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## STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

## STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO	45360.1.20	(BD-5114T	")	F.A. PROJ.
COUNTY <u>JACKSON</u>				
PROJECT DESCRIPTION	<b>BRIDGE</b>	No. 220 O	N S	SR-1166
OVR CULLOWHEE	CREEK			
SITE DESCRIPTION				TOTAL CONTRACTOR OF THE PARTY O
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STATE	STATE PROJECT REFERENCE NO.	SHBET	TOTAL
N.C.	45360.1.20 (BD-5114T)	1	13

### 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 FELD BORNE LOSS, ROCK CORES, AND SOLI LEST DATA ANALABLE MAY BE REVEWED OR INSPECTED IN RALEICH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEDITECHNICAL EMBRICERNO UNIT AT 1991 7250-7488. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORNEL LOSS, ROCK CORES, OR SOLI LEST DATA ARE PART OF THE CONTRACT.

GENERAL SOL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVALLABLE SUBSURFACE BATA AND MAY NOT NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNES OR BETWEEN SAMPLED STRATA WITHIN THE BORENOLE. HE LABORATORY SAMPLE DATA AND THE IN STILL IN-PLACE! TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABLITY INSCRIPTION THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS NIDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS NOT VARY CONSISTERALLY 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 PRELIMMARY ONLY AND IN MANY CASES THE FRAL DESIGN DETAILS ARE DEFERENT. FOR BODING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR CURRANTEE THE SUFFICENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERTATIONS ANDE, OR DANION OF THE SUBSURFACE THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS IN CEMINS CESSARY TO SATISFY HAWSELF AS TO CONDITIONS TO BE ENCOUNTEDED ON THIS PROJECT. THE CONFIGENCE THE SUBSURFACE INVESTIGATIONS AS IN CEMINS CESSARY TO SATISFY HAWSELF AS TO CONDITIONS TO BE ENCOUNTEDED ON THIS PROJECT. THE CONFIGATION FOR 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 OFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

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### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

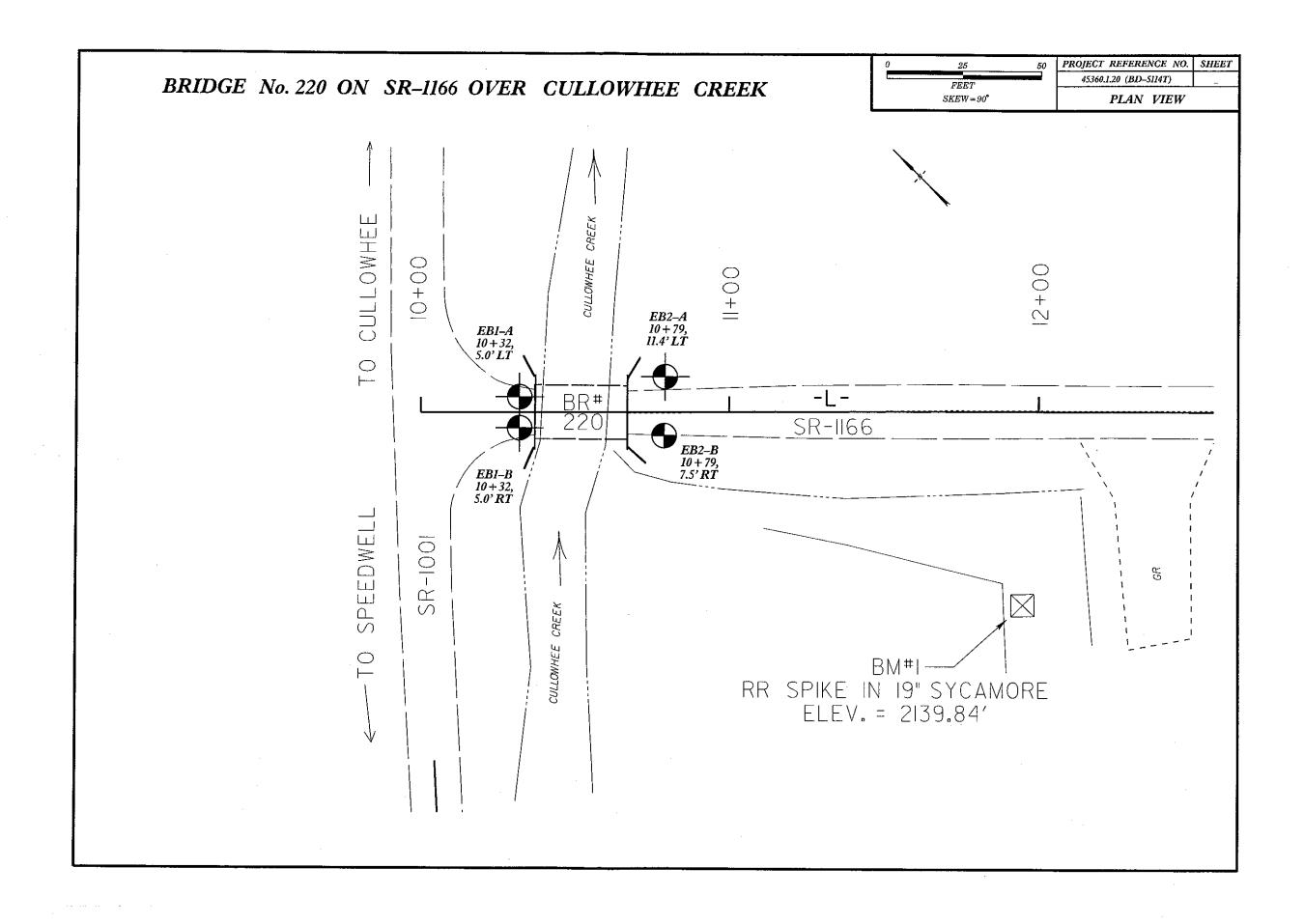
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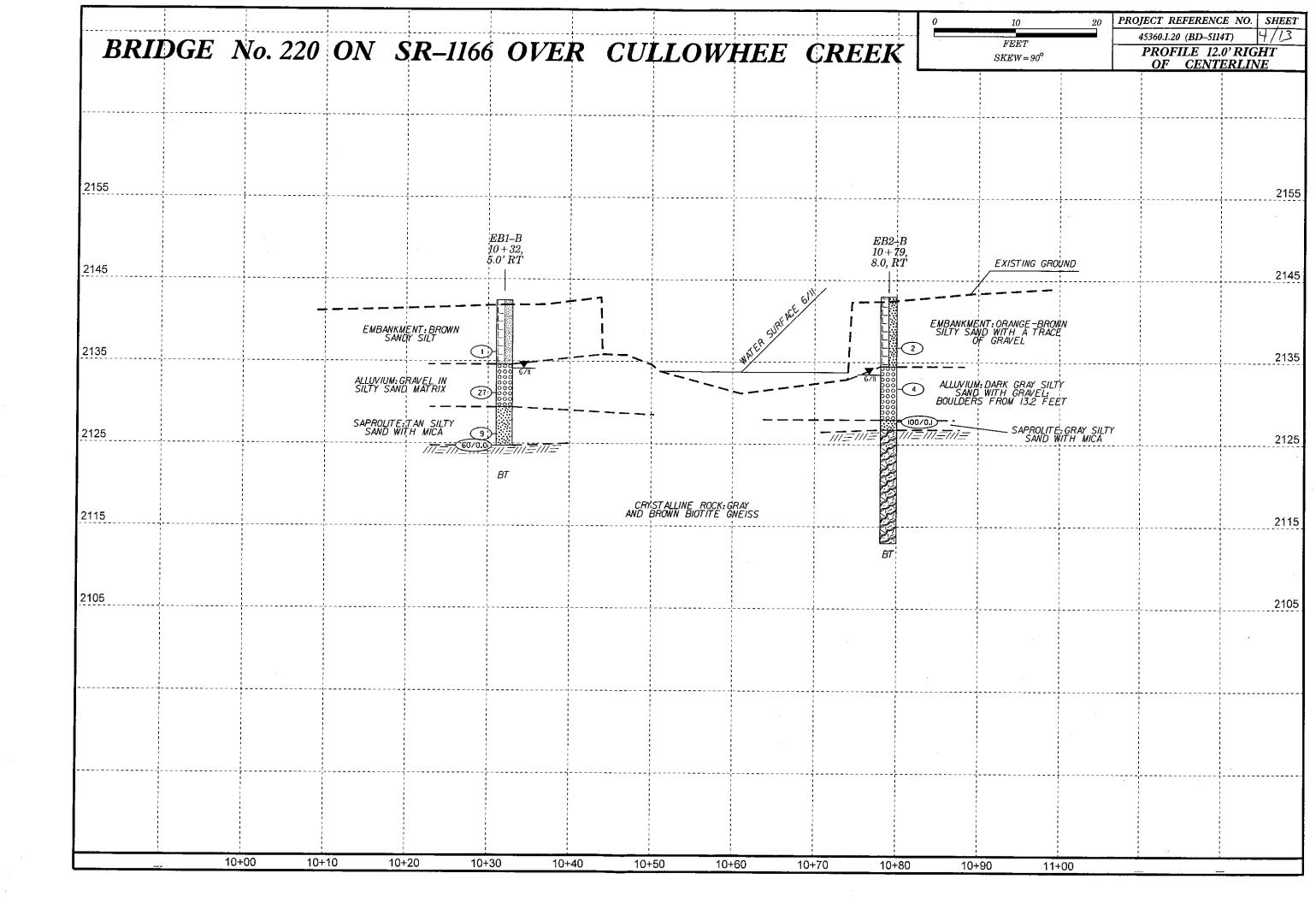
GEOTECHNICAL ENGINEERING UNIT

