

STATE	STATE PROJECT REFERENCE NO.	SHEET	TOTAL SHEETS
N.C.	17BP.14.R.157	1	7

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

**STRUCTURE  
SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 17BP.14.R.157 F.A. PROJ. N/A  
 COUNTY MACON  
 PROJECT DESCRIPTION DIVISION 14 - LOW IMPACT BRIDGE  
REPLACEMENT PROGRAM  
 SITE DESCRIPTION STRUCTURE NO. 550150 ON SR 1528  
(LITTLE ELLIJAY ROAD) OVER SOUTH PRONG  
ELLIJAY CREEK.

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**PERSONNEL**

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D. BURLERSON  
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E. ROBERTS  
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INVESTIGATED BY STV ENGINEERS  
 CHECKED BY J. SKYTIA, P.E.  
 SUBMITTED BY STV ENGINEERS  
 DATE JUNE, 2016

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. 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 (919) 250-4088. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. THE LABORATORY SAMPLE DATA AND THE IN SITU ON-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 DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION 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.

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

DRAWN BY: J. SKYTIA, P.E.









PROJECT REFERENCE NO. 17BP.14.R.157	SHEET NO. 2A
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**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT  
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

**ROCK DESCRIPTION**

<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 6.1 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:</p>	
<p><b>WEATHERED ROCK (WR)</b></p> 	<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES &gt; 100 BLOWS PER FOOT IF TESTED.</p>
<p><b>CRYSTALLINE ROCK (CR)</b></p> 	<p>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, DIABASE, GABBRO, SCHIST, ETC.</p>
<p><b>NON-CRYSTALLINE ROCK (NR)</b></p> 	<p>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.</p>
<p><b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b></p> 	<p>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>

**TERMS AND DEFINITIONS**

<p><b>ALLUVIUM (ALLU.)</b> - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.</p> <p><b>ARTESIAN</b> - A WATER BEARING FORMATION OR STRATA.</p> <p><b>ARGILLACEOUS</b> - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.</p> <p><b>ARGILLACEOUS</b> - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.</p> <p><b>ARTESIAN</b> - 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.</p> <p><b>CALCARIOUS (CALC.)</b> - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.</p> <p><b>COLLUVIUM</b> - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.</p> <p><b>CORE RECOVERY (REC.)</b> - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.</p> <p><b>DIKE</b> - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.</p> <p><b>DIP</b> - THE ANGLE AT WHICH A STRATUM OR ANY PLAIN FEATURE IS INCLINED FROM THE HORIZONTAL.</p> <p><b>DIP DIRECTION (DIP AZIMUTH)</b> - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.</p> <p><b>FALL</b> - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.</p> <p><b>FIBRILE</b> - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.</p> <p><b>FLOAT</b> - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND UNBLOODED FROM PARENT MATERIAL.</p> <p><b>FLOOD PLAIN (FP)</b> - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.</p> <p><b>FORMATION (FM)</b> - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.</p> <p><b>JOINT</b> - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.</p> <p><b>LEDGE</b> - A SHELF-LIKE HIDE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.</p> <p><b>LENS</b> - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.</p> <p><b>MOTTLED SOILS</b> - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.</p> <p><b>PERCHED WATER</b> - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.</p> <p><b>RESIDUAL (RES.) SOIL</b> - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.</p> <p><b>ROCK QUALITY DESIGNATION (RQD)</b> - 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.</p> <p><b>SAPROLITE (SAP.)</b> - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.</p> <p><b>SILL</b> - 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.</p> <p><b>SLICKENSHOE</b> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.</p> <p><b>STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT)</b> - NUMBER OF BLOWS IN OR SPF 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 6.1 FOOT PER 60 BLOWS.</p> <p><b>STRATA CORE RECOVERY (SPEC.)</b> - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.</p> <p><b>STRATA ROCK QUALITY DESIGNATION (SRQD)</b> - 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.</p> <p><b>TOPSOIL (TS)</b> - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>
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**WEATHERING**

