

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5404 46119	1	7

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY JACKSON
PROJECT DESCRIPTION BRIDGE NO. 136 OVER
BIG PINE CREEK ON SR-1163

SITE DESCRIPTION _____

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1919 TOT-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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

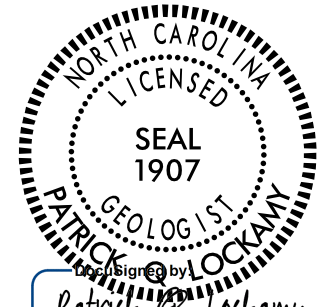
THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE 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.

NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

DC ELLIOTT
CJ COFFEY
DO CHEEK

INVESTIGATED BY PQ LOCKAMY
DRAWN BY PQ LOCKAMY
CHECKED BY JC KUHNE ^{DS}
SUBMITTED BY JC KUHNE ^{JK}
DATE 10-22-2014



Signature by Patrick C. Lockamy
E1F223BB61883/27/2015

SIGNATURE DATE

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4-5	CROSS SECTION(S)
6-7	BORE LOGS

REFERENCE: B-5404

PROJECT: 46119

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SUBSURFACE INVESTIGATION
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

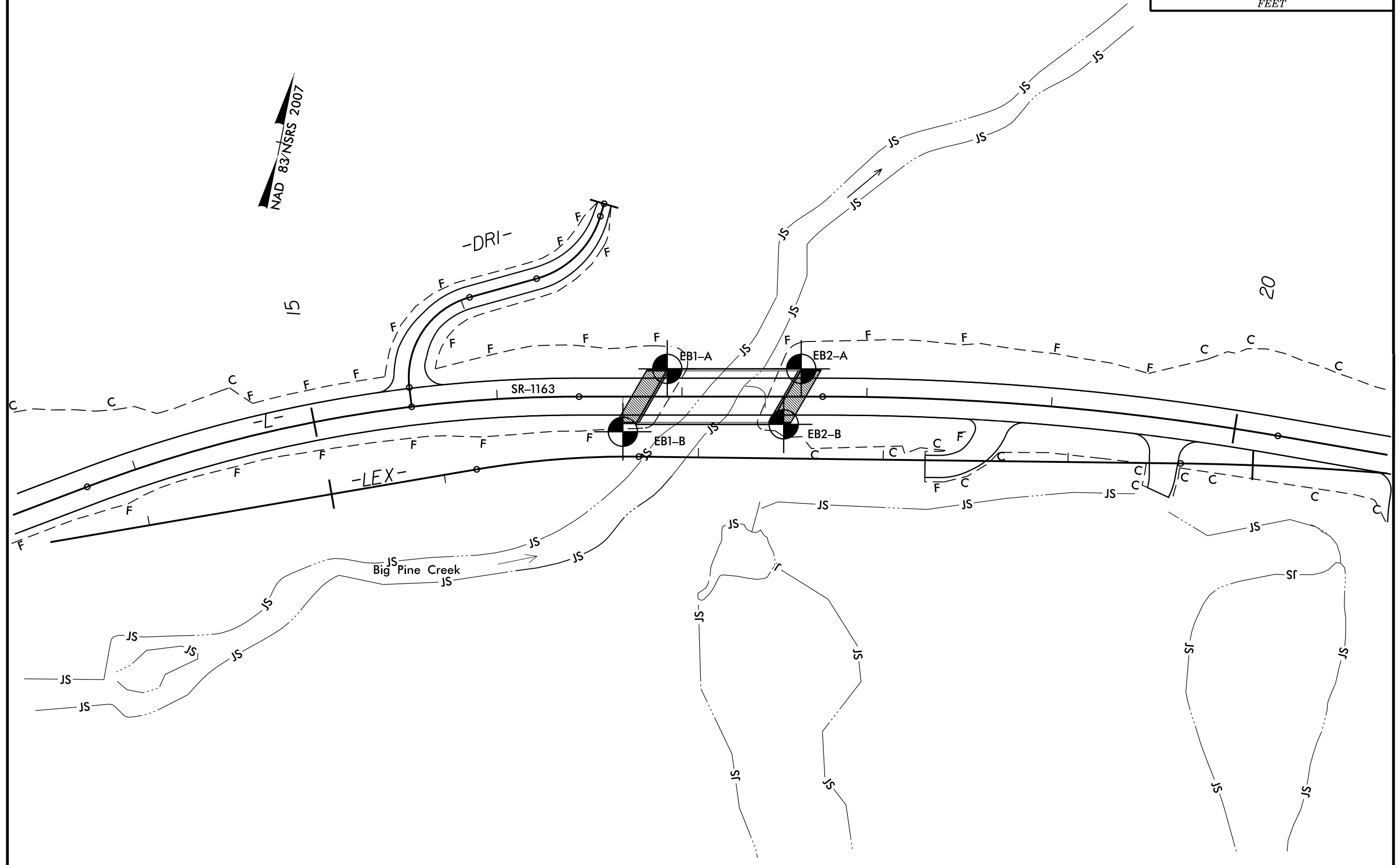
SOIL DESCRIPTION										
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										
SOIL LEGEND AND AASHTO CLASSIFICATION										
GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)					SILT-CLAY MATERIALS (> 35% PASSING #200)			ORGANIC MATERIALS	
GROUP CLASS.	A-1	A-3	A-2	A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	A-6, A-7
SYMBOL	[Patterned boxes for A-1 to A-7]					[Patterned boxes for A-1, A-2 to A-7]			[Patterned boxes for A-1, A-2 to A-7]	
% PASSING #10 #40 #200	[Tables for % passing values]					[Tables for % passing values]			[Tables for % passing values]	
MATERIAL PASSING #40 LL PI	[Tables for LL and PI values]					[Tables for LL and PI values]			[Tables for LL and PI values]	
GROUP INDEX	[Tables for Group Index values]					[Tables for Group Index values]			[Tables for Group Index values]	
USUAL TYPES OF MAJOR MATERIALS	[Tables for material types]					[Tables for material types]			[Tables for material types]	
GEN. RATING AS SUBGRADE	[Tables for gen. ratings]					[Tables for gen. ratings]			[Tables for gen. ratings]	
CONSISTENCY OR DENSENESS										
PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY		RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)		RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)					
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	[Consistency levels]		[N-value ranges]		[Strength ranges]		[Notes]			
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	[Consistency levels]		[N-value ranges]		[Strength ranges]		[Notes]			
TEXTURE OR GRAIN SIZE										
U.S. STD. SIEVE SIZE OPENING (MM)	[Sieve sizes]		[Sieve sizes]		[Sieve sizes]		[Sieve sizes]			
BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE, SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)				
[Values]	[Values]	[Values]	[Values]	[Values]	[Values]	[Values]				
SOIL MOISTURE - CORRELATION OF TERMS										
SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION								
[Limits]	[Descriptions]	[Guides]								
PLASTICITY										
PLASTICITY INDEX (PI)		DRY STRENGTH								
[PI ranges]	[PI ranges]	[Strength levels]	[Strength levels]							
COLOR										
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.										

