

PROJECT: 33610.1.1 ID: B-4269

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33610.1.1 (B-4269)	1	10
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		P.E.	
		CONST.	

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

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STRUCTURE
SUBSURFACE INVESTIGATION

STATE PROJECT 33610.1.1 I.D. NO. B-4269
F.A. PROJECT BRZ-1214(4)
COUNTY SAMPSON
PROJECT DESCRIPTION BRIDGE NO. 90 ON
-L- (SR 1214) OVER LITTLE COHARIE
CREEK AT -L- STATION 17+81.43

INVENTORY REVISIONS

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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-PLACED) 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.

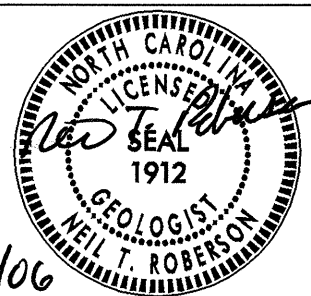
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT 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.

INVESTIGATED BY J. L. PEDRO PERSONNEL J. I. MILKOVITS, JR.
CHECKED BY N. T. ROBERSON O. B. OTT
SUBMITTED BY N. T. ROBERSON D. W. DIXON
DATE MARCH 2006 C. E. POPE
E. L. BARTLEY
SAMPSON COUNTY
BRIDGE MAINTENANCE

DRAWN BY: T. T. WALKER, J. L. PEDRO

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 DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL UNIT

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
B-4269	33610.1.1	2	10

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION					GRADATION					ROCK DESCRIPTION					TERMS AND DEFINITIONS																			
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED OR WEATHERED EARTH MATERIALS WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE ASHTO SYSTEM AND BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, ASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRN SETT CLM, MOST WITH INTERBEDDED FINE SAND LAYERS, MOD PLSTIC, A-7-6</i>					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. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS ARE DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.					HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN 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) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)					ALLUVIUM (ALLUV.) - SOILS WHICH 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 WHICH 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 (F.P.) - 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (R.Q.D.) - 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 WHICH 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, WHICH 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 B.P.F.) 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 LESS THAN 0.1 FOOT PENETRATION WITH 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 (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.																			
SOIL LEGEND AND AASHTO CLASSIFICATION					MINERALOGICAL COMPOSITION					WEATHERING																								
GENERAL CLASS. GRANULAR MATERIALS (>95% PASSING #200) SILT-CLAY MATERIALS (>95% PASSING #200) ORGANIC MATERIALS					MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.					FRESH ROCK GENERALLY FRESH, JOINTS STAINED, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V. SL.) 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 (SL.) 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. SEVERE (SEV.) ALL ROCKS 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. 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. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. FABRIC MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.					COMPRESSIBILITY SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 30 MODERATELY COMPRESSIBLE LIQUID LIMIT 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. PERCHED WATER, SATURATED ZONE OR WATER BEARING STRATA SPRING OR SEEPAGE					MISCELLANEOUS SYMBOLS ROADWAY EMBANKMENT WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS INFERRED SOIL BOUNDARIES INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP/DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL				
CONSISTENCY OR DENSENESS					ROCK HARDNESS					ABBREVIATIONS																								
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)					VERY LOOSE <4 LOOSE 4 TO 10 MEDIUM DENSE 10 TO 30 DENSE 30 TO 50 VERY DENSE >50					N/A					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 FRAGS. - FRAGMENTS MED. - MEDIUM PMT - PRESSUREMETER TEST SD. - SAND, SANDY SL. - SILT, SILTY SLL. - SLIGHTLY TCR - TRICONE REFUSAL UNIT WEIGHT MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST																			
TEXTURE OR GRAIN SIZE					EQUIPMENT USED ON SUBJECT PROJECT					FRACTURE SPACING					BEDDING																			
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.75 2.0 0.42 0.25 0.075 0.053					DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST OTHER OTHER ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING W/ ADVANCER TRICONE 2 1/8" * STEEL TEETH TRICONE * TUNG-CARB. CORE BIT OTHER HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST OTHER					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 PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED 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 FINGER NAIL.					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 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																			
SOIL MOISTURE - CORRELATION OF TERMS					INDURATION					INDURATION																								
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION					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.																								
LL - LIQUID LIMIT PL - PLASTIC LIMIT OM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT																																		
PLASTICITY																																		
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY																																		
COLOR																																		
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YEL-BRN, BLUE-GRAY) MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.																																		