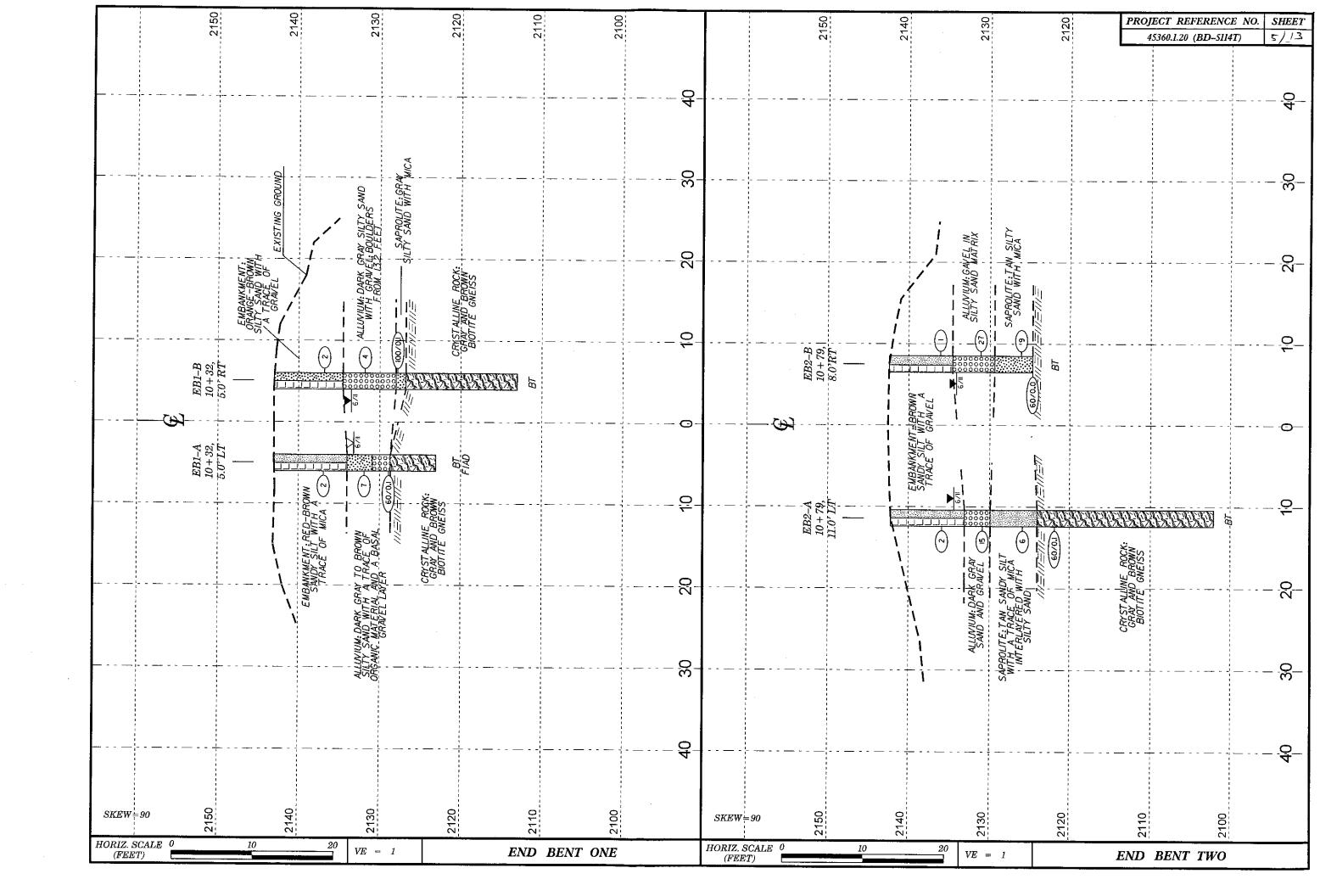
PROJECT REFERENCE NO.	SHEET
45360.I.20 (BD-5II4T)	2

