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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

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STRUCTURE SUBSURFACE INVESTIGATION

PROJ. RE	FERENCE NO	33704.1.1 (1	B-4449)		F.A. PROJ. BRS	<i>TP-1394(2)</i>
COUNTY	CABARRU S	S				
PROJECT	DESCRIPTION	BRIDGE	NO. 2 ON	SR	1394 (POPLAR	TENT
RD.) O	VER CODDL	E CREEK				
SITE DES	CRIPTION					

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL
N.C.	33704.1.1 (B-4449)	1	17

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARROUS FIELD BORNE LOGS, ROCK CORES, AND SOUL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, CEOTECHNICAL ENGINEERING LINIT AT 1919 250-0408. RETHERE THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT, FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTICATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTICATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY PRESON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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PERSONNEL J.K. STICKNEY

NOVEMBER 2007



PROJECT REFERENCE NO. 33704.I.I (B-4449)

SHEET NO.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

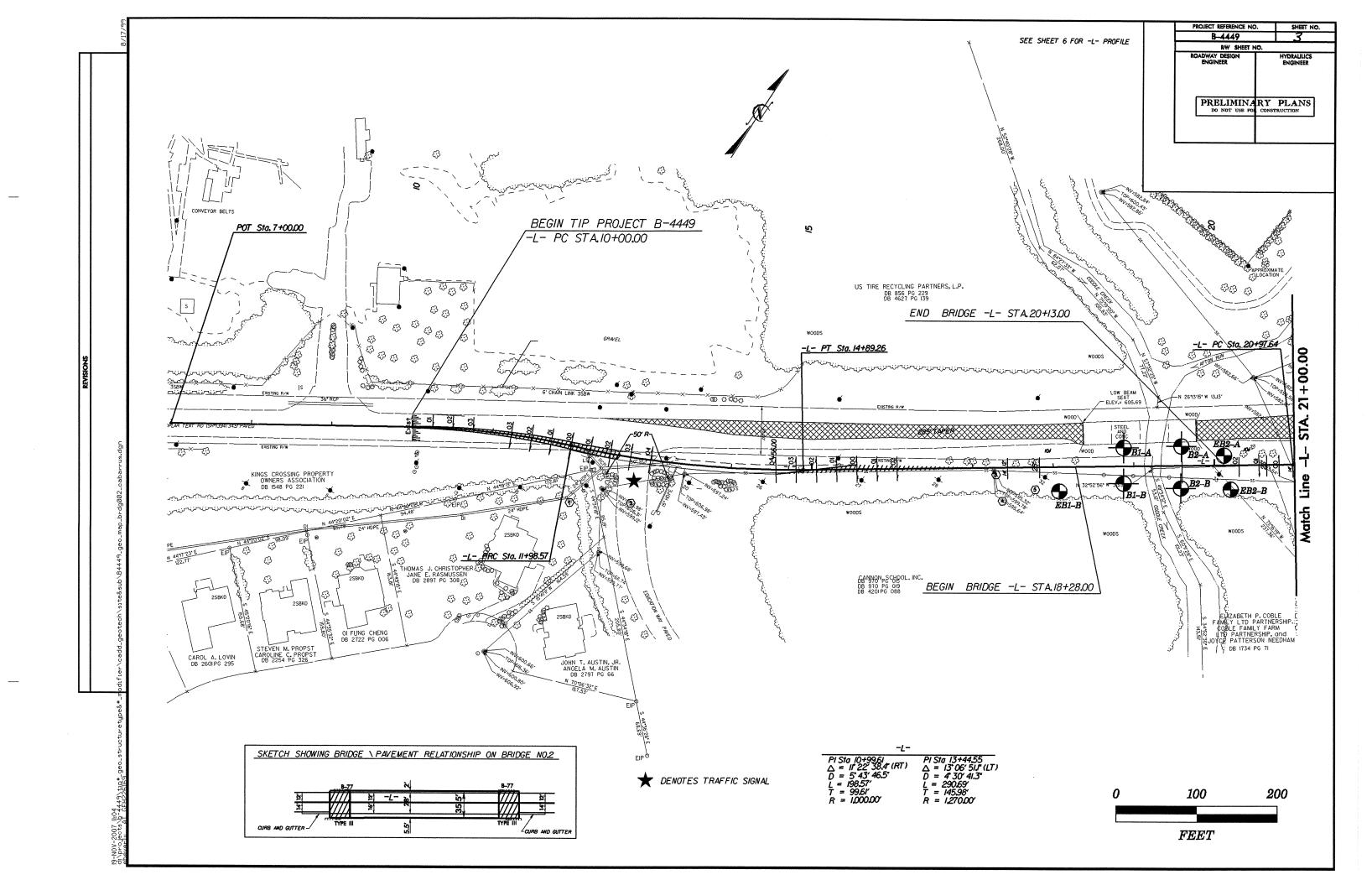
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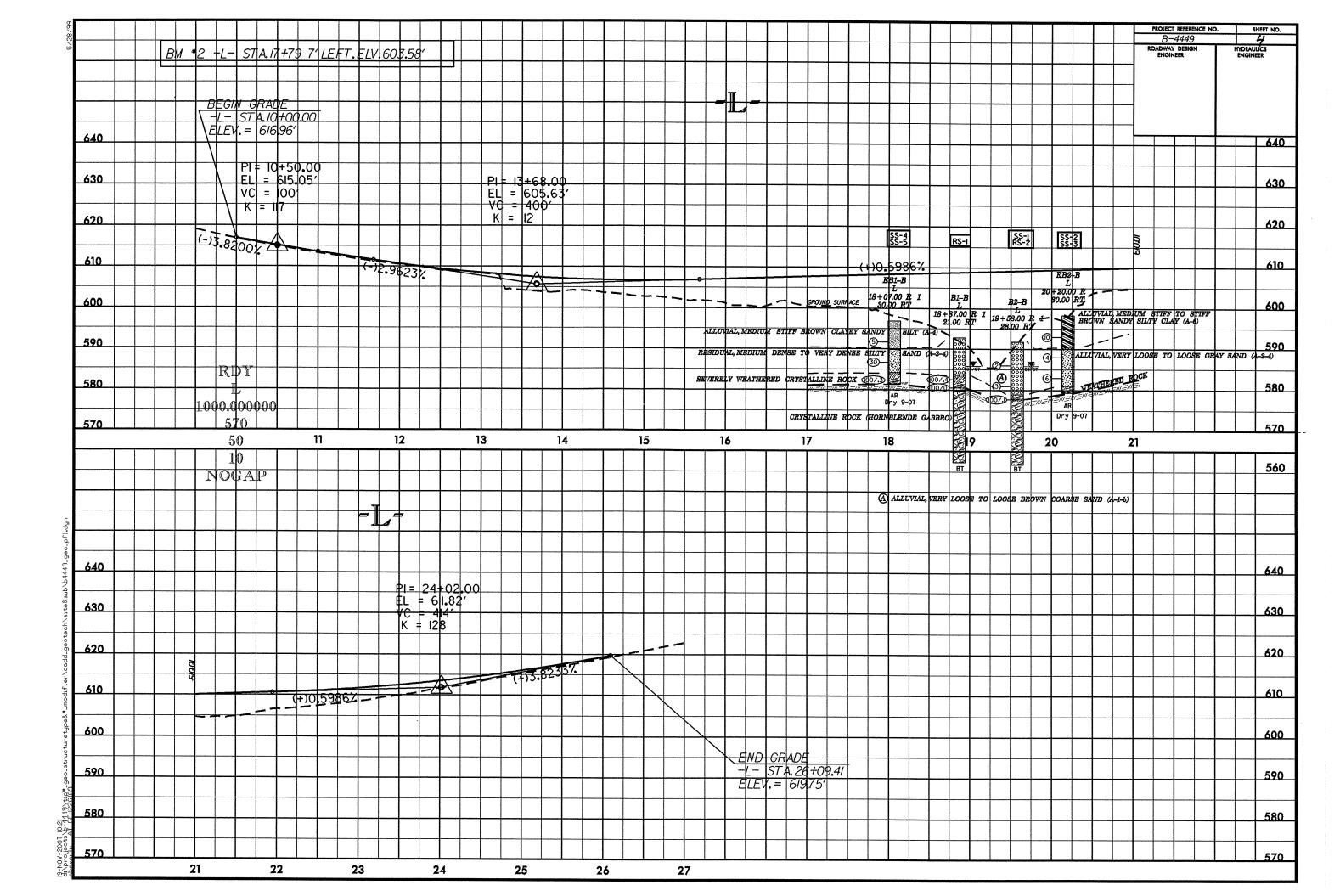
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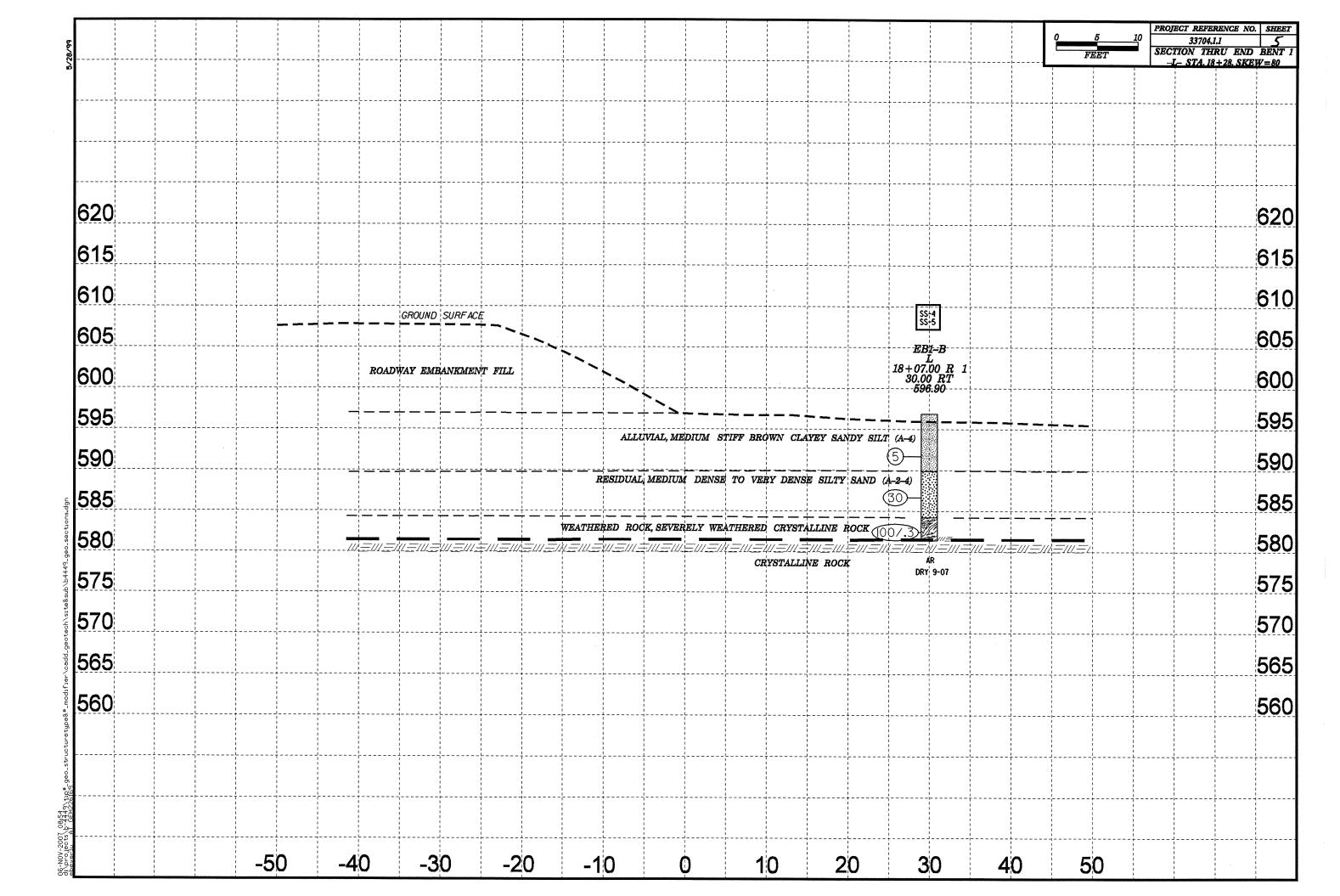
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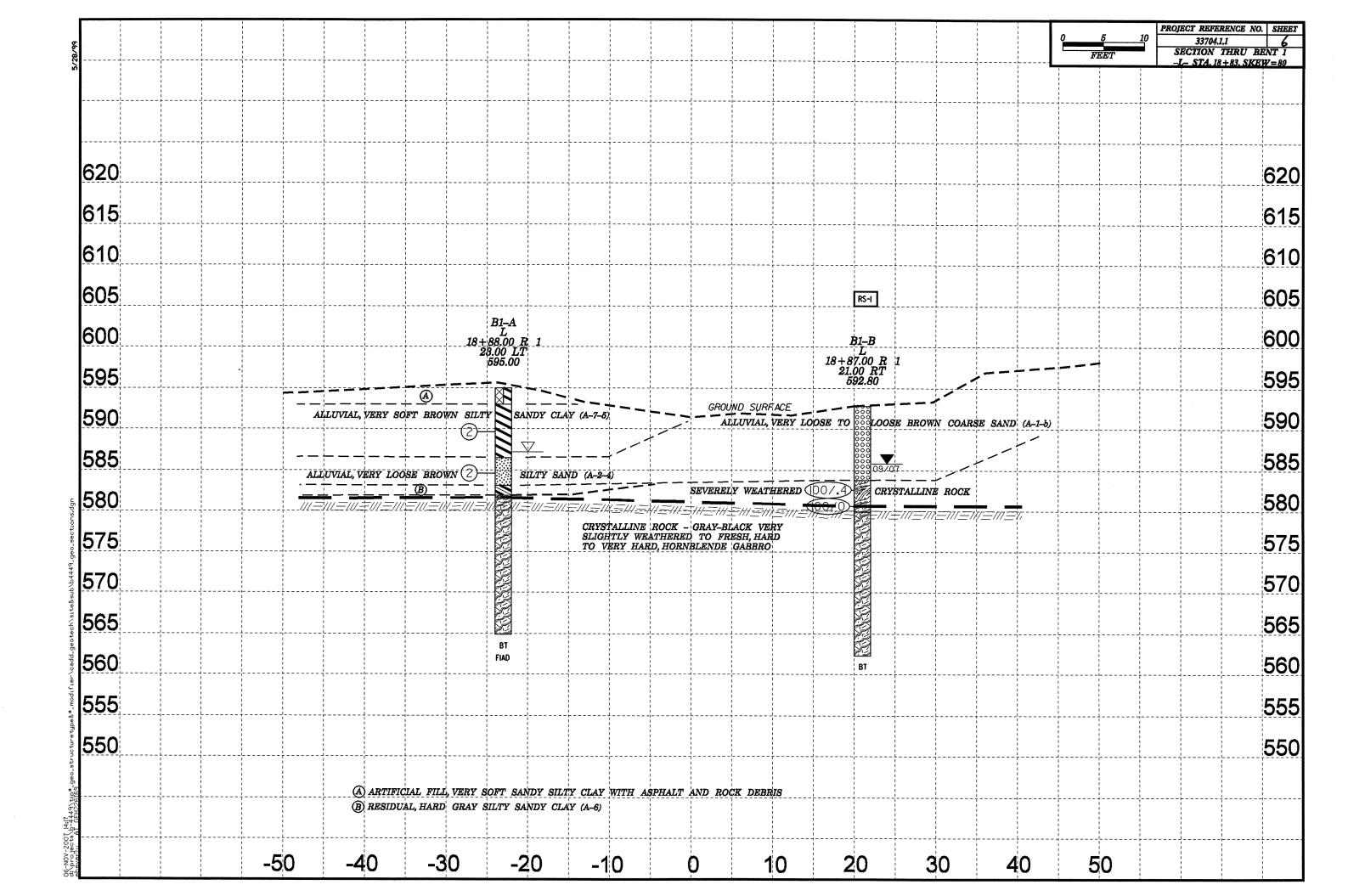
SOIL AND ROCK LEGEND TERMS SYMBOLS AND ARREVIATIONS