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

Michael F. Easley
GOVERNOR

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

Lyndo Tippet
SECRETARY

March 20, 2006

STATE PROJECT: 33610.1.1 (B-4269)
F.A. PROJECT: BRZ-1214 (4)
COUNTY: Sampson
DESCRIPTION: Bridge No. 90 on -L- (SR 1214) over Little Coharie Creek at -L- Station 17+81.43
SUBJECT: Geotechnical Report - Structure Inventory Revisions

Project Description

A three-span bridge, 160 feet in length with a 90° skew, is proposed on -L- (SR 1214) over Little Coharie Creek to replace the existing structure. The new bridge will be 23 feet longer than the existing bridge. The project is located in Sampson County about 10 miles southeast of Clinton.

The subsurface investigation was conducted during January of 2005 using a CME-45C drill machine with an automatic hammer. Borings B1-A, B2-B and EB2-A were advanced using wash drilling with N-casing. Boring EB1-B was advanced using rotary with bentonite drilling fluid. Standard Penetration Test borings were performed at each of the four bent locations. Representative soil samples were obtained for visual classification in the field and selected samples were submitted to the Materials and Test Unit for laboratory analysis.

Physiography and Geology

The project is located in the southern portion of Sampson County within the Coastal Plain Physiographic Province. The site is on flat terrain and is underlain by sands and clays of the Cretaceous age Black Creek Formation.

Soil Properties

Soils encountered at the project site include roadway embankment, alluvial and Coastal Plain soils.

Roadway embankment soils are present at both end bent locations and range in thickness from 5.0 to 8.0 feet. These soils consist predominantly of tan-brown and dark gray, moist, very loose, silty sand (A-2-4). Embankment soils are underlain by alluvial and Coastal Plain soils.

Alluvial soils were encountered in boring B2-B and EB2-A. The thickness ranges from 7.0 to 10.0 feet. Alluvial soils consist of tan-brown and gray, moist, very loose to loose, silty and fine to coarse sand (A-2-4, A-3). The alluvial soils were deposited on Coastal Plain soils.

Coastal Plain soils in the Black Creek Formation were encountered in all borings from an elevation of 68.7 in EB1-B to 62.0 feet in EB2-A. The soils consist of dark gray and tan-brown, moist, medium stiff to very stiff, sandy and silty clay (A-6, A-7) underlain by gray to dark gray, moist, loose to very dense, silty sand (A-2-4).

Goundwater

Groundwater was encountered at each bent location. Groundwater elevations ranged from 69.2 at EB2-A to 68.6 feet at B2-B.

Notice

This Geotechnical foundation report is based on the revised bridge survey report for Little Coharie Creek dated January 20, 2006 and the revised Preliminary General Drawing dated March 8, 2006. If significant changes are made in the design or location of the proposed structure, the subsurface information should be reviewed and modified as necessary.