## SUBSURFACE INVESTIGATION

CON DECEMBRIO		MS, SYMBOLS, AND ABBREVIATIONS	
SOIL DESCRIPTION	GRADATION  WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	ROCK DESCRIPTION	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	UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)	HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL, AN INFEARED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL.	ALLUYIUM (ALLUY.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE:	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 ZONG	AGUIFER - A WATER BEARING FORMATION OR STRATA.
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 STRE, GRAP, SETY CLA. MOST WITH INTEREDDED FIRE SAND LIVERS, HIGHLY PLASTIC, A-7-6	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS; ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	50//A9///A	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.
SOIL LEGEND AND AASHTO CLASSIFICATION		WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 ROCK (WR) BLOWS PER FOOT IF TESTED.	ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL
GENERAL GRANIL AR MATERIALS SUIT-CLAY MATERIALS	MINERAL COMPOSITION MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAQLIN, ETC. ARE USED IN DESCRIPTIONS	CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT	AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE
CLASS. (≤ 35% PASSING "200) (> 35% PASSING "200) ORGANIC MATERIALS	WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	GROUND SURFACE.  CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
GROUP A-I A-3 A-2 A-4 A-5 A-6 A-7 A-I, A-2 A-4, A-5	COMPRESSIBILITY	AION_COVETAL INC FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN	COLLUVIUM - 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-3 A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31	ROCK (NCR)  SEDIMENTARY MOULD YELLD SPI REFUSAL IF TESTED, ROCK TYPE  INCLUDES PHYLLITE, SLATE, SANOSTONE, ETC.	OF SLOPE.
SYMBOL COORDOOD	MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL
% PASSING SILT-	PERCENTAGE OF MATERIAL	(CP) SHELL BEOS, ETC.	LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.
SHANLER CLAY BEAT	I DRGANIC MATERIAL SIGN SECTORAL STATES AND ASSESSMENT OF THE PARTY OF	WEATHERING WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.
■ 200 15 MX 25 MX 18 MX 35 MX 35 MX 35 MX 36 MX	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE
LIQUID LIMIT 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 5011 S WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%	HAMMER IF CRYSTALLINE.  VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN.	HORIZONTAL.
PLASTIC INDEX 5 MX NP 16 MX 10 MX 11 MN 11 MN 10 MX 10 MX 11 MN 11 MN 11 MN LITTLE OR HIGHLY	MICH V PROMITE 29 - 334	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLL) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF	DIP DIRECTION (DIP AZIMUTHI - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
GROUP INDEX 8 8 8 4 MX 8 MX 12 MX 16 MX NO MX MODERATE ORGAN		OF A CRYSTALLINE NATURE,	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STUNE PROGS. STATE STATE OF AVEY CLAVEY DEGANIC	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO ISLL:  1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELOSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR CRAVEL, AND SAND SOILS SOILS MATTER	STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
GEN. RATING	——————————————————————————————————————	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM
AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITA	LE TOTAL STATES AND AND AND STATES	(MOOL) GRANITOID ROCKS, MOST FELOSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	PARENT MATERIAL.
PI OF A-7-5 SUBGROUP IS ≤ Lt - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	→ OMING 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 QUILL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAQLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTENCE COMPRESSIVE STRENGTH	ROADWAY EMBANKMENT (RE)  OF ON TEST BORING  OF SAMPLE  OF SAMPLE  OF STANDING  OF S	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK.	THE FIELD.
CONSISTENCY (N-VALUE) (TONS/F12 )	WITH SOIL DESCRIPTION OF SHIT TEST BORING DESIGNATIONS	IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
GENERALL Y VERY LOOSE <4	S - BULK SAMPLE AUGER BORING	SEVERE 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 KADLINIZED TO SOME	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO
GRANULAR         LOOSE         4 TO 10           MATERIAL         MEDIUM DENSE         10 TO 30         N/A	SS - SPLIT SPOON	EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.	ITS LATERAL EXTENT.
(NON-COHESIVE) DENSE 30 10 50	ARTIFICIAL FILL (AF) OTHER SAMPLE THAN ROADWAY EMBANKMENT - CORE BORING	IF TESTED, YIELDS SPT N VALUES > 100 BPF	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
VERY DENSE >50	ST - SHELBY TUBE  SAMPLE  SAMPLE	VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT IV SEV.)  THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRACMENTS OF STRONG ROCK	SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERY SOFT	MONITORING WELL TO DESCRIPTION	REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IE TESTED, YIELDS SPT N VALUES ( 100 BPF	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO LA	A SIEZOMETER		INTERVENING IMPERVIOUS STRATUM.  RESIDUAL IRESI SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
MATERIAL   STIFF   8 TO 15   1 TO 2     COHESIVE)   VERY STIFF   15 TO 30   2 TO 4	SAMPLE	SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS	ROCK QUALITY DESIGNATION IRODI - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
HARD >30 >4	25/825 DIP & DIP DIRECTION OF SLOPE INDICATOR INSTALLATION CBR - CALIFORNIA GEARING	ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES CIVIDED BY THE TOTAL LENGTH OF CORE RUN AND
TEXTURE OR GRAIN SIZE	RATIO SAMPLE  RATIO SAMPLE  SPT N-VALUE	ROCK HARDNESS	EXPRESSED AS A PERCENTAGE.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	SQUNDING ROD REF - SPT REFUSAL	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE ISAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053		SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.  HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	AR - AUGER REFUSAL HJ HIGHLY W - MOISTURE CONTENT	TO DETACH HAND SPECIMEN,	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEODING OR SCHISTOSITY OF THE INTRUDED ROCKS.
(BLDR.) (COB.) (GR.) (SE. SD.) (F SD.) (SL.) (CL.)	AR - AUGER REFUSAL HI HIGHLY w - 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	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR
GRAIN MM 305 75 2.0 0.25 0.05 0.005	CL CLAY MICA MICACEOUS VST - VANE SHEAR TEST CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHERED	HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.	SLIP PLANE.
SIZE IN. 1Z 3	CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHERED  CSE COARSE NP - NON PLASTIC 7 - UNIT WEIGHT	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	OMT - DILATOMETER TEST ORG ORGANIC $\hat{\gamma}_d$ - DRY UNIT WEIGHT	HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES LINCH 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 GUIDE FOR FIELD MOISTURE DESCRIPTION	DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST FIAD-FILLED IMMEDIATELY  • - VOID RATIO SAP SAPROLITIC AFTER DRILLING	POINT OF A GEOLOGIST'S PICK.  SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAYATED IN FRAGMENTS	THAN 0.1 FOOT PER 60 BLOWS.
	F - FINE SD SAND, SANDY WOH-WEIGHT OF HAMMER	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 (SAT.) FROM BELOW THE GROUND WATER TABLE	FOSS FOSSILIFEROUS SL SILT, SILTY FRAC FRACTURED, FRACTURES SLI SLIGHTLY	PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY
LL L10010 LIMIT	FRAGS FRAGMENTS TCR - TRICONE REFUSAL	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES I 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 EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE
PLASTIC   SEMISOLID; REQUIRES ORYING TO SEMISOLID; REQUIRES ORYING TO		FINGERNAIL.	TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.
(PI) PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE	EQUIPMENT USED ON SUBJECT PROJECT	FRACTURE SPACING BEDDING	TOPSOIL_ITS.1 - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	TERM SPACING TERM THICKNESS  VERY MURE MORE THAN 18 SEET VERY THICKLY BEDDED > 4 FEET	BENCH MARK: BM#1- R.R. SPIKE IN 19" SYCAMORE62.3 FEET RIGHT
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	CLAY BITS X AUTOMATIC MANUAL	WIDE 3 TO A FEET THICKLY BEDDED 1.5 - 4 FEET	OF -L- STA II+95
SL _ SHRINKAGE LIMIT		MODERATELY CLOSE L TO 3 FEET THINLY BEDOED 0.16 - 1.5 FEET	ELEVATION: 2139,84 FT.
- ORY - (O) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE		VERY CLOSE LESS THAN 8 IS FEFT THICKLY LAMINATED 9.888 - 9.93 FEET	NOTES:
PLASTICITY	- S. HOLLOW AUGERS	THINLY LAMINATED < 0.008 FEET  INDURATION	
	_ CME-45C	INDURALIUN  FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
PLASTICITY INDEX (PI) ORY STRENGTH NONPLASTIC 0-5 VERY LOW	X CME-950 TUNGCARBIDE INSERTS		
LOW PLASTICITY 6-15 SLIGHT	X CASING X W/ ADVANCER HAND TOOLS:	FRIABLE RUBBING WITH FINCER FREES NUMEROUS GRAINS: GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.	
MED. PLASTICITY	PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE:	
COLOR	TRICONE TUNG,-CARB. HAND AUGER	BREAKS EASILY WHEN HIT WITH HAMMER.	
DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).	CORE BIT SOUNDING ROD	INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE:	
MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.	VANE SHEAR TEST	DIFFICULT TO BREAK WITH HAMMER,	
The state of the s		EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.	
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# NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET

