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DRAWN BY:

T. PEREZ

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS GEOTECHNICAL UNIT

STRUCTURE SUBSURFACE INVESTIGATION

STATE PROJECT	33620.1.1	_ I.D. NO	B-4280
F.A. PROJECT	BRSTP-8(2	2)	
COUNTYSTOKE			
PROJECT DESCRIP		CEMENT OF	
BRIDGE No. 14 OVER T			
BRIDGE No. 44 OVER	TOWN FORK (CREEK OVER	RFLOW
ON NC 8			

STATE	STATE P	ROJECT	REFERENCE	NO.	SHEET NO.	TOTAL SHEETS
N.C.		B-4	1280		1	50
STATE	PROJ. NO.	P.	A. PROJ. NO.		DESCRIP	TION
3362	20.1.1	В	RSTP-8(2)		P.E.	
					CONS	Т.

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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.

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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.

For Letting

INVESTIGATED BY	S&ME	, INC.	PERS	ONNEL_	D. BENTS	
CHECKED BY	A.F. RIGG	S, JR.			J. MURPHY	
SUBMITTED BY	S&ME	. INC.			S. LANEY	\`.
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STATE PROJECT NO. SHEET NO. TOTAL SHEETS 0 33620.1.1 2 50 ID B-4280

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

SUBSURFACE INVESTIGATION

	SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS												
SOIL DESC	CRIPTION		GRADATION				K DESCRIPTION	TERMS AND DEFINITIONS					
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CO	CONSOLIDATED OR WEATHERED EARTH MATERIALS	UNIFORM- INDICATES THAT SOIL PAR	PRESENTATION OF PARTICLE SIZES FROM TICLES ARE ALL APPROXIMATELY THE SAM	I FINE TO COARSE ME SIZE.(ALSO	ROCK LINE INDICATES	S THE LEVEL AT WHICH N	THAT WHEN TESTED, WOULD YIELD SPT REFUSAL. AN INFERRE ION-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	HELOVION HELOVA SOLES WHICH HAVE BEEN THANSPORTED BY WHICH.					
WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT PI 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATI	ION TEST (AASHTO T206, ASTM D-1586). SOIL	POORLY GRADED)	OF UNIFORM PARTICLES OF TWO OR MORE		IN NON-COASTAL PLA	AIN MATERIAL. THE TRANS	POON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 B SITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY						
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND B CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFI	ICATION, AND OTHER PERTINENT FACTORS SUCH		ANGULARITY OF GRAINS	50.40 AVQ.4 AQ	OF WEATHERED ROCK ROCK MATERIALS ARE	C. E TYPICALLY DIVIDED AS	FOLOWS:	ARGILLACEOUS - APPLIED TO AUCKS THAT HAVE BEEN DERIVED FROM SAIND ON THAT CONTRIN SAIND,					
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, F VERY STIFF, GRAY SULY CLAY, MOIST WITH INTERBEDD		THE ANGULARITY OR ROUNDNESS OF SUBANGULAR, SUBROUNDED, OR ROUND	SOIL GRAINS ARE DESIGNATED BY THE TE DED.	EKMS: ANGULAK,	WEATHERED		AL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOW	OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.					
SOIL LEGEND AND AASH			NERALOGICAL COMPOSITION		ROCK (WR)	· Civi rooti.	PARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IS IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE					
GENERAL GRANULAR MATERIALS SI	ILT-CLAY MATERIALS 25% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FE WHENEVER THEY ARE CONSIDERED OF	LDSPAR, MICA, TALC, KAOLIN, ETC. ARE USEI SIGNIFICANCE.	D IN DESCRIPTIONS	CRYSTALLINE ROCK (CR)	WOULD YIEL	D SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE, 18RO, SCHIST, ETC.	GROUND SURFACE. CALCAREOUS (CALC.) - SOILS WHICH CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.					
1 2011 1 1 1 2011	257 PASSING #2001		COMPRESSIBILITY		NON-CRYSTALLINE	FINE TO CO	ARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN BY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED, ROCK	TYPE COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM					
CLASS. A-1-a A-1-b A-2-4 A-2-5 A-2-6 A-2-7	A-7-6 A-3 A-6, A-7	SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBL	LIQUIO LIMIT LE		COASTAL PLAIN	COASTAL PL	AIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL					
SYMBOL BOOKS BOOKS		HIGHLY COMPRESSIBLE	LIQUID LIMIT GR		SEDIMENTARY ROCK	SPT REFUSA SHELL BEDS	AL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - 101AL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY 101AL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.					
Z PASSING # 10 50 MX	GRANULAR SILT- MUCK,	GRANI	ERCENTAGE OF MATERIAL JLAR SILT- CLAY				WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.					
* 40 30 MX50 MX51 MN * 200 15 MX 25 MX10 MX 35 MX35 MX35 MX35 MX36 MX36	SOILS SOILS PEAT	ORGANIC MATERIAL SO TRACE OF ORGANIC MATTER 2 -	ils soils <u>ot</u>	THER MATERIAL 1 - 10%			W JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE					
LIQUID LINIT 46 MX41 MN 46 MX41 MN 46		LITTLE ORGANIC MATTER 3 -			VERY SLIGHT ROCK GE		STAINED. SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OF						
PLASTIC INDEX 6 MX N.P. 10 MX 10 MX 11 MN 11 MN 10	MX 10 MX 11 MN 11 MN LITTLE OR HIGHLY	HIGHLY ORGANIC >10	9% >20% HIGHLY		(V. SLI.) CRYSTAL		N FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.					
	MX 12 MX 16 MX No MX MODERATE ORGANIC SOILS		GROUND WATER		SLIGHT ROCK GE	NERALLY FRESH, JOINTS S	STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.					
OF MAJOR GRAVEL AND CAND GRAVEL AND CAND	SILTY CLAYEY ORGANIC SOILS SOILS MATTER	l —	N BORE HOLE IMMEDIATELY AFTER DRIL LEVEL AFTER <u>24</u> HOURS.	LLING.			N CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR BRED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.					
MATERIALS SAND SHIPD SHI	30123	T7	R, SATURATED ZONE OR WATER BEARING	STRATA			HOW DISCOLORATION AND WEATHERING EFFECTS. IN S ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.					
AS A EXCELLENT TO GOOD SUBGRADE	FAIR TO POOR FAIR TO POOR UNSUITABLE	HC HOLE CAVE			DULL SO		S AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOOD PLAIN (F.P.) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY					
P.I. OF A-7-5 ≤ L.L 30 : P		SPRING OR SEE			MODERATELY ALL ROCI	K EXCEPT QUARTZ DISCOL	ORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DU						
CONSISTENCY O	OR DENSENESS RANGE OF STANDARD RANGE OF UNCONFINED	<u> </u>	MISCELLANEOUS SYMBOLS		(MOD. SEV.) AND CAN	BE EXCAVATED WITH A G	SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STREN ECLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	THE FIGURE AMAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.					
	ETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT2)	ROADWAY EMBANKMENT WITH SOIL DESCRIPTION	SPT CPT DPT DHT TEST BORING VST PMT	SAMPLE DESIGNATIONS		<u>ED. WOULD YIELD SPT REFI</u> YS EXCEPT GUARTY DISCO	<i>USAL</i> OLORED OR STAINED.ROCK FABRIC CLEAR AND EVIDENT BUT I	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.					
GENERALLY VERY LOOSE	<4	SOIL SYMBOL	AUGER BORING	S- BULK SAMPLE	(SEV.) IN STREET	NGTH TO STRONG SOIL. IN	GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOM						
GRANULAR MEDIUM DENSE	4 TO 10 10 TO 30 N/A	ARTIFICIAL FILL OTHER	R THAN	SS- SPLIT SPOON		ED, YIELDS SPT N VALUES	RONG ROCK USUALLY REMAIN.	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.					
(NON-COHESIVE) DENSE VERY DENSE	30 TO 50 >50	ROADWAY EMBANKMENTS	- CORE BORING	SAMPLE			ORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBL ED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROC						
VERY SOFT	(2 (0.25	INFERRED SOIL BOUNDA	RIES MONITORING WELL	ST- SHELBY TUBE SAMPLE	REMAININ	NG. SAPROLITE IS AN EXAM	MPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY P FABRIC REMAIN. <i>IF TESTED, YIELDS SPT N VALUES < 100</i>	INOR PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN					
GENERALLY SOFT SILT-CLAY MEDIUM STIFF	2 TO 4	INFERRED ROCK LINE	BY A PIEZOMETER	RS- ROCK SAMPLE	1		BRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	RESIDUAL SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.					
MATERIAL STIFF (COHESIVE) VERY STIFF	8 TO 15 1 TO 2 15 TO 30 2 TO 4	25/025	RY INSTALLATION SLOPE INDICATOR	RT- RECOMPACTED TRIAXIAL SAMPLE	SCATTERE		RTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE	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					
HARD	>30 >4	DIP/DIP DIRECTION OF ROCK STRUCTURES	INSTALLATION	CBR- CBR SAMPLE	THE STATE OF THE S		OCK HARDNESS	EXPRESSED AS A PERCENTAGE.					
TEXTURE OR		SOUNDING ROD	SPT N-VALUE				OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL WHICH RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.					
U.S. STD. SIEVE SIZE 4 10 OPENING (MM) 4.76 2.0	40 60 200 270 0.42 0.25 0.075 0.053	> WATER LOSS	O- SPT TEST SAMPLE		1	L HARD BLOWS OF THE GE SCRATCHED BY KNIFE OR	EOLOGISTS PICK. 1 PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIR	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND					
CORRES CRAVES C	COARSE FINE SUIT CLAY	AD MARO DECISIO	ABBREVIATIONS	WETTO TEOT	TO DET	ACH HAND SPECIMEN.		RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, WHICH HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS					
(0,00) (00)	SAND SAND SET CENT CSE. SD.) (F. SD.) (SL.) (CL.)	AR - AUGER REFUSAL BT - BORING TERMINATI		Y	HARD EXCAVA	ATED BY HARD BLOW OF A	R PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.					
GRAIN MM 305 75 2,0 SIZE IN. 12° 3°	0.25 0.05 0.005	CL CLAY CPT - CONE PENETRATI				DERATE BLOWS. F GROOVED OR GOUGED 0.0	15 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POIN	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR B.P.F.) OF					
SOIL MOISTURE - CORF	RELATION OF TERMS	CSE COARSE DMT - DILATOMETER TE	TCR - TRICONE R ST 7 - UNIT WEIG		HARD CAN BE	E EXCAVATED IN SMALL CH OF A GEOLOGISTS PICK.	HIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF T	A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 0.1 FOOT PENETRATION					
SOIL MOISTURE SCALE FIELD MOISTU	URE GUIDE FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETR e - VOID RATIO	7d - DRY UNIT	WEIGHT	SOFT CAN BE	GROVED OR GOUGED READ	DILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS	WITH 60 BLOWS. N STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH					
(ATTERBERG LIMITS) DESCRIPTION	N	F FINE FOSS FOSSILIFEROUS	W - MOISTURE CO V VERY	ONTENT		CHIPS TO SEVERAL INCHES CAN BE BROKEN BY FING	IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THE PRESSURE.	OF STRATUM AND EXPRESSED AS A PERCENTAGE.					
- SATURATED (SAT.)	D - USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE	FRAC FRACTURED FRAGS FRAGMENTS	VST - VANE SHEA	AR TEST			N BE EXCAYATED READILY WITH POINT OF PICK, PIECES 1 IN BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY	I TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATOM EGOAL TO UN GREATER THAN 4 INCHES DIVIDED BY THE I					
PLASTIC LIQUID LIMIT	SEMISOLID: REQUIRES DRYING TO	MED MEDIUM			FINGERN	NAIL.		TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.					
RANGE - WET - (W	ATTAIN OPTIMUM MOISTURE	EQUIPME 1	ENT USED ON SUBJECT PRO			RE SPACING	BEDDING TERM THICKNESS						
MOIST	(M) SOLID: AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: A	DVANCING TOOLS:	HAMMER TYPE: AUTOMATIC MANUAL	TERM VERY WIDE	SPACING MORE THAN 10 FEET	VEDY THICKLY BERDER) 4 FFFT	BENCH MARK: USGS Benchmark located at Sta. 20+33.5. 28 feet Left of -L-					
OM OPTIMUM MOISTURE - MOIST - (THE SOCIOTHS OF NEW ORSTONE	MOBILE B	UNAC BITS	- HOLOHALIC MINHOH	WIDE MODERATELY CLOSE	3 TO 10 FEET E 1 TO 3 FEET	THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	ELEVATION: 664.0'					
- DRY - (D)	REQUIRES ADDITIONAL WATER TO	N BY-E1		CORE SIZE:	CLOSE VERY CLOSE	0.16 TO 1 FEET LESS THAN 0.16 FEE	THICKLY LAMINATED 0.008 - 0.03 FEET	NOTES:					
	HITHIN OF INOISTORE		- I	□-в			THINLY LAMINATED < 0.008 FEET INDURATION						
PLASTI PLASTICITY IN		CME-45		N_0-2	FOR SEDIMENTARY ROCK		RDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, E	тс.					
NONPLASTIC 0-5	VERY LOW	CME-750	TUNGCARBIDE INSERTS		FRIABLE		BING WITH FINGER FREES NUMEROUS GRAINS: ITLE BLOW BY HAMMER DISINTEGRATES SAMPLE.						
LOW PLASTICITY 6-15 MED. PLASTICITY 16-25	SLIGHT MEDIUM	PORTABLE HOIST	CASING W/ ADVANCER TRICONE STEEL TEETH	HAND TOOLS:		CDA	IILE BLUW BY HAMMER DISINIEURATES SAMPLE. INS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;						
HIGH PLASTICITY 26 OR M			TRICONE TUNGCARB.	POST HOLE DIGGER HAND AUGER	MODERATELY	BRE	AKS EASILY WHEN HIT WITH HAMMER.						
COL		OTHER DIEDRICH D-50	CORE BIT	SOUNDING ROD	INDURATED		NNS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE: FICULT TO BREAK WITH HAMMER.						
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR CO MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC.			OTHER	VANE SHEAR TEST	EXTREMELY I	INDURATED SHA	ARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE:						
				OTHER		SAM	MPLE BREAKS ACROSS GRAINS.	REVISED 09/15/00					
								UE A13ED 133/13/00					

STATE PROJECT NO.:

33620.1.1

I.D. NO.:

B-4280

FEDERAL PROJECT NO.:

BRSTP-8(2)

COUNTY:

Stokes

DESCRIPTION:

Bridge No. 14 Over Town Fork Creek & Bridge No. 44 Over Town Fork

Creek Overflow on NC 8

SUBJECT:

Structure Subsurface Investigation – Inventory Report

Project Description

The project site is located on NC Highway 8 approximately ½ mile north of its intersection with US Highway 65 in Stokes County, North Carolina at the crossing of Town Fork Creek and Overflow (See Site Vicinity Map, Sheet 5). The proposed project consists of replacement bridge structures. Based on the Bridge Survey and Hydraulic Design Report, the center of the structure for Bridge No. 14 will be at Station 19+10 and Bridge No. 44 will be at Station 25+22, both along the -L- survey line. The new Bridge No. 14 structure will have a clear roadway width of 34.0 feet. The new Bridge No. 14 structure will be 220 feet long with the bents constructed on a skew angle of 120° to the -L- survey line. The new Bridge No. 14 structure will consist of two spans of 70 feet and one of 80 feet. The structure will have four bents (two end bents and two interior bents). The new Bridge No. 44 structure will have a clear roadway width of 33.0 feet. The new Bridge No. 44 structure will be 100 feet long with the bents constructed on a skew angle of 90° to the -L- survey line. The new bridge structure will consist of two spans of 50 feet in each length. The structure will have three bents (two end bents and one interior bent).

Based upon the structural drawings provided by NCDOT, the finished grade elevations for the new Bridge No. 14 structure, at the approaches, will be approximately 667 feet. This will require fill depths of up to approximately 12 feet at the approaches. Finished grade elevations for the new Bridge No. 44 structure, at the approaches, will be approximately 664 feet. This will require fill depths of up to approximately 9 feet at the approaches. For both structures, fill slopes will be constructed at a slope of 1.5:1 (horizontal to vertical) with 2 feet of class II Rip Rap erosion protection.

A geotechnical investigation was conducted between July 18 and July 25, 2005. All borings for both structures were performed adjacent to the existing embankment or structures in the flood plain of Town Fork Creek. Borings B1-A, B2-A, and B2-B for Bridge No. 14 were drilled in the creek bed. All borings were performed with either a Longyear BK-51 or a Diedrich D-50 mounted on an all-terrain carrier. Representative soil samples were collected for visual classification in the field and for laboratory classification analysis by the NCDOT accredited S&ME soil testing laboratory. Shelby tubes were obtained at borings EB1-A and EB2-A between the depth of 8 to 12 feet beneath Bridge No. 14 and at boring EB1-B between the depth of 5 to 7 feet beneath Bridge No. 44 for triaxial and consolidation testing.

Physiography and Geology

The project site is located on NC Highway 8 approximately ¼ mile north of its intersection with US Highway 65 in Stokes County, North Carolina at the crossing of Town Fork Creek and Overflow. The

existing Bridge No. 14 structure is approximately 205.5 feet long with a bridge deck width of approximately 24 feet (outside to outside). The existing Bridge No. 44 structure is approximately 90.3 feet long with a bridge deck width of approximately 24 feet (outside to outside). The existing bridges are situated within the flood plain of Town Fork Creek along a two lane paved road (NC Highway 8). Both bridges consist of a reinforced concrete deck overlain with asphalt on steel girders supported on reinforced concrete pile caps and timber piles. North Carolina Highway 8 runs approximately north and south and has roadway embankment shoulders. The flood plain extends approximately 1000 feet on the north and 450 feet on the south side of the creek and is covered with mostly grass and crop fields with some large to small trees and undergrowth. Overhead power lines and communication lines cross the creek approximately 10 feet west of the existing bridges.

The site is located within the central portion of the Piedmont Physiographic and Geologic Province of North Carolina in Stokes County. The Piedmont Province is typically characterized by gently to steeply sloping topography with well-rounded hills and along rolling ridges with a northeast-southwest trend dissected by a moderate to well developed (mature) dentritic-type drainage system consisting of drainage swales, hollows, tributaries, streams and rivers. The geology of the southern portion of Stokes County, near the project site, primarily consists of recent alluvial sediments underlain by the Pine Hall Formation of Triassic Age. Typically, the recent alluvial sediments consists of silty coarse to fine sands and silty clays. The Pine Hall Formation consists of mudstone, sandstone, and conglomerate and is part of the Dan River Basin which trends southwest to northeast into Virginia. The project site is near the southwestern boundary of the Triassic Basin where the Pine Hall sedimentary rocks contact much older crystalline host bedrock consisting of felsic-rich mica gneiss.

Foundation Materials - Bridge No. 14

The borings were advanced to depths ranging from 21.1 to 31.5 feet (elevations 636.2 to 617.9 feet) at collar elevations ranging from 658.7 to 643.7 feet.

Roadway embankment fill materials were encountered in boring EB1-A to depths of about 2 feet (elevations 654.8 feet) below the collar elevation. The fill material encountered in these borings consists of medium dense brown silty fine sand (A-2-4). Standard penetration test (SPT) N-values in the fill material was 12 blows per foot.

Alluvial deposits were encountered from the ground surface or creek bed, and beneath the embankment fill materials in all borings except B1-A to depths ranging from about 0.8 to 14.0 feet (elevations 644.7 to 642.9 feet) beneath collar elevations. Typically, alluvial deposits encountered consist of very loose to medium dense tan to gray coarse to fine sands (A-2-4) with occasional gravel layers. A layer of very soft to soft gray and tan fine sandy silt (A-4) was encountered in borings EB1-A and EB2-A from a depth of 7.5 to 13 feet (elevations 649.9 to 643.8 feet) beneath the collar elevation. The creek channel typically consists of very thin deposits of loose tan silty coarse to fine sand and gravel (A-2-4). At boring B1-A, alluvial material has been scoured with bedrock exposed. The standard penetration test (SPT) N-values for the alluvial deposits range from Weight-of-Hammer (WOH) to 11 blows per foot.

Beneath the alluvium in borings EB1-A, EB1-B, B1-B, EB2-A, and EB2-B, weathered rock (Triassic) consisting of gray sandstone was encountered and extended to the termination of borings or auger refusal. The weathered rock was encountered at depths ranging from about 7.0 to 23.7 feet (elevations 644.7 to 631.4 feet) beneath the collar elevations. No residual soil was encountered above the weathered rock. Standard penetration

test (SPT) N-values in the weathered rock materials range from 100 blows per 0.7 feet of penetration to 60 blows per 0.1 feet of penetration.

The weathered rock transitions to non-crystalline rock (Triassic) consisting of red-brown and gray sandstone, and red-brown mudstone. The sandstone and mudstone are part of the Pine Hall Formation of the Dan River Basin. The non-crystalline rock was evaluated utilizing rock coring techniques by advancing an NQ2 core barrel. Coring activities recovered 56 to 100 percent of the rock cored. Rock Quality Designation (ROD) values range from 0 to 99 percent. Borings B1-A, B1-B, B2-A, B2-B, and EB2-B were terminated in indurated to extremely indurated sandstone and mudstone at elevations ranging from 617.9 to 633.5 feet. Borings EB1-A and EB2-A were terminated on sandstone at elevations ranging from 636.2 to 635.7 feet. Boring EB1-B was terminated in weathered rock (gray sandstone) at elevation 631.4 feet.

Foundation Materials – Bridge No. 44

The borings were advanced to depths ranging from 16.9 to 36.4 feet (elevations 637.9 to 617.5 feet) at collar elevations ranging from 654.8 to 653.8 feet.

Alluvial deposits were encountered from the ground surface in all borings depths ranging from about 11.0 to 12.5 feet (elevations 643.6 to 642.2 feet) beneath collar elevations. Typically, alluvial deposits encountered consist of very loose to loose tan to gray coarse to fine sands (A-2-4, A-3, A-1-b) with occasional gravel layers. Interbedded with the sands are layers of soft to medium stiff gray and tan fine sandy silt and clay (A-4, A-6, A-7-6). The standard penetration test (SPT) N-values for the alluvial deposits range from 2 to 16 blows per foot.