<p><b>FRESH</b></p> <p>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p>	<p><b>VERY SLIGHT (V SL.)</b></p> <p>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.</p>
<p><b>SLIGHT (SL.)</b></p> <p>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.</p>	<p><b>MODERATE (MOD.)</b></p> <p>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.</p>
<p><b>MODERATELY SEVERE (MOD. SEV.)</b></p> <p>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW HALOIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE ENCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL.</i></p>	<p><b>SEVERE (SEV.)</b></p> <p>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 HALOIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BFC.</i></p>
<p><b>VERY SEVERE (V SEV.)</b></p> <p>ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BFC.</i></p>	<p><b>COMPLETE</b></p> <p>ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DICES OR STRANDERS, SAPROLITE IS ALSO AN EXAMPLE.</p>

**ROCK HARDNESS**

<p><b>VERY HARD</b></p> <p>CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HARD SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p>	<p><b>HARD</b></p> <p>CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HARD SPECIMEN.</p>
<p><b>MODERATELY HARD</b></p> <p>CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE ENCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HARD SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p>	<p><b>MEDIUM HARD</b></p> <p>CAN BE GROOVED OR GOUGED 0.50 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE ENCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p>
<p><b>SOFT</b></p> <p>CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE ENCAVATED 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.</p>	<p><b>VERY SOFT</b></p> <p>CAN BE CARVED WITH KNIFE. CAN BE ENCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.</p>

**FRACTURE SPACING**

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.5 TO 1 FEET
VERY CLOSE	LESS THAN 0.5 FEET

**BEDDING**

TERM	THICKNESS
VERY THICKLY BEDDED	> 4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.5 - 1.5 FEET
VERY THINLY BEDDED	0.25 - 0.5 FEET
THICKLY LAMINATED	0.050 - 0.250 FEET
THINLY LAMINATED	< 0.050 FEET