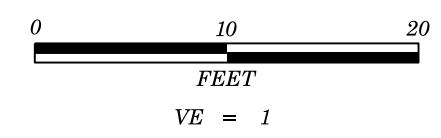
GRADATION									
WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.									
ANGULARITY OF GRAINS									
THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.									
MINERALOGICAL COMPOSITION									
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.									
COMPRESSIBILITY									
SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50									
PERCENTAGE OF MATERIAL									
ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE									
GROUND WATER									
[Water level symbols and descriptions]									
MISCELLANEOUS SYMBOLS									
[Roadway embankment, soil symbol, artificial fill, inferred soil boundary, inferred rock line, alluvial soil boundary, dip and dip direction, test boring, auger boring, core boring, monitoring well, piezometer installation, slope indicator, cone penetrometer test, sounding rod, test boring with core, SPT N-value]									
RECOMMENDATION SYMBOLS									
[Undercut excavation, unclassified excavation - unsuitable waste, unclassified excavation - acceptable degradable rock, unclassified excavation - acceptable]									
ABBREVIATIONS									
[AR - AUGER REFUSAL, BT - BORING TERMINATED, CL - CLAY, CPT - CONE PENETRATION TEST, CSE - COARSE, DMT - DILATOMETER TEST, DPT - DYNAMIC PENETRATION TEST, e - VOID RATIO, F - FINE, FOSS. - FOSSILIFEROUS, FRAC. - FRACTURED, FRAGMENTS, HI. - HIGHLY, MED. - MEDIUM, MICA - MICACEOUS, MOD. - MODERATELY, NP - NON PLASTIC, ORG. - ORGANIC, PMT - PRESSUREMETER TEST, SAP. - SAPROLITIC, SD. - SAND, SANDY, SL. - SILT, SILTY, SLI. - SLIGHTLY, TCR - TRICONE REFUSAL, w - MOISTURE CONTENT, V - VERY, VST - VANE SHEAR TEST, WEA. - WEATHERED, UNIT WEIGHT, DRY UNIT WEIGHT, SAMPLE ABBREVIATIONS, S - BULK, SS - SPLIT SPOON, ST - SHELBY TUBE, RS - ROCK, RT - RECOMPACTED TRIAXIAL, CBR - CALIFORNIA BEARING RATIO]									
EQUIPMENT USED ON SUBJECT PROJECT									
[Drill units: CME-45C, CME-55, CME-550, VANE SHEAR TEST, PORTABLE HOIST; Advancing tools: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE *STEEL TEETH, TRICONE *TUNG-CARB., CORE BIT; Hammer type: AUTOMATIC, MANUAL; Core size: B, H, N; Hand tools: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST]									