Beneath the alluvium, residual soils were encountered in boring B1-A at 10 to 11 feet (elevations 643.8 to 642.8) consisting of medium stiff red brown sandy silt (A-4). The residuum transitions to weathered rock (Triassic) in B1-A, and the weathered rock was encountered beneath the alluvium in all other borings consisting of red brown sandstone, gray and white conglomerate, and gray and white sandstone and extended to the termination of borings or auger refusal. The weathered rock was encountered at depths ranging from about 10.3 to 12.5 feet (elevations 642.2 to 643.6 feet) beneath the collar elevations. Standard penetration test (SPT) N-values in the weathered rock materials range from 100 blows per 0.9 feet of penetration to 60 blows per 0.1 feet of penetration.

The weathered rock transitions to non-crystalline rock (Triassic) consisting of red brown and gray sandstone, red brown mudstone, and gray and white conglomerate. The sandstone, mudstone, and conglomerate are part of the Pine Hall Formation of the Dan River Basin. Coring activities recovered 85 to 100 percent of the rock cored. Rock Quality Designation (RQD) values range from 38 to 74 percent. Borings EB1-A and were terminated in indurated red brown sandstone at elevations ranging from 636.0 to 637.9 feet. Borings B1-A and B1-B were terminated in extremely indurated gray and white conglomerate at elevations ranging from 622.3 to 617.5 feet. Borings EB2-A was terminated in extremely indurated dark gray mudstone at elevation 631.7 feet. Boring EB2-B was terminated on sandstone at elevation 630.8 feet.

Notes to Designer

The BK-51 and D-50 drill rigs are equipped with a rope, cathead and Safety Hammer to perform Standard Penetration tests.

Groundwater

Static groundwater levels were measured at Bridge No. 14 within borings EB1-A, EB1-B, EB2-A, and EB2-B at depths ranging from about 6.9 to 13.6 feet (elevations 648.2 to 641.4) Static groundwater levels were measured at Bridge No. 44 within borings EB1-B, B1-A, B1-B, B2-A, B2-B, EB2-A, and EB2-B at depths ranging from about 3.2 to 5.3 feet (elevations 651.2 to 649.5). Groundwater depths were not measured in the remaining borings due to hole cave-in or borings were below creek level. The creek elevation at the time of our field investigation was 644.7 feet on July 22, 2005. The overflow creek was dry on this date.

QUALIFICATIONS OF REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice for specific application to this project. The conclusions contained in this report were based on the applicable standards of our profession at the time this report was prepared. No other warranty, expressed or implied, is made.

The conclusions submitted in this report are based, in part, upon the data obtained from the subsurface exploration. The nature and extent of subsurface variations between the borings may not become evident until construction. If variations appear evident, then the conclusions contained in this report may need to be reevaluated. In the event that any changes in the nature, design, or location of the structure are planned, the conclusions contained in this report will not be considered valid unless the changes are reviewed by S&ME, and the conclusions of the report are modified or verified in writing.

S&ME appreciates the opportunity to be your geotechnical consultant on this project. If you have any questions or need additional information in regard to this report, please contact us.

Very truly yours,

S&ME, Inc.

Duane D. Bents, E.I. Staff Professional

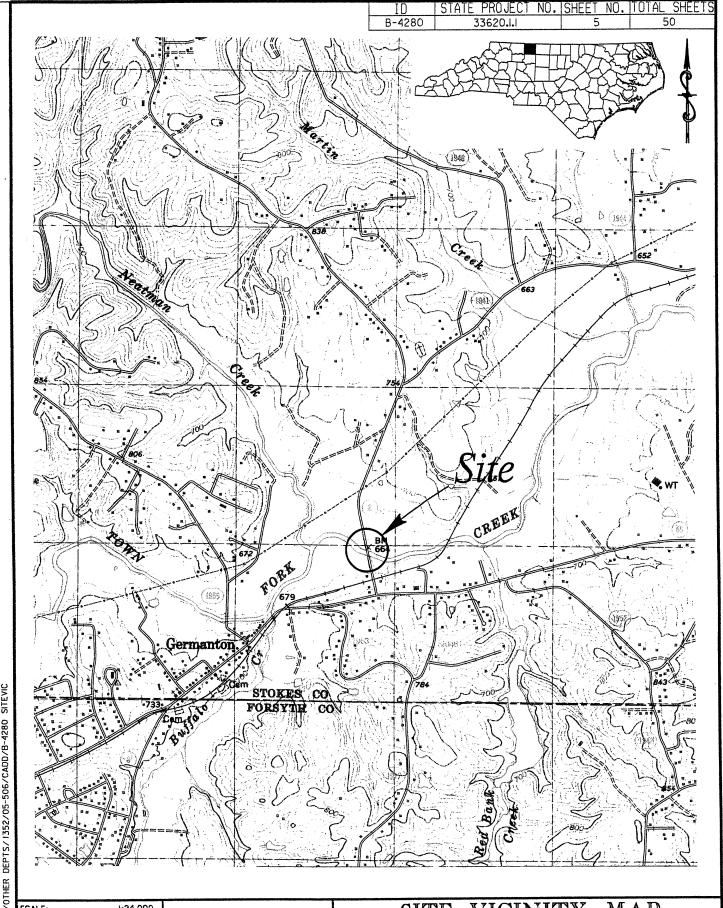
Jason D. Murphy, L

Project Geologist

N.C. Registration No. 1690

Chief Geotechnical Engineer SEA N.C. Registration N

Attachments

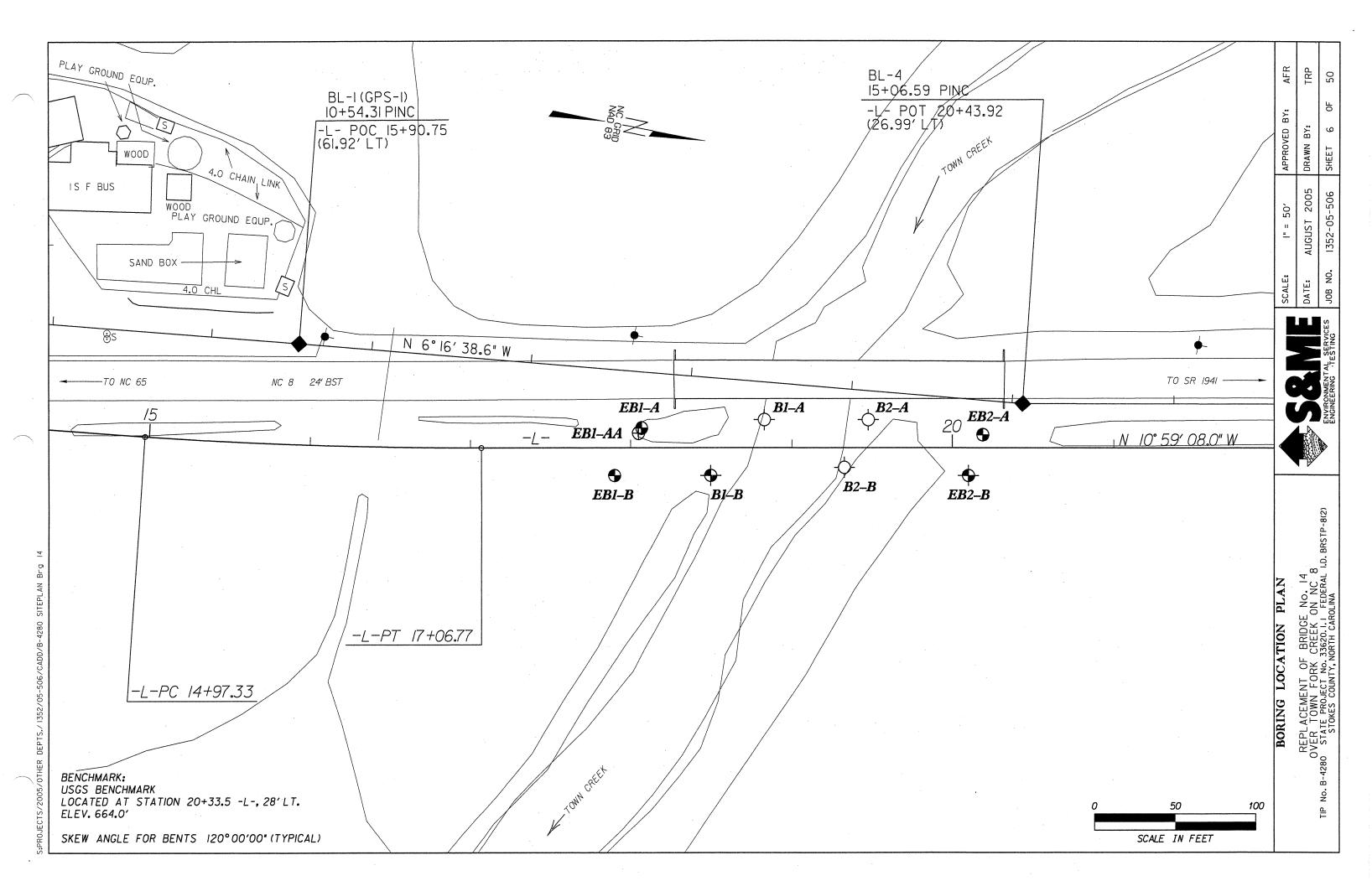


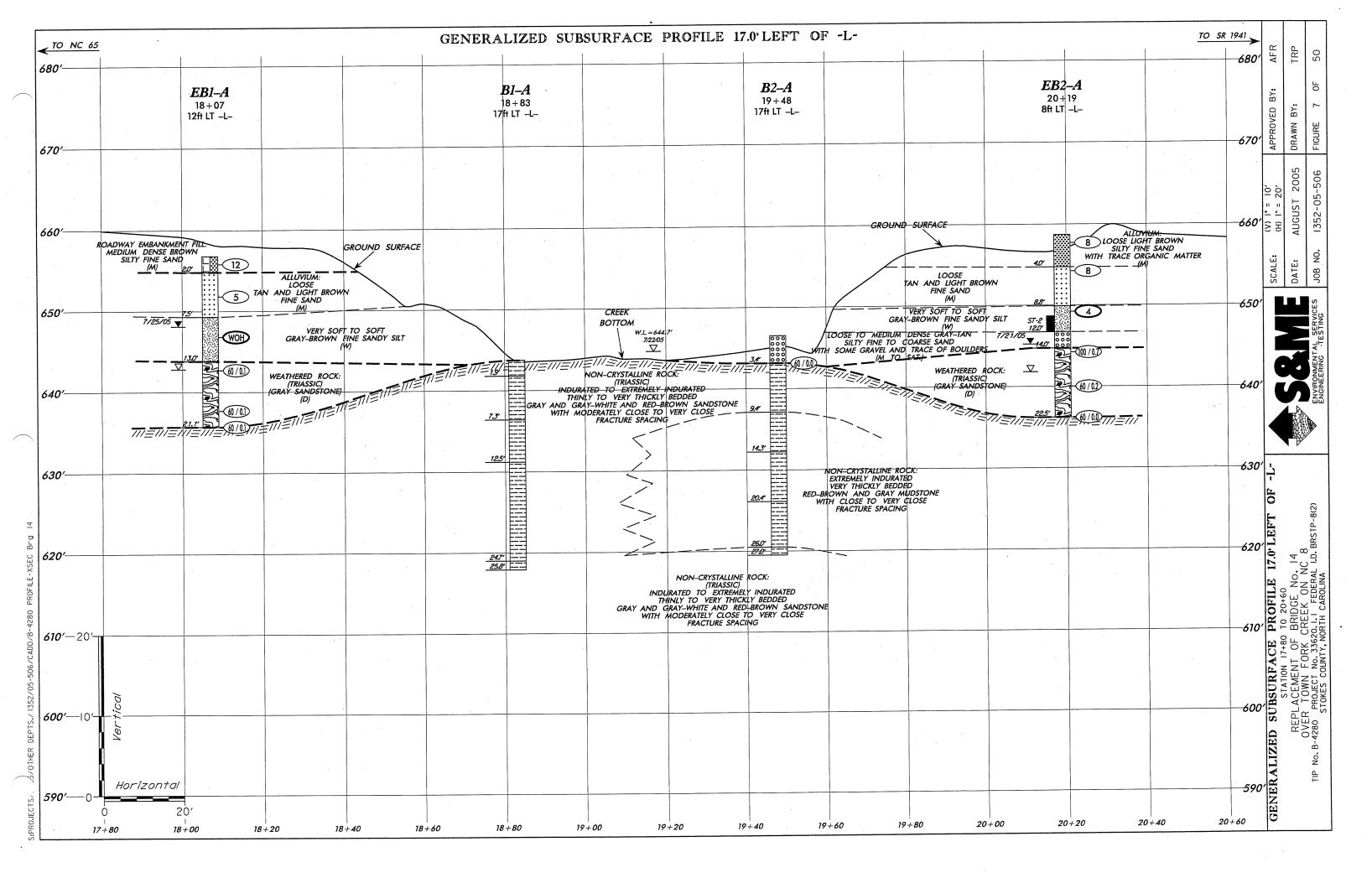
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REPLACEMENT OF BRIDGE No. 14 OVER TOWN FORK CREEK
AND BRIDGE No. 44 OVER TOWN FORK CREEK OVERFLOW ON NC 8

STATE PROJECT NO. 33620.1.1 TIP NO. B-4280
FEDERAL I.D. NO. BRSTP-8(2)
STOKES COUNTY, NORTH CAROLINA









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PROJECT NO. 33620.1.1 ID. B-4280				CC	YTNUC	STO	KES			GEOLOGIST K. LEWALLEN								
	ESCRIP		BRIDG	GE 14 C	OVER	NOT	FORK	CREEK C	ON NC	3							GROU	ND WATER
ORIN	G NO.	EB1-A		ВС	RING	LOCA	TION	18+07		OFFS	ET 12	ft LT		ALIGN	MENT -L-		0 HR.	14.0
LLA	R ELEV	. 656.	.8 ft	NORT	HING	918	,551.7			EAST	ING	1,639	,625.	1			24 HR.	8.7 on 7/2
TAL	DEPTH	21.1	ft	DRILL	MAC	HINE	BK-5	1	DRILL	METH	OD 23	¼" H.S.A	١.			HAMI	MER TYPE	MANUAL
TE S	STARTE	D 7/2	22/05	1		COMI	PLETE	7/22/05		SURF	ACE W	ATER	DEP	TH N//	Ą			
EV.	DEPTH	BLO	ow cou	JNT		L	BLOW	S PER FOC	T .		SAMP.	V			SOILA	ND ROCI	K DESCRIPT	ION
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				i .				ID 011DEA	05				ŀ	252.2				
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SHEET 12 OF 50 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

SHEET 1 OF 1

ROJE	ECT NO.	33620.			ID. B-4280	C	OUNTY	STO	KES		GEOLOGIST K	. LEWALLEN
SITE	ESCRIPT	ION E	RIDG	E 14 O	VER TOWN FORK CREEK	ON NC	8					GROUND WATER (ft)
BORIN	IG NO.	EB1-AA		во	PRING LOCATION 18+05		OFFS	ET 9 f	LT		ALIGNMENT -L-	0 HR. N/M
OLL	AR ELEV.	655.8	ft	NORT	HING 918,550.4		EAST		1,639,		4	24 HR. N/M
OTAL	L DEPTH	10.0 ft		DRILL	MACHINE BK-51	DRILL	METH	OD 2	4" H.S.A		HAM	WER TYPE N/A
	STARTED				COMPLETED 7/25/0		SURF	ACE W	T	DEP	TH N/A	
	DEPTH		V COU	NT 0.5ft	BLOWS PER FC 0 20 40 60	OT 80	100	SAMP.		0	SOIL AND ROC	K DESCRIPTION
(ft)	(ft)	0.5ft	υ.οπ	0.510		<u> </u>		NO.	MOI	G		
655.8					GROUND SURF	ACE			-		655.8 — ALL	JVIUM:
•	Ξl										LOOSE TA	N FINE SAND A-3)
	<u> </u>										·	
	\pm 1		ļ								- 649.3 - VEDV.S	OFT GRAY
	<u> </u>							ST-1	35.9%		CLAYEY FIN	IE SANDY SILT
	‡							<u> </u>	 		. 645.8 WITH TRACE (A-4) DF COARSE SAND 10.0
	‡				BORING TERMINA AT ELEVATION 645.						2) SHELBY TUBE TA	KEN FROM 8.0' TO
	‡				IN ALLUVIUM VERY SOFT GRAY FINE SA		(A-4)				10.0'.	
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SHEET 13 OF 50 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

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PROJE	CT NO.	3362	0.1.1			ID.	B-4280		С	OUNTY	STO	KES			GEOLOG	SIST K	LEWALLE		
SITE D	ESCRIP	TION	BRID	GE 14 C	OVER	TOW	N FORK	CREEK	ON NC	8							GROUN	ID WATER	(ft)
BORIN	G NO.	EB1-B		ВС	RING	LOC	ATION	17+90		OFFS	ET 17	ft RT		ALIGN	MENT -L-		0 HR.	9.5	
COLLA	R ELEV	. 655.	1 ft	NORT	HING	91	8,540.7			EAST		1,639		7			24 HR.	6.9 on 7/2	2/05
TOTAL	DEPTH	23.7	ft	DRILL	. MAC	HINE	BK-51		DRIL	L METH	OD 2	1/4" H.S.A	١.			HAM	MER TYPE	MANUAL	
DATE S	STARTE	D 7/2	21/05			CON	IPLETED	7/21/0	5	SURF	ACE W	ATER	DEP	TH N/A	\				
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(ft)	(ft)	0.5ft	0.5ft	0.5ft	1	20 1) 40	60 	80 1	100	NO.	MO	G						
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-		3	6	5		9 11								649.1	MEDIU	M DENS	E TAN FINE : A-3)	SAND	6
646.6	8.5				:									•	LOOS	E GRAY	SILTY FINE S -2-4)	SAND	
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_	<u>-</u>	60/0.2								60/0.2				_	. (GRAY SA	ANDSTONE)		
636.6	- - 18.5													•		*			
030.0 -	- 10.5	100/0.5			: :					00/0.5	ľ	D							
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631.6 -	23.5					: : :							5	631.4				- page 22-22-	23
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ROJEC	T NO.	3362	0.1.1				B-4280			OUNTY	STO	KES		GEOLOGI	ST K.	LEWALLE	
TE DE	SCRIP	TION	BRID	GE 14 (OVE	R TOWN	FORK (CREEK C	ON NC	·						4	D WATER
DRING	NO.	B1-A		BO	ORIN	G LOCA	TION	18+83		 	ET 17			ALIGNMENT -L-		0 HR.	N/A
OLLAF	RELEV	. 643	.7 ft	NORT	THING	G 918	,625.1			EAST		1,639		.8 VANCER/NQ-2 CORE		24 HR.	N/A
TAL	DEPTH	25.8	ft	DRIL	L MA	CHINE	BK-51		DRILL	METH	OD B	W CASII ARREL	NG AL	VANCERING-2 CORE	HAM	MER TYPE	MANUAL
ATE S	TARTE	D 7/	21/05			COMI	PLETED	7/22/05	5	SURF	ACE W	ATER	DEP	TH 1.1 ft			
EV.	DEPTH	BL	OW CO	UNT			BLOWS	PER FOO	T		SAMP.		L	SOIL AN	D ROC	K DESCRIPT	ON
(ft)	(ft)	0.5ft	0.5ft	0.5ft	P	20	40	60	80	100	NO.	MOI					
						*	CREE	K LEVEL									
4.8 3.7 –								ВОТТО				<u> </u>		- 643.7	CDVCT	ALLINE ROC	<i>V</i> ,
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+									, .					1.9 TO 25.0 3) CREEK W	ATER U	SED AS DRIL	LING
±								*						FLUID. 4) APPROXIN			
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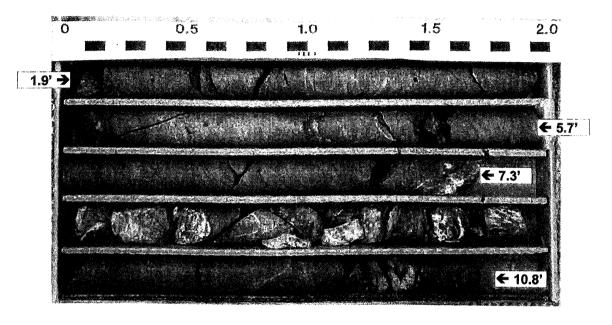
SHEET 14 OF 50 N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