	45360					IP BD-			Y JACKS	ON			GEOLOGIST Hager, M. M.		
SITE	DESC	RIPTIC	N Bri	dge No	. 220	on SR-1	166 over Cu	ıllowhee C	reek.				,,,,,,,,	GROUND W	/TR (f
BOR	ING NO	). EB1	-A		S	TATION	10+32		OFFSET	5 ft LT			ALIGNMENT -L-	0 HR.	9.8
COL	LAR EL	. <b>EV</b> . 2	,143.0	ft	Т	OTAL D	EPTH 19.9	ft	NORTHIN	RTHING 585,482			EASTING 752,241	24 HR.	FIAD
DRILL	RIG/HA	MMER I	EFF./DA	TE A	FO007	0 CME-550	X 81% 09/03	1/2009	1	DRILL	METHO	OD N		MMER TYPE Auto	
	LER C						ATE 06/22		COMP. D	<del></del>			SURFACE WATER DEPTH		mauc
LEV	DRIVE ELEV		· T	ow co		11		PER FOO	<u> </u>	SAME		7	OOM AGE WATER DEFIN	INA	
(ft)	ELEV (ft)	(ft)		0.5ft	0.5ft	10	25	50	75 100	11	MC	O SI G	SOIL AND ROCK D		
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-1.70		‡			Ì										
	-			<del>                                     </del>	ļ-—	<del>                                      </del>		1	T	<del>                                     </del>			2,143.0 GROUND SU  ROADWAY EMB.		0
140	_	Ĺ							1			-	Red-brown sandy silt wit	h a trace of gravel.	
	2 137 9	5.1		ŀ		1							<del>-</del> -		
	-		1	WOH	2	<b>•</b> 2					w		<del>-</del> -		
135	1	_				<u>                                   </u>				<u> </u>			- 		
	2,132 9	10.1				-   -							2,134.0 ALLUVIA	\ I	9.
	1		1	2	5	- 7 -				11	Sat.		Dark gray to brown silty s	and with a trace of	
130		_			!				+	<b>i</b>		000	2,130.9 organic mat  ALLUVIA		12.
	2.128.9 -	- 14.1	60/0.1						60/0,1	<u>†</u>		000	2,128,7 Brown silty sand	and gravel.	14
	‡	-				H : : :				} [			CRYSTALLINI Gray biotite gneiss w		
125	1	-				<del> </del>		-	<del>                                     </del>	<u> </u>			muscovit		
}	<del>- 1</del>					1				Ц		21	2,123.1 Boring Terminated at Ele	unting 0 400 4 4 in	19
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SHEET 6/13