		is, 51 mbols, and abbreviations	
SOIL DESCRIPTION	GRADATION WELL GRADED - INDICATES A COOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE	ROCK DESCRIPTION HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFERRED	TERMS AND DEFINITIONS
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN	MELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)	ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM D-1586). SOIL	GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE	AGUIFER - A WATER BEARING FORMATION OR STRATA.
CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: VERY STIFF, GRAY, SETY CLAY, MOST WITH INTERBEDDED FINE SAND LIVERS, HISHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.
	MINERALOGICAL COMPOSITION	RUCK (WR) BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS OPERANG MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS	CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE,	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO DR ABOVE THE GROUND SURFACE.
CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	GNEISS, GABBRO, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	COMPRESSIBILITY	NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLD SPT REFUSAL IF TESTED. ROCK TYPE	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
000000000 H71-8 H71-D H72-7 H7	SLIGHTLY COMPRESSIBLE LIOUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIOUID LIMIT EQUAL TO 31-50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
SYMBOL DOOOGOOGG	HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED (CP) SHELL BEDS, ETC.	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
7. PASSING 10 50 MX GRANULAR SILT- MUCK,	PERCENTAGE OF MATERIAL GRANULAR SILT - CLAY	WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
* 40 30 MX 50 MX 51 MN SOILS COLLY PEAT	URGANIL MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
■ 200 15 MX 25 MX 18 MX 35 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN 36 MN	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.	<u>DIP</u> - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
LIQUID LIMIT 46 MX 41 MN 48 MX 41 MN 49 MX 42 MN 46 MX 41 MN SOILS WITH PLASTIC INDEX 6 MX NP 108 MX 108 MX 101 MN 108 MX 108 MX 101 MN LITTLE OR	MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF
GROUP INDEX 8 8 8 8 4 MX 8 MX 12 MX 16 MX No MX MODERATE ORGANIC	HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE GROUND WATER	OF A CRYSTALLINE NATURE.	THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
LIGHAL TYPE CETALS EPACS AMOUNTS OF SOILS	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	SLIGHT ROCK GENERALLY FRESH, JOINTS 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 ISSUED OF MAJOR SAND SOND SOND SOND SOND SOND SOND SOND SO		(SLI,) 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SDME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SANU		MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLDRATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AS A EXCELLENT TO GOOD FAIR TO POOR PAIR IU POOR UNSUITABLE	E PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	(MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
SUBGRADE 100	SPRING OR SEEP	WITH FRESH ROCK.	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
PRIMARY SOIL TYPE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION POPULATIONS SPT CPT POPULATION SAMPLE DESIGNATIONS	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	THE FIELD.
CONSISTENCY (N-VALUE) (TONS/FT2)		SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALLY VERY LOOSE <4	S - BULK SAMPLE AUGER BORING	(SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KADLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
GRANULAR LOOSE 4 TO 10 GRANULAR MEDIUM DENSE 10 TO 30 MATERIAL MEDIUM DENSE 10 TO 30	SS - 9PLIT SPOON ARTIFICIAL FILL (AF) OTHER ARTIFICIAL FILL (AF) OTHER	EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED. YIELDS SPT N VALUES > 100 BPF	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
(NON-COHESIVE) DENSE 30 TO 50	THAN ROADWAY EMBANKMENT - CORE BORING ST - SHELBY TUBE	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN
MEDI COST	INFERRED SOIL BOUNDARY SAMPLE	(Y SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
GENERALLY SOFT 2 TO 4 0.25 TO 0.50	MONITORING WELL RS - ROCK SAMPLE	VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT. N VALUES < 100 BPF	INTERVENING IMPERVIOUS STRATUM.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0 MATERIAL STIFF 8 TO 15 1 TO 2	△ INSTALLATION RT - RECOMPACTED TRIAXIAL		RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
(COHESIVE) VERY STIFF 15 TO 30 2 TO 4	SAMPLE SLOPE INDICATOR	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
	25/825 DIP & DIP DIRECTION OF INSTALLATION CBR - CALIFORNIA BEARING ROCK STRUCTURES RATIO SAMPLE	ROCK HARDNESS	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	→ SPT N-VALUE	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE
U.S. STD. SIEVE SIZE 4 10 40 60 200 270 OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	SOUNDING ROD REF SPT REFUSAL	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	PARENT ROCK.
	ABBREVIATIONS	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REDUIRED TO DETACH HAND SPECIMEN.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL
BUILDER CUBBLE GRAVEL SAND SAND SILT CLAY	AR - AUGER REFUSAL HI HIGHLY # - MOISTURE CONTENT BT - BORING TERMINATED MED MEDIUM V - VERY	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE	TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(CSE, SD.) (F SD.)	CL CLAY MICA MICACEOUS VST - VANE SHEAR TEST	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT DR
GRAIN MM 305 75 2,0 0.25 0.05 0.005 SIZE IN. 12 3	CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHERED CSE COARSE NP - NON PLASTIC 7 - UNIT WEIGHT	BY MODERATE BLOWS. MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SOIL MOISTURE - CORRELATION OF TERMS	extstyle ext	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS
SOIL MOISTURE SCALE FIELD MOISTURE CHIDE FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST 6 - VOID RATIO SAP SAPROLITIC	POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	THAN 0.1 FOOT PER 60 BLOWS.
(ATTERBERG LIMITS) DESCRIPTION OF THE PROJECT OF TH	F - FINE SD SAND, SANDY FIAD - FILLED IMMEDIATELY	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY	FOSS FOSSILIFEROUS SL SILT, SILTY AFTER DRILLING FRAC FRACTURED, FRACTURES SLI SLIGHTLY	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY
(SAT.) FROM BELOW THE GROUND WATER TABLE	FRACE - FRACTORES SEE - SCIONICY NM - (WATER) NOT MEASURED FRAGS FRAGMENTS TCR - TRICONE REFUSAL	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY	TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EDUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
PLASTIC SEMISOLID; REQUIRES DRYING TO	FOUTDWENT HOED, ON OUR TEST, DRO TEST	FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
(PI) PI PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING TERM SPACING IERM IHICKNESS	
	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM SPACING LEMM THICKNESS VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET	BENCH MARK: BM #2 AT -L- STA. 17+79, 7' LT (-BL- STA. 21+54, 21' RT)
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	MOBILE B CLAY BITS X AUTOMATIC MANUAL	WIDE 3 TO 10 FEET THICKLY BEDDED 1.5 - 4 FEET	ELEVATION: 603,58 FT.
SL _ SHRINKAGE LIMIT REQUIRES ADDITIONAL WATER TO	6' CONTINUOUS FLIGHT AUGER CORE SIZE:	CLOSE 1 to 3 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET	
- DRY - (D) ATTAIN OPTIMUM MOISTURE	□ BK-51 X 8* HOLLOW AUGERS □ -B	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED 4.008 FEET	NOTES:
PLASTICITY		INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NONPLASTIC 0-5 VERY LOW	X CME-550 X CASING X W/ ADVANCER	FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM	HAND TOULS:	GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
HIGH PLASTICITY 26 OR MORE HIGH	PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE: BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	TRICONE 215/6 TUNG-CARB. HAND AUGER	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT SOUNDING ROD VANE SHEAR TEST	DIFFICULT TO BREAK WITH HAMMER.	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	LJ LJ	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	