PROJECT NO. 34320.1.1 ID. 8-2280 COUNTY STOKES GEOLOGIST K. LEWALLEN	. 💙	ENGII ENVIR	VEERII ONME	NG • TEST NTAL SERV	ING ICES							OF TRABLES			SHEET	1 OF 1	
BORING NO. B1-A BORING LOCATION 18+83 OFFSET 17 ft.LT ALIGNMENT 1 0 HR N/A	PROJE	CT NO.	336	20.1.1			ID . B-42	280		I	COUNTY ST	OKES	GEOLOGI				
COLLAR ELEV. 643.7 ft NORTHING 918,625.1 EASTING 1,639,605.8 24 HR. N/A TOTAL DEPTH 25.8 ft DRILL MACHINE BK-51 DRILL METHOD NV CASINS ADVANCERNO.2 CORE HAMMER TYPE MANUAL DATE STARTED 7/21/05 COMPLETED 7/22/05 SURFACE WATER DEPTH 1.1 ft CORE SIZE NO-2 ELEV. DEPTH RUN RATE, RAT	SITE D	ESCRIPT	TION	BRIDG	E 14 O	VER	TOWN FC	RK C	REEK	ON N	C 8				GROUN	D WATER	(ft)
TOTAL DEPTH 25.8 DRILL MACHINE BK-51 DRILL METHOD NW 26.896 ADVANCERNO-2 CORE HAMMER TYPE MANUAL	BORIN	G NO.	B1-A		во	RING	LOCATIO	N 18	3+83		OFFSET 1	7 ft LT ALIGN	IMENT -L-		0 HR.	N/A	
DATE STARTED 7/21/05 DATE STARTED 7/21/05 SURFACE WATER DEPTH 1.1 ft	COLLA	R ELEV.	643	3.7 ft	NORTI	HING	918,625	5.1			EASTING	.,,			24 HR.	N/A	:
CORE SIZE NO-2	TOTAL	DEPTH	25.8	8 ft	DRILL	MACH	HINE B	<-51 ·		DRI	LL METHOD		IQ-2 CORE	HAMN	IER TYPE	MANUAL	-
ELEV. (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft)	DATE	STARTE	7.	/21/05			COMPLE	TED	7/22/0	5	SURFACE	WATER DEPTH 1.1	1 ft				
ELEV, (ft),	CORE	SIZE N	Q-2				TOTAL R				DRILLER	J. LITTLE					
641.8 1.9 3.8 2.20 (3.8) (2.20 100% 58% 2.40 2.40 100% 58%	1	1		RATE	REC.	RQD		REC.	RQD	0		DESCRIF	PTION AND RE	MARKS			
Control Cont	_			0.00	(0.0)	(0.0)					641.8	Begi	n Coring @ 1	.9 ft			1.9
638.4 7.3 1.6 2.20 2.20 1.60 1.20 1.60 1.20 1.20 1.60 1.20 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.60 1.20 1.20 1.60 1.20 1	641.8	1.9	3.8	2:30		58%				탘	•	NON-C					1
Sacrage Sacr			1.6	1:20/0.8	// 6)	(1.4)	- I			茸	EXT		TÒ INDURATE	D VERY	THICKLY B	EDDED	
632.9 10.8 2:30 2:10 632.9 10.8 5.0 15.00 (4.5) (1.7) 90% 34% (23.3) (13.9) 97% 58% 22.00 2:10 627.9 15.8 6:00 55.0 3:20 2:40 3:00 55.0 3:20 2:40 3:00 55.0 3:20 2:40 3:00 622.9 20.8 5.0 4:00 3:00 3:00 2:10 617.9 25.8 25.8 2:30 3:00 3:00 3:00 3:00 3:00 3:00 3:00	636.4	7.3			100%	88%					636.4 V	VITH MODERATELY CL	LOSE TO CLOS	SE FRAC		CING	7.3
15.0	622.0	10.0								탈	-					ı	
15.8 2:20 2:10 627.9 15.8 6:00	032.9	10.6	5.0	2:10						量	631.2	NON-C	CRYSTALLINE	ROCK:			12.5
15.8 6.00 6.50				2:20	90%	34%					- 7	VER'	Y THICKLY BE	DDED	INATED		- 12.4
3:20 98% 94% RS-1 1NDETERMINEABLE JOINTS FROM 8.3 TO 9.1 FEET AND FROM 10.8 TO 12.5 FEET AND FROM 10.8 TO 12.5 FEET AND FROM 10.8 TO 12.5 FEET AND FROM 10.8 TO 12.5 FEET AND FROM 10.8 TO 12.5 FEET AND FROM 10.8 TO 12.5 FEET NON-CRYSTALLINE ROCK: EXTREMELY INDURATED VERY THICKLY BEDDED RED-BROWN SANDSTONE WITH MODERATELY CLOSE TO VERY CLOSE FRACTURE SPACING 7 JOINTS @ 10°, 3 JOINTS @ 30°, 24.7 25.8 20°, 3 JOINTS @ 60° 7 25.8 20°, 3 JOINTS @ 60°	627.9	15.8		6:00	(4.0)	(4.3)	4	31 70	30 /6	咠		WITH CLOSE TO V	ERY CLOSE FI	RACTUF			i
AND FROM 10.8 TO 12.5 FEET NON-CRYSTALLINE ROCK: EXTREMELY INDURATED VERY THICKLY BEDDED RED-BROWN SANDSTONE WITH MODERATELY CLOSE TO VERY CLOSE FRACTURE SPACING 7 JOINTS @ 10°, 3 JOINTS @ 60° 2247 25.8 220 3:00 3:00 3:00 3:00 2:10 2:30 2:20 3:00			5.0	3:20			RS-1			〓						•	
Size Size	600.0	20.0		3:00						〓		AND_FE	ROM 10.8 TO 12	2.5 FEET			
10 10 10 10 10 10 10 10	622.9	20.8	5.0	4:00						〓		EXTREMELY INDU	JRATED VERY	THICKL	YBEDDED		
617.9 25.8 2:30 2:30 8 JOINTS @ 45°, AND 10 JOINTS @ 60° 25.8 Comparison					100%	56%					. WIT	H MODERATELY CLOS	SE TO VERY C	LOSE FF		PACING	04.7
2:20 3:00	617.9	25.8				ļ											
GRAY SANDSTONE WITH CLOSE TO VERY CLOSE FRACTURE SPACING 1 JOINT @ 10°, 1 JOINT @ 30°, AND 1 JOINT @ 60° BORING TERMINATED AT ELEVATION 617.9 FEET IN NON-CRYSTALLINE ROCK: EXTREMELY INDURATED GRAY SANDSTONE				2:20											EDDED		
1 JOINT @ 10°, 1 JOINT @ 30°, AND 1 JOINT @ 60° BORING TERMINATED AT ELEVATION 617.9 FEET IN NON-CRYSTALLINE ROCK: EXTREMELY INDURATED GRAY SANDSTONE				0.00	1					-	-	GF	RAY SANDSTO	NE			
AT ELEVATION 617.9 FEET IN NON-CRYSTALLINE ROCK: EXTREMELY INDURATED GRAY SANDSTONE					ŀ					-		1 JOINT @ 10°, 1	JOINT @ 30°, A	ND 1 JC			
EXTREMELY INDURATED GRAY SANDSTONE				<u> </u>							· ·	AT EL	EVATION 617.	9 FEET			į
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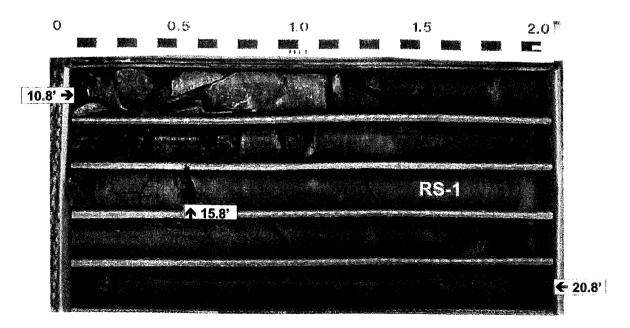


CORE PHOTOS

Project No: 33620.1.1	TIP No: B-4280	County: Stokes	Boring No.: B1-A
Site Description: Replacer	ment of Bridge No. 14 over To	own Fork Creek on NC 8	Driller: J. Little
Collar Elev.: 643.7 ft.	Core Size: NQ-2	Equipment: BK-51	Geologist: K. Lewallen
Elev. at T.D.: 617.9 ft.	Total Depth: 25.8 ft.	Total Run: 23.9 ft.	Date: 7/22/05



Box 1 of 3
Top of Box @ 1.9 feet; Bottom of Box @ 10.8 feet

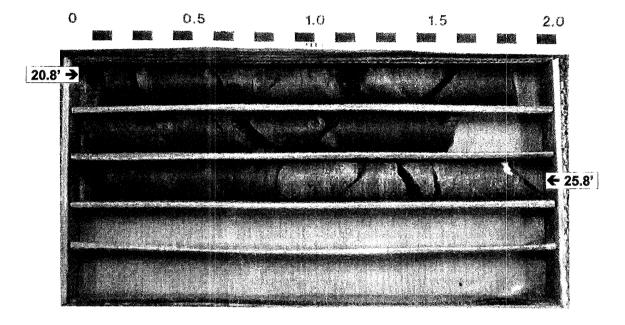


Box 2 of 3
Top of Box @ 10.8 feet; Bottom of Box @ 20.8 feet



SHEET 15 OF 50

Project No: 33620.1.1	TIP No: B-4280	County: Stokes	Boring No.: B1-A						
Site Description: Replacen	Driller: J. Little								
Collar Elev.: 643.7 ft.	Collar Elev.: 643.7 ft. Core Size: NQ-2 Equipment: BK-51								
Elev. at T.D.: 617.9 ft.	Total Depth: 25.8 ft.	Total Run: 23.9 ft.	Date: 7/22/05						



Box 3 of 3
Top of Box @ 20.8 feet; Bottom of Box @ 25.8 feet





0 171		NEERING ONMEN 3362		ICEO	ID. B-4280 C	OUNTY	STOK	ES		GEOLOGIST K.	SHEET 1 OF 1 LEWALLEN
	CT NO.			YE 14 O	OVER TOWN FORK CREEK ON NC						GROUND WATER (ff
	SCRIP		BRIDG		PRING LOCATION 18+50	OFFSE	T 17 f	RT	T	ALIGNMENT -L-	0 HR. N/A
		B1-B	2.4			EASTIN			645.4		24 HR. N/M
	R ELEV			NORTI		METHO	01/				MER TYPE MANUAL
	DEPTH			DRILL				TED	DEDT		
	TARTE		25/05		COMPLETED 7/25/05	SURFA		VIER	L		
· '	DEPTH		ow cor		BLOWS PER FOOT 0 20 40 60 80	100	SAMP.	\	ō	SOIL AND ROCK	DESCRIPTION
(i)	(ft)	0.5ft	0.5ft	0.5ft	0 20 40 60 80		NO.	/MOI	G	,	
										· :-	
1.3					GROUND SURFACE					651.3	
.3	- 0.0	1	1	2			SS-2	М			JVIUM: NE SANDY SILT
7.8	3.5					: : : : [A-4) BROWN
+	•	2	2	2] : 6 4	: : : :	SS-3	М	**	SILTY F	INE SAND -2-4)
+	-									- 644.3	RED ROCK:
2.8	8.5	400/2.5				: : :		D	對	(TRI	ASSIC)
‡	• •	100/0.5				100/0.5		_		GKAY SA	ANDSTONE)
3.5	- - 12.8					$\cdots \downarrow \downarrow$			5	638.3	
1		60/0.2]	60/0.2		D	国	(TRI	ALLINE ROCK: ASSIC)
+	-								탈		Y INDÚRATED KLY BEDDED
7	-					: : : :			丰	GRAY SA	ANDSTONE MODERATELY CLOSE
‡	-								量		RE SPACING
#	-								量	-	
1	-								目	•	•
1	-						RS-2		目	•	
1	_						1102	1	昌	- ·	
1	_			·						622.3 NON-CRYST	ALLINE ROCK:
1	-					 				INDURATED T	HICKLY BEDDED D GRAY MUDSTONE
	_				BORING TERMINATED		-			with very c	LOSE TO CLOSE RE SPACING
1					AT ELEVATION 619.8 FEET IN NON- CRYSTALLINE ROCK	,				1) ADVANCED 2-1/4"	HSA TO 12.8 FEET.
-					INDURATED RED-BROWN AND G	 BRAY					CORE BARREL FROM
1	-				MUDSTONE				1 1	_ 13 TO 31.5 FEET. _ 4) CREEK WATER U	SED AS DRILLING
. 1	<u> </u>								1 6	FLUID. 5) APPROXIMATE D	· *
1									1 F	DENSITY 62.4 PC ON LOSS OF DRIL	F.
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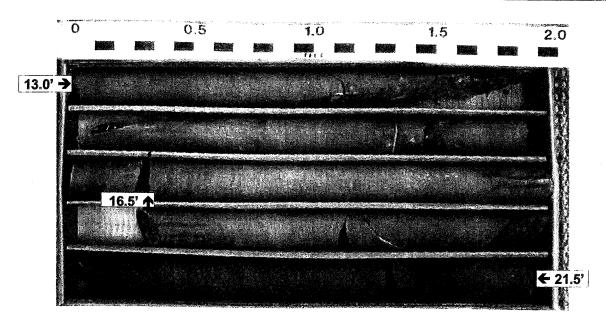
SHEET 16 OF 50 N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

~	ENG!	NEERII RONME	NG • TEST NTAL SERV	ING ICES						SHEET 1 OF 1
PROJE	CT NO.		20.1.1			ID. B-42	280			COUNTY STOKES GEOLOGIST K. LEWALLEN
SITE D	ESCRIP	TION	BRIDG	E 14 O	VER	TOWN FO	ORK C	REEK	ON NO	NC 8 GROUND WATER (ft)
BORIN	G NO.	B1-B		во	RING	LOCATIO	N 18	3+50		OFFSET 17 ft RT ALIGNMENT -L- 0 HR. N/A
COLLA	R ELEV	. 65	1.3 ft	NORTH	HING	918,599	9.4			EASTING 1,639,645.4 24 HR. N/M
TOTAL	DEPTH	31.	5 ft	DRILL	MACI	HINE B	<-51		DRII	RILL METHOD 21/4" HSA/NQ-2 CORE BARREL HAMMER TYPE MANUAL
DATE	STARTE	D 7	/25/05			COMPLE	TED	7/25/0	5	SURFACE WATER DEPTH N/A
CORE	SIZE N	IQ-2	,			TOTAL R				DRILLER J. LITTLE
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	UN RQD (ft) %	SAMP. NO.	REC. (ft)	RQD (ft) %	L O G	DESCRIPTION AND REMARKS
		0.5	1.00	(0.1)	(0.4)		(45.0)	(40.5)		638.3 Begin Coring @ 13.0 ft 13
638.3	13.0	3.5	1:30 2:00	(3.4) 97%	(3.4) 97%		99%	(12.5) 78%	量	NON-CRYSTALLINE ROCK:
634.8	16.5	5.0	2:00 2:00/0.5	(5.0)	(4.4)	-			量	(TRIASSIC) EXTREMELY INDURATED VERY THICKLY BEDDED
			2:10 2:20	100%					量	GRAY SANDSTONE WITH CLOSE TO MODERATELY CLOSE FRACTURE SPACING
329.8	21.5		2:30 2:20						量	1 JOINT @ 10°, 2 JOINTS @ 30°,
		5.0	2:20	(4.9) 98%	(3.1) 62%				斷	
			1:50 1:40	0070	. 02,0				==	
324.8	26.5	5.0	2:10	(5.0)	(2.2)	RS-2			計	
			2:00	100%	44%		(0.5)	(0.0)		622.3
319.8	31.5		2:30 3:30				(2.5) 100%	(0.6) 24%	噩	NON-CRYSTALLINE ROCK: _619.8 INDUBATED THICKLY REDDED 3'
			4:10 3:50	1.					ΠE	RED-BROWN AND GRAY MUDSTONE
									E	WITH VERY CLOSE TO CLOSE FRACTURE SPACING 3 JOINTS @ 30°, 3 JOINTS @ 45°, AND 2 JOINTS @ 60°
									1 E	BORING TERMINATED AT ELEVATION 619.8 FEET
									1 E	IN NON- CRYSTALLINE ROCK: INDURATED RED-BROWN AND GRAY
									łE	MUDSTONE
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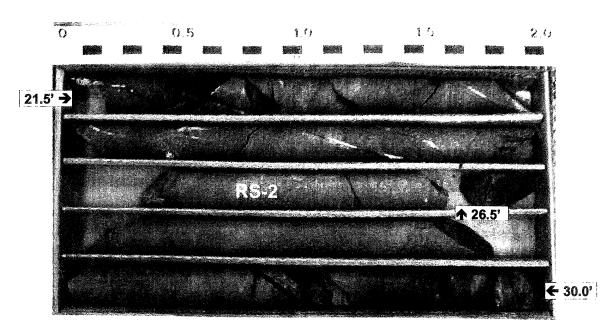


CORE PHOTOS

Project No: 33620.1.1	TIP No: B-4280	County: Stokes	Boring No.: B1-B					
Site Description: Replace	Driller: J. Little							
Collar Elev.: 651.3 ft.	llar Elev.: 651.3 ft. Core Size: NQ-2 Equipment: BK-51							
Elev. at T.D.: 619.8 ft.	Total Depth: 31.5 ft.	Total Run: 18.5 ft.	Date: 7/25/05					



Box 1 of 3
Top of Box @ 13.0 feet; Bottom of Box @ 21.5 feet

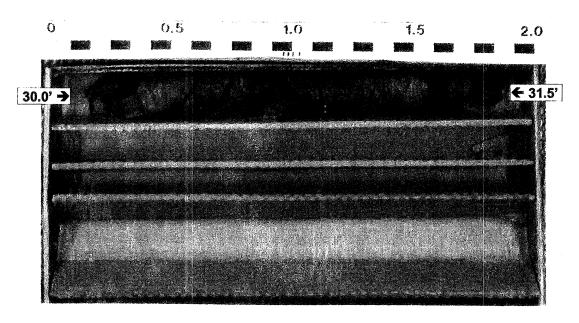


Box 2 of 3
Top of Box @ 21.5 feet; Bottom of Box @ 30.0 feet



SHEET 17 OF 50

Project No: 33620.1.1	TIP No: B-4280	County: Stokes	Boring No.: B1-B						
Site Description: Replacer	Driller: J. Little								
Collar Elev.: 651.3 ft.	Collar Elev.: 651.3 ft. Core Size: NQ-2 Equipment: BK-51								
Elev. at T.D.: 619.8 ft.	Total Depth: 31.5 ft.	Total Run: 18.5 ft.	Date: 7/25/05						



Box 3 of 3
Top of Box @ 30.0 feet; Bottom of Box @ 31.5 feet





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	CT NO.		20.1.1	05.44.0	\\	ID. B-4280	ODEEN O			STOR	\E3			GEULUGI	31 D		D WATER	(£1
	ESCRIP		BRID			TOWN FORK		N NC 8			41T		ALICAIA	ACNIT !	·	0 HR.	N/A	. (11
	G NO.	B2-A					19+48			ET 17			ALIGN	MENT -L-		-		
OLLA	R ELEV	. 646.	.5 ft	NORT	HING	918,689.1			EAST		1,639,			ORE BARREL		24 HR.	N/M	
OTAL	DEPTH	27.0	ft	DRILL	MAC	HINE BK-51		DRILL		עט				ONE BANNEL	HAMI	MER TYPE	MANUAL	
ATE S	STARTE	D 7/2	20/05			COMPLETED	7/20/05		SURF	ACE W	ATER	DEP.	TH N/A					
LEV.	DEPTH	BLO	OW CO	JNT			PER FOO			SAMP.		L O		SOIL AN	D ROCI	(DESCRIPTI	ON	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	Ŷ.	20 40	60	80	100	NO.	МОІ							
	4.																	
						0001111	D 011DEA											
46.5	-					GROUN I	D SURFA	<u> </u>				000	646.5			IVIUM:		
+ 13.1	- - 3.4										1 1	000				M DENSE GR DARSE SAND		
13.1	3.4	60/0.0		<u> </u>					0/0.0						(A	-1-b) ME GRAVEL,		Γ
	_				: :							〓	_ [TRACE BO	ULDEF	S FROM 2.5'		ĺ
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1	_				: :				· · ·			=	637.1			Y INDURATE KLY BEDDEI		Γ
4					: :					RS-3		哥	-	GRA`	Y-WHIT	E SANDSTON RATELY CLO	٧E	
1	-											哥	632.2	FF	RACTUF	RE SPACING		
‡	-												7	EXT	REMEL'	ALLINE ROC Y INDURATE	D .	Ī
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	_	·			·	PODING	TEDMINIAT						-	VEF	RY THIC	Y INDURATE KLY BEDDEI	כ	Γ
1	_					AT ELEVAT		FEET					<u> </u>			O GRAY MUD TO VERY CLO		
4	_				E	IN NON-CRY TREMELY INDI			IITE				_			RE SPACING ALLINE ROC	K:	1
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7	-											F	- I	1) ADVANCEI	O NW C	RE SPACING ASING TO 3.	4 FEET	ĺ
1	_												-	WITH ROT ADVANCEI	ARY W	ASH.		
	_													3.4 TO 27 F	EET.			
1	-												-	3) CREEK WA FLUID.				
												-	- '	4) APPROXIN DENSITY 6			D	
4													_ • •	5) NO LOSS (OBSERVE		LING FLUID	•	
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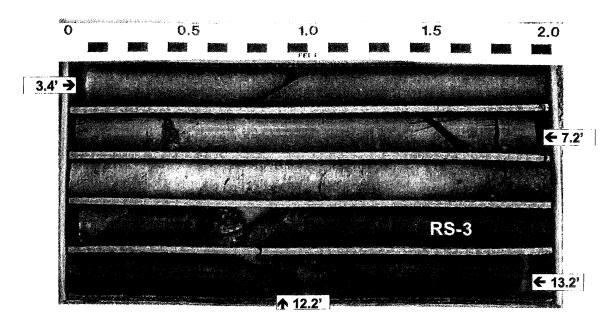
SHEET 18 OF 50 N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

