28	25 RT	46+48	14.3-15.8	A-3(0)	23	NP	76.9	19.0	2.0	2.0	98	56	5	-	-
SS-29	25 RT	46+48	24.3-25.8	A-2-6(0)	27	12	29.3	37.8	12.5	20.3	96	86	34	-	-
SS-30	25 RT	46+48	34.3-35.8	A-2-4(0)	25	NP	7.8	77.8	5.2	9.2	99	96	19	-	-
SS-31	25 RT	46+48	44.3-45.8	A-7-6(8)	42	23	3.1	54.1	16.4	26.4	95	93	51	-	-
SS-32	25 RT	46+48	54.3-55.8	A-3(0)	23	NP	65.3	28.8	2.8	3.1	98	85	7	-	-
SS-33	25 RT	46+48	64.3-65.8	A-2-4(0)	28	4	5.1	71.4	11.3	12.2	97	96	28	-	-

SOIL TEST RESULTS EB2-A

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	20 LT	48+73	1.0-1.5	A-7-6(9)	42	19	35.6	5.5	16.2	42.7	99	78	59	-	-
SS-2	20 LT	48+73	4.6-6.1	A-6(4)	35	17	44.6	10.4	12.5	32.6	97	76	45	-	-
SS-3	20 LT	48+73	9.6-11.1	A-1-b(0)	24	NP	91.9	6.6	0.5	1.0	99	34	2	-	-
SS-4	20 LT	48+73	14.6-16.1	A-6(2)	31	16	21.8	39.5	10.3	28.5	100	93	41	-	-
SS-5	20 LT	48+73	24.6-26.1	A-6(2)	30	17	28.5	35.2	9.9	26.4	100	91	39	-	-
SS-6	20 LT	48+73	34.6-36.1	A-2-4(0)	24	1	9.8	72.4	5.6	12.2	100	96	23	-	-
SS-7	20 LT	48+73	44.6-46.1	A-7-6(13)	47	29	1.6	52.9	12.9	32.6	97	97	56	-	-
SS-8	20 LT	48+73	54.6-56.1	A-3(0)	19	NP	64.9	25.8	3.2	6.1	98	73	10	-	-
SS-9	20 LT	48+73	69.6-70.1	A-2-4(0)	29	10	19.6	55.0	8.0	17.3	84	77	23	-	-

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 33395.1.1 TIP: B-4028 COUNTY: BLADEN

DESCRIPTION(1): BRIDGE NO. 18 ON NC 11 OVER CAPE FEAR RIVER OVERFLOW

EXISTING BRIDGE

Information from: Field Inspection X Microfilm ____ (reel ____ pos: ____)
Other (explain) BSR REPORT

Bridge No.: 18 Length: 340' Total Bents: 11 Bents in Channel: 0 Bents in Floodplain: 11
Foundation Type: CONCRETE (BATTERED)

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: NONE

Interior Bents: NONE NOTED

Channel Bed: NONE NOTED

Channel Bank: NONE NOTED

EXISTING SCOUR PROTECTION

Type(3): CONCRETE END AND SIDE SLOPES AT EACH END BENT

Extent(4): COVERS THE ENTIRE SLOPE TO 27' OUTSIDE EDGE OF BRIDGE

Effectiveness(5): EFFECTIVE

Obstructions(6): NONE

INSTRUCTIONS

1 Describe the specific site's location, including route number and body of water crossed.
2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
3 Note existing scour protection (e.g. rip rap).
4 Describe extent of existing scour protection.
5 Describe whether or not the scour protection appears to be working.
6 Note obstructions such as dams, fallen trees, debris at bents, etc.
7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
10 Determine the approximate floodplain width from field observation or a topographic map.
11 Describe the material covering the floodplain (e.g. grass, trees, crops).
12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoritical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

DESIGN INFORMATION

Channel Bed Material(7): CLAY

Channel Bank Material(8): CLAY

Channel Bank Cover(9): TREES

Floodplain Width(10): 3500'

Floodplain Cover(11): TREES

Stream is(12): Aggrading ____ Degrading ____ Static X

Channel Migration Tendency(13): LOW, NO ACTIVE CHANNEL, NO CHANNEL BANKS (OVERFLOW BRIDGE)

Observations and Other Comments:

DESIGN SCOUR ELEVATIONS(14) Feet X Meters ____

BENTS

B1	B2	B3	B4							
4.0	4.0	4.0	4.0							

Comparison of DSE to Hydraulics Unit theoretical scour:
GEOTECHNICAL ANALYSIS AGREES WITH THE MAXIMUM THEORETICAL SCOUR ELEVATIONS AS OUTLIINED IN THE BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank						
Sample No.						
Retained #4						
Passed #10						
Passed #40						
Passed #200						
Coarse Sand						
Fine Sand						
Silt						
Clay						
LL						
PI						
AASHTO						
Station						
Offset						
Depth						

See Sheet 10
"Soil Test Results",
for samples:
SS- 26 & 18 (CHANNEL BED)
SS- 1 & 44 (CHANNEL BANK)

Template Revised 02/07/06

Reported by: [signature] Date: 3/18/2010

PROJECT: 33395.1.1 ID: B-4028

CONTENTS

SHEET	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	-L- PROFILE
5-9	BORELOGS
10	SOIL TEST RESULTS
11	SCOUR REPORT

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33395.1.1 (B-4028) F.A. PROJ. BRSTP-0011(9)

COUNTY BLADEN

PROJECT DESCRIPTION BRIDGE NO. 42 OVER CAPE FEAR RIVER OVERFLOW ON NC 11 AT -L- STA. 56+35.5

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33395.1.1 (B-4028)	1	11

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
33395.1.1	BRSTP-0011(9)	P.E.
		R/W & UTIL.