ROCK DESCRIPTION		TERMS AND DEFINITIONS	
HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:		ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.	
WEATHERED ROCK (WR) [Symbol]		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	
CRYSTALLINE ROCK (CR) [Symbol]		FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	
NON-CRYSTALLINE ROCK (NCR) [Symbol]		FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	
COASTAL PLAIN SEDIMENTARY ROCK (CP) [Symbol]		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	
WEATHERING			
FRESH		ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.	
VERY SLIGHT (V SL.)		ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	
SLIGHT (SL.)		ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	
MODERATE (MOD.)		SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.	
MODERATELY SEVERE (MOD. SEV.)		ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL.	
SEVERE (SEV.)		ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF.	
VERY SEVERE (V SEV.)		ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF.	
COMPLETE		ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	
ROCK HARDNESS			
VERY HARD		CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	
HARD		CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.	
MODERATELY HARD		CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	
MEDIUM HARD		CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.	
SOFT		CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	
VERY SOFT		CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.	
FRACTURE SPACING		BEDDING	
TERM SPACING		TERM THICKNESS	
VERY WIDE MORE THAN 10 FEET		VERY THICKLY BEDDED 4 FEET	
WIDE 3 TO 10 FEET		THICKLY BEDDED 1.5 - 4 FEET	
MODERATELY CLOSE 1 TO 3 FEET		THINLY BEDDED 0.16 - 1.5 FEET	
CLOSE 0.16 TO 1 FOOT		VERY THINLY BEDDED 0.03 - 0.16 FEET	
VERY CLOSE LESS THAN 0.16 FEET		THICKLY LAMINATED 0.008 - 0.03 FEET	
		THINLY LAMINATED < 0.008 FEET	
INDURATION			
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.			
FRIABLE		RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MODERATELY INDURATED		GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
INDURATED		GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.	
EXTREMELY INDURATED		SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	