CORE E	BURING REPURI			9//>		
WBS 45360.1.20	TIP BD-5114T COUNT	TY JACKSON	GEOLOGIST Hager, M. M.			
SITE DESCRIPTION Bridge No. 2	220 on SR-1166 over Cullowhee C	reek.		GROUND WTR (ft)		
BORING NO. EB1-A	STATION 10+32	OFFSET 5 ft LT	ALIGNMENT -L-	0 HR. 9.8		
COLLAR ELEV. 2,143.0 ft	TOTAL DEPTH 19.9 ft	NORTHING 585,482	<b>EASTING</b> 752,241	24 HR. FIAD		
DRILL RIG/HAMMER EFF./DATE AFOR	0070 CME-550X 81% 09/03/2009	DRILL METHOD N	W Casing W/SPT & Core HAMN	MER TYPE Automatic		
DRILLER Cheek, D. O.	START DATE 06/22/11	COMP. DATE 06/22/11	SURFACE WATER DEPTH N	/A		
CORE SIZE NXWL	TOTAL RUN 5.6 ft		•			
ELEV RUN DEPTH RUN DRILL RATE	TOTAL RUN	L	DESCRIPTION AND REMARKS			
(ft) (ft) (ft) (ft) (Min/ft)	REC.   RQD   SAMP.   REC.   RQD   (ft)   (ft)   NO.   (ft)   (ft)   %	G ELEV. (ft)		DEPTH (ft)		
2128.7	(0.6) (0.6)	2 120 7	Begin Coring @ 14.3 ft CRYSTALLINE ROCK			
5.0 1.1/0.0		2,128.7 Gray biotite gneiss	with garnets and muscovite. Slightly w	eathered to fresh;		
1.0/0.0	94%   84%	nard with soft, very	severely to severely weathered seam feet.	rrom18.5 to 19.3		
2,123.1 19.9 1.4/0.0		2,123.1	a) Joints @ 50°. b) Joint@ 30°.	19,9		
T		Boring Terr	c) Part along foliation @ 60°. minated at Elevation 2,123.1 ft in biotite	a aneiss.		
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# NCDOT GEOTECHNICAL ENGINEERING UNIT

SHEET

WBS	45360	0.1.20			1	ΓIΡ	BD-511	4T	COUNT	Y JACKS	NC			GEOLOGIST Hager, M. M.	
SITE	DESC	RIPTIO	N Bri	dge N	o. 220	on S	SR-1166	over Cul	lowhee C	reek.					GROUND WTR
BOR	RING NO	). EB1	-B		S	STAT	TION 10	0+32		OFFSET	5 ft RT			ALIGNMENT -L-	0 HR. N/
COL	LAR EL	.EV. 2	143.0	ft	Т	TOT/	AL DEP	TH 30.0 f	t	NORTHIN	G 585,	475		EASTING 752,234	<b>24 HR.</b> 9.
DRIL	L RIG/HA	MMER E	FF./DA	ATE A	FO007	0 CM	E-550X 8	81% 09/03/2	2009		DRILL	METHO	D NV		MER TYPE Automatic
	LER C	···· <del>-</del> ···						E 06/20/1		COMP. D.				SURFACE WATER DEPTH N	
ELEV	DRIVE		1	ow co		П			PER FOOT		SAMP		11	TOUR NOT WATER DEFINIT	
(ft)	ELEV (ft)	(ft)	`——		0.5ft	0	2		5,0	75 100	1 I	MO	O G	SOIL AND ROCK DE	SCRIPTION DEPTH
												7,,,,,		LLLV. (II)	DEFIN
2145			ĺ												
		Ī											-	2,143.0 GROUND SURI	FACE
	-				1	†  <u> </u>  -		T						ROADWAY EMBAN	KMENT
2140	_			ŀ									口生	Orange-brown silty sand gravel.	with a trace of
	2,137.8-	- 5.2													
V40.5	-		1	1	1	•2						Sat.			
135	-	_				忕				<del>-</del>		_		2,134.5	
	2,132.8	_10.2_	2	2	2							- V	000	ALLUVIAL Dark gray silty sand with g	ravel; boulders
2130	1		_	_	_	•	4					Sat.	000	from 13.2 fee	t:
		-								<u></u>			000	0.400.0	
ŀ	2,127 8	- 15.2 -	2	6	100/0.1	:				100/0.1				2,128.0 2,126.8 <b>SAPROLITE</b>	
125		-		[		<u>                                   </u>								Gray silty sand with CRYSTALLINE F	
	1	-				:							3	Gray and brown bioti	
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120		-				<u>                                    </u>									
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115	‡	.													
115	+	<u> </u>				-									
ŀ						H					-		1-1	2,113.0  Boring Terminated at Eleva	30 tion 2.113.0 ft in
	<u> </u>	.												biotite gneiss	
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SHEET 7/13

WE	<b>S</b> 4536	0.1.20			TIP	BD-5	114T	С	OUNT	Y J	ACKSON	GEOLOGIST Hager, M. M.	( / / -					
<u> </u>			N Brid	lge No. 2	<del></del>								GROUND WTR (ft)					
	RING NO			<u>-</u>			10+32		·	т	FSET 5 ft RT	ALIGNMENT -L-	0 HR. N/A					
СО	LLAR EL	.EV. 2,	143.0	ft	-		PTH 30	.0 ft		+	RTHING 585,475	EASTING 752,234	<b>24 HR.</b> 9.5					
DRI	L RIG/HA	MMER E	FF./DA	TE AFO	070 CN	/E-550>	< 81% 09/	03/200	 9			R TYPE Automatic						
DR	LLER C	Cheek, [	D. O.		STA	RT DA	TE 06/2	0/11		co	MP. DATE 06/20/11	SURFACE WATER DEPTH N/						
СО	RE SIZE	NXWL	-		TOTA	AL RU	N 13.0 f	t										
ELE	/ RUN ELEV	DEPTH		DRILL RATE	REC.	UN RQD	SAMP.	REC.	RQD	L O	D	ESCRIPTION AND REMARKS						
. (ft) 	(ft)	(ft)	(ft)	(Min/ft)	REC. (ft) %	(ft) %	NO.	(ft) %	(ft) %	Ğ	ELEV. (ft)	LOOKE HOWARD KEWAKKO	DEPTH (ft)					
2126	;   2,126.0	17:0	3.0	1 0/0 0	(3.0)	(1.6)						Begin Coring @ 17.0 ft CRYSTALLINE ROCK						
	2,123.0	T	5.5	1.0/0.0 0.9/0.0 1.3/0.0	100%	53%					Biotite gneiss with gar	rnets and muscovite. Gray, slightly we ock interlayered with brown, severely	athered to fresh,					
		-	5.0	0.6/0.0 0.5/0.0	(4.5) 90%	,(3.1) 62%			į		weat	hered, soft to moderately hard rock.	to moderately					
2120	_	Ŧ		0.8/0.0 1.0/0.0	5078	02,0					• <del></del>	a) Joints @ 10°. b) Parts along foliation @ 45°.						
	2,118.0	25.0	5.0	1.1/0.0 0.9/0.0	(4.7)	(2.2)					• •	c) Joint @ 45°. (continued)						
2115		1		1.1/0.0 0.9/0.0	94%	(2.2) 44%					•							
	2,113.0	30,0		0.9/0.0 1.3/0.0							2,113.0	·	30.0					
	-	<u> </u>									. Boring Termin	nated at Elevation 2,113.0 ft in biotite	gneiss.					
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## NCDOT GEOTECHNICAL ENGINEERING UNIT