	ENGI ENVIR	NEERIN	NG + TEST NTAL SERV	ING ICES						SHEET 1 OF 1
PROJE	CT NO.	336	20.1.1			ID . B-42	280			COUNTY STOKES GEOLOGIST D. BENTS
SITE D	ESCRIP	TION	BRIDG	E 14 O	VER	TOWN FC	RK CF	REEK	ON N	NC 8 GROUND WATER (ft)
BORIN	G NO.	B2-A		BOI	RING	LOCATIO	N 19	+48		OFFSET 17 ft LT ALIGNMENT -L- 0 HR. N/A
COLLA	R ELEV	. 646	3.5 ft	NORTH	IING	918,689).1			EASTING 1,639,593.5 24 HR . N/M
TOTAL	DEPTH	27.0) ft	DRILL	MACI	HINE B	(-51		DF	ORILL METHOD NW ROTARY WASH/NQ-2 CORE BARREL HAMMER TYPE MANUAL
DATE S	STARTE	D 7/	/20/05			COMPLE	TED	7/20/0	5	SURFACE WATER DEPTH N/A
CORE	SIZE N	IQ-2				TOTAL R		3.6 ft		DRILLER J. LITTLE
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	JN RQD (ft) %	SAMP. NO.	STR REC. (ft) %	ATA RQD (ft) %	L O G	
* .										643.1 Begin Coring @ 3.4 ft 3.4
643.1	3.4	3.8	1:30 1:40	(3.8) 100%	(3.8) 100%	,	(6.0) 100%	(5.8) 97%		NON-CRYSTALLINE ROCK:
639.3	7.2		1:40 1:10/0.8						鬪	TRIASSIC) EXTREMELY INDURATED VERY THICKLY BEDDED
		5.0	1:40	(4.8) 96%	(3.6) 72%				目	GRAY-WHITE SANDSTONE 637.1 WITH MODERATELY CLOSE FRACTURE SPACING 9.4
			2:00 1:30			RS-3	(16.3) 98%	(7.4) 45%	圁	1 JOINT @ 10°, 1 JOINT @ 30°, AND 3 JOINTS @ 60°
634.3	12.2	5.0	1:50 2:20	(5.0)	(2.1)		0070	1.570		NON-CRYSTALLINE ROCK: EXTREMELY INDURATED
			1:50 1:30	100%	42%					632.2 VERY THICKLY BEDDED 14.3
629.3	17.2		2:00 1:50							WITH CLOSE FRACTURE SPACING 4 JOINTS @ 10°, 8 JOINTS @ 60°, AND 2 JOINTS @ 80°
		5.0	1:30 2:00	/ (4.9) 98%	(1.7) 34%					NON-CRYSTALLINE ROCK:
			2:20	3070	O+70					EXTREMELY INDURATED VERY THICKLY BEDDED - 20-4
624.3	22.2	4.8	2:20 2:10	(4.8)	(2.8)	_			国	RED-BROWN MUDSTONE WITH VERY CLOSE TO CLOSE FRACTURE SPACING
		4.0	3:30 3:20	100%	58%				国	INDETERMINEABLE JOINTS NON-CRYSTALLINE ROCK:
619.5	27.0		5:00 5:30				(1.0)	(0.8)		EXTREMELY INDURATED 20.0
			3:00 2:10/0.8				100%/			VERY THICKLY BEDDED RED-BROWN AND GRAY MUDSTONE
				1						WITH CLOSE TO VERY CLOSE FRACTURE SPACING 5 JOINTS @ 10°, 6 JOINTS @ 45°, AND 4 JOINTS @ 60°
										NON-CRYSTALLINE ROCK: EXTREMELY INDURATED THINLY BEDDED
	'e									GRAY-WHITE SANDSTONE
							,			WITH CLOSE TO VERY CLOSE FRACTURE SPACING 3 JOINTS @ 30° AND 1 JOINT @ 60°
		,								BORING TERMINATED AT ELEVATION 619.5 FEET
										IN NON-CRYSTALLINE ROCK: EXTREMELY INDURATED GRAY-WHITE
									.	SANDSTONE
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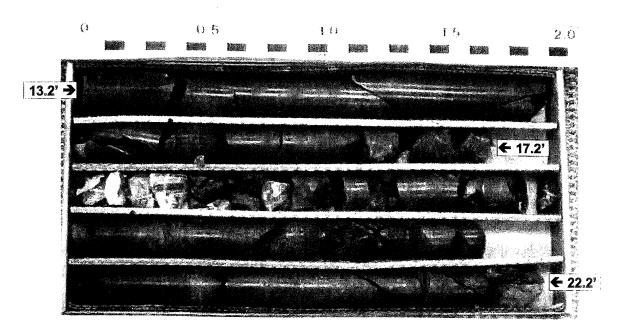
CORE PHOTOS

Project No: 33620.1.1	TIP No: B-4280	County: Stokes	Boring No.: B2-A
Site Description: Replacer	Driller: J. Little		
Collar Elev.: 646.5 ft.	Core Size: NQ-2	Equipment: BK-51	Geologist: D. Bents
Elev. at T.D.: 619.5 ft.	Total Depth: 27.0 ft.	Total Run: 23.6 ft.	Date: 7/20/05



Box 1 of 3

Top of Box @ 3.4 feet; Bottom of Box @ 13.2 feet

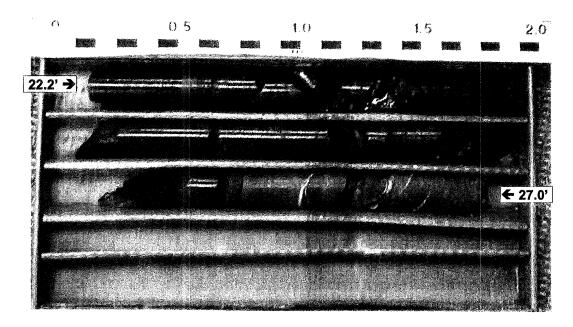


Box 2 of 3
Top of Box @ 13.2 feet; Bottom of Box @ 22.2 feet



SHEET 19 OF 50

Project No: 33620.1.1	TIP No: B-4280	County: Stokes	Boring No.: B2-A						
Site Description: Replacen	Driller: J. Little								
Collar Elev.: 646.5 ft.	Collar Elev.: 646.5 ft. Core Size: NQ-2 Equipment: BK-51								
Elev. at T.D.: 619.5 ft.	Total Depth: 27.0 ft.	Total Run: 23.6 ft.	Date: 7/20/05						



Box 3 of 3
Top of Box @ 22.2 feet; Bottom of Box @ 27.0 feet





ROJE	CT NO.	INEERIN RONMEN 3362		11013		ID. B-428	30	С	OUNTY	STO		78489	GEOLÓGIST K	SHEET 1 C	'1 I
	ESCRIP			GE 14 C	VEF	R TOWN FOR	·							GROUND W	ATER (ft
	G NO.	B2-B				G LOCATION			T .	ET 12	ft RT		ALIGNMENT -L-	0 HR.	N/A
	R ELEV		7 ft	NORT					EASTI		1,639	624		24 HR.	N/A
				 				DOUL	METH	N	W CASI		VANOEDAIO O CODE	J	NUAL
	DEPTH			DRILL	. IVIA	CHINE BK-			·		ARREL			MEKTIFE WA	NUAL
	TARTE		21/05			COMPLET			SURF	ACE W	AIER	DEP	TH 0.4 ft		
EV.			OW COL	T	0		WS PER FO 40 60	80	100	SAMP. NO.	\	0	SOIL AND ROC	C DESCRIPTION	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	ļ <u>i</u>	Ĭ	<u> </u>			NO.	MOI	G			
14.1	******					CF	REEK LEVE	EL			∇		642.7		
3.7	_					ÇR	EK BÖTT	<u>ом</u>				• • •		JVIUM:	
1					: :								$=\frac{641.2}{640.2}$ \(\frac{1}{2}\)	N FINE SAND A-3)	
1	-											囯	NON-CRYST	ALLINE ROCK: ASSIC)	
1	.											冒	RED-BROW	N SANDSTONE ALLINE ROCK:]
+	- -				: :							〓	EXTREMEMI	Y INDURATED	
7	-				: :			 				目		BEDDED SANDSTONE	
‡	-				: :								WITH CLOSE	TO VERY CLOSE RE SPACING	
1	-											目	NON-CRYST	ALLINE ROCK:	
1	- ·				: :							量		Y INDURATED BEDDED	
-	-				: :			 					RED-BROWN TO	GRAY MUDSTON	E
4	-				: :							픨	— FRACTURE	E SPACING	
. ‡	- -				: :			<i>.</i> .				〓		ALLINE ROCK: Y INDURATED	
				 									VERY THIC	KLY BEDDED ITE SANDSTONE	Γ
+	-						IG TERMIN ATION 622						─ WITH MODERATE	Y CLOSE TO CLO	
Ŧ	-					IN NON-C	RYSTALLIN	E ROCK:	,				1) ADVANCED NW- (RE SPACING CASING ADVANCE	RTO
1	-					EXTREMEMLY WHIT	INDURATE E SANDST		AND				2.5 FEET. 2) ADVANCED NQ-2	CORE BARREL FE	ROM
+	-												2.5 TO 21.7 FEET.	•	
1	-												_ 3) CREEK WATER U		
1	- .												L 4) APPROXIMATE DF DENSITY 62.4 PCF		
+	-												 5) NO LOSS OF DRIL OBSERVED. 	LING FLUID	
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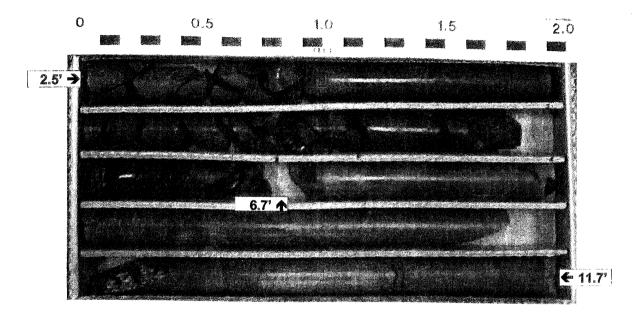
SHEET 20 OF 50 N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

	ENVIRONMENTAL SERVICES										OF TRANS							SHEET 1 OF 1				
PROJE	CT NO.	336	20.1.1			ID. B-42	280			COL	UNTY	STO	KES		GEOLOG	SIST K.	LEWALLEN					
SITE D	ESCRIP	TION	BRIDG	E 14 O	VER	TOWN FC	RK C	REEK	ON N	NC 8							GROUND	WATER (ft)				
BORIN	G NO.	B2-B		ВО	RING	LOCATIO	N 19	9+33		(OFFS	ET 12	ft RT	ALIGNM	ENT -L-		0 HR.	N/A				
COLLA	R ELEV	. 643	3.7 ft	NORTI	ING	918,679	9.9			E	EAST		1,639,624.		,		24 HR.	N/A				
TOTAL	DEPTH	21.	7 ft	DRILL	MACH	IINE B	<-51		DR	RILL N	METH	IOD B	IW CASING AD ARREL	/ANCER/NQ-	2 CORE	HAMN	ER TYPE	MANUAL				
DATE S	STARTE	D 7.	/21/05			COMPLE	TED	7/21/0	5	5	SURF	ACE W	ATER DEP	ΓH 0.4 1	ft							
CORE	SIZE N	IQ-2				TOTAL R				Ι	DRILL	LER J.	LITTLE									
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	RQD (ft) %	SAMP. NO.	REC. (ft)	RQD (ft) %	LOG				[DESCRIPTI	ON AND RI	EMARKS						
														Bogin (Coring @ 1	2.5. 4						
641.2	2.5	4.2	1:50	(4.0)	(1.3)	<u> </u>	(0.9)	(0.0)		641.2 640.2					Coring @ 2							
			6:10 5:10	95%	31%		\ <u>90%</u> / (3.9)	(0.9)		-					YSTALLINE (TRIASSIC)							
637.0	6.7	5.0	5:00 1:00/0.2	(5.0)	(4.3)	1	98%	23%		636.2	2		EXTRE		DURATED OWN SAND		EDDED	7.				
			3:00 2:40	100%	86%		(14.2) 100%	(13.7) 96%							RY CLOSE F 30° AND 3 J		E SPACING					
632.0	11.7		2:10 2:40					•.	昌	-		****************		NON-CR	YSTALLINE	ROCK:						
		5.0	2:20	(5.0)	(5.0) 100%					-			RE	D-BROWN	DURATED I TO GRAY	MUDSTO	NE					
			2:30						哥	•				JOINTS @	45° AND 1	JOINT @	E SPACING 80°					
627.0	16.7	5.0	3:00 2:30	(5.0)	(4.5)	1			目	-			EXTREME		YSTALLINE ATED VER		Y BEDDED					
	·		2:30 2:40	100%						_		1/4/	. (GRAY AND	WHITE SA	NDSTON						
622.0	21.7	*	2:40 2:30							- - 622.0		. **1			15° AND 3 J			21.				
			3:00 2:30	1					-	-			-		IG TERMIN ATION 622							
										-				IN NON-C	RYSTALLIN	IE ROCK:						
						,				• •		E	KTREMEMLY	INDURATE	ED GRAY A	ND WHIT	E SANDSTON	E				
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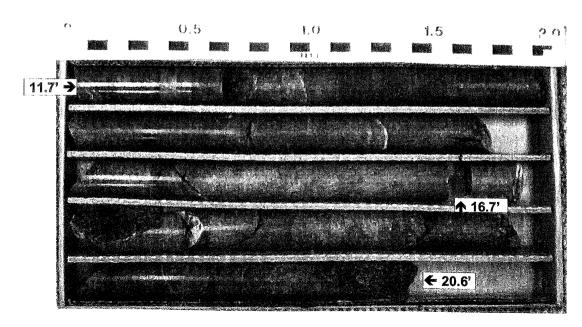


CORE PHOTOS

Project No: 33620.1.1	TIP No: B-4280	County: Stokes	Boring No.: B2-B							
Site Description: Replace	Site Description: Replacement of Bridge No. 14 over Town Fork Creek on NC 8									
Collar Elev.: 643.7 ft.	ollar Elev.: 643.7 ft. Core Size: NQ-2 Equipment: BK-51									
Elev. at T.D.: 622.0 ft.	Total Depth: 21.7 ft.	Total Run: 19.2 ft.	Date: 7/21/05							



Box 1 of 3
Top of Box @ 2.5 feet; Bottom of Box @ 11.7 feet

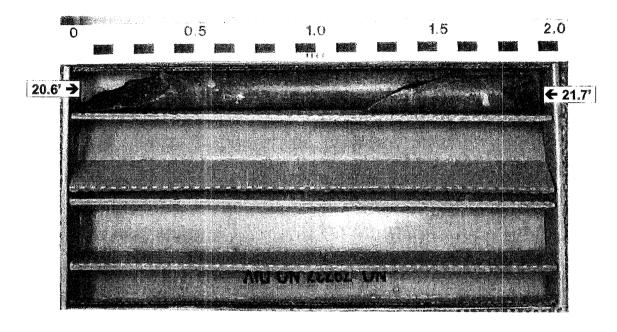


Box 2 of 3
Top of Box @ 11.7 feet; Bottom of Box @ 20.6 feet



SHEET 21 OF 50

Project No: 33620.1.1	TIP No: B-4280	County: Stokes	Boring No.: B2-B
Site Description: Replace	ment of Bridge No. 14 over To	own Fork Creek on NC 8	Driller: J. Little
Collar Elev.: 643.7 ft.	Core Size: NQ-2	Equipment: BK-51	Geologist: K. Lewallen
Elev. at T.D.: 622.0 ft.	Total Depth: 21.7 ft.	Total Run: 19.2 ft.	Date: 7/21/05



Box 3 of 3
Top of Box @ 20.6 feet; Bottom of Box @ 21.7 feet





	OT 1:0		IG • TES	····		ın	D 400		T			<i>/</i> = <i>c</i>			10000			1 OF 1
	CT NO.		20.1.1			L	B-4280				STO	KES			GEOLOG	SIST D		
	ESCRIP							CREEK (JN NC 8					T			1	ID WATER (1
	G NO.	EB2-A						20+19			ET 8 ft			ALIGNI	MENT -L-	····	0 HR.	16.9
OLLA	R ELEV	. 658	.7 ft	NORT	HING	918	,760.5		·	·							13.5 on 7/21	
DTAL	DEPTH	22.5	ft	DRILL	MAC	HINE	Died	rich D-50	DRILL	METH	OD 23	¼" H.S.A	١.			HAMN	MER TYPE	MANUAL
ATE S	TARTE	D 7/	20/05			COM	PLETE	D 7/20/05	5	SURF	ACE W	ATER	DEP	TH N/A				
EV.	DEPTH	BL	ow col	TNL				S PER FOO			SAMP.	\mathbf{V}			SOIL A	ND ROCK	DESCRIPTI	ON
(ft)	(ft)	0.5ft	0.5ft	0.5ft	9	20	40	60	80	100	NO.	MO						
l																		
						,	2001	ID OUDEA	.05									
58.7 58.7.	0.0	2	3	5				ND SURFA				M	****	658.7			IVIUM:	
55.2	- - 3.5				: :									-	L		HT BROWN NE SAND	
5.2	<u> </u>	4	4	4								М		654.7	. \^/\	(A-	-2-4)	
Ŧ	-				::									- \			RGÁNIC MAT ROWN FINE	
0.2	- 8.5				: :		 							- - 649.9		(A	\- 3)	
7	_	1	2	2	لم 4∳:						SS-4	w		- 649.9			AY-BROWN	,
‡	<u>-</u>										ST-2	20.8%		- - 646.7	COAF		NE SANDY S (~4)	SILT
5.2	13.5			,								V	000	- 644.7		<u>WITH LÌT</u>	TLE CLAY DENSE TAN	
Ŧ	-	18	72	28/0.2					10	0/0.7		D	2	- 7		FINE TO	COARSE SA	ND [
Ŧ	-					 			!	0,0.7		∇			······		1-b) RED ROCK:	
0.2	18.5	60/0.2				 				:: 1		D.	2	- -			NDSTONE)	
‡	•	00/0.2								0/0.2		. D.		•	(Sivii on	NDO FORE)	
6.2	22.5								<u></u>				2	636.2				
+	-	60/0.0				BOE	NG TE	RMINATED		0/0.0		D			I) ADVANCE 2) SHELBY T	D 2-1/4" I UBE TAK	HSA TO 22.5 EN FROM 10	FEET.).0' TO
Ŧ	-	•			STA	NDARD	PENE	TRATION T	EST REF	USAL				•	12.0'.			
#	-							TION 636.2 YSTALLINE										
+	-					EXTR		RIASSIC) INDURATE	D GRAY					-			•	
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SHEET 22 OF 50 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG



		INEERIN IRONMEI		RVICES	······································							W.	TRAN	SHEET 1 OF 1
	CT NO		20.1.1				-4280			DUNTY	STO	KES		GEOLOGIST K. LEWALLEN
	ESCRI	PTION	BRID	GE 14 (OVER	TOWN	FORK	CREEK O	N NC	3				GROUND WATER
	G NO.	EB2-E		BC	ORING	LOCAT	ION	20+10		OFFS	ET 17	ft RT		ALIGNMENT -L- 0 HR. 14.1
LLA	R ELE	/. 655	.0 ft	NORT	THING	918,7	756.2	- K		EAST	ING	1,639	9,614	
TAL	DEPTH	1 21.5	ft	DRILL	L MACI	HINE	BK-51		DRILL	METH	OD 2	11/4" HSA	/NQ-2	CORE BARREL HAMMER TYPE MANUAL
TE S	TARTE	D 7/	20/05		I	COMP	LETED	7/20/05		SURF	ACE W	ATER	DEF	
EV.	DEPTH	BL	ow co	UNT	T	I	BLOWS	PER FOOT	<u>'</u> Г		SAMP	. 🗸	1	
ft)	(ft)	0.5ft	0.5ft	0.5ft	7 o	20	40	60	80	100	NO.	МО	0 G	SOIL AND ROCK DESCRIPTION
												T WIC	10	
														,
5.0 5.0	0.0	2	1	2	.0.3.	Gl	ROUNE) SURFAC	CE			M		655.0 ALLUVIUM:
1.5	- - 3.5				1.43:							"		VERY LOOSE TO LOOSE TAN
1.5 +	- 3.5	3	2	3	1						SS-5	М		SILTY FINE SAND (A-2-4)
7	-				: "							1	***	649.5 VERY LOOSE TAN FINE SAND
3.5	- 8.5				: : :		 							(A-3)
Ī	-	1	2	1	. . . 3 :							w		F
Ŧ	•				: Ľ								<u>::</u>	644.0
<u> -</u>	13.5 14.1				: : :		· · · ·		· · ·	:: 1		_		WEATHERED ROCK: (TRIASSIC)
9]	<u> 14.1</u>	60/0.17	***************************************] : : :					0/0.18		B		640.8 (GRAY SANDSTONE)
+		60/0.1		.					60)/0.1 ·		D	目	638.9 (TRIASSIC)
Ŧ				ŀ	: : :		· · · ·	: : : : :	• • •	: : :	,		冒	637.1 INDURATED THINLÝ BEDDED 636.4 GRAY SANDSTONE
#	-				: : :		 			: : :			冒	WITH CLOSE FRACTURE SPACING
\pm				 	<u> </u>		<u></u>	· · · · ·				<u> </u>		NON-CRYSTALLINE ROCK: - 633.5 INDURATED THINLY BEDDED
Ŧ	•					BO	RING T	ERMINATE	:n	.				RED-BROWN MUDSTONE WITH VERY CLOSE FRACTURE SPACING
‡	•					AT E	LEVATION	ON 633.5 F	EET	İ			1	NON-CRYSTALLINE ROCK:
<u> </u>					IND	IN NON URATE	N- CRYS D RED-I	STALLINE F BROWN MI	ROCK: UDSTOI	VF				INDURATED THICKLY BEDDED RED-BROWN MUDSTONE
+										-				WITH VERY CLOSE TO CLOSE
Ŧ	•.													FRACTURE SPACING NON-CRYSTALLINE ROCK:
‡														- INDURATED THINLY BEDDED RED-BROWN MUDSTONE
+				.										WITH VERY CLOSE FRACTURE SPACING
Ŧ														NON-CRYSTALLINE ROCK: INDURATED THICKLY BEDDED
‡													-	RED-BROWN MUDSTONE
±					_								F	WITH VERY CLOSE TO CLOSE FRACTURE SPACING
Ŧ														1) ADVANCED 2-1/4" HSA TO 14.1 FEET. 2) SET NW CASING TO 14.2 FEET.
‡										1				3) ADVANCED NQ-2 CORE BARREL FROM
‡														14.2 TO 21.5 FEET. 4) CREEK WATER USED AS DRILLING
\pm														FLUID.
Ŧ				- 1						1				5) APPROXIMATE DRILLING FLUID DENSITY 62.4 PCF.
‡														- 6) NO LOSS OF DRILLING FLUID - OBSERVED.
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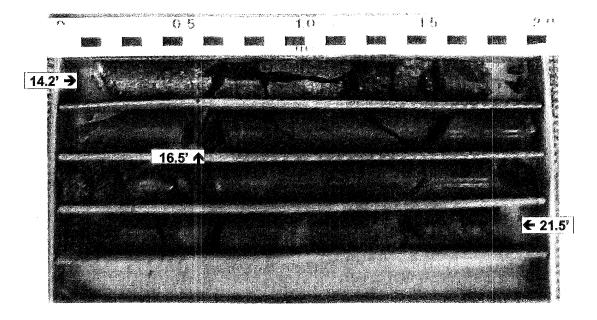
N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