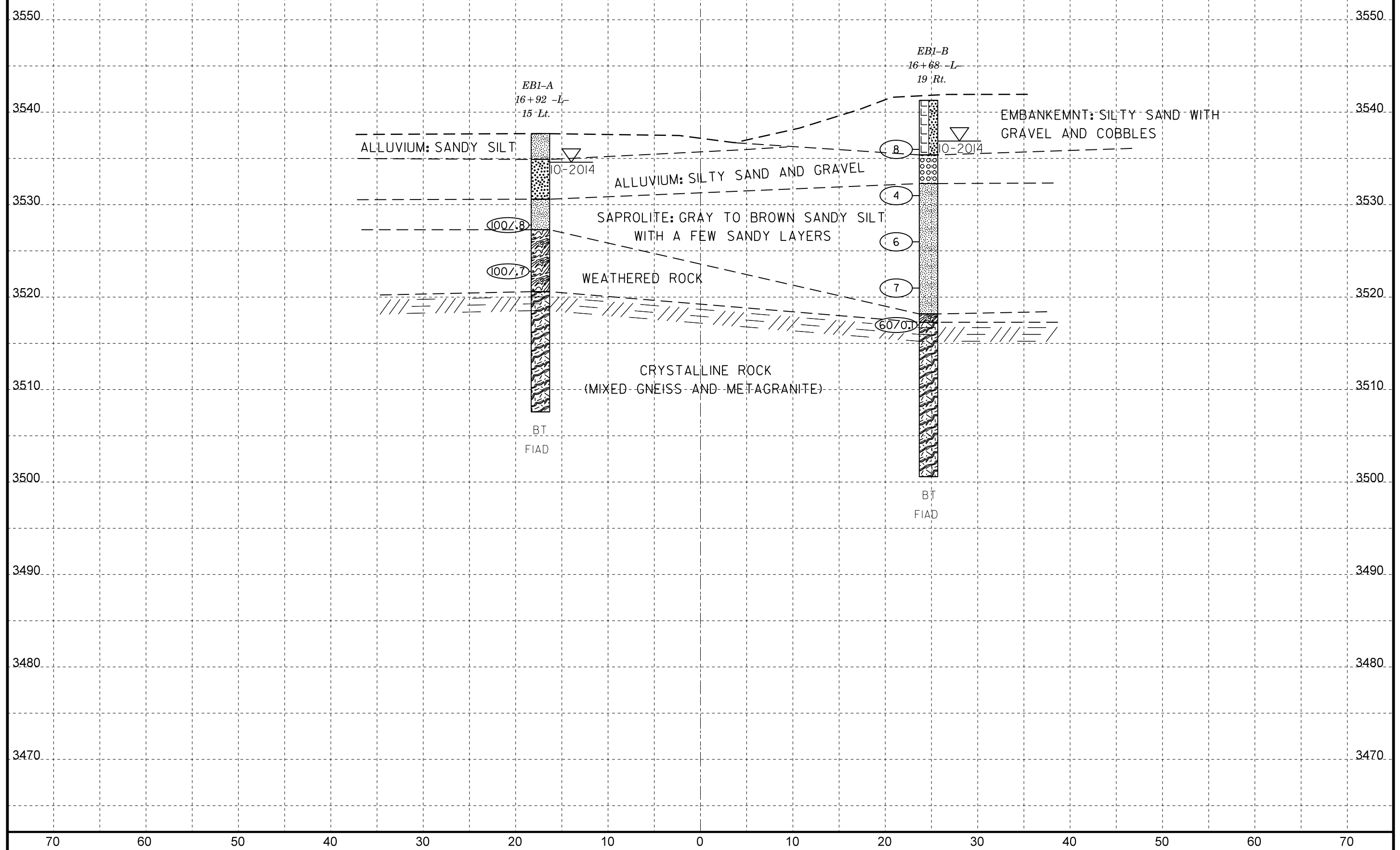
BENCH MARK: BL-2 BL STA. 9+98.61 ELEVATION: 3541.34 FEET	
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