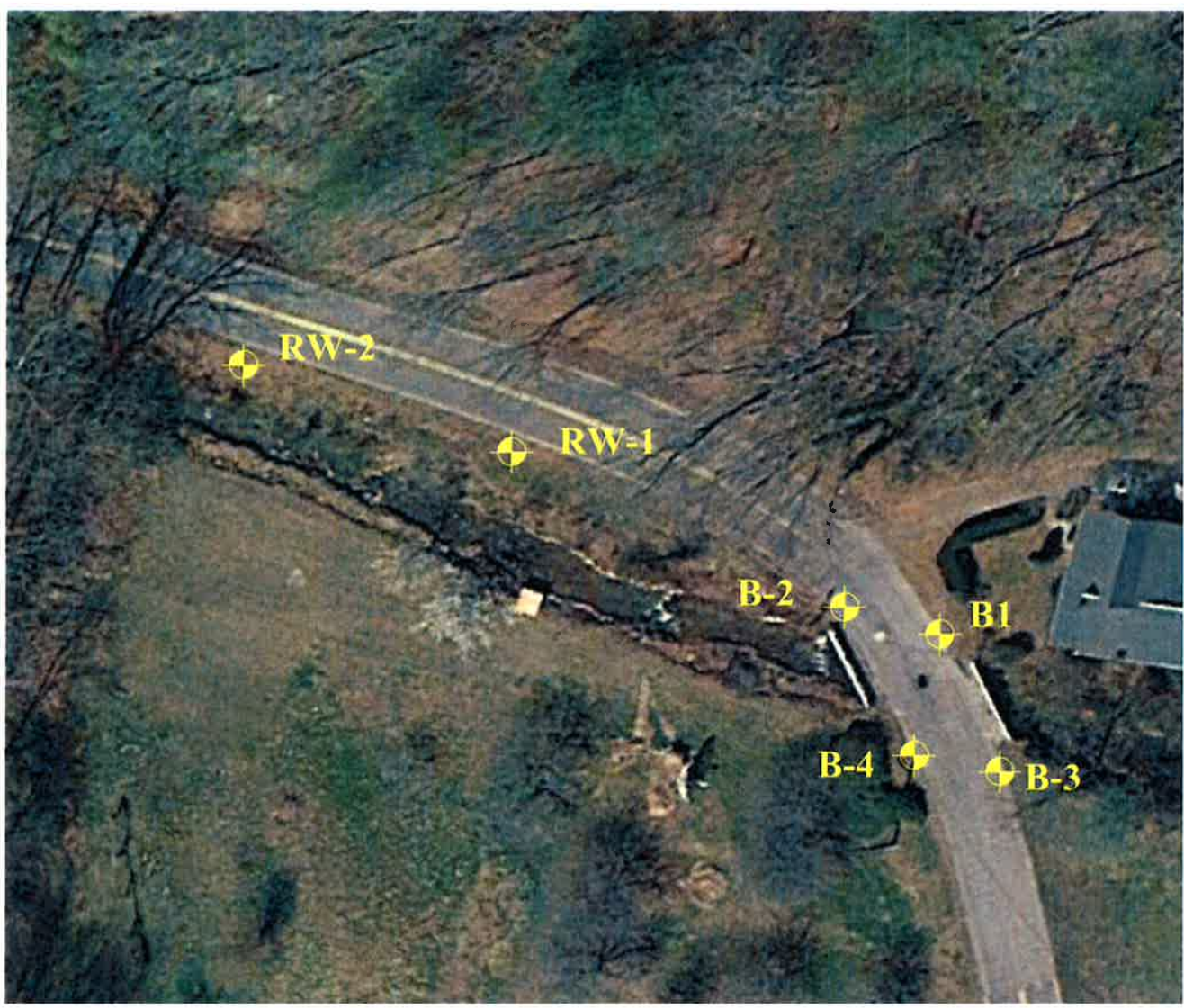
**INDURATION**

<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>	
<p><b>FRAGILE</b></p> <p>RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.</p>	<p><b>MODERATELY INDURATED</b></p> <p>GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.</p>
<p><b>INDURATED</b></p> <p>GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER.</p>	<p><b>EXTREMELY INDURATED</b></p> <p>SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</p>

**BENCH MARK, GPS 100**

**ELEVATION 2233.53 feet**

**NOTES:**  
Boring elevations determined by normal surveying techniques with reference to GPS 100, Elev. 2233.53 feet.



Aerial Photograph obtained from Google earth. Date of photography: March 2017.

**Boring Locations**

Structure No. 550150  
over South Prong Ellijay Creek  
on SR 1528 (Little Ellijay Rd.)  
Macon Co., North Carolina

State Project No. 17BP.14.R.157



**STV Engineers, Inc.**

Scale: 1"= 40' (approx.)  
Date: June 2017  
Project: 4017927-1003





# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

<b>WBS</b> 17BP.14.R.157		<b>TIP</b> N/A		<b>COUNTY</b> Macon		<b>GEOLOGIST</b> J. Skytta, PE	
<b>SITE DESCRIPTION</b> Bridge 550150 on SR 1528 (Little Ellijay Road) over South Prong Ellijay Creek							<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B-2		<b>STATION</b> 15+07		<b>OFFSET</b> 5 ft LT		<b>ALIGNMENT</b> -L-	<b>0 HR.</b> 3.8
<b>COLLAR ELEV.</b> 2,233.2 ft		<b>TOTAL DEPTH</b> 7.8 ft		<b>NORTHING</b> 724,372		<b>EASTING</b> 552,744	<b>24 HR.</b> FIAD
<b>DRILL RIG/HAMMER EFF./DATE</b> CME-55/93%/2-22-15				<b>DRILL METHOD</b> H.S. Augers		<b>HAMMER TYPE</b> Automatic	
<b>DRILLER</b> AmeriDrill		<b>START DATE</b> 06/22/16		<b>COMP. DATE</b> 06/22/16		<b>SURFACE WATER DEPTH</b> N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
2235																
2,232.2	2,232.2	1.0	5	5	3	8									2,233.2	0.0
2,229.7	2,229.7	3.5	2	8	5	13									2,227.2	6.0
2,227.2	2,227.2	6.0	9	23	20	43									2,225.4	7.8
2,225.4	2,225.4	7.8	50/0.0													