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. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. 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 MAY VARY CONSIDERABLY WITH TIME ACCORDING TO 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 ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING 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 ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

CMW

MACTEC PERSONEL

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE MARCH 2010

NORTH CAROLINA LICENSED SEAL 2007 GEOLOGIST JOSEPH L. STONE 3-25-10

DRAWN BY: C.R. SUMNER, J.L. STONE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS 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.

PROJECT REFERENCE NO.	SHEET NO.
B-4028	2 OF 11

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:

VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX		50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
LIQUID LIMIT PLASTIC INDEX	6 MX		NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS A SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	HIGH

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B- ___
- [ ] BK-51
- [X] CME-550
- [ ] CME-750
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [X] TRICONE 2 1/16" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [ ] -N_____
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.
CRYSTALLINE ROCK (CR)	FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.
NON-CRYSTALLINE ROCK (NCR)	FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.
COASTAL PLAIN SEDIMENTARY ROCK (CP)	COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
SEVERE (SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
COMPLETE	ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.

ROCK HARDNESS

VERY HARD	CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD	CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD	CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

FRIABLE	RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.
MODERATELY INDURATED	GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.
INDURATED	GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.
EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.

TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-6 -BL- STA. 49+25

ELEVATION: 25.82 FT.

NOTES:

REVISED 02/23/06

PROJECT REFERENCE NO.	SHEET
B-4028	3 OF 11

SITE PLAN

0 50 100
FEET

NAD 83

55

60

EB1 BENT LINE

B1 BENT LINE

B2 BENT LINE

B3 BENT LINE

B4 BENT LINE

EB2 BENT LINE

POND

WOODS

EB1-A

B2-A

B3-A

EB2-A

-L-

TO NC 87

TO NC 41

B1-B

B4-B

EXISTING BRIDGE # 42

WOODS

PROJECT REFERENCE NO.	SHEET NO.
B-4028	4 OF 11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PROFILE THROUGH BORINGS PROJECTED ALONG -L-

VE = 2.5

EB1-A 54+48 30' LT
B1-B 55+23 17' RT
B2-A 55+98 17' RT
B3-A 56+73 30' LT
B4-B 57+48 18' RT
EB2-A 58+23 28' RT

VERY LOOSE TO STIFF TO LOOSE TO MEDIUM DENSE
VERY STIFF TO HARD
LOOSE TAN GRAY GRAY GREEN SANDY AND CLAYEY SANDY TO VERY DENSE
SAND, MOIST TO SAT. (ALLUVIAL)
CLAY, WET (PEEDEE FORMATION)
WITH STIFF TO HARD GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
MEDIUM DENSE GRAY SAND, SAT. (PEEDEE FORMATION)
GRAY GREEN CLAYEY SAND, MEDIUM DENSE TO VERY DENSE
SILT, WET
SAT. (PEEDEE FORMATION)
ST-3

MEDIUM DENSE TO DENSE GRAY SAND, SAT. (PEEDEE FORMATION)

Ⓐ MODERATELY HARD TO HARD LIMESTONE (PEEDEE FORMATION)
Ⓑ VERY SOFT BROWN MODERATELY ORGANIC SILTY CLAY, WET (ALLUVIAL)
Ⓒ SOFT TAN SANDY CLAY, MOIST TO WET (ALLUVIAL)
Ⓓ VERY STIFF TO HARD GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)

✱ HIGH WATER DUE TO FLOODING OF SITE

NOTE: GROUNDLINE PROFILE AT CL OF -L- TAKEN FROM HYDRAULICS REPORT DATED 12/02/09

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

70 60 50 40 30 20 10 0 -10 -20 -30 -40 -50 -60 -70 -80 -90 -100 -110

52+50 53+00 53+50 54+00 54+50 55+00 55+50 56+00 56+50 57+00 57+50 58+00 58+50 59+00 59+50