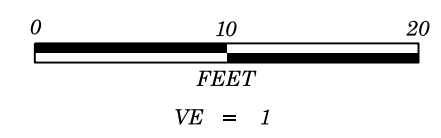
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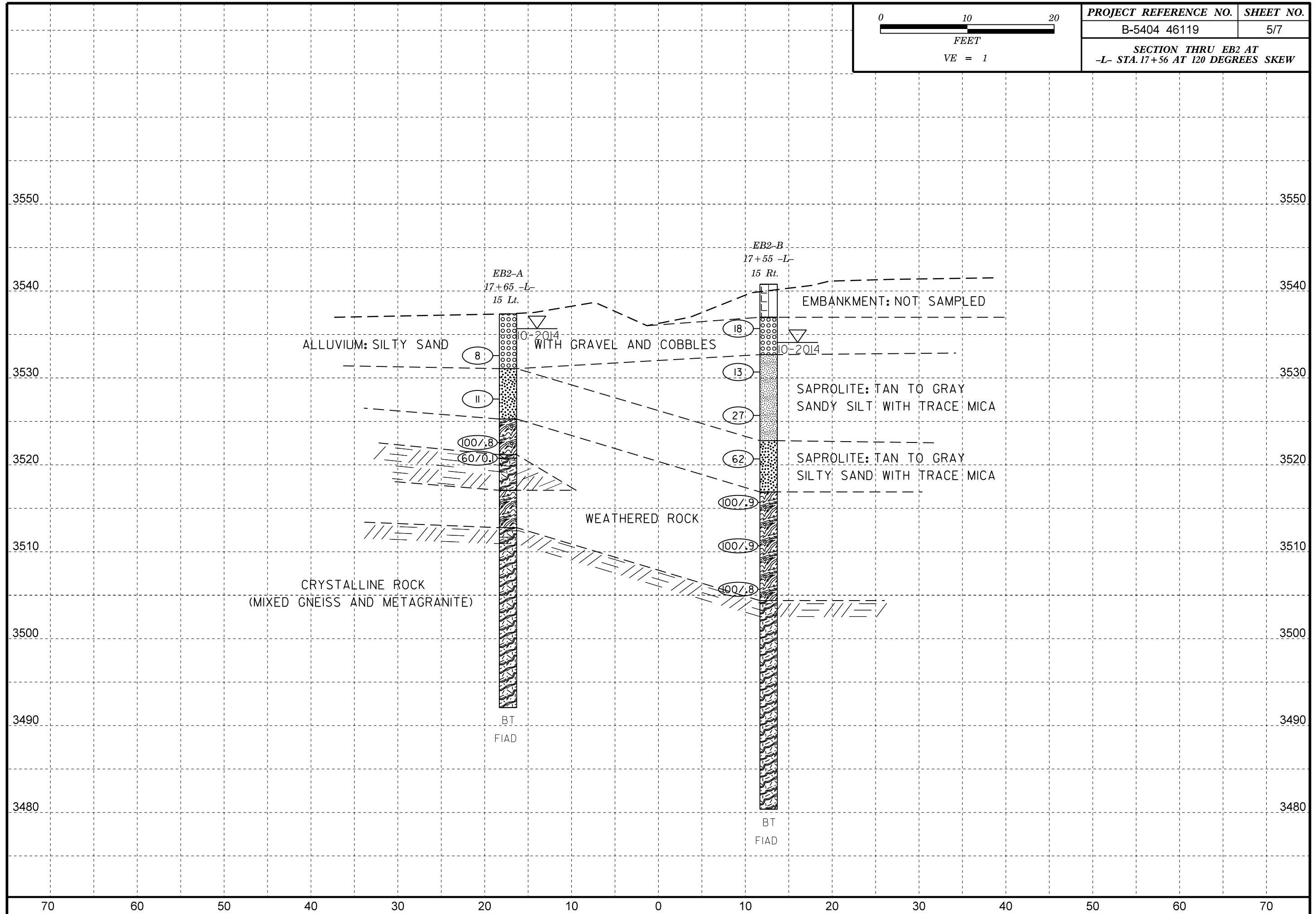