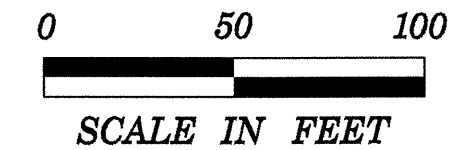
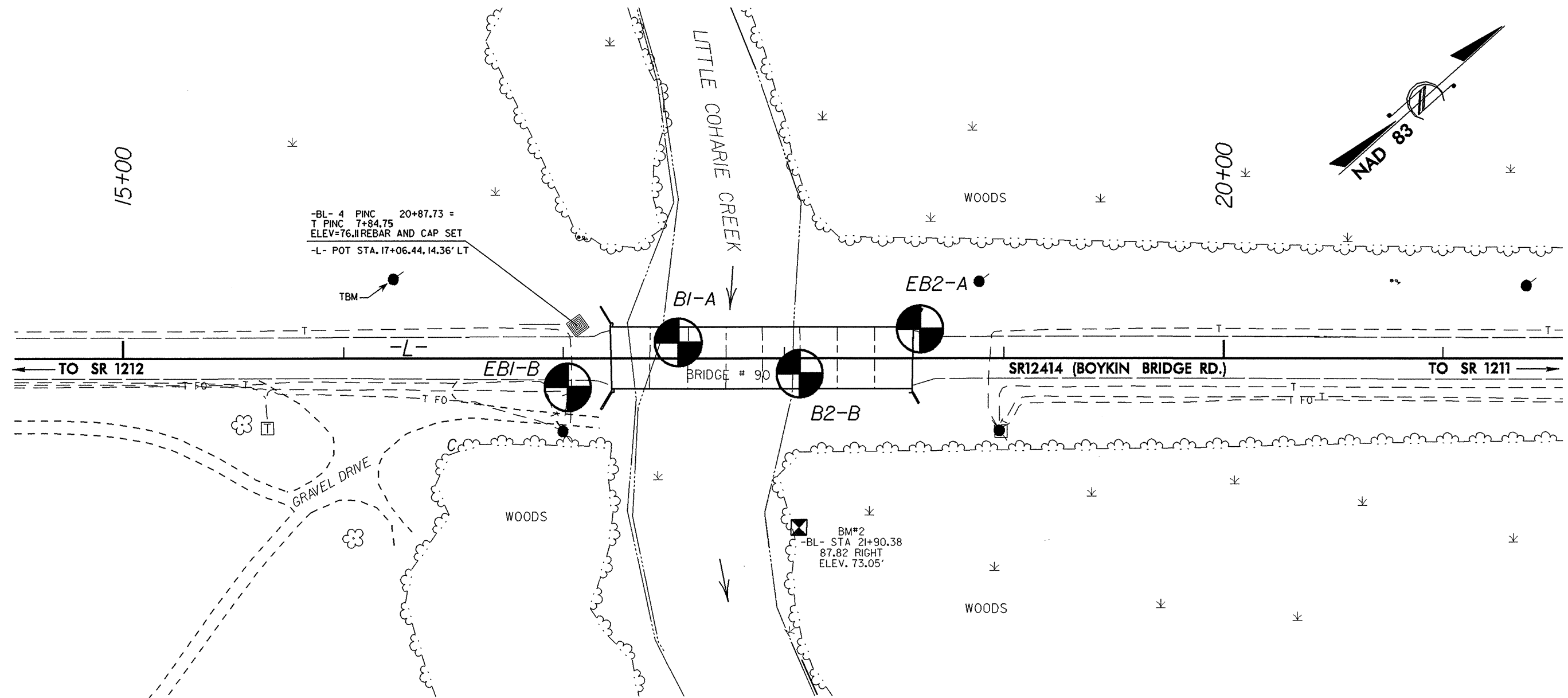
Respectfully submitted,

A handwritten signature in cursive script that reads "Jaime Love Pedro".