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO 42 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 54+48	**OFFSET** 30 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 11.5 ft	**TOTAL DEPTH** 76.3 ft	**NORTHING** 239,079	**EASTING** 2,221,738	**24 HR.** 0.8
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/05/10	**COMP. DATE** 03/05/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION (ELEV. (ft) / DEPTH (ft))
15										
	11.5	0.0								11.5 / 0.0 GROUND SURFACE
10			WOH	1	2	3	SS-57			**ALLUVIAL** TAN SANDY CLAY, MOIST TO WET
	6.5	5.0								8.5 / 3.0 **ALLUVIAL** TAN SAND, SAT.
5			1	2	5	7	SS-58			
	1.5	10.0								3.5 / 8.0
0			2	2	4	6	SS-59			
	-3.5	15.0								-1.5 / 13.0 **COASTAL PLAIN** GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
-5			4	4	5	9				
	-8.3	19.8								
-10			3	4	7	11	SS-60			
	-13.3	24.8								
-15			9	8	9	17				
	-16.5	28.0								-16.5 / 28.0 **COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
	-18.3	29.8								
-20			4	5	6	11	SS-61			
	-23.3	34.8								
-25			4	4	4	8	SS-62			
	-28.3	39.8								
-30			5	7	7	14				
	-31.5	43.0								-31.5 / 43.0 **COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
	-33.3	44.8								
-35			4	5	8	13	SS-63			
	-38.3	49.8								
-40			4	6	19	25				
	-40.0	51.5								-40.0 / 51.5 MODERATLEY HARD TO HARD LIMESTONE
	-40.7	52.2								-40.7 / 52.2 **COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
	-43.3	54.8								
-45			11	13	22	35	SS-64			
	-48.3	59.8								
-50			8	15	16	31				
	-51.5	63.0								
	-53.3	64.8								
-55			6	14	14	28	SS-65			
	-54.9	66.4								-54.9 / 66.4 MODERATLEY HARD TO HARD LIMESTONE
	-56.0	67.5								-56.0 / 67.5 **COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
	-58.3	69.8								
-60			57	60/0.1		60/0.1				
	-58.7	70.2								-58.7 / 70.2 MODERATLEY HARD TO HARD LIMESTONE
	-59.5	71.0								-59.5 / 71.0 **COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE
	-63.3	74.8								
-65			7	13	17	30	SS-66			

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO 42 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 54+48	**OFFSET** 30 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 11.5 ft	**TOTAL DEPTH** 76.3 ft	**NORTHING** 239,079	**EASTING** 2,221,738	**24 HR.** 0.8
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/05/10	**COMP. DATE** 03/05/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-65						Match Line				
-70										
-75										
-80										
-85										
-90										
-95										
-100										
-105										
-110										
-115										
-120										
-125										
-130										
-135										
-140										
-145										FORMATION) Boring Terminated at Elevation -64.8 ft IN MEDIUM DENSE SAND

NCDOT GEOTECHNICAL ENGINEERING UNIT
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PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO 42 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 55+23	**OFFSET** 17 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 11.4 ft	**TOTAL DEPTH** 75.6 ft	**NORTHING** 239,136	**EASTING** 2,221,806	**24 HR.** 0.7
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/04/10	**COMP. DATE** 03/04/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
15											
	11.4	0.0								11.4 GROUND SURFACE	0.0
10			1	WOH	WOH	0	SS-48			**ALLUVIAL**	
	7.1	4.3								9.4 TAN SAND, MOIST TO SAT.	2.0
5			WOH	WOH	WOH	0	SS-49				
	2.1	9.3									
0			3	4	4	8					
	-2.9	14.3								-0.6	12.0
			3	4	5	9	SS-50			**COASTAL PLAIN** GRAY GREEN SANDY CLAY, WT (PEEDEE FORMATION)	
-5	-7.7	19.1									
			3	4	6	10					
-10										-10.4	21.8
	-12.7	24.1								-10.5 MODERATELY HARD TO HARD LIMESTONE	21.9
			4	5	7	12	SS-51			**COASTAL PLAIN** GRAY SAND AND CLAYEY SAND, SAT. (PEEDEE FORMATION)	
-15	-17.7	29.1									
			3	4	5	9					
-20										-20.6	32.0
	-22.7	34.1									
			7	8	6	14	SS-52				
-25											
	-27.7	39.1									
			4	5	7	12					
-30										-30.6	42.0
	-32.7	44.1								**COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)	
			4	7	8	15	SS-53				
-35											
	-37.7	49.1								-36.6	48.0
			61	44	19	63	SS-54			-37.9 MODERATELY HARD TO HARD LIMESTONE	49.3
-40										-38.5	49.9
	-42.7	54.1								-39.2	50.6
			8	26	68	94	SS-55			**COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)	
-45										**COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)	
	-47.7	59.1									
			12	20	18	38					
-50											
	-52.7	64.1								-53.2	64.6
			21	100/0.4		100/0.4	SS-56			-54.5 MODERATELY HARD TO HARD LIMESTONE	65.9
-55										-55.2	66.6
	-57.7	69.1								-56.0 **COASTAL PLAIN**	67.4
			60/0.1			60/0.1				-57.3 GRAY SAND, SAT. (PEEDEE FORMATION)	68.7
-60										-58.2 MODERATELY HARD TO HARD LIMESTONE	69.6
	-62.7	74.1								**COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)	
			5	7	12	19				-64.2 MODERATELY HARD TO HARD LIMESTONE	75.6
-65											