PROJECT REFERENCE NO.	SHEET NO.
B-5404 46119	4/7
SECTION THRU EBI AT -L- STA. 16+83.5 AT 120 DEGREES SKEW	





PROJECT REFERENCE NO.	SHEET NO.
B-5404 46119	5/7
SECTION THRU EB2 AT -L- STA. 17+56 AT 120 DEGREES SKEW	



WBS 46119.1.1		TIP B5404		COUNTY JACKSON		GEOLOGIST Elliott, D. C.										
SITE DESCRIPTION JACKSON COUNTY BRIDGE NO. 136 ON SR-1163 OVER PINE CREEK							GROUND WTR (ft)									
BORING NO. EB1-A		STATION 16+92		OFFSET 15 ft LT		ALIGNMENT L										
COLLAR ELEV. 3,537.7 ft		TOTAL DEPTH 30.1 ft		NORTHING 548,256		EASTING 750,783										
DRILL RIG/HAMMER EFF./DATE AFO9394 CME-45C 88% 05/14/2014		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic												
DRILLER Cheek, D. O.		START DATE 10/09/14		COMP. DATE 10/09/14		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
3540														3,537.7	GROUND SURFACE	0.0
3535														3,534.9	ALLUVIUM: SANDY SILT, MOI.	2.8
3530														3,530.6	ALLUVIUM: SILTY SAND GRADING TO CSE SAND AND GRAVEL WITH BASAL COBBLES, MOI. TO WET	7.1
3525	3,527.8	9.9	13	87/3										3,527.3	SAPROLITE: SANDY SILT, WET	10.4
3520	3,522.8	14.9	48	52/2										3,520.6	WEATHERED ROCK	17.1
3515														3,517.6	CRYSTALLINE ROCK (MIXED GNEISS AND METAGRANITE)	20.1
3510														3,512.6	CRYSTALLINE ROCK (MIXED GNEISS AND METAGRANITE)	25.1
														3,507.6	CRYSTALLINE ROCK (MIXED GNEISS AND METAGRANITE)	30.1
Boring Terminated at Elevation 3,507.6 ft IN CRYSTALLINE ROCK																

NCDOT BORE SINGLE B5404_GEO_BORINGS.GPJ_NC_DOT.GDT 10/22/14

WBS 46119.1.1		TIP B5404		COUNTY JACKSON		GEOLOGIST Cheek D.O.										
SITE DESCRIPTION JACKSON COUNTY BRIDGE NO. 136 ON SR-1163 OVER PINE CREEK							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 16+68		OFFSET 19 ft RT		ALIGNMENT L										
COLLAR ELEV. 3,541.3 ft		TOTAL DEPTH 40.7 ft		NORTHING 750,766		EASTING 548,218										
DRILL RIG/HAMMER EFF./DATE AFO9394 CME-45C 88% 05/14/2014		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic												
DRILLER Coffey, Jr., C.		START DATE 10/13/14		COMP. DATE 10/13/14		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
3545														3,541.3	GROUND SURFACE	0.0
3540														3,536.0	EMBANKMENT: GRAY SILTY SAND WITH GRAVEL AND COBBLES, MOI.	5.3
3535			6	7	8									3,535.4	ALLUVIUM: SILTY SAND AND GRAVEL	5.9
3530														3,531.0	SAPROLITE: GRAY TO BROWN SANDY SILT WITH FEW SANDY LAYERS, WET	10.3
3525			2	3	3									3,526.0	CRYSTALLINE ROCK (MIXED GNEISS AND METAGRANITE)	15.3
3520			3	3	4									3,521.0	CRYSTALLINE ROCK (MIXED GNEISS AND METAGRANITE)	20.3
3515														3,517.0	CRYSTALLINE ROCK (MIXED GNEISS AND METAGRANITE)	24.3
3510														3,518.2	WEATHERED ROCK	23.1
														3,517.3	CRYSTALLINE ROCK	24.0
														3,516.5	CRYSTALLINE ROCK (METAGRANITE)	24.4
														3,515.6	CRYSTALLINE ROCK (METAGRANITE)	25.7
3510														3,510.6	CRYSTALLINE ROCK (METAGRANITE AND GNEISS)	30.7
3505														3,505.6	CRYSTALLINE ROCK (METAGRANITE AND GNEISS)	35.7
														3,500.6	CRYSTALLINE ROCK (METAGRANITE AND GNEISS)	40.7
Boring Terminated at Elevation 3,500.6 ft IN CRYSTALLINE ROCK																