*	ENG!	NEERIN ONME	NG . TEST NTAL SERV	ING ICES								OF THAN			SHEET 1	OF 1
PROJE	CT NO.	336	20.1.1	22.700000000000000000000000000000000000		ID. B-42	280			CC	DUNTY STO	KES	GEO	OLOGIST	K. LEWALLEN	
SITE D	ESCRIP	TION	BRIDG	E 14 O	VER	TOWN FC	ORK CI	REEK	ON	NC 8	3				GROUN	D WATER (ft)
BORIN	G NO.	EB2-	3	BO	RING	LOCATIO	N 20	+10			OFFSET 17	ft RT	ALIGNMENT	-L-	0 HR.	14.1
COLLA	R ELEV	. 655	5.0 ft	NORTH	HING	918,756	3.2				EASTING	1,639,614			24 HR.	13.6 on 7/21/0
TOTAL	. DEPTH	21.5	5 ft	DRILL	MAC	HINE BI	<-51		D	RILL	METHOD 2	1/4" HSA/NQ-2	CORE BARREL	HA	MMER TYPE	MANUAL
DATE	STARTE	D 7	/20/05			COMPLE	TED	7/20/0	5		SURFACE W		PTH N/A			
CORE	SIZE N	IQ-2	7	1 5	JŅ	TOTAL R			cymomora		DRILLER J	LITTLE	The second secon			an parameter and a state of the design of the state of th
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft)	SAMP. NO.	REC. (ff)	ATA RQD (ff) %	L O G		Colonia de la colonia de la colonia de la colonia de la colonia de la colonia de la colonia de la colonia de l	and the second second	DESCRIPTION A	ND REMARI	<s< td=""><td></td></s<>	
640.8	14.2	2.3	2:00 3:00	(1.9) 83%	(0.8) 35%		(1.0)	(0.4)		640			Begin Coring		Commence of the commence of th	1
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33.5	21.5		1:50 2:00							- 630	3.5		WITH CLOSE FRA 2 JOINTS @ 45° A			2
			1:40	1						-			NON-CRYSTA INDURATED TH	LLINE ROC	K:	
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SHEET 23 OF 50

Project No: 33620.1.1	TIP No: B-4280	County: Stokes	Boring No.: EB2-B
Site Description: Replacen	nent of Bridge No. 14 over To	own Fork Creek on NC 8	Driller: J. Little
Collar Elev.: 655.0 ft.	Core Size: NQ-2	Equipment: BK-51	Geologist: K. Lewallen
Elev. at T.D.: 633.5 ft.	Total Depth: 21.5 ft.	Total Run: 7.3 ft.	Date: 7/20/05



Box 1 of 1
Top of Box @ 14.2 feet; Bottom of Box @ 21.5 feet

LABORATORY SUMMARY SHEET

PROJECT NO.: 33620.1.1

TIP NO.: B-4280 **COUNTY: STOKES**

BRIDGE 14 OVER TOWN FORK CREEK ON NC 8



	SOIL TEST RESULTS																
BORING	SAMPLE				DEPTH	AASHTO		T. 5.		% BY W	/EIGHT		% PAS	SING SIE	EVES	%	%
NO.	NO.	STATION	OFFSET	LINE	INTERVAL (FT)		L.L.	P.L.	C. SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
EB1-A	SS-1	18+07	12 FT LT	-L-	9.0-10.5	A-4(2)	31	10	5	54	16	25	100	99	48	-	-
EB1-AA	ST-1	18+05	9 FT LT	-L-	8.0-10.0	A-4(2)	31	10	5	56	18	22	100	100	50	35.9	-
B1-B	SS-2	18+50	17 FT RT	-L-	0.0-1.5	A-4(6)	34	10	3	37	33	27	100	99	71	-	-
B1-B	SS-3	18+50	17 FT RT	-L-	3.5-5.0	A-2-4(0)	23	NP	18	59	10	12	100	97	28	-	-
EB2-A	SS-4	20+19	8 FT LT	-L-	8.5-10.0	A-4(2)	29	8	11	46	22	21	100	95	53	-	-
EB2-A	ST-2	20+19	8 FT LT	-L-	10.0-12.0	A-4(0)	25	5	14	54	15	17	100	95	44	20.8	-
EB2-B	SS-5	20+10	17 FT RT	-L-	3.5-5.0	A-2-4(0)	28	NP	18	72	. 4	. 6	100	99	13	-	-
	S-1	19+48	25 FT LT	-L-	surface	A-1-a(0)	20	NP	20	9	1	1	30	15	2		
	S-2	19+44	40 FT LT	-L-	surface	A-3(0)	31	NP	43	41	4	2	91	73	9	-	-

	Consolidation Test Results									
Borehole	Sample	Depth (ft)	AASHTO Classification	Cc	C _v (ft²/day)	t ₉₀ (min)	γ, Initial (lbs/ft ³)	Initial Moisture, %	G _s	Initial Voids Ratio, e
EB1-AA	ST-1	8.0-10.0	(A-4)	0.261	0.772	2.495	112.60	35.9	2.656	1.0008
EB2-A	ST-2	10.0-12.0	(A-4)	0.144	1.424	1.373	117.19	20.8	2.658	0.7101

			•	Triaxial Com	pression Te	st (Consc	lidated Un	idrained)			
Borehole	Sample	Depth	AASHTO	c'	Φ'	C _T	Фт	γ, Initial	Initial	G _s	Initial Voids
	·	(ft)	Classification	(lbs/in²)	(degrees)	(lbs/in ²)	(degrees)	(lbs/ft ³)	Moisture, %		Ratio, e
EB1-AA	ST-1	8.0-10.0	(A-4)	0.62	27	0.96	12.5	113.19	36.03	2.654	0.99

	ROCK CORE UNCONFINED COMPRESSION TEST RESULTS												
									Unit	Unconfined	Young's	Splitting Tensile	
					Geologic	Run	2		Weight	Compressive	Modulus	Strength	1
Sample #	Bridge #	Boring #	Depth (ft)	Rock Type	Map Unit	RQD	Length (ft)	Diameter (ft)	(PCF)	Strength (PSI)	(PSI)	(PSI)	Remarks
RS-1	14	B1-A	16.5 - 17.1	Sandstone	Trdp	94%	4.380	1.980		16,434			
RS-2	14	B1-B	25.2 - 26.1	Sandstone	Trdp	44%	4.405	1.995		5,752			
RS-3	14	B2-A	10.5 - 11.4	Mudstone	Trdp	72%	4.346	1.992		7,435		No. 100	

NOTES: Natural Moisture Content Test Method - AASHTO T 265-93

Atterberg Limits Test Methods - AASHTO T 88-94 and T 90-94 Grain Size Test Results Test Method - AASHTO T-88-93

Consolidation Test Method - ASTM D2435-96

Triaxial Compression Test (Consolidation Undrained) Method - ASTM D4767-95

Unconfined Compression - ASTM D2938

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: <u>33620.1.1</u>	ID: B-4280 COUNTY: STOKES
DESCRIPTION(1):	REPLACEMENT OF BRIDGE NO. 14 OVER TOWN FORK CREEK ON NC 8
INFORMATION ON E	XISTING BRIDGES Information obtained from: X field inspection microfilm(Reel:Pos:) X othe Bridge Survey and
COUNTY BRIDGE NO.	Hydraulic Design Report14BRIDGE LENGTH 205.5NO. BENTS IN: CHANNEL 2FLOOD PLAIN 6
FOUNDATION TYPE:	CONCRETE OR TIMBER POSTS ON CONCRETE SPREAD FOOTINGS AT INTERIOR BENTS AND TIMBER PILES WITH REINFORCED CONCRETE CAP AT END BENTS
EVIDENCE OF SCO	DUR(2):
ABUTMENTS OR END	BENT SLOPES: NONE OBSERVED
INTERIOR BENTS:	SCOUR HOLE UPSTREAM FACE OF B4
CHANNEL BED:	NON OBSERVED
CHANNEL BANKS:	SOME SCOURING OF NORTH BANK BENEATH BRIDGE
EXISTING SCOUR	PROTECTION:
TYPE(3): RIP RAP A	T INTERIOR AND END BENTS. CONCRETE APRON COVERS END BENT SLOPES
EXTENT(4): RIP RAP GI	ENERALLY EXTENDS 5 FEET OR MORE FROM BENTS, EXCEPT AT INTERIOR BENTS IN CREEK
EFFECTIVENESS(5): _	MOSTLY EFFECTIVE. RIP RAP HAS BEEN DISPLACED FROM INTERIOR BENTS IN CREEK
OBSTRUCTIONS(6) (Da	AMS,DEBRIS,ETC.): SIGNIFICANT DEBRIS AT B2,B3 & SOME AT B4. DEBRIS ALSO
DOWNSTREAM ALONG	S NORTH BANK
DESIGN INFORMA	<u>TION</u>
CHANNEL BED MATER	RIAL(7) (SAMPLE RESULTS ATTACHED): TAN SILTY FINE SAND (A-2-4), FINE SAND (A-3),
AND GRAY TAN FINE	TO COARSE SAND (A-1-a) AND GRAVELLY SAND (A-1-b) WITH BOULDERS
CHANNEL BANK MATE	RIAL(8) (SAMPLE RESULTS ATTACHED): TAN FINE SAND (A-3) AND TAN TO BROWN
SILTY FINE SAND (A-2	-4)
CHANNEL BANK COVE	ER(9): UNDERBRUSH, SMALL TO LARGE TREES
FLOOD PLAIN WIDTH(10):+/- 450 FEET SOUTH OF BRIDGE, +/- 1000 FEET NORTH OF BRIDGE
FLOOD PLAIN COVER	(11): MOSTLY GRASS & CROP FIELDS, SOME UNDERBRUSH & SMALL TO LARGE TREES

SHEET 25 OF 50

DESIGN INFORMATION CONT. PAGE
STREAM ISXDEGRADING AGGRADING (12)
OTHER OBSERVATIONS AND COMMENTS: TOWN FORK CREEK OVERFLOW WAS NOT FLOWING
DURING EXPLORATION
CHANNEL MIGRATION TENDENCY (13): NO MIGRATION
REPORTED BY: Duane D. Bents John for DATE: 7/22/2005
GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (14):
Location 100 yr 500 yr
B1-A 642.4' 642.2'
B1-B 640.8' 639.9'
B2-A 641.9' 641.6'
B2-B 640.9' 640.5'
REPORTED BY: DATE: 9/2/05 NCDOT GEOTECHNICAL UNIT INSTRUCTIONS GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED. NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION. DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC. TO DESCRIBE THE CHANNEL BED MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC. GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE). DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE LATERALLY DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
(APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. THE GEOTECHNICALLY ADJUSTED SCOUR ELEVEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY: CORE RECOVERY PERCENTAGE:

PERCENTAGE RQD; DIFFERENTIAL WEATHERING, SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

Particle Size Analysis of Soils

Test Date(s):

8/11/2005

08/08 - 08/11/2005

AASHTO T 88 as Modified by NCDOT

1352-05-506 S&ME Project #:

Bridge 14 over Town Fork Creek on NC 8

Report Date:

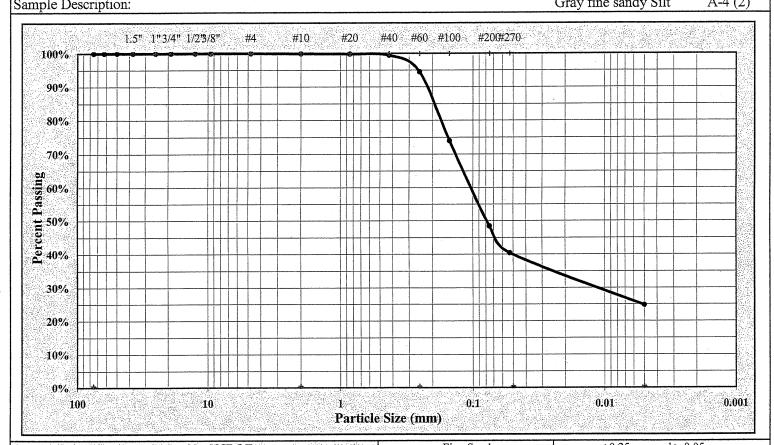
NCDOT Client Name:

Client Address:

Project Name:

TIP NO: B-4280 F.A. Project No: BRSTP-9(2) State Project #: 33620.1.1

Commis Dage	wintion:		Gray fine sandy Silt $A-4(2)$
Location:	18+07	Offset: 12' LT	Depth: 9' - 10.5'
Boring #:	EB1-A	Sample #: SS-1	Sample Date: Unknown



As Defin	ed by NCDO1			Fin	e Sand	< 0.25 mm and > 0.03	mm
Gravel	< 75 n	nm and > 2.00	mm	Ç	Silt	< 0.05 and > 0.005	mm ·
.Coarse Sand	< 2.00	mm and > 0.25	mm	(Clay	< 0.005 mm	
Maximum Pa	rticle Size	#4	С	oarse Sand	5.4%	Silt	16.0%
	Gravel	0.1%		Fine Sand	54.1%	Clay	25.0%
Apparent Relativ	e Density		Moistu	ire Content	•	% Passing #200	48.4%
Lic	uid Limit	31	P1	lastic Limit	21	Plastic Index	10

	Soil 1	Mortar (-#10	Sieve)			
Coarse Sand 5.4%	Fine Sand 54.	2%	Silt	15.7%	Clay	24.7%
Description of Sand & Gravel Partic	les: Rounded 🗆	Angular 🗆	Hard & Durable	□ Soft □	Weathered	& Friable
Mechanical Stirring Apparatus (A)	Length of Dispersion Period:	1 min.	Dispersing Agent:	Sodium Hexametar	phosphate:	40 g./ Liter

References: AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes ASTM D 854: Specific Gravity of Soils

Technical Responsibility:

Mal Karajan

Laboratory Supervisor

Laboratory Report Version 4.2

Particle Size Analysis of Soils

SHEET 26 OF 50

AASHTO T 88 as Modified by NCDOT

S&ME Project #: 1352-05-506 Report Date: 8/11/2005 Project Name: Bridge 14 over Town Fork Creek on NC 8 Test Date(s): 08/08 - 08/11/2005

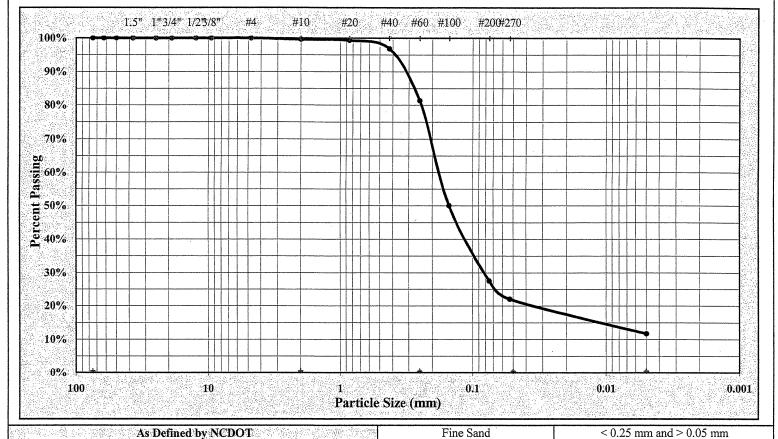
Client Name: **NCDOT**

Client Address:

State Project #: 33620.1.1 F.A. Project No: BRSTP-9(2) TIP NO: B-4280

B1-B Sample #: SS-3 Sample Date: Unknown Boring #: 18+50 Location: Offset: 17' RT Depth: 3.5' - 5'

Sample Description: Brown Silty Fine Sand A-2-4(0)



Gravel	< 75 r	nm and > 2.00	0 mm		Silt		< 0.05 and > 0.005	mm
Coarse Sand	< 2.00	mm and > 0.2	25 mm	,	Clay		< 0.005 mm	
Maximum I	Particle Size	#4	Coa	arse Sand	18.3%		Silt	10.0%
	Gravel	0.4%	F	ine Sand	59.3%		Clay	12.0%
Apparent Rela	tive Density		Moisture	e Content		%	Passing #200	27.5%
ī	iauid Limit	23	Plas	stic Limit	0		Plastic Index	N.P.

Soil Mortar (-#10 Sieve)

Coarse Sand 18.4%	Fine Sand 59.:	5%	Silt	10.4%	Clay	11.7%	
Description of Sand & Gravel Parti	icles: Rounded 🗆	Angular 🗆	Hard & Durable	□ Soft □	Weathered	& Friable	
Mechanical Stirring Apparatus (A)	Length of Dispersion Period:	1 min.	Dispersing Agent:	Sodium Hexametap	hosphate:	40 g./ Liter	
TO C A A CITATION CHOOL TO A 1 1 CT	1 1 CC 1 1 14 11C 11	. d. NODOT					

References: AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T265: Laboratory Determination of Moisture Content of Soils AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO T89: Determining the Liquid Limit of Soils

ASTM D 854: Specific Gravity of Soils AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Signature

Technical Responsibility:

S&ME. INC.

Mal Karajan

Laboratory Supervisor

Signature

3109 Spring Forest Road, Raleigh, N.C. 27616

Particle Size Analysis of Soils



AASHTO T 88 as Modified by NCDOT

Report Date:

8/11/2005

Test Date(s):

08/08 - 08/11/2005

NCDOT Client Name:

Client Address:

Project Name:

S&ME Project #:

33620.1.1 State Project #:

1352-05-506

Bridge 14 Over Town Fork Creek on NC 8

F.A. Project No: BRSTP-8(2)

TIP NO: B-4280 Sample Date: Unknown

Sample #: S-2 Grab Boring #: Depth: N/A Offset: 40' LT 19+44 Location:

Tan Fine SAND A-3(0)Sample Description:

100% 🎞										111		
90%												
80%			1									
70%					\							
60%					\setminus							
60%												
40%					+							
30%												
20%												
10%												
0% □				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		11 024 12 12 12	Ш	eruen makebi	/33. Au	12 Sec. 2 54	Mari Programiče	ija estjejnja

As Defin	ed by NCDOI	第 字第25章第6四次第一		Fin	ne Sand	<	0.25 mm and > 0.05	mm	
Gravel		nm and > 2.00			Silt	•	< 0.05 and > 0.005 r	nm	
Coarse Sand	< 2.00	mm and > 0.2	5 mm		Clay		< 0.005 mm		
Maximum Par	ticle Size	1"	C	Coarse Sand	43.2%		Silt	4.0%	
	Gravel	9.5%		Fine Sand	41.2%		Clay	2.0%	

8.6% % Passing #200 Moisture Content Apparent Relative Density N.P. 0 Plastic Index Plastic Limit 31 Liquid Limit

Coarse Sand 47.7%	Fine Sand 45.6	5%	Silt	4.7%	Clay	2.0%
Description of Sand & Gravel Par	ticles: Rounded 🗆	Angular 🗆	Hard & Durable	□ Soft □	Weathered &	k Friable 🛚
Mechanical Stirring Apparatus (A)	Length of Dispersion Period:	1 min.	Dispersing Agent:	Sodium Hexametaph	osphate: 4	0 g./ Liter

References: AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO T89: Determining the Liquid Limit of Soils AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Technical Responsibility:

S&ME. INC.

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

Mal Karajan

Laboratory Supervisor Signature

ASTM D 854: Specific Gravity of Soils

Laboratory Report Version 4.2

SHEET 27 OF 50

Particle Size Analysis of Soils

AASHTO T 88 as Modified by NCDOT

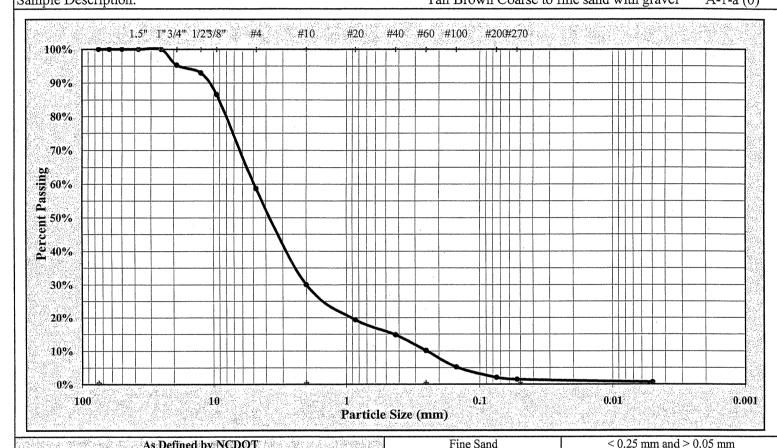
1352-05-506 S&ME Project #: Report Date: 8/11/2005 Project Name: Bridge 14 over Town Fork Creek on NC 8 Test Date(s): 08/08 - 08/11/2005

Client Name: **NCDOT**

Client Address:

TIP NO: B-4280 State Project #: 33620.1.1 F.A. Project No: BRSTP-9(8)

Grab Sample #: S-1 Sample Date: Boring #: 19+48 Offset: 25' LT Location: Depth: Surface Tan Brown Coarse to fine sand with gravel Sample Description: A-1-a(0)



the control of the investment made or many and specifical	cu by incoor	Read of the control of the control of		* **	ne bana	0.20 111	11 4114 0.00	*****
Gravel	< 75 r	nm and > 2.00) mm		Silt	< 0.05 a	1 nd > 0.005 r	nm
Coarse Sand	< 2.00	mm and > 0.2	25 mm		Clay	<	0.005 mm	
Maximum Par	rticle Size	1"	C	oarse Sand	19.9%		Silt	1.0%
	Gravel	70.0%		Fine Sand	8.6%		Clay	1.0%
Apparent Relativ	e Density		Moistu	ire Content		% Passin	g #200	2.1%
Liq	uid Limit	20	P	lastic Limit	0	Plasti	ic Index	N.P.

Soil Mortar (-#10 Sieve) Silt 2.8% 2.3% Coarse Sand 66.3% Fine Sand 28.6% Clay Rounded Angular □ Hard & Durable □ Soft □ Weathered & Friable □ Description of Sand & Gravel Particles: Length of Dispersion Period: Mechanical Stirring Apparatus (A) Dispersing Agent: Sodium Hexametaphosphate:

References: AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO T89: Determining the Liquid Limit of Soils

S&ME. INC.