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WBS	45360	0.1.20			T	IP BE	D-511	4T	COUNT	TY JACKS	ON			GEOLO	GIST Hager, M	. M.		
SITE	DESCR	RIPTIO	N Bric	dge No	o. 220	on SR	-1166	over Cu	llowhee C	reek.	. ,				• ,	T T	GROUND WTF	 R (1
BOR	ING NO	. EB2	-A		s	TATIO	N 1	0+79		OFFSET	11 ft LT			ALIGNMENT -L-			OHR. N/A	
COL	LAR EL	EV. 2,	142.2	ft	T	OTAL	DEP	TH 40.1	 ft	NORTHIN	IG 585,	585,453			EASTING 752,279			7.
ORILI	RIG/HAI	MMER E	FF./DA	TE A	FO0076	0 CME-5	550X 8	31% 09/03	/2009	i			א מכ	// Casing W/			24 HR. R TYPE Automa	
	LER C							E 06/17/		COMP. D					CE WATER DEF			100
LEV	DRIVE ELEV	DEPTH	1	ow co					PER FOO		SAME		711	JONIA	JE WATER DEF	TH IN//	·	_
(ft)	ELEV (ft)	(ft)	0.5ft	0.5ft	1	16	2		50	75 10	i I	Mo	O G	EL E. ( /4)	SOIL AND RO	CK DESC		<b></b> .
	.,						•	<del></del>	1	-	1	7 18/0		ELEV. (ft)			DEPT	111
2145																	*	
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	-	-	-	ļ	<del> </del>	<del>                                     </del>		<del>                                     </del>	1	·	┦	╀		2,142.2	GROUNE ROADWAY E			
140	_	-			ļ	<u>  i · ·</u>	• -		1					_	Brown sandy silt v			
	-											1						
	.2,136.9-	- 5.3	2	1	1							D						
135	-	-				<del>                                    </del>					41	¥		-				
į	2,131.9	10.2			Ì		· .							2,133.1	Δ1.1	UVIAL		ç
130	.2,131.8	10.3	2	3	12		•15					Sat.			Dark gray sa			
130	1	-			ļ	<del>                                    </del>					1			2,129.9	SAPF	ROLITE		1:
	2,126.9	- - 15.3.				]   j :							M:		Tan sandy silt w interlayered			
125		-	2	2	4	<b>6</b> 6						W	-			······································	ound.	
	1	-			 			<b>-</b>	<del>-</del>	<b></b>	]			2,124.1	CRYSTAL	LINE RO	ОСК	18
-	2,121.9	20.3	60/0.1		ļ					60/0.1			S		Gray and brov	vn biotite	gneiss.	
20	- 1	-	00/0.1			<u>                                    </u>	• •							-				
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	<u>/ Ч</u>			RE B	UK	VIV	3 KE	70	KI							
WBS	45360	.1.20			TIP	BD-5	114T	С	оиит	ΥJ	CKSON G	GEOLOGIST Hager, M. M.				
SITE	DESCR	RIPTIO	N Brid	lge No. 2	20 on	SR-11	66 over (	Cullow	hee C	reek.			GROUND WTR (			
BOR	ING NO	. EB2-	-A	<del>-,</del>	STA	TION	10+79			OF	SET 11 ft LT A	LIGNMENT -L-	0 HR. N//			
COL	LAR EL	EV. 2,	142.2	ft	тот	AL DE	PTH 40	.1 ft		NO	RTHING 585,453 EA	<b>ASTING</b> 752,279	<b>24 HR.</b> 7.6			
DRIL	_RIG/HAI	MMER E	FF./DA	TE AFOO	070 CN	1E-550>	< 81% 09/	03/200	9		DRILL METHOD NW Ca	asing W/SPT & Core HAMME	R TYPE Automatic			
DRIL	LER C	heek, [	D. O.		STAI	RT DA	TE 06/1	7/11		co	MP. DATE 06/17/11 St	URFACE WATER DEPTH N/	٩			
COR	E SIZE	NXWL					N 18.8 f			ļ,						
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	REC. (ft) %	RGD RGD	SAMP. NO.	REC. (ft)	RQD (ft) %	O G	DESC	CRIPTION AND REMARKS	DEPTH			
120.9 2120	2,120.9	21.3	3.8	1.0/0.0 0.9/0.0	(3.8) 100%	(3.2) 84%					- Biotite gneiss with gar	egin Coring @ 21.3 ft CRYSTALLINE ROCK rnets and muscovite. Gray, fresh, v	ery hard rock			
21 <u>1</u> 5	2,117.1	25.1	5.0	0.9/0.0 0.5/0.8 0.8/0.0 0.8/0.0	(4.9) 98%	(2.8) 56%						<ul> <li>n, severely to moderately weathere moderately hard rock.</li> <li>Parts along foliation @ 65°.</li> <li>b) Joint @ 65°.</li> </ul>	d , very soft to			
	2,112.1	30.1	5.0	0.7/0.0 0.7/0.0 0.7/0.0 0.8/0.0	(4.4)	(2.8)					d)	c) Joints @ 45° l) Joints @ 35°. (continued)				
2110	-	-	3.0	0.9/0.0 0.8/0.0 0.8/0.0	88%	56%										
2105	2,107.1	35.1	5.0	0.8/0.0 0.9/0.0 1.0/0.0 1.0/0.0	(4.5) 90%	(3.4) 68%										
	2,102.1	40.1		1.1/0.0 0.9/0.0							2,102.1		40			
	-	-									Boring Terminate	ed at Elevation 2,102.1 ft in biotite	gneiss.			
\$								-								
	+															