NCDOT BORE SINGLE B5404_GEO_BORINGS.GPJ_NC_DOT.GDT 10/22/14

WBS 46119.1.1		TIP B5404		COUNTY JACKSON		GEOLOGIST Cheek D.O.										
SITE DESCRIPTION JACKSON COUNTY BRIDGE NO. 136 ON SR-1163 OVER PINE CREEK							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 17+65		OFFSET 15 ft LT		ALIGNMENT L										
COLLAR ELEV. 3,537.4 ft		TOTAL DEPTH 45.3 ft		NORTHING 548,270		EASTING 750,854										
DRILL RIG/HAMMER EFF./DATE AFO9394 CME-45C 88% 05/14/2014		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic												
DRILLER Coffey, Jr., C.		START DATE 10/16/14		COMP. DATE 10/16/14		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
3540														3,537.4	GROUND SURFACE	0.0
3535	3,532.6	4.8	3	4	4										ALLUVIUM: TAN TO GRAY SAND AND GRAVEL WITH COBBLES, MOI. TO SAT.	
3530	3,527.6	9.8	5	5	6									3,531.1	SAPROLITE: BROWN AND GRAY SILTY SAND WITH TRACE MICA, SAT.	6.3
3525	3,522.6	14.8	28	36	64/3									3,525.3	WEATHERED ROCK (SCHISTY GNEISS WITH A FEW GRANITIC STRINGERS)	12.1
3520	3,520.8	16.6	60/1											3,521.2	CRYSTALLINE ROCK	16.2
														3,520.8	CRYSTALLINE ROCK (SCHISTY GNEISS)	16.8
3515														3,517.1	WEATHERED ROCK	20.3
3510														3,512.8	CRYSTALLINE ROCK (GNEISS)	24.6
														3,512.1	CRYSTALLINE ROCK - (VARIABLE WEATHERED GNEISS)	25.3
3505														3,504.7	CRYSTALLINE ROCK (GNEISS)	32.7
3500														3,502.1	CRYSTALLINE ROCK (GNEISS)	35.3
3495														3,497.1	CRYSTALLINE ROCK (GNEISS)	40.3
														3,492.1	CRYSTALLINE ROCK (GNEISS)	45.3
Boring Terminated at Elevation 3,492.1 ft IN CRYSTALLINE ROCK																

NCDOT BORE SINGLE B5404 GEO BORINGS.GPJ NC_DOT.GDT 3/27/15

WBS 46119.1.1		TIP B5404		COUNTY JACKSON		GEOLOGIST Cheek D.O.											
SITE DESCRIPTION JACKSON COUNTY BRIDGE NO. 136 ON SR-1163 OVER PINE CREEK							GROUND WTR (ft)										
BORING NO. EB2-B		STATION 17+55		OFFSET 15 ft RT		ALIGNMENT L											
COLLAR ELEV. 3,540.8 ft		TOTAL DEPTH 60.4 ft		NORTHING 548,239		EASTING 750,850											
DRILL RIG/HAMMER EFF./DATE AFO9394 CME-45C 88% 05/14/2014		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic													
DRILLER Coffey, Jr., C.		START DATE 10/15/14		COMP. DATE 10/15/14		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
3545															3,540.8	GROUND SURFACE	0.0
3540																EMBANKMENT: NOT SAMPLED	
3535	3,535.7	5.1	7	9	9									3,537.0	ALLUVIUM: GRAY SILTY SAND AND SUB ROUNDED GRAVELS WITH TRACE MICA, MOI. TO SAT.	3.8	
3530	3,530.7	10.1	5	5	8									3,532.7	SAPROLITE: TAN TO GRAY SANDY SILT WITH TRACE MICA, WET	8.1	
3525	3,525.7	15.1	9	13	14										WEATHERED ROCK (SCHISTY GNEISS WITH A FEW GRANITIC STRINGERS)		
3520	3,520.7	20.1	16	32	30									3,522.8	SAPROLITE: TAN TO GRAY SILTY SAND WITH TRACE MICA, SAT.	18.0	
3515	3,515.7	25.1	35	37	63/4									3,516.9	WEATHERED ROCK	23.9	
3510	3,510.7	30.1	46	54/4											CRYSTALLINE ROCK (GNEISS)		
3505	3,505.7	35.1	48	52/3										3,504.4	CRYSTALLINE ROCK (GNEISS)	36.4	
														3,504.1	CRYSTALLINE ROCK (GNEISS)	36.7	
3500														3,500.4	CRYSTALLINE ROCK (GNEISS)	40.4	
3495														3,495.4	CRYSTALLINE ROCK (GNEISS)	45.4	
3490														3,490.4	CRYSTALLINE ROCK (GNEISS)	50.4	
3485														3,485.4	GNEISS - VERY HARD ANBD FRESH - NO FRACTURES	55.4	
														3,480.4	CRYSTALLINE ROCK (GNEISS)	60.4	
Boring Terminated at Elevation 3,480.4 ft																	

NCDOT BORE SINGLE B5404 GEO BORINGS.GPJ NC_DOT.GDT 3/27/15