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Mal Karajan Technical Responsibility:

Laboratory Supervisor Signature

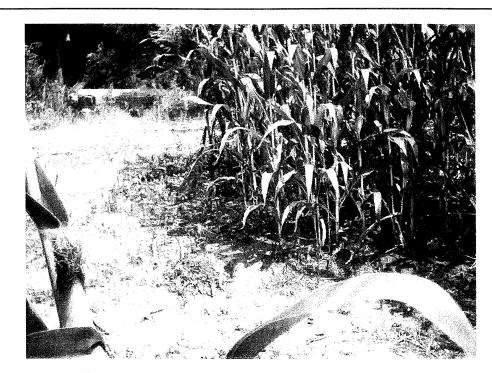
ASTM D 854: Specific Gravity of Soils

3109 Spring Forest Road, Raleigh, N.C. 27616 Classification B2-A Grab 1.xls

Signature



Photograph No. 1:
This photograph was taken from the right side of the existing bridge, looking north.



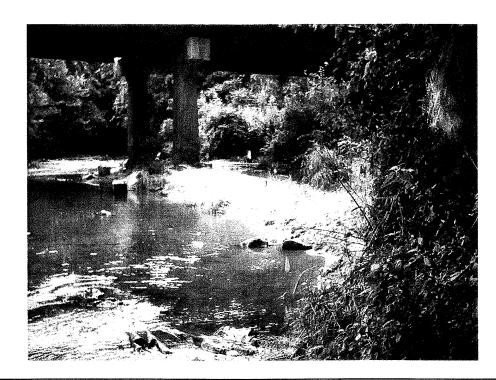
Photograph No. 2:
This photograph was taken at proposed End Bent No. 1, looking north, upstation, along the -L- alignment.



Photograph No. 3: This photograph was taken from the right side of the -L- alignment, looking west, across proposed End Bent No. 1.



Photograph No. 4:
This photograph was taken from the right side of the -L- alignment, looking west, across proposed Interior Bent No. 1.



Photograph No. 5:
This photograph was taken from the right side of the -L- alignment, looking west, across proposed Interior Bent No. 2.



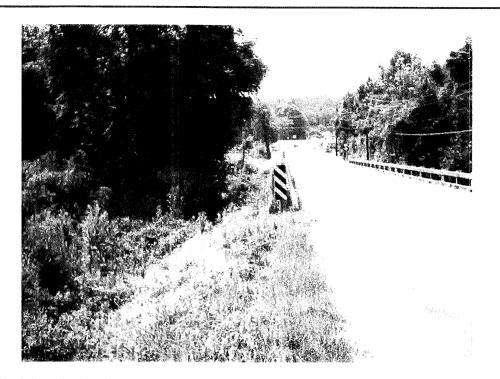
Photograph No. 6: This photograph was taken from the right side of the -L- alignment, looking west, across proposed End Bent No. 2.



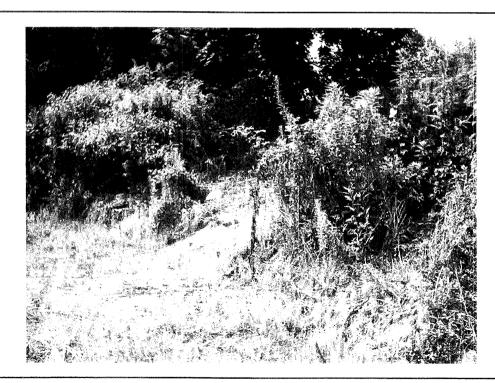
Photograph No. 7:
This photograph was taken from the existing bridge, looking west (upstream).



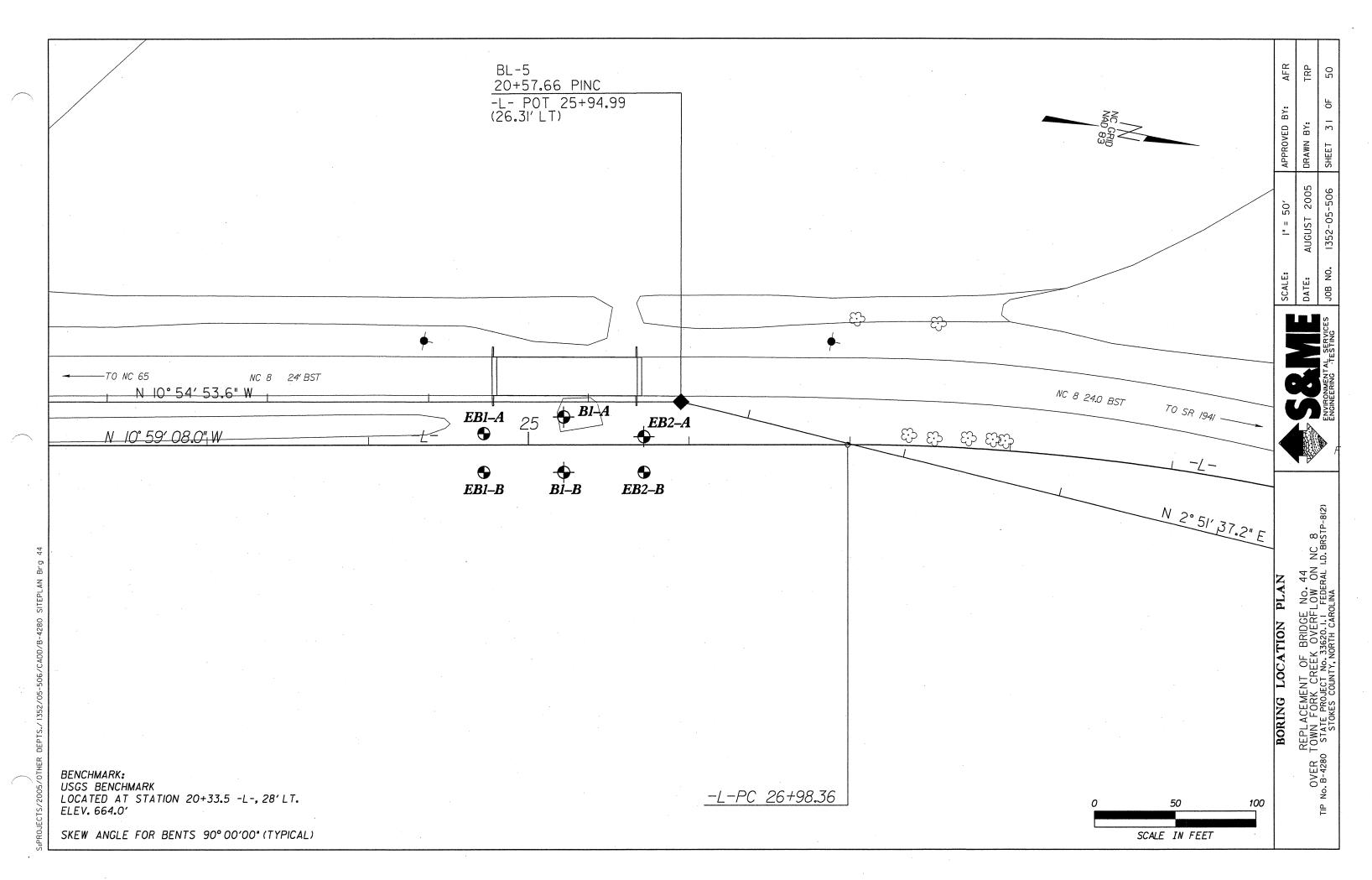
Photograph No. 8: This photograph was taken from the existing bridge, looking east (downstream).

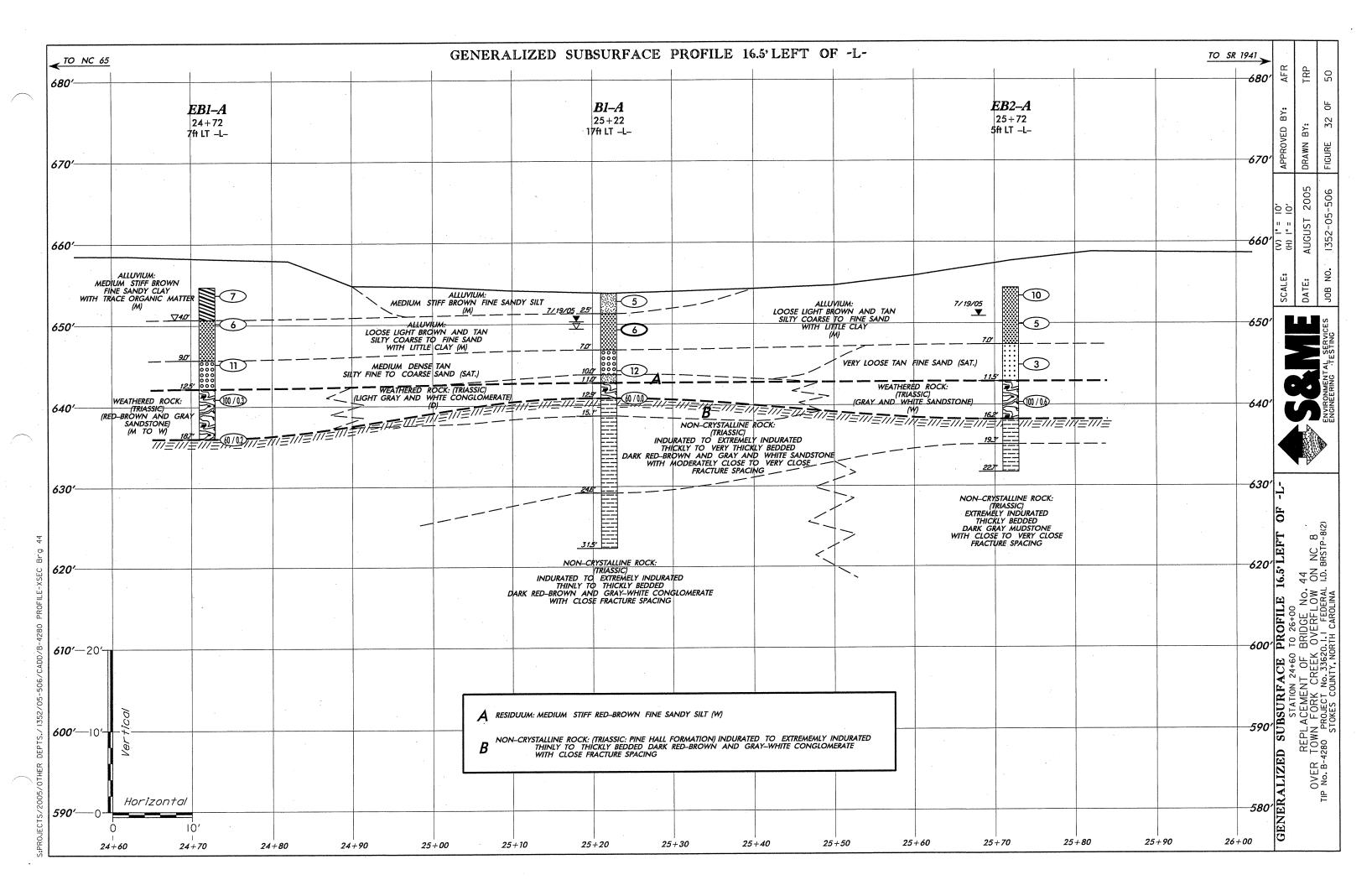


Photograph No. 9:
This photograph was taken from the right side of the existing bridge, looking south.



Photograph No. 10:
This photograph was taken at proposed End Bent No. 2, looking south, downstation, along the -L- alignment.









ROJE	CT NO.	3362					B-4280			YTNUC					GE	OLOG	IST [D. BENTS		
TE DE	ESCRIP	TION	BRIDO				FORK C	REEK C	VERFL										ID WATER	
ORING	G NO.	EB1-A		BC	RING	G LOCA	TION 24	1+72		OFFSE				<u>.i</u>	MENT	-L-		0 HR.	4.0	
DLLA	R ELEV	. 654.	7 ft	NORT	HINC	919	,205.4			EASTI		1,639	,503.	3				24 HR.	N/M	
TAL	DEPTH	18.7	ft	DRILL	. MA	CHINE	Diedrich	D-50	DRILL	METHO	OD ²	1/4" HSA					HAN	IMER TYPE	MANUA	L
TE S	TARTE	D 7/1	19/05			COM	PLETED	7/19/05		SURF	ACE W	ATER	DEP	TH N	/A		·			
ΞV.	DEPTH	BLC	ow cor	JNT			BLOWS P				SAMP		L	•		OIL AN	ND ROC	K DESCRIPT	ION	
t)	(ft)	0.5ft	0.5ft	0.5ft	0	20 	40 	60 	80	100	NO.	MOI	1 1	2						
						,	GROUND	CLIDEV	CE.					654.7						
4.7 4.7	0.0	• 4	4	3		b .7 · · ·						М		- 054.7				UVIUM:	.1	
1.2	- - 3.5				::		 		<i></i>					- 050.7			FINE S	STIFF BROWI ANDY CLAY	V	
		3	3	3	: g	6			<i>.</i>			- M -		<u>650.7</u>	7	NITH T	RACE	(A-6) ORGANIC MA	TTER	\int_{-}^{-}
‡	-													- -				IGHT BROWN FINE SAND		
3.2	8.5											Sat		- - 645.7			(,	A-2-4)		
1	-	3	5	6		- 1						Sat.	000	 -				DENSE TAN O COARSE S		
🖠	-				: :				· · · ·	· · · ·			000					A-1-b) ERED ROCK:		
1.2	13.5	100/0.3		-	: :					•	٠.	М		-			(TR	(IASSIC)		
Ŧ	-				: :		· · · · · ·							<u>.</u>	(REI	D-RKO	WN AN	D GRAY SAN	DSTONE)	
3.2	- - 18.5	-] : :							w	5	636.0						
1	-	60/0.2					NA TERM	UNIATED		50/0.2				_	1) AD\	/ANCE	D 2-1/4	" HSA TO 18.	FEET.	
1	-				ST	ANDARE	RING TERM PENETRA	TION TE	EST REF	FUSAL		1		-						
‡	- -						ELEVATIO							-						
+	_					F)	TRIA) TREMELY		TED	,				-						
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SHEET 36 OF 50 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

7-1 A J	THO WILL	IG • TES VIAL SER	VICES	•						S. Si	TRANS	•			SHEET	1 OF 1	
JECT NO		20.1.1		ID.	B-4280		CO	UNTY	STOR	KES			GEOLOGIS				
DESCRI	IPTION	BRID	GE 44 O	VER TO	VN FORK	CREEK (OVERFLO	10 WC	4 NC 8						GROU	ND WATER	R (ft)
RING NO.	EB1-E	3	во	RING LO	CATION	24+72		OFFSE	E T 17	ft RT		ALIGNN	IENT -L-		0 HR.	5.0	
LAR ELE	EV. 654	.8 ft	NORTI	HING 9	19,209.9			EASTI	NG	1,639	,526.	4			24 HR.	5.3 on 7/	20/0
AL DEPT	H 16.9	ft	DRILL	MACHINI	E Diedri	ch D-50	DRILL I	METHO	סס ²⁷	4" HSA				HAMN	MER TYPE	MANUA	L
E START	ED 7/	19/05		co	MPLETED	7/19/05	5 :	SURFA	ACE W	ATER	DEP	TH N/A					
V. DEPTI	H BL	ow col	UNT		BLOWS	PER FOO	TC		SAMP.	V /	LO		SOIL AND	POCK	DESCRIP	TION	
(ft)	0.5ft	0.5ft	0.5ft	0 2	20 40	60	80	100	NO.	MOI			SOIL AIVE		DESCRIP		
					CDOUN	D CUDEA	\C=										
3 0.0	5	5	5	6 10		<u>D SURFA</u> 			SS-1	М		654.8			IVIUM:		
3 + 3.5	,			::/ <u>:</u> ::				: : :				- -		(A-	ILTY FINE (-2-4)		
#	3	2	3	: 6 5				: : : <u> </u>		₩		649.8			CE OF CLA NIC MATTE		
<u> </u>								• • •	ST-1	26.1%	1	-	M	DIUM	STIFF TAN		
8.5								[646.8		H TRA	CE OF CLA		_
Ŧ	WOH	5	11	::: ;	16			: : :		Sat.			MEDIUM		(-4) ETAN FINE	SAND	J
Ŧ				::: <u>L</u>	· · · · ·						5	643.1	WE		(-3) RED ROCK	•	
3 <u>† 13.5</u> †	19	81/0.3		• • • •				: : []		w	5	-	(RED-BROW	(TRIA	ASSIC)		
16.9						 	100	/0.8				637.9	(ILLD-DITOW	I AIV	Olotti Orti	(DOTONE)	
10.3	60/0.0	<u> </u>					60.	/0.0	· · · · · · · · · · · · · · · · · · ·	- W) ADVANCED	2-1/4"	HSA TO 16	.9 FEET.	
‡					ORING TER			JSAL				-					
†					AT ELEVAT	TON 637.9	FEET					- -					
İ				O		RIASSIC)					1 -	-					
+	İ			RED-E	EXTREME BROWN AN			VE									
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N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

	CT NO.	3362					3-4280				STOR				GEOLOGIST K	LEWALLE		154
TE DE	SCRIP	TION	BRIDO					REEK OV	ERFL					T		1	ID WATER	. (π)
ORING	S NO.	B1-A		ВО	RING	LOCA		5+22			ET 17			ALIGN	MENT -L-	0 HR.	4.4	
DLLA	R ELEV	653.	8 ft	NORT	HING	919,	252.7			EASTI	01	1,639	,	5 ORE BARF	DEI	24 HR.	3.5 on 7/1	
TAL	DEPTH			DRILL	MAC	,	BK-51			METH	JU			· · · · · · · · · · · · · · · · · · ·	1 1/7/10/1	MER TYPE	MANUAL	-
ATE S	TARTE	D 7/1	8/05			COMF	PLETED	····		SURF	ACE W	ATER	DEP	TH N//	4			
	DEPTH		ow cor			20	BLOWS F	ER FOOT 60	80	100	SAMP.	V /	0		SOIL AND ROCK	C DESCRIPT	ION	
ft)	(ft)	0.5ft	0.5ft	0.5ft	9_	20 	40		- 10	100	NO.	MOI	G					
		,																
3.8						(ROUND	SURFACE	=	,				653.8	A. 1.	JVIUM:		
3.8	- 0.0	2	3	2	· •	5 · · ·	 					М		- 651.3	MEDIUM S	TIFF BROWN	١ .	
0.3	3.5				:]					 	SS-2	Y		_	(NDY SILT A-4)		
1	-	3	3	3	. 0	6						М		-	LOO: SILTY COARS	SE TAN E TO FINE SA	AND	
- ^ I	- - 8.5				. 1	T :::							000	646.8		-2-4) ITLE CLAY		Γ
5.3	- 0.5	3	4	8		0 12						1	000	643.8	MEDIUM	DENSE TAN DARSE SANI		
+	-											W	51	642.8	(A	-1-b) DUUM:		-
0.9	12.9	60/0.0		-								No Rec		640.9	MEDIUM STIF	F RED-BRO	WN	H
. 7	-	00,010	,		: :									638.7	(.	ANDY SILT A-4)		-
Ŧ	-		·										量	-	(TRI	RED ROCK: ASSIC)		ĺ
Ŧ	-												量	 '.		Y AND WHIT OMERATE)	E	
Ŧ	-												Ħ	-	NON-CRYST	ALLINE ROC ASSIC)	K:	
7	-													-	EXTREMEL	Y INDÚRATE Y BEDDED	:D	
7	-				: :		• • • • •		: : :				量	629.2	LIGHT GRAY AND W	HITE CONGL		Г
1	-				: :									<u>.</u>	WITH CLOSE FF NON-CRYST	ALLINE ROC	K:	1
1	-													_		KLY BEDDE	D	
- 1	-				<u>: :</u>		· · · · ·	· · · · · ·	· · ·	· · ·				622.3		STONE.		ļ
1	-					F	BORING TE	ERMINATE	D					_	WITH CLOSE FRACTU	RE SPACING		
7	-					AT	ELEVATIO	ON 622.3 FE	EET					_	NON-CRYST			
. ‡	-					E	CTREMELY	INDURAT	ED	T=				_	THINLY TO THE DARK RED-BROWN	HICKLY BEDI	DED	
4	-					GIVAT A	AND WINTE	CONGLO	VIL.I VI	·		1				OMERATE		
1	-													_	1) ADVANCED 2-1/4"	HSA TO 12.9		J
1	-													•	2) SET CASING TO 1 3) ADVANCED NQ-2	CORE BARR	REL FROM	
7	-													-	12.9 TO 31.5 FEET 4) CREEK WATER U		LING	
1	-													_	FLUID. 5) APPROXIMATE DI	RILLING FLUI	ID	
-	_														DENSITY 62.4 PC 6) NO LOSS OF DRIL			
1	-													<u> </u>	OBSERVED.			
1	- ·													-				
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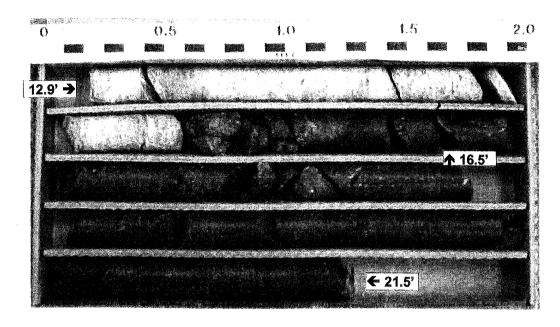
SHEET 37 OF 50 N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