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO 42 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 55+23	**OFFSET** 17 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 11.4 ft	**TOTAL DEPTH** 75.6 ft	**NORTHING** 239,136	**EASTING** 2,221,806	**24 HR.** 0.7
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/04/10	**COMP. DATE** 03/04/10	**SURFACE WATER DEPTH** N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
-65						Match Line				**COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION) Boring Terminated at Elevation -64.2 ft IN MEDIUM DENSE SAND
-70										
-75										
-80										
-85										
-90										
-95										
-100										
-105										
-110										
-115										
-120										
-125										
-130										
-135										
-140										
-145										

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PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO 42 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 55+98	**OFFSET** 30 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.3 ft	**TOTAL DEPTH** 65.8 ft	**NORTHING** 239,222	**EASTING** 2,221,784	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/04/10	**COMP. DATE** 03/04/10	**SURFACE WATER DEPTH** 1.8ft	

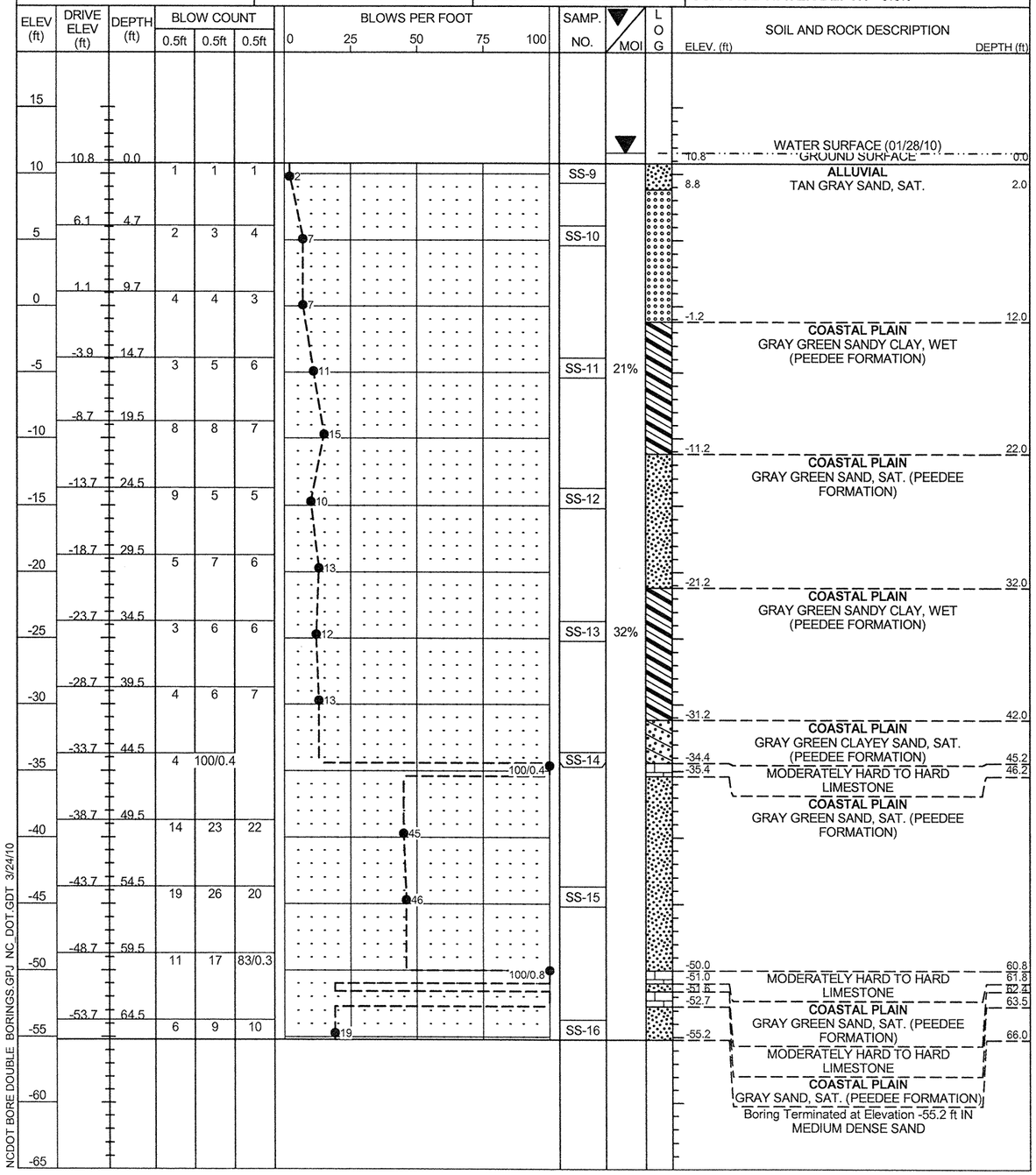
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft) / DEPTH (ft)
										WATER SURFACE (03/04/10)
10	9.3	0.0								9.3 GROUND SURFACE 0.0
			WOH	WOH	WOH	0	SS-40			**ALLUVIAL** BROWN MODERATLEY ORGANIC SILTY CLAY, WET
5	5.0	4.3								6.3 3.0
			1	3	3	6	SS-41			**ALLUVIAL** TAN SAND, SAT.
0	0.0	9.3								
			1	1	2	3				
-5	-5.0	14.3								-3.7 13.0
			3	4	6	10	SS-42			**COASTAL PLAIN** GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
-10	-10.0	19.3								
			4	6	8	14				
-15	-15.0	24.3								-13.7 23.0
			27	29	14	43	SS-43			**COASTAL PLAIN** GRAY GREEN SANDY AND CLAYEY SANDY SILT, WET (PEEDEE FORMATION)
-20	-20.0	29.3								
			4	4	14	18				
-25	-25.0	34.3								
			4	6	6	12	SS-44			
-30	-30.0	39.3								
			4	5	8	13				
-35	-35.0	44.3								
			4	6	94	100/1.0	SS-45			
-40	-40.0	49.3								
			7	24	35	59	SS-46			
-45	-45.0	54.3								
			8	21	21	42				
-50	-50.0	59.3								-48.7 58.0
			12	12	17	29	SS-47			**COASTAL PLAIN** GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
-55	-55.0	64.3								-52.4 61.7
			5	9	15	24				MODERATELY HARD TO HARD LIMESTONE
										-53.9 63.2
-60										**COASTAL PLAIN** GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
										-56.5 65.8
-65										Boring Terminated at Elevation -56.5 ft IN VERY STIFF SANDY CLAY
-70										