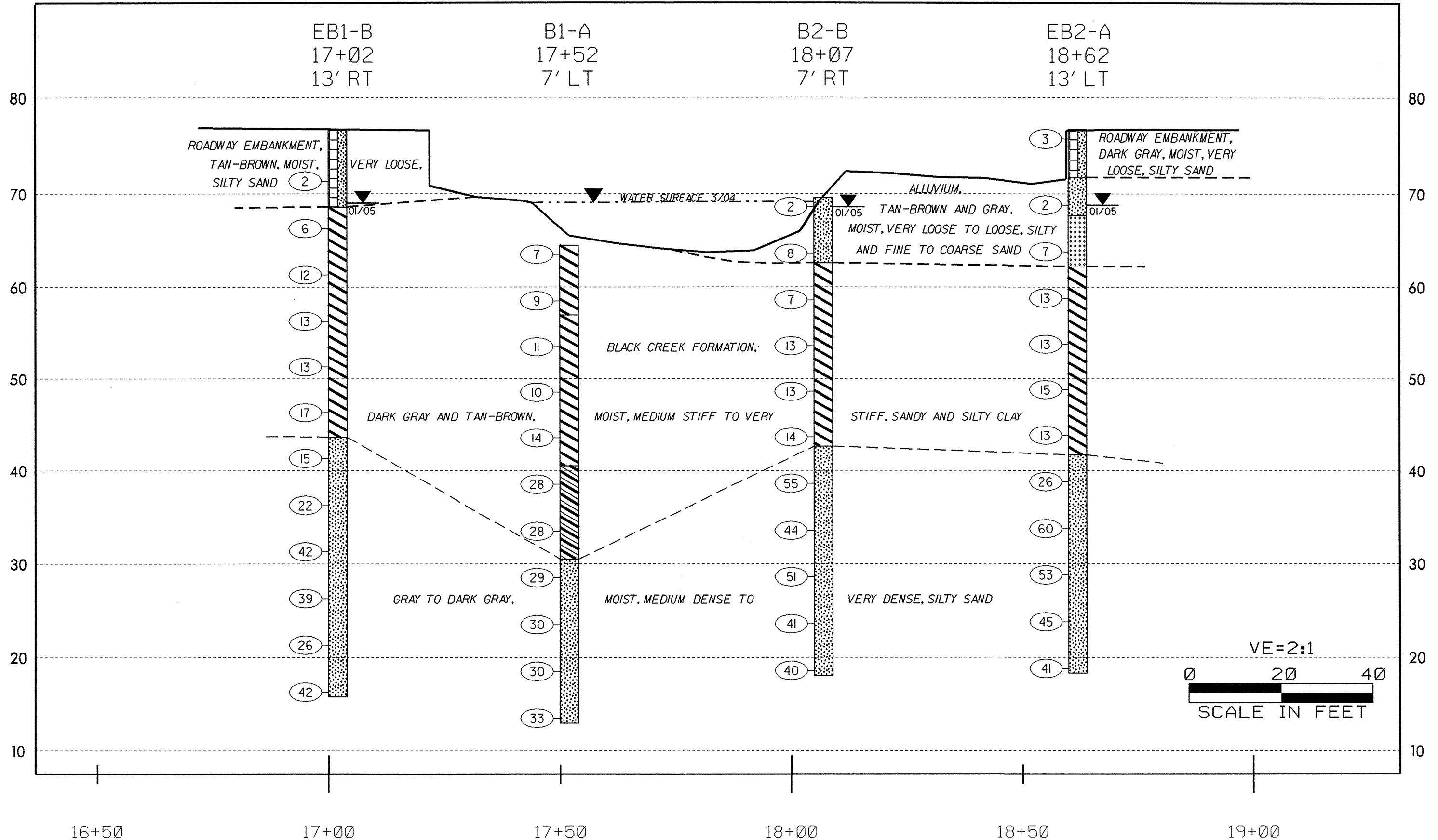
Jaime Love Pedro
Engineering Geologist

PROJECT REF. NO.	SHEET NO.	TOTAL SHEETS
33610.1.1(B-4269)	4	10

TEST SITE PLAN



PROFILE THROUGH BORINGS PROJECTED ALONG -L-



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

SHEET 6

PROJECT NO. 33610.1.1		ID. B-4269		COUNTY SAMPSON		GEOLOGIST J.I. MILKOVITS, JR.								
SITE DESCRIPTION BRIDGE NO. 90 ON -L- (SR 1214) OVER LITTLE COHARIE CREEK							GROUND WATER							
BORING NO. EBI-B		BORING LOCATION 17+02		OFFSET 13' RT		ALIGNMENT -L-								
COLLAR ELEVATION 76.6'		NORTHING 414999'		EASTING 2167169'		24 HR. 7.6'								
TOTAL DEPTH 60.8'		DRILL MACHINE CME-45C		DRILL METHOD ROTARY W/MUD		HAMMER TYPE AUTOMATIC								
START DATE 1/27/05		COMPLETION DATE 1/27/05		SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A								
ELEV. (FT.)	DEPTH (FT.)	BLOW COUNT			PEN. (FT.)	BLOWS PER FOOT					SAMPLE NUMBER	LOG MOL.	SOIL AND ROCK DESCRIPTION	
		0.5'	0.5'	0.5'		0	25	50	75	100				
76.6														
75.0	4.3	1	1	1	1.0	X 2						SS-7	M	ROADWAY EMBANKMENT, TAN-BROWN, SILTY SAND
70.0	9.3	2	2	4	1.0	X 6						SS-8	M	
65.0	14.3	4	5	7	1.0	X 12						SS-9	M	
60.0	19.3	3	5	8	1.0	X 13							M	BLACK CREEK FORMATION, TAN-BROWN AND DARK GRAY, SILTY CLAY
55.0	24.3	3	6	7	1.0	X 13							M	
50.0	29.3	4	7	10	1.0	X 17						SS-10	M	
45.0	34.3	3	6	9	1.0	X 15						SS-11	M	
40.0	39.3	4	8	14	1.0	X 22							M	
35.0	44.3	9	17	25	1.0	X 42							M	DARK GRAY, SILTY SAND
30.0	49.3	11	19	20	1.0	X 39							M	
25.0	54.3	4	9	17	1.0	X 26							M	
20.0	59.3	9	19	23	1.0	X 42							M	
15.0	BORING TERMINATED AT ELEVATION 15.8 FEET IN DENSE SILTY SAND													
10.0														
5.0														
0.0														