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620												6
615												6
610												6
605												6
600				32–A L					SS-I RS-2 B2-B			6
595			19+5 24. 5	9.00 R 1 00 LT 93.10				19	B2-B L + 58.00 R 1 28.00 RT 591.80			5
590		ARTIFICIAL FI WITH ASPHA	ILL, VERY SOFT	SANDY SIL	TY CLAY	GROU	ND SURFACE		000			5
585								2	000 000 000 000 000 000 000 000 000 00			5
580		RESIDUAL,	HARD SANDY	CLAY (A-7-	THE THAT THE TAXE OF A SECOND			ROWN COARSE SA	000			5
575		\\\\\=\\\\=\\\\		K = 1		1	i	(00/		ELY WEATHERED	<u>CRY</u> STALLINE ROCK	5
570				ا	INE ROCK, GRAY-B. VERY HARD, HORI	VBLENDE GABB	RO	ED TO FREGIA				5
565												5
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555		-						-				5
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600	ROAD	DWAY EMBANKME	ENT FILL		20+12.00 R 1 12.00 LT 597.90			20+20,00 R 30,00 598.40	1			6
595	<u> </u>		 				I <u>D</u> SURFACE O STIFF BROWN	N SANDY SILTY CLAY (A-6)				5
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	-50	-40	-30	-20	-10	0	10	20 30	40	50		1

GEOLOGIST Todd, R. W. PROJECT NO. 33704.1.1 COUNTY Cabarrus SITE DESCRIPTION Bridge #2 on SR 1394 over Coddle Creek GROUND WTR (ft) ALIGNMENT -L-BORING NO. EB1-B 0 HR. STATION 18+07 OFFSET 30ft RT COLLAR ELEV. 596.9 ft EASTING N/A TOTAL DEPTH 15.5 ft NORTHING N/A 24 HR. Dry DRILL METHOD H.S. Augers DRILL MACHINE CME-550X HAMMER TYPE Automatic START DATE 09/13/07 COMP. DATE 09/13/07 SURFACE WATER DEPTH N/A DEPTH TO ROCK 15.5 ft BLOW COUNT **BLOWS PER FOOT** ELEV DEPTH SOIL AND ROCK DESCRIPTION (ft) (ft) 0.5ft 0.5ft 0.5ft 100 NO. DEPTH (ft) 600 GROUND SURFACE ALLUVIAL
MEDIUM STIFF BROWN CLAYEY SANDY
SILT (A-4) 592.7 \$\frac{1}{4}\$.2 2 SS-4 Μ RESIDUAL
MEDIUM DENSE TO VERY DENSE SILTY 587.7 9.2 10 SS-5 SAND (A-2-4) WEATHERED ROCK SEVERELY WEATHERED CRYSTALLINE ROCK 582.7 14.2 100/.3 - - 100/.3**9** Boring Terminated by Auger Refusal at Elevation 581.4 ft On Crystalline Rock