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO 42 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B3-A	**STATION** 56+73	**OFFSET** 30 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 9.7 ft	**TOTAL DEPTH** 66.5 ft	**NORTHING** 239,293	**EASTING** 2,221,806	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 03/03/10	**COMP. DATE** 03/03/10	**SURFACE WATER DEPTH** 1.5ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION
										WATER SURFACE (03/03/10)
10	9.7	0.0								9.7 GROUND SURFACE 0.0
			WOH	WOH	WOH	0	SS-31			**ALLUVIAL** BROWN MODERATLEY ORGANIC SILTY CLAY, WET
5	4.7	5.0								6.7 3.0
			3	3	5	8	SS-32			**ALLUVIAL** TAN SAND, SAT.
0	-0.3	10.0								
			1	1	2	3				
-5	-5.3	15.0								-3.5 13.2
			3	4	6	10	SS-33			**COASTAL PLAIN** GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
-10	-10.3	20.0								-8.3 18.0
			4	5	6	11				**COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
-15	-15.3	25.0								-14.0 23.7
			3	5	5	10	SS-34			-14.4 24.1 MODERATLEY HARD TO HARD LIMESTONE
-20	-20.3	30.0								**COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
			9	6	6	12				
-25	-25.3	35.0								-23.3 33.0
			4	6	7	13	SS-35			**COASTAL PLAIN** GRAY CLAYEY SANDY SILT, WET (PEEDEE FORMATION)
-30	-30.3	40.0								
			5	6	6	12				
-35	-35.3	45.0								-33.3 43.0
			7	21	79/0.2	100/0.7	SS-36			**COASTAL PLAIN** GRAY SANDY CLAY, WET (PEEDEE FORMATION)
-40	-40.3	50.0								-36.3 46.0
			23	16	18	34	SS-37			-37.2 46.9 MODERATLEY HARD TO HARD LIMESTONE
-45	-45.3	55.0								**COASTAL PLAIN** GRAY GREEN SANDY CLAY, WET (PEEDEE FORMATION)
			14	21	17	38				
-50	-50.3	60.0								-48.3 58.0
			7	18	11	29	SS-38			**COASTAL PLAIN** GRAY GREEN SAND, SAT. (PEEDEE FORMATION)
-55	-55.3	65.0								-53.1 62.8
			6	6	9	15	SS-39			-54.0 63.7 MODERATELY HARD TO HARD LIMESTONE
-60										**COASTAL PLAIN** GRAY SAND, SAT. (PEEDEE FORMATION)
										-56.8 66.5
-65										Boring Terminated at Elevation -56.8 ft IN MEDIUM DENSE SAND
-70										