PROJECT NO. 33610.1.1		ID. B-4269		COUNTY SAMPSON		GEOLOGIST J.I. MILKOVITS, JR.								
SITE DESCRIPTION BRIDGE NO. 90 ON -L- (SR 1214) OVER LITTLE COHARIE CREEK							GROUND WATER							
BORING NO. BI-A		BORING LOCATION 17+52		OFFSET 7' LT		ALIGNMENT -L-								
COLLAR ELEVATION 64.5'		NORTHING 415051'		EASTING 2167183'		24 HR. N/A								
TOTAL DEPTH 51.5'		DRILL MACHINE CME-45C		DRILL METHOD N-CASING/WASH BORING		HAMMER TYPE AUTOMATIC								
START DATE 1/25/05		COMPLETION DATE 1/25/05		SURFACE WATER DEPTH 4.5'		DEPTH TO ROCK N/A								
ELEV. (FT.)	DEPTH (FT.)	BLOW COUNT			PEN. (FT.)	BLOWS PER FOOT					SAMPLE NUMBER	LOG MOL.	SOIL AND ROCK DESCRIPTION	
		0.5'	0.5'	0.5'		0	25	50	75	100				
64.5	0.0	WOH	3	4	1.0	X 7						SS-1	W	
60.0	5.0		2	4	1.0	X 9						SS-2	W	
55.0	10.0		4	5	1.0	X 11							M	BLACK CREEK FORMATION, DARK GRAY, SILTY CLAY
50.0	15.0		3	4	1.0	X 10						SS-3	M	
45.0	20.0		4	6	1.0	X 14							M	
40.0	25.0		10	12	1.0	X 28						SS-4	M	
35.0	30.0		7	10	1.0	X 28							M	DARK GRAY, SANDY CLAY
30.0	35.0		9	12	1.0	X 29						SS-5	M	
25.0	40.0		8	14	1.0	X 30							M	GRAY, SILTY SAND
20.0	45.0		7	13	1.0	X 30							M	
15.0	50.0		7	13	1.0	X 33							M	
10.0	BORING TERMINATED AT ELEVATION 13.0 FEET IN DENSE SILTY SAND													
5.0														
0.0														
-5.0														
-10.0														
-15.0														