ROJE	CT NO.	33/0	4.1.1		D.	B-4449			COUNTY	Caba	rrus			GEOLOGIST Stic	kney, J. K.	
ITE DI	ESCRIP	TION	Bridge	#2 on	SR	R 1394 over Co	ddle Cre	ek							GROUND \	WTR (fi
ORING	G NO.	B1-A			ST	TATION 18+8	8		OFFSET	23ft L	Т		ALIGNMENT	· -L-	0 HR.	7.8
OLLA	R ELEV	. 595	.0 ft		TO	OTAL DEPTH	30.1 ft		NORTHIN	G N/A	\		EASTING N	I/A	24 HR.	FIA
RILL	MACHIN	IE CN	1E-550	X	DI	RILL METHOD	NW C	asing w	// Core					HAMMER TYPE	Automatic	
TART	DATE	06/12/	06	******************	CC	OMP. DATE 0	6/12/06		SURFAC	E WATE	R DE	PTH	N/A	DEPTH TO ROCI	K 13.4 ft	
ELEV	DEPTH	BL	ow cor	TNL	П	BLC	WS PER	FOOT		SAMP.	V	L	80	L AND ROCK DESCR	PIDTION	
(ft)	(ft)	0.5ft	0.5ft	0.5ft		0 25	50	7	5 100	NO.	MOI		ELEV. (ft)	L AND ROCK DESCR	ar non	DEPTH
595					Ш								595.0	GROUND SURFAC		(
1	-												593.0 VERY	ARTIFICIAL FILI SOFT SANDY SILTY		2
590.6	- - 4.4									l .	į		. A:	SPHALT AND ROCK I	DEBRIS	J
1		0	1	1		6 2					М		- VERYS	OFT BROWN SILTY	SANDY CLAY	
7	-						:: :				∇			(A-7-5)		8
85.6	9.4	1	1		41		:: :			-			586.5	ALLUVIAL		
7	-	'	'	1		Q 2	.				Ŵ		- VERY LO	OOSE BROWN SILTY	SAND (A-2-4)) 1
Ŧ	-						-:-†÷	÷÷÷					581.9	RESIDUAL GRAY SILTY SANDY	CLAY (A-6)	/\1
7	-				$\ \cdot\ $								_	WEATHERED RO	CK	1
1	-				Ш		:: :					M	SEVER	ELY WEATHERED CI ROCK	RYSTALLINE	
‡	-				Ш		:: :					M	GRAY-BL	CRYSTALLINE RO ACK VERY SLIGHTLY		D
1	-				11							M		RESH, HARD TO VE HORNBLENDE GAB	RY HARD,	_
‡	-						:: :							HORNBELINDE GAD	ыко	
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<u> </u>	.				\parallel		.									. "
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	- 		<u> </u>	 	╀						ļ	42	_564.9 Boring	Terminated at Elevation	on 564.9 ft In	3
1												l F		Crystalline Rock		
<u> </u>	-				Ì							l F		was originally designated for Bridge Maintena		
+	•											l F	emerge	ency job. No core phot	os available.	
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ROJE	ECT NO	. 337	04.1.1	11	D. B-4	1449				COUNTY Cabarrus		GEOLOGIST Stic	kney, J. K.	
SITE	ESCRI	PTION	Bridge	#2 on	SR 13	94 over (Coddle	Creek	(GROUND V	NTR (ft)
ORIN	IG NO.	B1-A			STAT	ION 18	+88			OFFSET 23ft LT	ALIGNMEN	Γ -L-	0 HR.	7.8
OLLA	AR ELE	V. 59	5.0 ft		TOTA	L DEPTI	d 30.1	ft		NORTHING N/A	EASTING	N/A	24 HR.	FIAD
RILL	MACH	NE C	ME-550	X	DRILL	METHO	D NV	V Cas	ing w	/ Core	<u> </u>	HAMMER TYPE	Automatic	
TAR	DATE	06/1:	2/06		COMP	. DATE	06/12	/06		SURFACE WATER DEPTH N	 'A	DEPTH TO ROCI	√ 13.4 ft	
ORE	SIZE	NXWL			TOTA	L RUN	16.7 ft			DRILLER Smith, M. L.				
LEV	DEPTH	RUN	DRILL	PEC.	UN RQD	SAMP.	STR	ATA	L	<u> </u>				
(ft)	(ft)	(ft)	RATE (Min/ft		(ft) %	NO.	REC. (ft) %	RQD (ft) %	0 G	DES ELEV. (ft)	CRIPTION AND	REMARKS		DEPTH (f
81.6											egin Coring @	D 13.4 ft		
81.6 . 79.9 <u>.</u>	13.4 15.1	1.7		(1.4) 82%	(0.4)		(16.3)	(12.1) 72%		581.6 GRAY-BLACK VERY SLIC	CRYSTALLIN	E ROCK	PD TO VERY	13.
	ł	5.0		(4.9)	(3:6)	1	30%	12/0		HARD, HORNBLENDE	GABBRO WITH	VERY CLOSE TO MO	DERATELY	
	Ŧ			98%	72%					Ci	OSE FRACTUR	RE SPACING		
74.9	20.1	5.0	ļ	(5.0)	(3.8)					- -				
	Ŧ	0.0	•	100%	76%					•				
_ 59.9	25.1									•				
	- 23.1	5.0	<u> </u>	(5.0)	(4.3)					-				
	‡			100%	86%					•				
34.9	30.1									_564.9				30.
	İ									Boring Terminat	ed at Elevation s	564.9 ft In Crystalline R	ock	
	ł									Boring was originally desig		drilled for Bridge Main photos available.	tenance as an	
-	F								ŀ	- emerge	icy job. No core	priotos available.		
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ROJE	CT NO.	3370	4.1.1	1	D.	B-4449		COUNTY	Caba	rrus			SEOLOGIST Tod	d, R. W.	
ITE D	ESCRIP	TION	Bridge	#2 on	S	R 1394 over Co	ddle Creek					-		GROUND W	VTR (1
ORIN	G NO.	B1-B			s	STATION 18+8	7	OFFSET	21ft R	Т		ALIGNMENT	-L-	0 HR.	N/
OLLA	R ELEV	/. 592.	8 ft		7	TOTAL DEPTH	30.5 ft	NORTHIN	IG N/A	١		EASTING N	I/A	24 HR.	7
RILL	MACHIN	NE CN	IE-550)	X	C	DRILL METHOD	NW Casing w	/ Core					HAMMER TYPE	Automatic	
TART	DATE	09/13/	07		С	COMP. DATE 0	9/13/07	SURFACI	E WATE	R DEF	РΤΗ	N/A	DEPTH TO ROC	K 12.2 ft	
LEV	DEPTH	BLO	ow cor	JNT	Ī	BLC	WS PER FOOT		SAMP.	V /	L L	SOI	L AND ROCK DESCF	RIPTION	
(ft)	(ft)	0.5ft	0.5ft	0.5ft		0 25	50 75	5 100	NO.	MOI		ELEV. (ft)	E AND ROOK BEGO!		DEPTH
595 _	-										000	592.8	GROUND SURFA	CE	
1.1.1.1							• 1 1			D	00000000000000000000000000000000000000	 - - - -	OSE TO LOOSE BRO SAND (A-1-b)	OWN COARSE	
3.0	9.8	100/4			l	1		∹÷÷↓				_ 000.0	WEATHERED RO		
0.6	- - 12.2	100/.4						100/.4				- SEVER - 580.6	ELY WEATHERED C ROCK	RYSTALLINE	
1	-	100/0						100/0	RS-1			=579.9 CPVST	CRYSTALLINE RO ALLINE ROCK (DEFI		$\overline{\Gamma}$
-	-							::::	K5-1				REFUSAL)		J
_	_					• • • • •							CRYSTALLINE RO Y-BLACK FRESH, VE	RY HARD,	
-	-					::::						_ HORN	BLENDE GABBRO W FRACTURE SPACI		
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NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET //