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

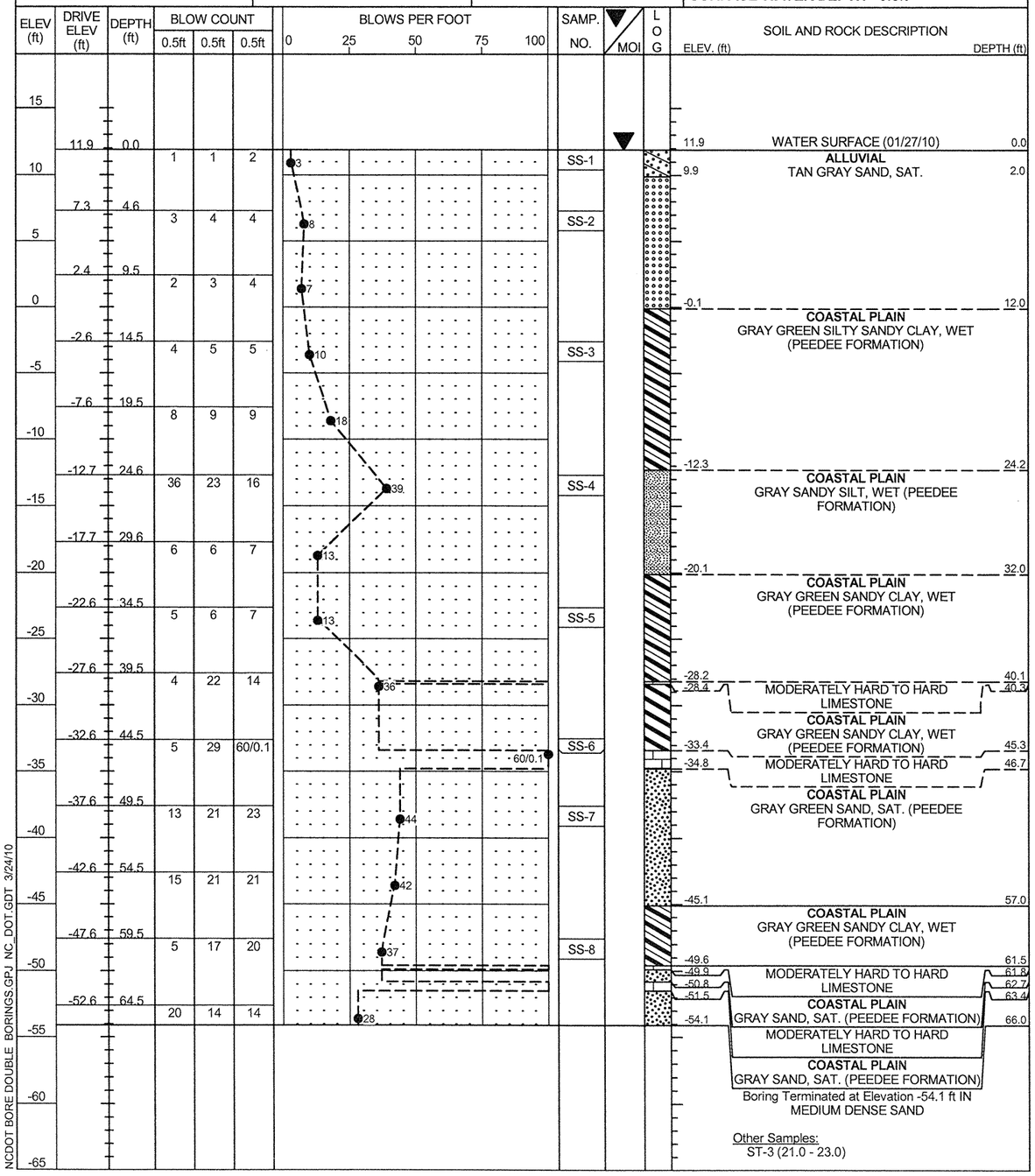
PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO 42 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. B4-B	**STATION** 57+48	**OFFSET** 18 ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 10.8 ft	**TOTAL DEPTH** 66.0 ft	**NORTHING** 239,350	**EASTING** 2,221,875	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/28/10	**COMP. DATE** 01/29/10	**SURFACE WATER DEPTH** 0.8ft	



NCDOT BORE DOUBLE BORINGS.GPJ NC_DOT.GDT 3/24/10

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33395.1.1	**ID.** B-4028	**COUNTY** BLADEN	**GEOLOGIST** Wrike, C. M.	
SITE DESCRIPTION BRIDGE NO 42 ON -L- (NC 11) OVER CAPE FEAR RIVER OVERFLOW				**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 58+23	**OFFSET** 28 ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 11.9 ft	**TOTAL DEPTH** 66.0 ft	**NORTHING** 239,436	**EASTING** 2,221,854	**24 HR.** N/A
DRILL MACHINE CME-550	**DRILL METHOD** Mud Rotary		**HAMMER TYPE** Automatic	
DRILLER Contract Driller	**START DATE** 01/27/10	**COMP. DATE** 01/27/10	**SURFACE WATER DEPTH** 0.0ft	



NCDOT BORE DOUBLE BORINGS.GPJ NC_DOT.GDT 3/24/10

B-4028

33395.1.1

BRIDGE NO. 42 OVER CAPE FEAR RIVER

OVERFLOW ON NC 11

SOIL TEST RESULTS EB1-A

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-57	30 LT	54+48	1.0-1.5	A-6(3)	40	17	50.4	7.9	7.1	34.6	100	73	42	-	-
SS-58	30 LT	54+48	5.0-6.5	A-2-4(0)	18	NP	57.0	26.9	7.9	8.1	100	83	18	-	-
SS-59	30 LT	54+48	10.0-11.5	A-3(0)	25	NP	88.3	11.5	0.2	0.0	100	54	1	-	-
SS-60	30 LT	54+48	19.8-21.3	A-6(1)	29	15	26.2	39.2	10.2	24.4	100	90	37	-	-
SS-61	30 LT	54+48	29.8-31.3	A-2-4(0)	26	10	22.4	47.2	12.2	18.3	100	97	34	-	-
SS-62	30 LT	54+48	34.8-36.3	A-2-4(0)	26	NP	9.3	73.3	4.2	13.2	99	95	20	-	-
SS-63	30 LT	54+48	44.8-46.3	A-7-6(14)	50	29	0.8	53.5	13.2	32.5	100	100	59	-	-
SS-64	30 LT	54+48	54.8-56.3	A-2-6(0)	30	14	40.0	33.4	7.2	19.3	93	86	26	-	-
SS-65	30 LT	54+48	64.8-66.3	A-2-4(0)	30	8	7.0	63.9	9.8	19.3	91	88	32	-	-
SS-66	30 LT	54+48	74.8-76.3	A-2-4(0)	26	NP	7.7	73.9	4.2	14.2	100	98	21	-	-