**	ENG	NEERII RONME	NG + TEST	TING VICES							TRAIL			:	SHEET	1 OF 1	1
PROJE	CT NO.	336	20.1.1			ID . B-42	280			COUNTY S	***************************************		GEOLOGI		LEWALLE		
	ESCRIP								OVE	RFLOW ON N	C 8				GROUN	D WATER	₹ (ft)
BORIN		B1-A				LOCATIO		5+22		OFFSET			ENT -L-		0 HR.	4.4	
	R ELEV			NORTH		919,252				EASTING	1,639,484.				24 HR.	3.5 on 7/	
	STARTE		/18/05	DRILL		COMPLE	<-51	7/18/0		SUBEACE	WATER DEP			HAMM	ER TYPE	MANUA	<u>L</u>
	SIZE N					TOTAL R		18.6 ft			J. LITTLE	III N/A					-
ELEV.	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	JN RQD (ft)	J		RQD (ft)	L O G			DESCRIPTI	ON AND REI	MARKS			
		•								640.9		Begin C	oring @ 12	Q ff	······································		
640.9	12.9	3.6	2:00 2:20	(3.2) 89%	(1.8) 50%		(2.2) 100%	(1.3) 59%		638.7			YSTALLINE			· · · · · · · · · · · · · · · · · · ·	12.
637.3	16.5		2:20 1:40/0.6	^			(9.1) 96%	(5.7) 60%		030.7		. (TRIASSIC) MELY INDUR				15.
		5.0	2:20 1:50	/ (5.0) 100%	(3.5) 70%		90 %	00 /6		_	LIGHT	THI	CKLY BEDDE	ED	FRATE		
632.3	21.5		1:30 1:30						咠			VITH CLOSE	FRACTURE OINTS @ 45	SPACI			
		5.0	1:30 2:40	(5.0) 100%	(3.3) 66%				冒	Laure	INDI	NON-CR	YSTALLINE I	ROCK:	ATED		
			2:10 2:20				(6.9)	(4.9)		629.2		VERY T	HICKLY BEI	DDED			24.
627.3	26.5	5.0	1:40 2:00	(5.0)	(3.3)		100%	71%	鬪		WITH CLO	SE TO VER	Y CLOSE FF	RACTUR	E SPACING		
			1:20 2:00	100%	66%							NON-CR	YSTALLINE I EXTREMELY	ROCK:			_1
622.3	31.5		2:00 1:50						罩	622.3		THINLY TO	THICKLY B	EDDED			31.
			1:50	1								ITH CLOSE	FRACTURE	SPACI	NG	41E	
										L	5.	BORIN	0° AND 3 JO	TED	45	·	
									-			IN NON-C	ATION 622.3 RYSTALLINE	ROCK:			
										•	GF		MELY INDUR HITE CONG		TE		
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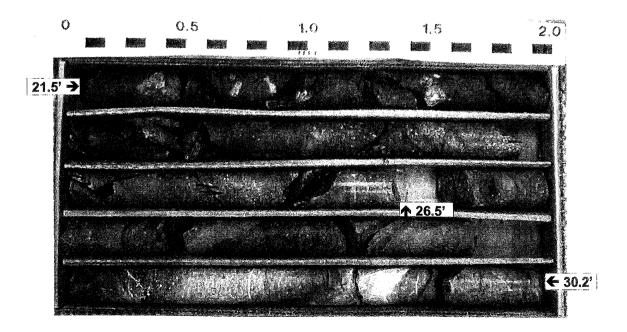


CORE PHOTOS

Project No: 33620.1.1	oject No: 33620.1.1 TIP No: B-4280 County: Stokes								
Site Description: Replacen	<i>Driller</i> : J. Little								
Collar Elev.: 653.8 ft.	Collar Elev.: 653.8 ft. Core Size: NQ-2 Equipment: BK-51								
Elev. at T.D.: 622.3 ft.	Total Depth: 31.5 ft.	Total Run: 18.6 ft.	Date: 7/18/05						



Box 1 of 3
Top of Box @ 12.9 feet; Bottom of Box @ 21.5 feet



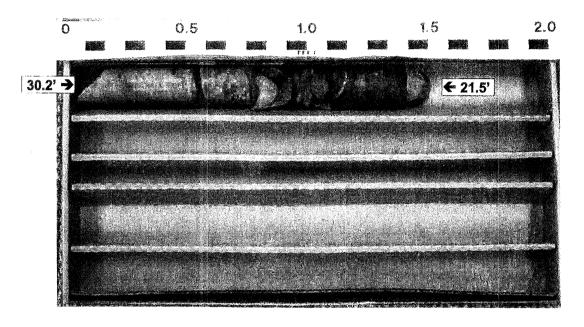
Box 2 of 3
Top of Box @ 21.5 feet; Bottom of Box @ 30.2 feet



SHEET 38 OF 50

CORE PHOTOS

Project No: 33620.1.1	TIP No: B-4280	County: Stokes	Boring No.: B1-A								
Site Description: Replacement of Bridge No. 44 over Town Fork Creek Overflow on NC 8 Driller: J. Little											
Collar Elev.: 653.8 ft.	Collar Elev.: 653.8 ft. Core Size: NQ-2 Equipment: BK-51										
Elev. at T.D.: 622.3 ft.	Total Depth: 31.5 ft.	Total Run: 18.6 ft.	Date: 7/18/05								



Box 3 of 3
Top of Box @ 30.2 feet; Bottom of Box @ 31.5 feet





N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

•	ENGI	NEERIN	G • TES'	TING VICES	The CP TRANSPORT	SHEET 1 OF 1						
PROJE	CT NO.	3362	0.1.1		ID. B-4280 COUNTY STOKES GE	OLOGIST K. LEWALLEN						
SITE D	ESCRIP	TION	BRIDO	3E 44 C	ER TOWN FORK CREEK OVERFLOW ON NC 8	GROUND WATER (ft)						
BORIN	G NO.	B1-B		ВС	ING LOCATION 25+22 OFFSET 17 ft RT ALIGNMENT	-L- 0 HR. 5.2						
COLLA	R ELEV	. 653.	.9 ft	NORT	RTHING 919,259.0 EASTING 1,639,516.9 24 HR.							
TOTAL	DEPTH	36.4	ft	DRILL	MACHINE BK-51 DRILL METHOD 21/4" HSA/NQ-2 CORE BARREL	HAMMER TYPE MANUAL						
DATE S	TARTE	D 7/	19/05	L	COMPLETED 7/19/05 SURFACE WATER DEPTH N/A							
ELEV.	DEPTH	BLO	ow cou	JNT	BLOWS PER FOOT SAMP. V	SOIL AND ROCK DESCRIPTION						
(ft)	(ft)	0.5ft	0.5ft	0.5ft	0 20 40 60 80 100 NO. MOI G	, one , who is a part of the same of the s						
					CDOUND SUDFACE	0.0						
653.9 653.9	0.0	3	3	4	GROUND SURFACE 653.9 - 0.7 SS-3 M	ALLUVIUM:						
650.4	- - 3.5					MEDIUM STIFF TAN NE SANDY SLIGHTLY CLAYEY SILT						
650.4	- 3.5	2	3	2	φ ₅	(A-4) LOOSE TAN SILTY FINE SAND						
1	-				. M M	(A-2-4)						
645.4	- - 8.5				- L	LOOSE GRAY FINE SAND						
	-	1	2	6	Sat. Sat. W	(A-3) ITH TRACE OF ORGANIC MATTER 10.3						
	-					WEATHERED ROCK: (TRIASSIC)						
640.4	13.5	34	66/0.4		(GF	RAY AND WHITE CONGLOMERATE)						
637.6	_ - 16.3	34	00/0.4		637.5	16.						
-	-	60/0.1			No Rec.	NON-CRYSTALLINE ROCK: (TRIASSIC)						
-	_				633.9	EXTREMELY INDÚRATED 20.0						
1	-				Gi	THICKLY BEDDED RAY AND WHITE TO RED-BROWN						
-	-					CONGLOMERATE WITH VERY CLOSE TO CLOSE						
-	-				RS-1 = 629.1	FRACTURE SPACING 24.3 NON-CRYSTALLINE ROCK:						
-	-					EXTREMELY INDURATED						
_	_					VERY THICKLY BEDDED ED-BROWN TO GRAY AND WHITE						
-	_					SANDSTONE WITH VERY CLOSE TO CLOSE						
.]						FRACTURE SPACING NON-CRYSTALLINE ROCK:						
-					RS-2	EXTREMELY INDURATED						
					617.5 R	VERY THICKLY BEDDED ED-BROWN TO GRAY AND WHITE 36.						
-	-				BORING TERMINATED	CONGLOMERATE WITH INTERBEDDED MUDSTONE						
-	_				AT ELEVATION 617.5 FEET IN NON-CRYSTALLINE ROCK:	WITH VERY CLOSE TO MODERATELY CLOSE						
-	-				EXTREMELY INDURATED	FRACTURE SPACING VANCED 2-1/4" HSA TO 16.3 FEET.						
-	_				SIGN AND WHILE CONCEONIE! VITE 2) SE	T CASING TO 16.4 FEET.						
-					16.	VANCED NQ-2 CORE BARREL FROM 4 TO 36.4 FEET.						
-	_					EEK WATER USED AS DRILLING UID.						
-	_					PROXIMATE DRILLING FLUID NSITY 62.4 PCF.						
-	-				6) NO	LOSS OF DRILLING FLUID						
-					,	SERVED.						
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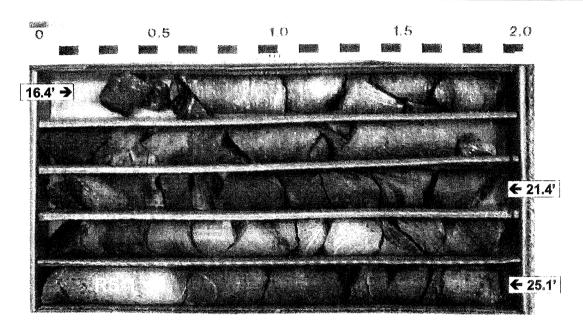
SHEET 39 OF 50 N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

4	ENG ENVI	INEERII RONME	NG • TEST	TING VICES						SHEET 1 OF 1
PROJE	CT NO.		20.1.1			ID. B-4	280			COUNTY STOKES GEOLOGIST K. LEWALLEN
SITE D	ESCRIP	TION	BRIDG	SE 44 O	VER	TOWN FO	ORK C	REEK	OVER	RFLOW ON NC 8 GROUND WATER (ft)
	G NO.	B1-B		ВО	RING	LOCATIO	N 25	5+22		OFFSET 17 ft RT ALIGNMENT -L- 0 HR. 5.2
	R ELEV		3.9 ft	NORTI	HING	919,259	9.0			EASTING 1,639,516.9 24 HR. 4.1 on 7/20/05
	DEPTH			DRILL	MAC		<-51			RILL METHOD 2½" HSA/NQ-2 CORE BARREL HAMMER TYPE MANUAL
	STARTE		/19/05			COMPLE			5	SURFACE WATER DEPTH N/A
	SIZE N		DRILL	RI	UN	TOTAL R		20.0 ft	L	DRILLER J. LITTLE
ELEV. (ft)	DEPTH (ft)	RUN (ft)	RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %	RQD (ft) %	ÖG	DESCRIPTION AND REMARKS
637.5	16.4	5.0	2:10	(5.0)	(1.8)		(3.6)	(1.8)		637.5 Begin Coring @ 16.4 ft 16
007.0	10.4		1:50 1:40	100%			100%	50%		- NON-CRYSTALLINE ROCK: - (TRIASSIC)
632.5	21.4		1:40				(4.8)	(1.8)		EXTREMELY INDURATED THICKLY BEDDED GRAY AND WHITE TO RED-BROWN CONGLOMERATE
		5.0	1:50 1:50	(5.0) 100%	(2.8) 56%		100%	38%	量	WITH VERY CLOSE TO CLOSE FRACTURE SPACING
			1:30	1.00%	00%	RS-1	(44.4)	(0.1)		4 JOINTS @ 45° AND 1 JOINT @ 60° 629.1 NON-CRYSTALLINE ROCK: 24
627.5	26.4	5.0	1:50 1:40	(4.5)	(2.9)	1	(11.1) 96%	(8.4) 72%	量	EXTREMELY INDURATED VERY THICKLY BEDDED RED-BROWN TO GRAY AND WHITE SANDSTONE
		5.5	1:40 1:20	90%	58%				量	WITH VERY CLOSE TO CLOSE FRACTURE SPACING 3 JOINTS @ 30° AND 7 JOINTS @ 45°
622.5	31.4		1:30 2:00						量	NON-CRYSTALLINE ROCK:
		5.0	1:50 1:40	(5.0) 100%	(4.5) 90%				量	EXTREMELY INDURATED VERY THICKLY BEDDED RED-BROWN TO GRAY AND WHITE CONGLOMERATE
			1:20	100%	90%	RS-2			量	_ WITH INTERBEDDED MUDSTONE . WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING
617.5	36.4		1:50							- 617.5 8 JOINTS @ 45° AND 4 JOINTS @ 60° 36
			2:00	4					lE	BORING TERMINATED AT ELEVATION 617.5 FEET
										IN NON-CRYSTALLINE ROCK:
									l E	EXTREMELY INDURATED GRAY AND WHITE CONGLOMERATE
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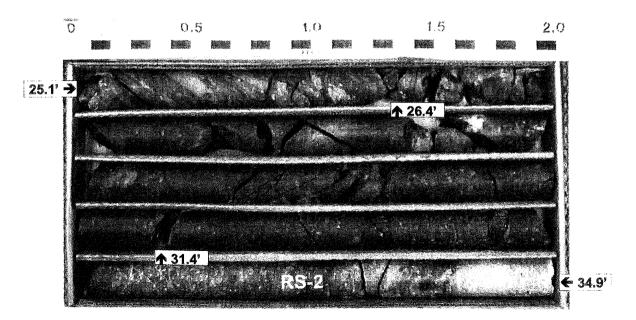


CORE PHOTOS

Project No: 33620.1.1	Project No: 33620.1.1 TIP No: B-4280 County: Stokes								
Site Description: Replacen	Driller: J. Little								
Collar Elev.: 653.9 ft.	Collar Elev.: 653.9 ft. Core Size: NQ-2 Equipment: BK-51								
Elev. at T.D.: 617.5 ft.	Total Depth: 36.4 ft.	Total Run: 20.0 ft.	Date: 7/19/05						



Box 1 of 3
Top of Box @ 16.4 feet; Bottom of Box @ 25.1 feet



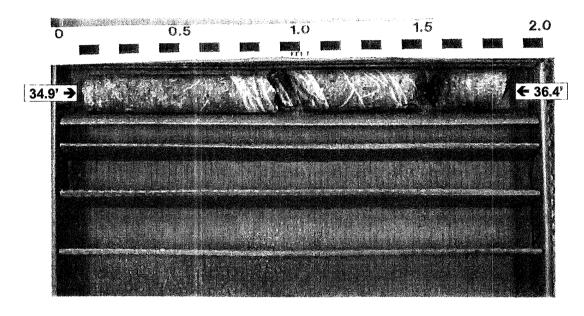
Box 2 of 3
Top of Box @ 25.1 feet; Bottom of Box @ 34.9 feet



SHEET 40 OF 50

CORE PHOTOS

Project No: 33620.1.1	TIP No: B-4280	County: Stokes	Boring No.: B1-B								
Site Description: Replacement of Bridge No. 44 over Town Fork Creek Overflow on NC 8 Driller: J. Little											
Collar Elev.: 653.9 ft.	Collar Elev.: 653.9 ft. Core Size: NQ-2 Equipment: BK-51										
Elev. at T.D.: 617.5 ft.	Total Depth: 36.4 ft.	Total Run: 20.0 ft.	Date: 7/19/05								



Box 3 of 3
Top of Box @ 34.9 feet; Bottom of Box @ 36.4 feet

	S&ME	
A	ENGINEERING . TESTING	



SHEET 41 OF 50 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

·	ENG ENVI	NEERIN RONMEN	IG • TES VTAL SER	TING VICES								Mer o	TRAM	19			SHEET	1 OF 1	
PROJE	CT NO.	3362	20.1.1	31		ID.	B-4280		(COUNTY	STO	KES			GEOLOGI	ST D.	BENTS		
SITE DI	ESCRIP	TION	BRID	GE 44 (OVER	TOWN	N FORK	CREEK (OVER	LOW O	N NC 8	3					GROUN	ID WATE	२ (ft)
BORING	G NO.	EB2-A	\	BC	ORING	LOCA	TION	25+72		OFFS	ET 5 f	t LT		ALIGN	MENT -L-		0 HR.	N/A	١
COLLA	R ELEV	. 654	.4 ft	NORT	HING	919	,304.0			EAST		1,639	·				24 HR.	3.5 on 7/	19/05
TOTAL	DEPTH	22.7	ft	DRILL	. MAC	HINE	Diedric	ch D-50	DRIL	L METH	OD 2	¼" HSA/	NQ-2 (ORE BARR	REL	HAMN	ER TYPE	MANUA	L
DATE S	TARTE	D 7/	18/05			COM	PLETED	7/18/05	5	SURF	ACE W	ATER	DEP	TH N/A	1				
ELEV.	DEPTH	BLO	ow cor	JNT				PER FOO			SAMP.	\mathbf{V}	0 Г		SOII ANI	D BOCK	DESCRIPT	ION	
(ft)	(ft)	0.5ft	0.5ft	0.5ft	1	20 	40 1	60 L	80	100	NO.	МО							
654.4						(GROUNI	D SURFA	ACE					654.4					0.0
654.4	- 0.0 -	5	5	5	: :	þ 10 · ·						М	***	-	1.00	ALLU	VIUM: HT BROWN		0.0
650.9	3.5				: /							Y		-		SILTY FII	NE SAND 2-4)		
1 1	-	2	2	3	: 6	5						M		 ·		(A-	2-4)		
1 0450	- 0-				لم. ا									647.4	VERVI	OOSE	AN FINE SA	AND	7.0
645.9	8.5	2	1	2	• 3			• • • • •				Sat.		-	V LIVI L		-3)	NAD.	
1 1	- -				:[<u>`</u>				· · ·					642.9					11.5
640.9	13.5			<u> </u>			· · · · ·							-	W	EATHER (TRIA	ED ROCK: SSIC)		
1 1	- -	87	13/0.1		: :		· · · · ·			100/0.6		W			(GRAY A	ND WHI	TE SÁNDST	ONE)	,
1 ±	-				: :		· · · · ·			!				638.2	NON-		LLINE ROC	K:	16.2
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<u> </u>	-		ļ	ļ	. `.	· · · ·						ļ	F	631.7	W	ITH VEF	RY CLOSE TELY CLOS		22.7
1 +	-							TERMINAT						-	FR	ACTURE	SPACING		1 .
1 1	- -							ION 631.7 STALLINE		•				-	EXT	REMELY	INDURATE		
1 7	-							Y INDURA Y MUDST						-	DAR	K GRAY	BEDDED MUDSTON		
1 7	-													-	FR	ACTURE	O VERY CLO E SPACING		
1 7	-														1) ADVANCED 2) SET CASING			FEET.	
1. 7	-											-		-	 ADVANCED 16.2 TO 22. 		ORE BARRI	EL FROM	
1 . ‡	-													-	4) CREEK WA		ED AS DRIL	LING	
1 1	-													-	5) APPROXIMADENSITY 62		LLING FLUII	D	
1 7	-													-	6) NO LOSS O	F DRILL	ING FLUID		
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N.C.D.O.T. GEOTECHNICAL UNIT CORE BORING REPORT

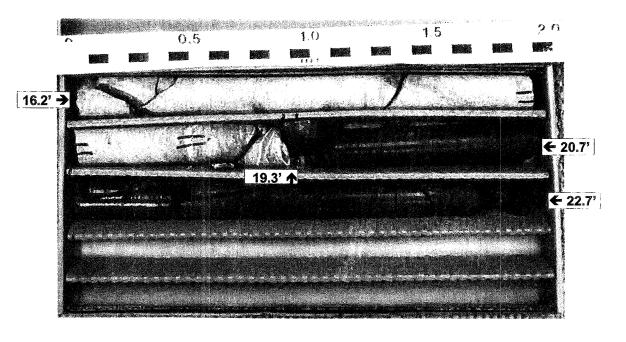
	ENG ENVI	INEERII RONME	NG = TEST NTAL SERV	ING ICES	Van one on the same of the sam					SHEET 1 OF 1
PROJE	ECT NO.	336	20.1.1			ID . B-4	280			COUNTY STOKES GEOLOGIST D. BENTS
SITE C	ESCRIP	MOIT	BRIDG	E 44 O	VER	TOWN FO	ORK C	REEK	OVE	RFLOW ON NC 8 GROUND WATER (fit
BORIN	G NO.	EB2-	A	ВО	RING	LOCATIO	N 2	5+72		OFFSET 5 ft LT ALIGNMENT -L- 0 HR. N/A
OLLA	R ELEV	7. 654	4.4 ft	NORTI	HING	919,30	4.0			EASTING 1,639,486.2 24 HR . 3.5 on 7/19/0
OTAL	. DEPTH	22.	7 ft	DRILL	MAC	INE D	edrich	D-50	DR	RILL METHOD 21/4" HSA/NQ-2 CORE BARREL HAMMER TYPE MANUAL
ATE	STARTE	D 7	/18/05			COMPLE	TED	7/18/0)5	SURFACE WATER DEPTH N/A
ORE	SIZE N	1Q-2				TOTAL R	UN (3.5 ft		DRILLER L. SCHRADER
ELEV. (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	UN RQD (ft)	SAMP. NO.	STF REC. (ft) %	RATA RQD (ft)	LOG	DESCRIPTION AND REMARKS
38.2	16.2	3.1	1:00/0.5	(2.9)	(2.3)		(2.9)	(2.3)		638.2 Begin Coring @ 16.2 ft
335.1	19.3		1:00	94%	74%		94%	74%	目	NON-CRYSTALLINE ROCK:
333.7	20.7	1.4	0:10/0.1	(1.1)	(0.9)		(2.9)	(1.5)		635.1 (TRIASSIC) EXTREMELY INDURATED THICKLY BEDDED
31.7	22.7	2.0	3:20 1:30/0.4	79% (1.8)	64% (0.6)		85%	44%	亖	GRAY AND WHITE SANDSTONE 631.7 WITH VERY CLOSE TO MODERATELY CLOSE FRACTURE SPACING
			2:00 3:00	90%	30%	1			T	1 JOINT @ 10 °, 2 JOINTS @ 45°, AND 2 JOINTS @ 60°
			0.00	1						NON-CRYSTALLINE ROCK: EXTREMELY INDURATED THICKLY BEDDED
									1 1	DARK GRAY MUDSTONE
									1 F	WITH CLOSE TO VERY CLOSE FRACTURE SPACING 2 JOINTS @ 10°, 2 JOINTS @ 30°,
										2 JOINTS @ 45°, AND 1 JOINT @ 90°
									ΙĿ	BORING TERMINATED AT ELEVATION 631,7 FEET
									F	IN NON-CRYSTALLINE ROCK:
									F	EXTREMELY INDURATED DARK GRAY MUDSTONE
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SHEET 42 OF 50