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PROJECT NO.				D. B-4					COUNTY Cabarrus	GEOLOGIST Tod	
SITE DESCRIPT		Bridge #	2 on				Creek		·		GROUND WTR (ft)
BORING NO. B					ON 18+				OFFSET 21ft RT ALIGNMEN		0 HR. N/A
COLLAR ELEV.					L DEPTH				NORTHING N/A EASTING		24 HR. 7.0
DRILL MACHINE					METHO			ng w		HAMMER TYPE	
START DATE		/07			. DATE				SURFACE WATER DEPTH N/A	DEPTH TO ROC	< 12.2 ft
CORE SIZE NX		DD!!!		TOTAI UN	RUN				DRILLER Smith, M. L.		
ELEV DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	STR REC. (ft) %	RQD (ft) %	L 0 G	DESCRIPTION AND	REMARKS	DEPTH (f
572.2 20.6	7.7		(7.6) 99%	(5.4) 70%	RS-1	- (17.5) 99%	(13.8) 78%		Begin Coring (579.9 CRYSTALLIN GRAY-BLACK FRESH, VERY HARD, HOI FRACTURE S	E ROCK RNBLENDE GABBRO	MITH CLOSE
‡	4.6		(4.6) 100%	(4.2) 91%					-		
‡	5.3		(5.3) 100%	(4.2) 79%					-		
562.3 + 30.5								1	562.3 Boring Terminated at Elevation	562 3 ft In Crystalline R	30.:
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NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET

ROJE	CT NO.	3370	4.1.1	I	D.	B-4449			COUNTY	Caba	rrus			GEOLOGIST St	ickney, J. K.	
ITE D	ESCRIP	TION	Bridge	#2 on	S	R 1394 ove	r Coddle	e Creek	-						GROUND W	/TR (f
ORIN	G NO.	B2-A	···········		s	STATION	19+59		OFFSET	24ft L	Т		ALIGNMEN	NT -L-	0 HR.	N/
OLLA	R ELEV	7. 593.	1 ft		7	TOTAL DEP	TH 29	2 ft	NORTHIN	IG N/A	4		EASTING	N/A	24 HR.	8.
RILL	MACHIN	NE CN	1E-550	X	C	ORILL METI	HOD N	W Casing v	v/ Core					HAMMER TYPE	Automatic	
TART	DATE	06/09/	06		+-	OMP. DAT			SURFAC	E WAT	ER DEI	PTH	N/A	DEPTH TO RO	CK 13.5 ft	
ELEV	DEPTH	BLO	ow cor	JNT	Τ		BLOWS	PER FOOT		SAMP	V /	L				
(ft)	(ft)	0.5ft	0.5ft	0.5ft	1	0 25	5	50	75 100	NO.	MOI	0 G	ELEV. (ft)	OIL AND ROCK DESC		DEPTH
595														•		
3														GROUND SURF.	ACE	
1					T			1				X	591.1 VFR	ARTIFICIAL FI		
89.6	- - 3.5						· · · ·	1		1				ASPHALT AND ROCK		\int_{-}^{-}
1	-	0	0	1		1: : : :					М		- -	ALLUVIAL VERY SOFT TO MEDI	UM STIFF	
4	-					<i>[</i> ::::				1.			- BROV -	/N-GRAY SILTY SAND	OY CLAY (A-7-5)	
84.6	- 8.5 -	1	2	3	\dashv	1		 			W		 -			
-	-		_			•6		1 : : : :	: : : :		"		-			
79.6	- - 13.5					7	> :		<u> </u>				581.1 579.6	RESIDUAL		1 1
10.0	- 10.0	100/.1							- 100/.1	·			-579.5 HAF	RD GRAY SILTY SAND		伔
4	-							::::						DEFINED BY SPT R	EFUSAL	
4									1				- - GRAY-i	CRYSTALLINE R BLACK VERY SLIGHT)
1	-							: : : :					- TO	FRESH, HARD TO V HORNBLENDE GA		
1	-							: : : :					•			
4	- -							+								
1	-					: : : :		1::::	: : : :							
<u>†</u>	-												•	•		
				 	+	11			<u> </u>	╂			563.9 Borir	ng Terminated at Eleva	tion 563.9 ft In	2
1	-												•	Crystalline Roo		
\pm	_					·							Borin	g was originally design	ated B-2 when	
- 1	-													illed for Bridge Mainter rgency job. No core ph		•
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PROJE	CT NO.	3370	04.1.1		D. B-4	1449				COUNTY Cabarrus GEOLOGIST Stickney, J. K.	٦
SITE D	ESCRIP	TION	Bridge :	#2 on	SR 13	94 over C	Coddle	Cree	k	GROUND WTR (fi	t)
BORIN	G NO.	B2-A			STAT	ION 19-	+59			OFFSET 24ft LT ALIGNMENT -L- 0 HR. N//	Α
COLLA	R ELEV	7. 593	3.1 ft		TOTA	L DEPTH	1 29.2	2∙ft		NORTHING N/A EASTING N/A 24 HR. 8.	7
DRILL	MACHIN	NE C	ME-550X		DRILL	_ METHO	D NV	V Cas	ing w	w/ Core HAMMER TYPE Automatic	7
START	DATE	06/09	9/06		COMP	P. DATE	06/09	/06		SURFACE WATER DEPTH N/A DEPTH TO ROCK 13.5 ft	٦
CORE	SIZE N	IXWL	-		TOTA	L RUN	15.2 ft			DRILLER Smith, M. L.	٦
ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft)	ATA RQD (ft) %	D O G		(ft)
579.1 579.1									1 1	Begin Coring @ 14.0 ft	
579.1	14.0	5.2		(5.1) 98% (5.0)			(14.9) 98%	(8.9) 59%	KIKIK		4.0
568.9	24.2	5.0		(4.8) 96%	(3.4) 68%				HANNE OF THE		
563.9	29.2									563.9 29	12
										Boring Terminated at Elevation 563.9 ft In Crystalline Rock	
-										Boring was originally designated B-2 when drilled for Bridge Maintenance as an emergency job. No core photos available.	
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DJECT NO. 33704.1.1	.OG REPORT ID. B-4449	COUNTY Cabarrus	GEOLOGIST Todd, R.	W.
	on SR 1394 over Coddle Creek		GRO	UND WTR (1
RING NO. B2-B	STATION 19+58	OFFSET 28ft RT	ALIGNMENT -L- 0	HR. 6.
LAR ELEV. 591.8 ft	TOTAL DEPTH 30.0 ft	NORTHING N/A		HR . 6
LL MACHINE CME-550X	DRILL METHOD NW Casing w		HAMMER TYPE Auto	matic
ART DATE 09/12/07	COMP. DATE 09/12/07	SURFACE WATER DEPTH N/		
	BLOWS PER FOOT	SAMP. L	<u> </u>	
V DE1 111	5ft 0 25 50 7	100	SOIL AND ROCK DESCRIPTION _EV. (ft)	N DEPTH
.0 4.8		59 000 000 000 000 000 000 000 000 000 0	91.8 GROUND SURFACE ALLUVIAL VERY LOOSE BROWN COARSE S (A-1-B)	SAND
.0 7 9.8	•3 · · · · · · · · · · · · · · · · · · ·		79.0 77.8 WEATHERED ROCK SEVERELY WEATHERED CRYST <i>A</i> ROCK	ALLINE
		RS-2	CRYSTALLINE ROCK GRAY-BLACK, FRESH, VERY HA HORNBLENDE GABBRO WITH CI FRACTURE SPACING	
‡			i1.8 Boring Terminated at Elevation 561	0.61
			Crystalline Rock	