SOIL TEST RESULTS B3-A

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-31	30 LT	56+73	1.0-1.5	A-7-5(18)	59	16	12.5	7.1	34.1	46.4	100	94	82	-	-
SS-32	30 LT	56+73	5.0-6.5	A-3(0)	23	NP	84.6	14.0	0.4	1.0	100	86	2	-	-
SS-33	30 LT	56+73	15.0-16.5	A-6(1)	29	15	24.0	39.9	11.9	24.2	94	85	36	-	-
SS-34	30 LT	56+73	25.0-26.5	A-2-4(0)	26	10	26.6	45.0	8.3	20.2	100	95	31	-	-
SS-35	30 LT	56+73	35.0-36.5	A-4(1)	33	10	0.2	70.2	9.5	20.2	100	100	42	-	-
SS-36	30 LT	56+73	45.0-46.0	A-6(3)	39	24	27.8	37.1	10.9	24.2	95	85	37	-	-
SS-37	30 LT	56+73	50.0-51.5	A-6(2)	33	14	0.6	61.7	11.5	26.2	100	100	41	-	-
SS-38	30 LT	56+73	60.0-61.5	A-2-4(0)	30	9	11.1	60.9	7.9	20.2	98	92	31	-	-
SS-39	30 LT	56+73	65.0-66.5	A-2-4(0)	29	7	10.3	68.1	7.5	14.1	98	94	24	-	-

SOIL TEST RESULTS B1-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-48	17 RT	55+23	1.0-1.5	A-2-6(0)	31	12	69.7	7.2	5.8	17.3	93	58	22	-	-
SS-49	17 RT	55+23	4.3-5.8	A-3(0)	24	NP	77.4	20.9	1.6	0.0	99	70	2	-	-
SS-50	17 RT	55+23	14.3-15.8	A-6(2)	30	14	23.0	40.2	12.4	24.4	100	93	39	-	-
SS-51	17 RT	55+23	24.1-25.6	A-2-6(1)	28	14	30.3	35.8	11.6	22.4	97	88	35	-	-
SS-52	17 RT	55+23	34.1-35.6	A-2-4(0)	27	5	22.1	58.6	5.1	14.2	96	86	21	-	-
SS-53	17 RT	55+23	44.1-45.6	A-7-6(8)	44	19	1.0	58.5	14.0	26.4	100	100	56	-	-
SS-54	17 RT	55+23	49.9-50.6	A-6(2)	30	15	25.6	32.5	23.6	18.3	83	74	39	-	-
SS-55	17 RT	55+23	54.1-55.6	A-2-4(0)	29	8	9.5	59.3	8.8	22.4	98	96	34	-	-
SS-56	17 RT	55+23	64.1-64.6	A-2-4(0)	27	5	16.7	60.0	8.1	15.2	89	82	24	-	-

SOIL TEST RESULTS B4-B

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-9	18 RT	57+48	1.0-1.5	A-2-4(0)	26	6	75.5	11.1	3.4	10.1	96	59	14	-	-
SS-10	18 RT	57+48	4.7-6.2	A-3(0)	27	NP	90.3	8.2	1.4	0.0	100	56	4	-	-
SS-11	18 RT	57+48	14.7-16.2	A-6(2)	29	15	23.2	40.6	9.9	26.3	100	91	38	21.2	-
SS-12	18 RT	57+48	24.5-26.0	A-2-4(0)	24	9	21.4	48.1	10.3	20.2	95	91	32	-	-
SS-13	18 RT	57+48	34.5-36.0	A-6(4)	37	17	1.0	66.7	8.1	24.2	100	100	45	32.3	-
SS-14	18 RT	57+48	44.5-45.2	A-2-6(1)	34	18	28.3	40.0	7.5	24.2	87	76	32	-	-
SS-15	18 RT	57+48	54.5-56.0	A-2-4(0)	23	NP	20.1	55.2	8.6	16.2	96	95	26	-	-
SS-16	18 RT	57+48	64.5-66.0	A-2-4(0)	30	7	22.1	57.6	4.1	16.2	98	89	22	-	-