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

SHEET 7

PROJECT NO. 33610.1.1		ID. B-4269		COUNTY SAMPSON		GEOLOGIST J.I. MILKOVITS, JR.									
SITE DESCRIPTION BRIDGE NO. 90 ON -L- (SR 1214) OVER LITTLE COHARIE CREEK							GROUND WATER								
BORING NO. B2-B		BORING LOCATION 18+07		OFFSET 7' RT		ALIGNMENT -L-									
COLLAR ELEVATION 69.6'		NORTHING 415087'		EASTING 2167226'		24 HR. 1.0'									
TOTAL DEPTH 51.5'		DRILL MACHINE CME-45C		DRILL METHOD N-CASING/WASH BORING		HAMMER TYPE AUTOMATIC									
START DATE 1/26/05		COMPLETION DATE 1/26/05		SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A									
ELEV. (FT.)	DEPTH (FT.)	BLOW COUNT			PEN. (FT.)	BLOWS PER FOOT					SAMPLE NUMBER	LOG	SOIL AND ROCK DESCRIPTION		
		0.5'	0.5'	0.5'		0	25	50	75	100					
69.6	0.0	1	2	0	1.0									SS-6	ALLUVIUM, TAN-BROWN, SILTY SAND
65.0	5.0	2	4	4	1.0									M	
60.0	10.0	1	3	4	1.0									M	
55.0	15.0	3	5	8	1.0									M	BLACK CREEK FORMATION, DARK GRAY, SILTY CLAY
50.0	20.0	3	6	7	1.0									M	
45.0	25.0	4	6	8	1.0									M	
40.0	30.0	14	15	40	1.0									M	
35.0	35.0	11	18	26	1.0									M	
30.0	40.0	7	16	35	1.0									M	GRAY, SILTY SAND
25.0	45.0	9	16	25	1.0									M	
20.0	50.0	12	16	24	1.0									M	
15.0	BORING TERMINATED AT ELEVATION 18.1 FEET IN DENSE SILTY SAND														
10.0															
5.0															
0.0															
-5.0															
-10.0															

PROJECT NO. 33610.1.1		ID. B-4269		COUNTY SAMPSON		GEOLOGIST J.I. MILKOVITS, JR.									
SITE DESCRIPTION BRIDGE NO. 90 ON -L- (SR 1214) OVER LITTLE COHARIE CREEK							GROUND WATER								
BORING NO. EB2-A		BORING LOCATION 18+62		OFFSET 13' LT		ALIGNMENT -L-									
COLLAR ELEVATION 76.7'		NORTHING 415144'		EASTING 2167242'		24 HR. 7.9'									
TOTAL DEPTH 58.4'		DRILL MACHINE CME-45C		DRILL METHOD N-CASING/WASH BORING		HAMMER TYPE AUTOMATIC									
START DATE 1/28/05		COMPLETION DATE 1/28/05		SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A									
ELEV. (FT.)	DEPTH (FT.)	BLOW COUNT			PEN. (FT.)	BLOWS PER FOOT					SAMPLE NUMBER	LOG	SOIL AND ROCK DESCRIPTION		
		0.5'	0.5'	0.5'		0	25	50	75	100					
76.7	0.0	1	1	2	1.0									SS-12	ROADWAY EMBANKMENT, DARK GRAY, SILTY SAND
75.0															
70.0	6.9	1	1	1	1.0									M	ALLUVIUM, TAN-BROWN, FINE TO COARSE SAND
65.0	11.9	1	2	5	1.0									M	GRAY, SAND
60.0	16.9	3	6	7	1.0									M	
55.0	21.9	2	6	7	1.0									M	BLACK CREEK FORMATION, DARK GRAY, SILTY CLAY
50.0	26.9	3	7	8	1.0									M	
45.0	31.9	4	6	7	1.0									M	
40.0	36.9	6	11	15	1.0									M	
35.0	41.9	16	26	34	1.0									M	
30.0	46.9	6	23	30	1.0									M	DARK GRAY, SILTY SAND
25.0	51.9	7	18	27	1.0									M	
20.0	56.9	9	18	23	1.0									M	
15.0	BORING TERMINATED AT ELEVATION 18.3 FEET IN DENSE SILTY SAND														
10.0															
5.0															
0.0															

EB1-B

SOIL TEST RESULTS															
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-7	13' RT	17+02	4.3-5.8	A-2-4(0)	17	NP	56.7	28.4	12.9	2.0	87	54	15	-	-
SS-8	13' RT	17+02	9.3-10.8	A-7-5(22)	62	31	12.5	19.4	9.7	58.5	100	94	69	-	-
SS-9	13' RT	17+02	14.3-15.8	A-7-5(64)	93	55	1.2	5.0	17.1	76.6	100	99	95	-	-
SS-10	13' RT	17+02	29.3-30.8	A-7-5(79)	105	68	0.8	4.4	14.1	80.6	100	99	96	-	-
SS-11	13' RT	17+02	34.3-35.8	A-2-4(0)	31	4	62.0	18.9	0.0	19.2	100	68	23	-	-