SHEET

PROJECT NO.		· · · · · ·			449				COUNTY Cabarrus		GEOLOGIST Toda	J, IX. VV.	
SITE DESCRIP	TION	Bridge #	2 on	SR 139	94 over C	oddle	Creek				-	GROUND W	TR (f
ORING NO.	B2-B			STATI	ON 19+	-58			OFFSET 28ft RT ALIC	IGNMENT	-L-	0 HR.	6.
OLLAR ELEV	. 591	.8 ft		TOTA	L DEPTH	30.0) ft		NORTHING N/A EAS	STING N	I/A	24 HR.	6.0
RILL MACHIN	IE CI	ME-550X		DRILL	METHO	D NV	V Cas	ing w	/ Core		HAMMER TYPE	Automatic	
TART DATE	09/12	/07		COMP	. DATE	09/12	/07		SURFACE WATER DEPTH N/A		DEPTH TO ROCK	(14.0 ft	
ORE SIZE N	XWL			TOTA	L RUN 1	6.0 ft			DRILLER Smith, M. L.				
ELEV DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft)	RQD (ft) %	SAMP. NO.	STR REC. (ft) %	ATA RQD (ft)	LOG	DESCRIPT ELEV. (ft)	TION AND	REMARKS	D	EPTH
77.8										Coring @	14.0 ft		
77.8 14.0	6.5		(6.5) 100%		RS-2	(15.9) 99%	(13.3) 83%	1515151	- 577.8 CRY - GRAY-BLACK, FRESH, VERY H - FRACTURE SPACING - PROMIN	YSTALLINE HARD, HOR NANT VERT	ROCK NBLENDE GABBRO		14
66.3 25.5	5.0 4.5		(5.0) 100% (4.4)	(3.8) 76% (4.2)									
‡	4.5		98%	93%					- -				
61.8 30.0		****							- - 561.8				30
									Boring Terminated at E	Elevation 56	61.8 ft In Crystalline Re	ock	
+++++++++++++++++++++++++++++++++++++++													



PROJECT NO. 33704.1.1 ID. B-4449 COUNTY						Caba	rrus				GEOLOGIST Too	ld, R. W.				
ITE D	ESCRIP	TION	Bridge	#2 on	S	R 1394 over Co	oddle Creek								GROUND W	VTR (
ORIN	G NO.	EB2-A			s	STATION 20+	12	OFFSET	12ft L	Т		ALIGI	MEN.	T -L-	0 HR.	D
OLLA	R ELEV	. 597.	9 ft		Т	OTAL DEPTH	19.0 ft	NORTHING N/A EASTING N/A					N/A	24 HR.	D	
RILL	MACHIN	NE CN	1E-550)	X	C	ORILL METHOD	H.S. Augers							HAMMER TYPE	Automatic	
TART	DATE	09/13/	07		+-	OMP. DATE		SURFAC	E WATE	R DE	PTH	N/A		DEPTH TO ROC	K 19.0 ft	
ELEV	DEPTH	BLO	ow cou	JNT	Т	7	OWS PER FOOT	·	SAMP.	V/	1 L	T .		1		**************************************
(ft)	(ft)	0.5ft	0.5ft	0.5ft	1	0 25	50 7	5 100	NO.	MO	O G	ELEV. (ft)	SC	OIL AND ROCK DESC		DEPTH
600 _	-											597.9	OTICE	GROUND SURFA	CE	
94.6	- 3.3							• • • • •				Ļ	SHEE	TO VERY STIFF BRO SILTY CLAY (A-		
1	-	7	8	8		16		::::		D						
1	-					· · • • · ·		: : : :				t				
89.6	- 8.3	2	2	3	\dashv					١,,,		589.9		ALLUVIAL		
1	_	-	-			5				W		ŧ		LOOSE GRAY SAND	(A-2-4)	
84.6	- - 13.3											L				
1	-	2	2	2	1	6 4 · · · ·				w		-				
1												E80 E				
79.6	- 18.3	100/0						100/0				580.5 579.6 578.9		WEATHERED RO		5
+	,											-	Borin	ROCK CRYSTALLINE RO TALLINE ROCK DEFI REFUSAL Ig Terminated by Auge ation 578.9 ft On Crys	NED BY SPT er Refusal at	
1	-															
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SHEET 14