SOIL TEST RESULTS B2-A

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-40	30 LT	55+98	1.0-1.5	A-7-5(19)	61	25	13.2	8.9	29.1	48.8	88	81	70	-	14.4
SS-41	30 LT	55+98	4.3-5.8	A-1-b(0)	24	NP	84.1	12.4	2.5	1.0	100	50	4	-	-
SS-42	30 LT	55+98	14.3-15.8	A-6(2)	29	16	23.0	39.1	11.7	26.2	100	91	40	-	-
SS-43	30 LT	55+98	24.3-25.8	A-4(0)	21	5	19.6	45.0	17.3	18.1	98	92	39	-	-
SS-44	30 LT	55+98	34.3-35.8	A-4(1)	33	10	2.2	68.8	6.9	22.2	100	99	41	-	-
SS-45	30 LT	55+98	44.3-45.3	A-6(2)	33	14	6.3	57.9	9.7	26.2	100	98	39	-	-
SS-46	30 LT	55+98	49.3-50.8	A-2-4(0)	25	1	21.2	54.6	10.1	14.1	100	97	31	-	-
SS-47	30 LT	55+98	59.3-60.8	A-6(4)	38	21	20.3	40.0	13.2	26.4	91	83	41	-	-

SOIL TEST RESULTS EB2-A

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
SS-1	28 LT	58+23	1.0-1.5	A-2-7(1)	41	16	60.6	12.9	8.5	18.1	100	68	27	-	-
SS-2	28 LT	58+23	4.6-6.1	A-3(0)	23	NP	84.1	10.3	3.6	2.0	100	58	6	-	-
SS-3	28 LT	58+23	14.5-16.0	A-6(1)	29	14	23.5	40.6	11.7	24.1	100	91	38	-	-
SS-4	28 LT	58+23	24.6-26.1	A-4(1)	24	9	15.7	46.1	20.1	18.1	99	96	43	-	-
SS-5	28 LT	58+23	34.5-36.0	A-6(2)	34	12	0.8	66.8	10.3	22.1	100	100	41	-	-
SS-6	28 LT	58+23	44.5-45.3	A-7-6(3)	41	22	25.8	40.8	9.3	24.1	97	87	36	-	-
SS-7	28 LT	58+23	49.5-51.0	A-2-4(0)	25	NP	0.4	75.5	8.0	16.1	100	100	28	-	-
SS-8	28 LT	58+23	59.5-61.0	A-6(2)	33	11	3.6	57.5	14.7	24.1	100	99	45	-	-

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 33395.1.1 TIP: B-4028 COUNTY: BLADEN

DESCRIPTION(1): BRIDGE NO. 42 ON NC 11 OVER CAPE FEAR RIVER OVERFLOW

EXISTING BRIDGE

Information from: Field Inspection X Microfilm ____ (reel ____ pos: ____)
Other (explain) BSR REPORT

Bridge No.: 18 Length: 340' Total Bents: 11 Bents in Channel: 0 Bents in Floodplain: 11
Foundation Type: CONCRETE (BATTERED)

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: NONE

Interior Bents: NONE NOTED

Channel Bed: NONE NOTED

Channel Bank: NONE NOTED

EXISTING SCOUR PROTECTION

Type(3): CONCRETE END AND SIDE SLOPES AT EACH END BENT

Extent(4): COVERS THE ENTIRE SLOPE TO 27' OUTSIDE EDGE OF BRIDGE

Effectiveness(5): EFFECTIVE

Obstructions(6): NONE

DESIGN INFORMATION

Channel Bed Material(7): MODERATELY ORGANIC SILTY CLAY WITH SAND AND SANDY CLAY

Channel Bank Material(8): MODERATELY ORGANIC SILTY CLAY WITH SAND AND SANDY CLAY

Channel Bank Cover(9): TREES

Floodplain Width(10): 3500'

Floodplain Cover(11): TREES

Stream is(12): Aggrading ____ Degrading ____ Static X

Channel Migration Tendency(13): LOW, NO ACTIVE CHANNEL, NO CHANNEL BANKS (OVERFLOW BRIDGE)

Observations and Other Comments:

DESIGN SCOUR ELEVATIONS(14) Feet X Meters ____

BENTS

B1	B2	B3	B4							
1.0±	1.0±	1.0±	1.0±							

Comparison of DSE to Hydraulics Unit theoretical scour:
GEOTECHNICAL ANALYSIS AGREES WITH THE MAXIMUM THEORETICAL SCOUR ELEVATIONS AS OUTLIINED IN THE BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank						
Sample No.						
Retained #4						
Passed #10						
Passed #40						
Passed #200						
Coarse Sand						
Fine Sand						
Silt						
Clay						
LL						
PI						
AASHTO						
Station						
Offset						
Depth						

See Sheet 10 "Soil Test Results", for samples:
SS- 40 & 31 (CHANNEL BED)
SS- 57, 48, 1 & 9 (CHANNEL BANK)

Template Revised 02/07/06

Reported by: [signature] **Date:** 3/23/2010

INSTRUCTIONS

1 Describe the specific site's location, including route number and body of water crossed.
2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
3 Note existing scour protection (e.g. rip rap).
4 Describe extent of existing scour protection.
5 Describe whether or not the scour protection appears to be working.
6 Note obstructions such as dams, fallen trees, debris at bents, etc.
7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
10 Determine the approximate floodplain width from field observation or a topographic map.
11 Describe the material covering the floodplain (e.g. grass, trees, crops).
12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
14 Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoritical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.