B1-A

SOIL TEST RESULTS															
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	7' LT	17+52	0.0-1.5	A-7-5(63)	91	57	0.8	11.3	9.3	78.6	100	99	93	-	-
SS-2	7' LT	17+52	5.0-6.5	A-7-6(48)	77	52	1.0	17.5	8.9	72.6	100	99	84	-	-
SS-3	7' LT	17+52	15.0-16.5	A-7-5(92)	111	79	0.8	6.3	16.3	76.6	100	99	98	-	-
SS-4	7' LT	17+52	25.0-26.5	A-6(1)	35	15	32.4	34.0	3.4	30.2	100	85	36	-	-
SS-5	7' LT	17+52	35.0-36.5	A-2-4(0)	27	NP	13.2	75.6	0.1	11.1	100	100	15	-	-

B2-B

SOIL TEST RESULTS															
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-6	7' RT	18+07	0.0-1.5	A-2-4(0)	20	NP	56.3	32.3	9.5	2.0	93	68	13	-	-

EB2-A

SOIL TEST RESULTS															
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-12	13' LT	18+62	0.0-1.5	A-2-4(0)	24	NP	7.8	67.3	12.8	12.1	100	99	31	-	-
SS-13	13' LT	18+62	11.9-13.4	A-3(0)	25	NP	35.3	57.1	7.7	0.0	100	91	9	-	-



**FIELD
SCOUR REPORT**

WBS: 33610.1.1 TIP: B-4269 COUNTY: Sampson

DESCRIPTION(1): Bridge No. 90 on -L- (SR 1214) over Little Coharie Creek

EXISTING BRIDGE

Information from: Field Inspection Microfilm _____ (reel _____ pos: _____)
Other (explain) _____

Bridge No.: 90 Length: 138 Total Bents: 9 Bents in Channel: 4 Bents in Floodplain: 5
Foundation Type: Timber Piles

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: None

Interior Bents: Contraction and local scour around bents no. 2, 3, 4 and 5. (1 to 2 feet total)

Channel Bed: Minor contraction

Channel Bank: Minor contraction scour along the bank

EXISTING SCOUR PROTECTION

Type(3): Timber abutment wall

Extent(4): Across the end slope and 10 +/- feet outside the edge of the bridge

Effectiveness(5): Very effective

Obstructions(6): Fallen trees about 50 feet upstream

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 geotechnically adjusted scour elevation (GASE) 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 theoretical scour and the GASE. If the GASE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The GASE 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): Channel bed material consists of silty clay (SS-1)

Channel Bank Material(8): Channel bank material consists of silty sand (SS-6)

Channel Bank Cover(9): Grass, trees, and shrubs

Floodplain Width(10): +/- 300 feet

Floodplain Cover(11): Grass, shrubs, and woods

Stream is(12): Aggrading _____ Degrading Static _____

Channel Migration Tend.(13): Slight tendency for migration towards the east

Observations and Other Comments: _____

GEOTECHNICALLY ADJUSTED SCOUR ELEVATIONS(14) Feet Meters _____

The GASE is at elevation 55.0 feet for both Interior Bents.

Comparison of GASE to Hydraulics Unit theoretical scour:

The GASE for Bent 1 is 9 feet higher than the theoretical scour, and Bent 2 is 5.5 feet higher than the theoretical scour from the Hydraulics Report (dated 1-20-06).

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank	Bed	Bank					
Sample No.	SS-1	SS-6					
Retained #4	-	1					
Passed #10	100	93					
Passed #40	99	68					
Passed #200	93	13					
Coarse Sand	0.8	56.3					
Fine Sand	11.3	32.3					
Silt	9.3	9.5					
Clay	78.6	2					
LL	91	20					
PI	57	NP					
AASHTO	A-7-5(63)	A-2-4(0)					
Station	17+52	18+07					
Offset	7' LT	7' RT					
Depth	0.0'-1.5'	0.0'-1.5'					

Reported by: Jaime Love Pedro
Jaime Love Pedro

Date: 2/3/2005

SITE PHOTOGRAPH

BRIDGE NO. 90 ON -L- (SR 1214) OVER LITTLE COHARIE CREEK