	NCDOT GEOTECHNICAL BORELOG REPORT	ENGINEERING U	JNIT
W	BORELOG REPORT	•	

MIDO	/ <b>U</b>		BO	KE.	$-\tau$	G REPO		V IACISO	NI.			OFOLOGIST ::		
WBS 45360.1.20 TIP BD-5114T COUNT SITE DESCRIPTION Bridge No. 220 on SR-1166 over Cullowhee C								TY JACKSON				GEOLOGIST Hager, M. M.		
	ING NO			ige ivo			***		0 A DT			ALIONISCUT	GROUND WTR (f	
	LAR EL			<u></u>	<del></del>	TATION 10+7		OFFSET				ALIGNMENT -L-	0 HR. N/A	
						OTAL DEPTH		NORTHIN	<del></del>			EASTING 752,265	24 HR. 8.3	
DRILL RIG/HAMMER EFF./DATE AFO0070 CME-550X 81% 09/03/2009  DRILLER Cheek, D. O. START DATE 06/20/11						T	DRILL		D N	W Casing w/ SPT HAMMER TYPE Automatic				
						TART DATE (	16/20/11 LOWS PER FOO	COMP. DA			1 4 1	SURFACE WATER DEPI	rh n/A	
ELEV (ft)	DRIVE ELEV	DEPTH (ft)	0.5ft	OW CO	0.5ft	<b>⊣</b> 1	1 75 100,	SAMP.	/	0	SOIL AND ROCK			
	(ft)		0.51	0.510	0.510	1	50	10 100	INO.	MOI	G	ELEV (ft)	DEPTH (	
				-				-						
2145		_									-	_		
	· -		ļ	ļ							1 1000	2,142.4 GROUND		
2140	_	-	İ									ROADWAY EN Brown sa		
												-		
	2,137.1	5.3	1	WOH	1					w				
2135	1									~		-2,134.6	7.	
	2,132.1	10.3								Ť	000	ALLU' Gravel in silty	VIAL sand matrix.	
2130	.2,1572.1	- 10.3	5	10	17	27				Sat.	000			
2130	-	- -				<del>     </del>						-2,129.4 SAPRO	13.	
	2,127.1	15.3									Ł	Tan silty san		
2125	2,124 <del>7-</del>	- - 177	3	4	5	- ∳9   -				W	<b>-</b>	_2,1 <b>2</b> 4.7	17.	
ļ	1,1,1,1	-	60/0.0					60/0.0	7			Boring Terminate Penetration Test R	ed with Standard	
	‡	-										2,124.7 ft on b		
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# FIELD SCOUR REPORT

WBS:	45360.1.20	_ TIP:	BD-5114T	COUNTY: Jackson	
DESCRIPTION(1): E	3ridge No. 220	on SR-1	166 over Cullowhee	e Creek.	
			EXISTING E	BRIDGE	<del></del>

	EXISTING BRIDGE
Information from:	Field Inspection X Microfilm (reel pos: ) Other (explain)
Bridge No.: Foundation Type:	
EVIDENCE OF S Abutments or E	SCOUR(2) End Bent Slopes: None noted.
Interior Bents:	N/A
Channel Bed:	None noted.
Channel Bank:	Minor undercutting of bank approx. 15ft downstream of EB1-A.
	JR PROTECTION Pile and panel end-bent walls and wingwalls. Boulder rip-rap at EB1-B and EB2-B.
Extent(4):	Wingwalls extend 10.0ft beyond endbent walls. Rip-rap emplaced between wingwalls and creek.
Effectiveness(5):	Good.
Obstructions(6):	Boulder field in channel begins 25ft downstream and acts as a small dam.

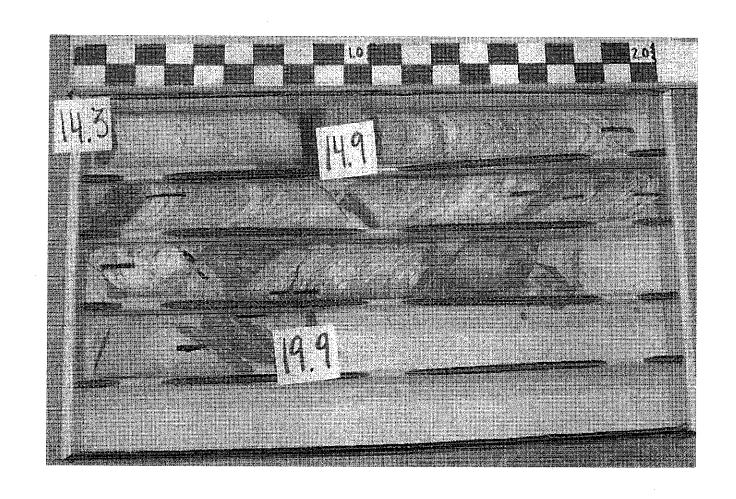
### **INSTRUCTIONS**

- 1 Describe the specific site's location, including route number and body of water crossed.
- 2 Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
- 3 Note existing scour protection (e.g. rip rap).
- 4 Describe extent of existing scour protection.
- 5 Describe whether or not the scour protection appears to be working.
- 6 Note obstructions such as dams, fallen trees, debris at bents, etc.
- 7 Describe the channel bed material based on observation and/or samples. Include any lab results with report.
- 8 Describe the channel bank material based on observation and/or samples. Include any lab results with report.
- 9 Describe the material covering the banks (e.g. grass, trees, rip rap, none).
- 10 Determine the approximate floodplain width from field observation or a topographic map.
- 11 Describe the material covering the floodplain (e.g. grass, trees, crops).
- 12 Use professional judgement to specify if the stream is degrading, aggrading, or static.
- 13 Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
- 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.