WW	y B	OR	ELC	OG REPO	DRT								
PROJECT NO.				D. B-4449		COUNTY	Caba	rrus			GEOLOGIST Too	d, R. W.	
SITE DESCRIP	PTION	Bridge	#2 on	SR 1394 over C	oddle Creek						-	GROUND W	/TR (ft)
BORING NO.	EB2-B			STATION 20+		OFFSET	30ft R	T ·		ALIGNMEN	VT -L-	0 HR.	Dry
COLLAR ELE				TOTAL DEPTH	19.0 ft	NORTHIN	IG N/A	\		EASTING	N/A	24 HR.	Dry
DRILL MACHI			Κ	DRILL METHO	D H.S. Augers						HAMMER TYPE	Automatic	***************************************
START DATE	09/12/	07		COMP. DATE	09/12/07	SURFACE WATER DEPTH N/A DEPTH TO ROCK 19.0 ft						K 19.0 ft	
ELEV DEPTH (ft) (ft)	0.5ft	OW COL	0.5ft		OWS PER FOOT 50 7	5 100	SAMP.		LOG	S ELEV. (ft)	OIL AND ROCK DESCR		DEPTH (ft)
600									<u> </u>	598.4	GROUND SURFA	CE	0.0
<u> </u>										MEDII	ALLUVIAL JM STIFF TO STIFF BR SILTY CLAY (A-6		
594.0 4.4	4	4	6	- 10			SS-2	D					
589.0 9.4	2	2	2							590.4 VER	ALLUVIAL Y LOOSE TO LOOSE (RAY SAND	8.0
<u>‡</u>		-	_	4			SS-3	W		,	(A-2-4)		
584.0 14.4	3	3	3	6									
<u> </u>									7///	581.1 579.4 SEVE	WEATHERED RO		17.3
<u> </u>									E	Bor	ROCK ing Terminated by Auge vation 579.4 ft On Cryst	r Refusal at	J
‡									<u> </u>	Lie	valion 575.4 it on Grysl	amine rock	
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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAY MATERIALS & TESTS UNIT SOILS LABORATORY

T. I.	P.	No.	B-4449
I . I.		140.	עדדדי

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project	33704.1.1	County	CABARRUS		Owner
Date: Sampled	9/7/07	Received	9/24/07		Reported 9/26/07
Sampled from	BRIDGE	•		Ву	J E BEVERLY
Submitted by	N WAINAINA				1995 Standard Specifications

740849 TO 740853 11/19/07

TEST RESULTS

Proj. Sample No.		SS-1	SS-2	SS-3	SS-4	SS-5	
Lab. Sample No.		740849	740850	740851	740852	740853	
Retained #4 Sieve	%	-	_	-	-	1	
Passing #10 Sieve	%	98	100	98	98	93	
Passing #40 Sieve	%	23	97	68	87	62	
Passing #200 Sieve	%	3	74	12	48	25	4.

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%							
Coarse Sand Ret - #60	%	90.5	9.2	54.4	20.0	48.5	
Fine Sand Ret - #270	%	7.6	23.1	36.0	36.8	29.4	-
Silt 0.05 - 0.005 mm	%	0.9	30.9	5.5	22.7	18.0	
Clay < 0.005 mm	%	1.0	36.8	4.1	20.4	4.1	
Passing #40 Sieve	%	-	_	-	-		
Passing #200 Sieve	%	-	-	-	-	-	

L. L.		27	36	24	24	31	
P. I.		NP	15	NP	8	3	
AASHTO Classification		A-1-b(0)	A-6(10)	A-2-4(0)	A-4(1)	A-2-4(0)	
Station							
LOCATION		B2 B	EB2 B	EB2 B	EB1-B	EB1-B	
ALIGNMENT		L	L	L	L	L	<u></u>
Depth (Ft)		4.80	4.40	9.40	4.20	9.20	
	to	6.30	5.90	10.90	5.70	10.70	

cc: JE BEVERLY Soils File

Soils Engineer Page 1

Date: 11/26/2007



FIELD SCOUR REPORT

WBS:	33704.1.1 TIP: B-4449 COUNTY: Cabarrus	
DESCRIPTION(1):	Bridge #002 on Poplar Tent Rd. (SR 1394) over Coddle Creek	
	EXISTING BRIDGE	
Information from:	Field Inspection X Microfilm (reel pos:) Other (explain)	
	2 Length: 141 Total Bents: 5 Bents in Channel: 3 Bents in Floodplain: Timber piles and recently added steel H-Piles	5
EVIDENCE OF	, ,	
Abutments or I	End Bent Slopes: Slopes are soft and deteriorating at both End Bents. Wingwalls are separating from abutments.	
Interior Bents:	None observed	· · · · · · · · · · · · · · · · · · ·
Channel Bed:	None observed	
Channel Bank:	Undercutting in banks with trees leaning in toward channel.	
EXISTING SCO	JR PROTECTION	
Type(3):	None	
Extent(4):		
Obstructions(6):	Some limbs and small shrubs	

INSTRUCTIONS

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

			<u>DES</u>	<u>IGN IN</u>	IFORM	ATION	<u>l</u>				
Channel Bed M	aterial(7):	silty san									
Channel Bank M	silty sand (A-2-4)										
Channel Bank	Cover(9):	Mature t	rees, shr	ubs, and	l grass						
Floodplain V	Vidth(10):	аррх. 25	50'								
Floodplain C	Cover(11):	Mature t	rees, shr	ubs, and	l grass						
Strea	am is(12):	Aç	ggrading	Χ_	Degr	ading	Un	determin	ed	_	
Channel Migration Tend											
Observations and Ot	her Comm	added b		nd alon	g side of	existing	d to increa bents. Th				
DESIGN SCOUR ELEVATIONS(14)						Feet	t_X_	Mete	ers	-	
	BENTS B1	•	Da	D4							
	586	B2 583	B3	B4	1	<u> </u>	T	Γ	r	<u> </u>	
	300	363									
							 				
							1				
											L
Comparison of DSE											
The Geotechnical En	gineering	Unit has	no cause	to adjus	st the Hy	draulics	Theoritica	l Scour.	The Des	ign Scou	ir
elevations are equiva	ient to the	tneoretic	cai scour.								
SOIL ANALYSIS RE	SULTS F	ROM CH	ANNEL	BED AN	ID BANK	MATE	RIAL				
Bed or Bank			- T		ካ						
Sample No.											
Retained #4											
Passed #10											
Passed #40	See Shee						ļ				
Passed #200											
Coarse Sand Fine Sand										ļ	
Silt										<u> </u>	
Clay									*		
					J						
PI				***************************************		l					
AASHTO											
Station											
Offset											
Depth											
				4 6	18.	. 1.				Template R	Revised 02/07/0

33704.1.1 (B-4449) CABARRUS COUNTY BRIDGE NO. 2 ON SR 1394 OVER CODDLE CREEK

CORE PHOTOS OF B1-B AND B2-B