CORE PHOTOS

Project No: 33620.1.1	TIP No: B-4280	Boring No.: EB2-A									
Site Description: Replacement of Bridge No. 44 over Town Fork Creek Overflow on NC 8 Driller: J. Little											
Collar Elev.: 654.4 ft.	Collar Elev.: 654.4 ft. Core Size: NQ-2 Equipment: BK-51										
Elev. at T.D.: 631.7 ft.	Total Depth: 22.7 ft.	Total Run: 6.5 ft.	Date: 7/18/05								



Box 1 of 1

Top of Box @ 16.2 feet; Bottom of Box @ 22.7 feet

	S&ME
**	ENGINEERING . TESTING



SHEET 43 OF 50 N.C.D.O.T. GEOTECHNICAL UNIT BORING LOG

	ENG	NEERIN RONMEN	G • TES TAL SER	TING VICES								Mar Si	TRANS!	y			SHEET	1 OF 1	
PROJE	CT NO.	3362	0.1.1			ID.	B-4280		C	OUNTY	STO	KES			GEOLOGI	ST K.	LEWALLE	N .	
SITE D	ESCRIP	TION	BRID	GE 44 (OVER	NOT	FORK	CREEK	OVERF	LOW O	N NC 8	3		•			GROUN	ID WATER	(ft) ·
BORIN	G NO.	EB2-B		BC	RING	LOCA	TION	25+72		OFFS	ET 17	ft RT		ALIGNI	MENT -L-		0 HR.	5.9	
COLLA	R ELEV	. 654.	4 ft	NORT	HING	919	,308.1			EAST		1,639	,507.	3 ·			24 HR.	3.2 on 7/1	9/05
TOTAL	DEPTH	23.6	ft:	DRILL	. MAC	HINE	BK-51		DRILL	METH	OD 21	"/4" HSA				HAMN	MER TYPE	MANUAL	-
DATE S	TARTE	D 7/	18/05		•	COM	PLETED	7/18/0	5	SURF	ACE W	ATER	DEP.	TH N/A	٠.				
	DEPTH		OW COL	T				PER FO		. 400	SAMP.	▼/	O L		SOIL AN	D ROCK	(DESCRIPT	ON	
(ft)	(ft)	. 0.5ft	0.5ft	0.5ft	9	20	40	60	80	100	NO.	MOI	G	·····					
654.4			,			(GROUN	D SURF	ACE					654.4					0.0
654.4 -	- 0.0 -	2	2	4	: •	6		 				М	I	651.9	LO		JVIUM: SHT BROWN		2.5
650.9	3.5	2	2	2	: [SS-4	M	7				INE SAND -2-4)	i	Γ <u>-2.5</u>
648.4	- - 6.0] : '	4	· · · ·	<i>.</i> 			33-4	V		. `	SITL		BROWN SANDY CLA	Y	
645.9	8.5	2	2	1	· ф :3			 				No Rec.		646.4		(A-	-7-6)		8.0
-		1.	1	1	. . . 2			 <i></i> .	: : : :			Sat.			VERY L		RAY FINE S 4-3)	AND	
	_												52	643.4	· w		RED ROCK:		11.0
640.9	13.5	68	32/0.1		::			 	· · · ·	:: \		D		•	(GRAY A	TRIA ND WHI	ASSIC) ITE SANDST	ONE)	
	_	00	32/0.1		: :			 	10	00/0.6									
635.9	18.5							 						•					
-	_	100/0.5			1::					00/0.5		D							
					::			 											
630.9	23.5	60/0.1			<u> · · ·</u>					50/0.1		No Rec	3	630.8	1) ADVANCE	2-1/4"	HSA TO 23.5	FEET	23.6
	-				CTA			RMINATE	HTIW C					•	.,		,		
	_				SIA	AT	ELEVAT	RATION T ION 630.8	FEET					•					
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	L							LY INDUR HITE SAN		Ē		ļ.		. '					
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LABORATORY SUMMARY SHEET

PROJECT NO.: 33620.1.1

TIP NO.: B-4280 **COUNTY: STOKES**

BRIDGE 44 OVER TOWN FORK CREEK OVERFLOW ON NC 8



	SOIL TEST RESULTS																
BORING	SAMPLE				I DEPTH	AASHTO	1 1	ΡI	% BY WEIGHT			% PAS	SING SIE	NG SIEVES %		%	
NO.	NO.	STATION	OFFSET	LINE	INTERVAL (FT)	CLASS.	L.L.	P.L.	C. SAND	F.SAND	SILT	CLAY	10	40	200	MOISTURE	ORGANIC
EB1-B	SS-1	24+72	17 FT RT	-L-	0.0-1.5	A-2-4(0)	22	NP	6	75	10	. 8	100	100	29	<u> </u>	-
EB1-B	ST-1	24+72	17 FT RT	-L-	5.0-7.0	A-4(0)	22	3	13	58	20	9	100	98	37	26.1	-
B1-A	SS-2	25+22	17 FT LT	-L-	3.5-5.0	A-2-4(0)	26	NP	16	60	13	11	100	98	30		-
B1-B	SS-3	25+22	17 FT RT	-L-	0.0-1.5	A-4(1)	28	6	6	53	22	19	100	97	51	-	-
EB2-B	SS-4	25+72	17 FT RT	-L-	3.5-5.0	A-7-6(13)	42	18	3	32	31	34	100	99	76		

,	Consolidation Test Results									
Borehole	Sample	Depth	AASHTO	C _c	C _v	t ₉₀	γ, Initial	Initial	Gs	Initial Voids
	•	(ft)	Classification		(ft²/day)	(min)	(lbs/ft ³)	Moisture, %		Ratio, e
EB1-B	ST-1	5.0-7.0	(A-4)	0.064	3.366	0.615	121.15	26.1	2.664	0.7296

	ROCK CORE UNCONFINED COMPRESSION TEST RESULTS												
									Unit	Unconfined	Young's	Splitting Tensile	
		·			Geologic	Run			Weight	Compressive	Modulus	Strength	
Sample #	Bridge #	Boring #	Depth (ft)	Rock Type	Map Unit	RQD	Length (ft)	Diameter (ft)	(PCF)	Strength (PSI)	(PSI)	(PSI)	Remarks
RS-1	44	B1-B	23.3 - 23.9	Sandstone	Trdp	56%	4.387	1.990		16,365	ew m.		
RS-2	44	B1-B	33.3 - 34.1	Conglomerate	Trdp	90%	4.435	1.995		12,438			

NOTES: Natural Moisture Content Test Method - AASHTO T 265-93 Atterberg Limits Test Methods - AASHTO T 88-94 and T 90-94 Grain Size Test Results Test Method - AASHTO T-88-93 Consolidation Test Method - ASTM D2435-96 Unconfined Compression - ASTM D2938

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: <u>33620.1.1</u>	ID: B-4280 COUNTY: STOKES
DESCRIPTION(1):	REPLACEMENT OF BRIDGE NO. 44 OVER TOWN FORK CREEK OVERFLOW ON NC 8
INFORMATION ON E.	XISTING BRIDGES Information obtained from: X field inspection microfilm(Reel:Pos:) X othe Bridge Survey and Hydraulic Design Report
COUNTY BRIDGE NO.	44 BRIDGE LENGTH 90.3 NO. BENTS IN: CHANNEL 0 FLOOD PLAIN 4
FOUNDATION TYPE:	TIMBER PILES WITH REINFORCED CONCRETE CAPS
EVIDENCE OF SCO	DUR(2):
ABUTMENTS OR END	BENT SLOPES: NONE OBSERVED
INTERIOR BENTS:	SCOUR HOLES AT BOTH INTERIOR BENTS
CHANNEL BED:	NONE OBSERVED
CHANNEL BANKS:	N/A
EXISTING SCOUR	PROTECTION:
TYPE(3): NO SCOUP	R PROTECTION AT INTERIOR BENTS. CONCRETE APRON COVERS END BENT SLOPES
EXTENT(4):	
EFFECTIVENESS(5): _	CONCRETE APRON IS MOSTLY EFFECTIVE AT END BENTS
OBSTRUCTIONS(6) (DA	AMS,DEBRIS,ETC.): DEBRIS AND DIRT PILES OBSERVED BENEATH BRIDGE
DESIGN INFORMA	<u>TION</u>
CHANNEL BED MATER	RIAL(7) (SAMPLE RESULTS ATTACHED):TAN AND BROWN SILTY FINE SAND (A-2-4)
FINE SANDY SILT (A-4)	
CHANNEL BANK MATE	RIAL(8) (SAMPLE RESULTS ATTACHED): NO BANKS
CHANNEL BANK COVE	ER(9): N <u>/</u> A
FLOOD PLAIN WIDTH(10):+/- 1,100 FEET SOUTH OF BRIDGE, +/- 500 FEET NORTH OF BRIDGE
FLOOD PLAIN COVER(11): MOSTLY GRASS & CROP FIELDS, SOME UNDERBRUSH & SMALL TO LARGE TREES

SHEET 45 OF 50

DESIGN INFORMATION CONT. PAGE	2
STREAM ISXDEGRADING AGGRADING (12)	
OTHER OBSERVATIONS AND COMMENTS: SANDBAR EXTENDS DOWNSTREAM FROM B4 AND ONE	
FORMING DOWNSTREAM FROM B3. DRAINAGE DITCH EMPTIES INTO CREEK APPROXIMATELY 2	25 F
UPSTREAM OF BRIDGE ON NORTH BANK. SIGNIFICANT DEBRIS OBSERVED AROUND INTERIOR BENTS	
CHANNEL MIGRATION TENDENCY (13): MIGRATION TENDENCY TO THE SOUTH	•
REPORTED BY: Duane D. Bents Man John Jan DATE: 7/22/2005	
GEOTECHNICALLY ADJUSTED SCOUR ELEVATION (14):	
Location 100 yr 500 yr	
B1-A 644.9' 642.2'	
B1-B 644.9' 642.8	
	
REPORTED BY: DATE: 9/2/05 NCDOT GEOTECHNICAL UNIT INSTRUCTIONS	
(1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED. (2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS, DEGRADATIONS, ETC.) (3) NOTE ANY EXISTING SCOUR PROTECTION (RIP RAP, ETC.) (4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION. (5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING. (6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC. (7) DESCRIBE THE CHANNEL BED MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS. (8) DESCRIBE THE CHANNEL BANK MATERIAL: A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.	
 (9) DESCRIBE THE BANK COVERING (GRASS, TREES, RIP RAP, NONE, ETC. (10) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE). (11) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.) (12) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING (13) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE LATERALLY DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). (14) GIVE THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICALLY ADJUSTED SCOUR ELEVATION. THE GEOTECHNICALLY 	

ADJUSTED SCOUR ELEVEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENTAGE RQD; DIFFERENTIAL WEATHERING, SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.

Particle Size Analysis of Soils



AASHTO T 88 as Modified by NCDOT

S&ME Project #: 1352-05-506

8/11/2005 Report Date:

Bridge 44 over Town Fork Creek Overflow on NC 8

Test Date(s): 08/08 - 08/11/2005

Client Name: Client Address:

Project Name:

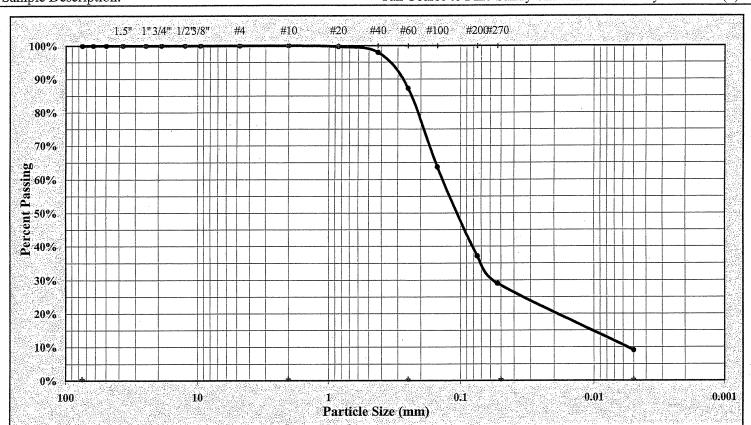
State Project #: 33620.1.1

NCDOT

F.A. Project No: BRSTP-8(2) TIP NO: B-4280

Sample Date: 7/19/05 Sample #: ST-1 EB1-B Boring #: Depth: 5' - 7' Offset: 17' RT 24+72 Location:

Tan Coarse to Fine Sandy Silt with trace of clay A-4(0)Sample Description:



As Detin	led by NCDO I	Fine Sand	< 0.25 mm and > 0.05 mm			
Gravel	< 75 mm and > 2.00 mm	n Silt	< 0.05 and > 0.005 mm			
Coarse Sand	< 2.00 mm and > 0.25 m	m Clay	< 0.005 mm			
Maximum Pa	rticle Size #4	Coarse Sand 12.8%	Silt 20.0%			

58.2% 9.0% 0.0% Fine Sand Clay Gravel % Passing #200 37.1% Apparent Relative Density Moisture Content 3 Liquid Limit 22 Plastic Limit 19 Plastic Index

Soil Mortar (-#10 Sieve)

58.2% Silt 20.0% 9.0% Fine Sand Clay Coarse Sand 12.8% Angular Hard & Durable □ Soft □ Weathered & Friable □ Description of Sand & Gravel Particles: Rounded Sodium Hexametaphosphate:

3109 Spring Forest Road Raleigh N.C. 27616

References: AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

Length of Dispersion Period:

Mal Karajan

ASTM D 854: Specific Gravity of Soils

Technical Responsibility:

Mechanical Stirring Apparatus (A)

Dispersing Agent:

Laboratory Supervisor

Classification ER1_R ST_1 vis

Laboratory Report Version 4.2

Particle Size Analysis of Soils



AASHTO T 88 as Modified by NCDOT

S&ME Project #: 1352-05-506 Report Date: 8/11/2005 Project Name: Bridge 44 over Town Fork Creek Overflow on NC 8 Test Date(s): 08/08 - 08/11/2005

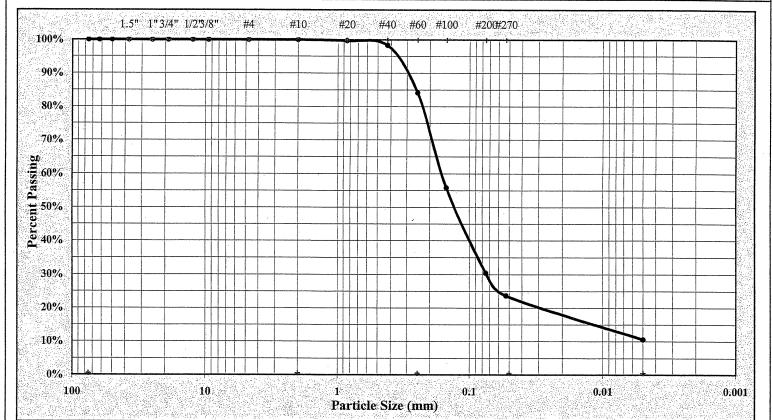
Client Name: **NCDOT**

Client Address:

State Project #: 33620.1.1 F.A. Project No: BRSTP-8(2) TIP NO: B-4280

Boring #: B1-A Sample #: SS-2 Sample Date: 7/18/05 Location: 25+22 Offset: 17' LT Depth: 3.5 - 5'

Sample Description: Tan Silty Coarse to Fine Sand with little Clay A-2-4(0)



As Detin	ied by NCDO			Fin	e Sand	< 0	0.25 mm and > 0.05	mm
Gravel	< 75 n	nm and > 2.00	mm		Silt	<	0.05 and > 0.005 n	nm
Coarse Sand	< 2.00	mm and > 0.23	5 mm		Clay		< 0.005 mm	
Maximum Pa	rticle Size	#10	. C	Coarse Sand	15.9%		Silt	13.0%

0.0% Gravel Fine Sand 60.4% 11.0% Clay Apparent Relative Density Moisture Content % Passing #200 30.4% Liquid Limit 26 Plastic Limit Plastic Index N.P.

Soil Mortar (-#10 Sieve)

Length of Dispersion Period:

Coarse Sand 15.9% 60.4% 13.2% Fine Sand Silt 10.5% Clay Description of Sand & Gravel Particles: Rounded Angular Hard & Durable □ Soft □ Weathered & Friable □

References: AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T265: Laboratory Determination of Moisture Content of Soils

Sodium Hexametaphosphate:

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

Technical Responsibility:

Mal Karajan

Dispersing Agent:

Laboratory Supervisor

ASTM D 854: Specific Gravity of Soils

S&ME. INC.

Mechanical Stirring Apparatus (A)

3109 Spring Forest Road, Raleigh, N.C. 27616

Laboratory Report Version 4.2

Particle Size Analysis of Soils



AASHTO T 88 as Modified by NCDOT

 S&ME Project #:
 1352-05-506
 Report Date:
 8/11/2005

 Project Name:
 Bridge 44 over Town Fork Creek Overflow on NC 8
 Test Date(s):
 08/08 - 08/11/2005

Client Name: NCDOT

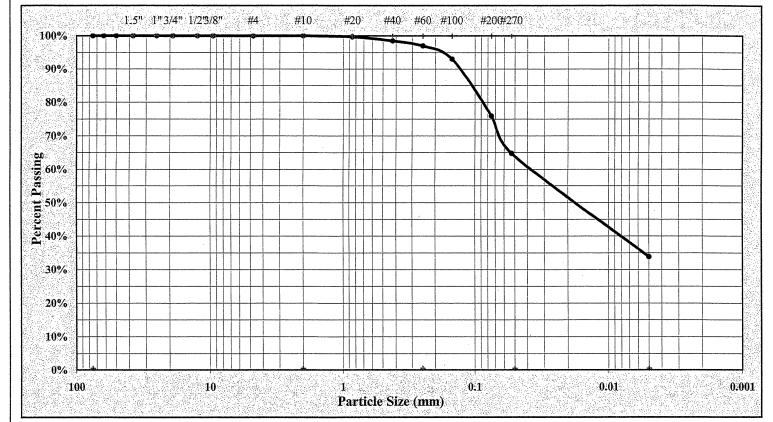
Client Address:

State Project #: 33620.1.1 F.A. Project No: BRSTP-8(2) TIP NO: B-4280

Boring #: EB2-B Sample #: SS-4 Sample Date: 7/18/05

Location: 25+72 Offset: 17' RT Depth: 3.5' - 5'

Sample Description: Brown Silty Fine Sandy Clay A-7-6 (13)



As Defin	ted by NCDOT	Fine Sand	< 0.25 mm and > 0.05 mm			
Gravel	< 75 mm and > 2.00 mm	Silt	< 0.05 and > 0.005 mm			
Coarse Sand	< 2.00 mm and > 0.25 mm	Clay	< 0.005 mm			
Marrimarum Da	entiala Siza #10 (Coorse Sand 2 00/	Cilt 21 00/			

Maximum Particle Size Coarse Sand 3.0% Silt 31.0% 0.0% 34.0% Gravel Fine Sand 32.2% Clay Apparent Relative Density Moisture Content % Passing #200 75.9% 42 Plastic Limit 18 Liquid Limit 24 Plastic Index

Soil Mortar (-#10 Sieve)

 Coarse Sand
 3.0%
 Fine Sand
 32.2%
 Silt
 31.0%
 Clay
 33.8%

 Description of Sand & Gravel Particles:
 Rounded □
 Angular □
 Hard & Durable □
 Soft □
 Weathered & Friable □

Mechanical Stirring Apparatus (A)

Length of Dispersion Period: 1 min.

Angular Light Hard & Durable Light Soft Light Weathered & Friable Light Mechanical Stirring Apparatus (A)

Dispersing Agent: Sodium Hexametaphosphate: 40 g./ Liter

References: AASHTO T88: Particle Size Analysis of Soils as Modified by the NCDOT

AASHTO T87: Dry Preparation of Disturbed Soil and Soil Aggregate Samples for Test

AASHTO T265: Laboratory Determination of Moisture Content of Soils

AASHTO T89: Determining the Liquid Limit of Soils

AASHTO T90: Determining the Plastic Limit & Plasticity Index of Soils

AASHTO M 145: The Classification of Soils and Soil Aggregate Mixtures for Highway Construction Purposes

ASTM D 854: Specific Gravity of Soils

Technical Responsibility:

Mal Karajan

<u>Laboratory Supervisor</u>

S&ME. INC.

3109 Spring Forest Road, Raleigh, N.C. 27616

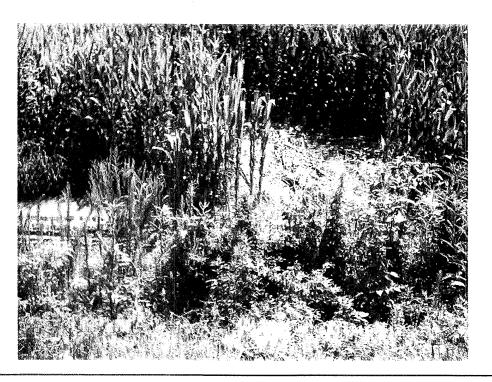
Classification FR2-R SS-12Fixed xls



Photograph No. 1:
This photograph was taken from the right side of the existing bridge, looking north.



Photograph No. 2:
This photograph was taken at proposed End Bent No. 1, looking north, upstation, along the -L- alignment.



Photograph No. 3: This photograph was taken from the left side of the -L- alignment, looking east, across proposed End Bent No. 1.



Photograph No. 4: This photograph was taken from the left side of the -L- alignment, looking east, across proposed Interior Bent No. 1.



Photograph No. 5: This photograph was taken from the left side of the -L- alignment, looking east, across proposed End Bent No. 2.



Photograph No. 6:
This photograph was taken from the existing bridge, looking west (upstream).



Photograph No. 7:
This photograph was taken from the existing bridge, looking east (downstream).



Photograph No. 8:
This photograph was taken from the right side of the existing bridge, looking south.



Photograph No. 9: This photograph was taken at proposed End Bent No. 2, looking south, downstation, along the -L- alignment.