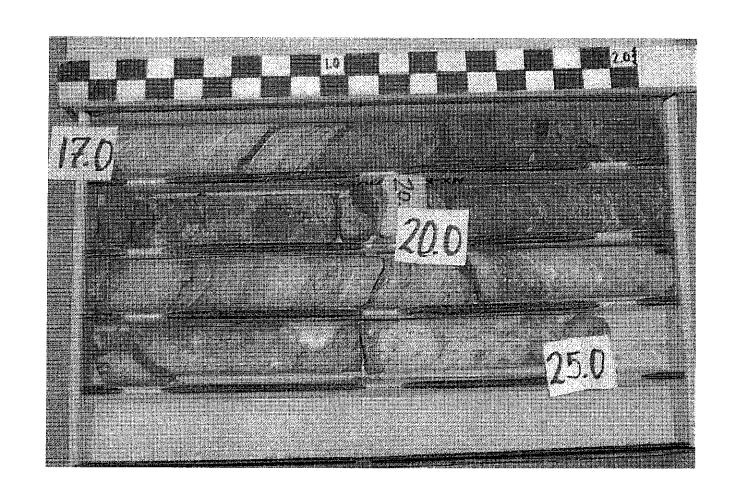
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			<u>DESIGN IN</u>	<u>VFORMAT</u>	<u>ION</u>				
Channe	l Bed Material(7	): Silty sand of bridge.	at bridge site;	with boulder	s 80ft upstre	am and 25	ift downs	stream	
Channel	Bank Material(8								
Channe	el Bank Cover(9		d trees.					·	
Floo	dplain Width(10	): <u>EB</u> 1=0ft; E	EB2>100ft.						<b>-</b>
Flood	dplain Cover(11	): Grass with	shrubs and tr	ees.					
	Stream is(12	): Aggı	rading	Degradir	ngX_	Stat	ic		
แ Channel Migratic ll	on Tendency(13	): Norhtwest				<del></del>			
Observations	and Other Com								
	R							6/13/2	011
DESIGN SCO	OUR ELEVATIO	NS(14)			Feet	Mete	rs		
	BENT	<u>s</u>							
	of DSE to Hydra					1 1		·	
	nical Engineerin								
blidge Survey	Report dated 1	1///2011. B	otn ena-bents	are impacted	by the 100-	year scou	event.		
	DSE dete	ermined by:		W D Frye,	Jr		Date:	2/24/2	011
SOIL ANALY	SIS RESULTS	FROM CHA	NNEL BED A	ND BANK M	ATERIAL				
Bed or Bank									
Sample No.									_
Retained #4					·				
Passed #10									
Passed #40					<u> </u>				
Passed #200									
Coarse Sand									
Fine Sand									
Silt									
Clay	<u> </u>		<del> </del>						
LL			<del>  </del>						
PI AASHTO									
Station			<del>                                     </del>	<del> </del>		.			
Offset									
Depth					_				
l pebuli	l_		L	I				<u> </u>	

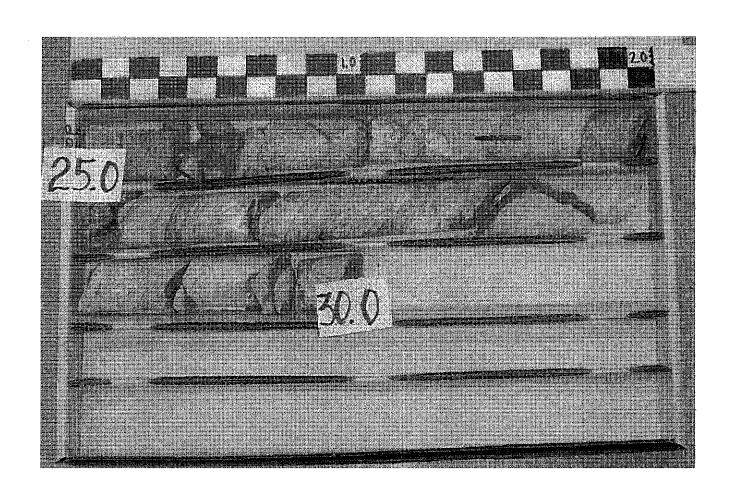
emplate Revised 02/07/08



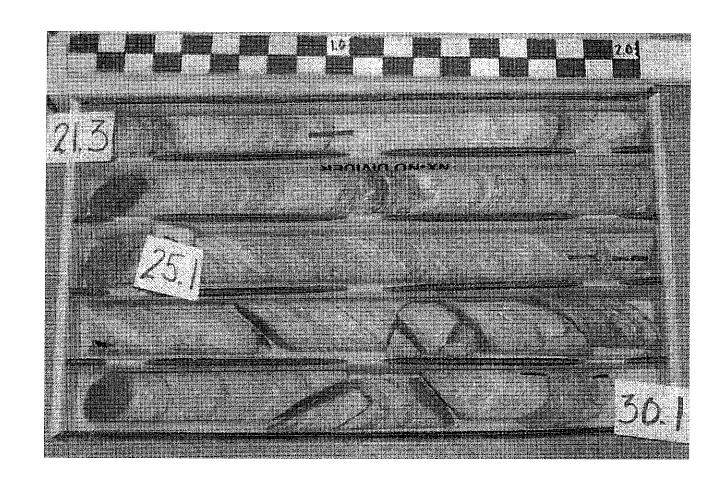
45360.1.4 (BD-5113T)
Jackson Co.
Bridge No. 220 on SR-1166
Over Cullowhee Creek
EB1-A
Box 1 of 1



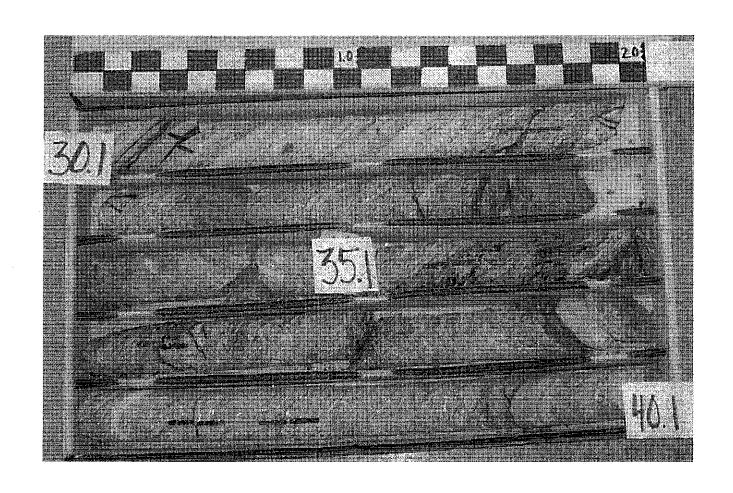
45360.1.4 (BD-5113T)
Jackson Co.
Bridge No. 220 on SR-1166
Over Cullowhee Creek
EB1-B
Box 1 of 2



45360.1.4 (BD-5113T)
Jackson Co.
Bridge No. 220 on SR-1166
Over Cullowhee Creek
EB1-B
Box 2 of 2



45360.1.4 (BD-5113T)
Jackson Co.
Bridge No. 220 on SR-1166
Over Cullowhee Creek
EB2-A
Box 1 of 2



45360.1.4 (BD-5113T)
Jackson Co.
Bridge No. 220 on SR-1166
Over Cullowhee Creek
EB2-A
Box 2 of 2