GROUND SURFACE 0.0

PAVEMENT 0.9

3 inches asphalt on 3 inches stone

ROADWAY EMBANKMENT

Loose to medium dense orange brown silty fine to medium SAND, with rock pieces

RESIDUAL

Dense orange brown slightly silty fine to coarse SAND, with fragmented rock

Boring Terminated by Auger Refusal at Elevation 2,225.4 ft

NCDOT BORE SINGLE DIV 14 BR 150 GP.1 NC\_DOT\_GDT 8/18/17



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 17BP.14.R.157	TIP N/A	COUNTY Macon	GEOLOGIST J. Skytta, PE
SITE DESCRIPTION Bridge 550150 on SR 1528 (Little Ellijay Road) over South Prong Ellijay Creek			GROUND WTR (ft)
BORING NO. B-3	STATION 15+52	OFFSET 15 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,232.1 ft	TOTAL DEPTH 5.8 ft	NORTHING 724,407	EASTING 552,707
DRILL RIG/HAMMER EFF./DATE CME-55/93%/2-22-15		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER AmeriDrill	START DATE 06/22/16	COMP. DATE 06/22/16	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
2235																
2230	2,231.1	1.0	4	4	4									2,232.1	0.0	GROUND SURFACE
	2,228.6	3.5	1	2	4						SS-1	M		2,229.1	3.0	PAVEMENT 2 inches asphalt on 2 inches stone
	2,226.3	5.8									SS-2	Sat.		2,226.3	5.8	ROADWAY EMBANKMENT Loose orange brown silty fine to medium SAND
			50/0.0													RESIDUAL Loose dark gray silty silty fine SAND Boring Terminated by Auger Refusal at Elevation 2,226.3 ft

NCDOT BORE SINGLE DIV 14 BR 150 GPJ NC\_DOT\_GDT 8/18/17



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 17BP.14.R.157	TIP N/A	COUNTY Macon	GEOLOGIST J. Skytta, PE
SITE DESCRIPTION Bridge 550150 on SR 1528 (Little Ellijay Road) over South Prong Ellijay Creek			GROUND WTR (ft)
BORING NO. B-4	STATION 15+38	OFFSET 2 ft LT	ALIGNMENT -L-
COLLAR ELEV. 2,232.3 ft	TOTAL DEPTH 7.9 ft	NORTHING 724,388	EASTING 552,710
DRILL RIG/HAMMER EFF./DATE CME-55/93%/2-22-15		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER AmeriDrill	START DATE 06/22/16	COMP. DATE 06/22/16	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75					
2235														
	2,231.3	1.0											GROUND SURFACE	0.0
2230	2,228.8	3.5	1	3	2					SS-1	M		SHOULDER 3 inches gravel	2.5
	2,226.3	6.0	WOH	WOH	WOH					SS-2	W		ROADWAY EMBANKMENT Firm orange brown fine to medium sandy SILT	6.0
2225	2,224.4	7.9	11	13	25					SS-3	W		RESIDUAL Very soft dark brown fine to medium sandy SILT	7.9
			50/0.0										Dense brown slightly silty fine to coarse SAND, with rock fragments Boring Terminated by Auger Refusal at Elevation 2,224.4 ft	

NCDOT BORE SINGLE DIV 14 BR 150 GPJ NC\_DOT\_GDT 8/18/17





# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 17BP.14.R.157	TIP N/A	COUNTY Macon	GEOLOGIST J. Skytta, PE
SITE DESCRIPTION Bridge 550150 on SR 1528 (Little Ellijay Road) over South Prong Ellijay Creek			GROUND WTR (ft)
BORING NO. RW-1	STATION 14+21	OFFSET 9 ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,231.3 ft	TOTAL DEPTH 30.0 ft	NORTHING 724,303	EASTING 552,783
DRILL RIG/HAMMER EFF./DATE CME-55/93%/2-22-15		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER AmeriDrill	START DATE 04/10/17	COMP. DATE 04/10/17	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				
2235														
2230	2,230.3	1.0	3	2	4						SS-1	M	GROUND SURFACE TOPSOIL 3 inches TOPSOIL having a root mat ROADWAY EMBANKMENT Loose to medium dense orange brown gray silty fine to coarse SAND, with rock pieces	0.0
	2,227.8	3.5	4	4	9						SS-2	M		
2225	2,225.3	6.0	6	11	13						SS-3	M		
	2,222.8	8.5	13	19	7						SS-4	M		
2220	2,217.8	13.5	12	15	7						SS-5	M	RESIDUAL Very dense to medium dense dark gray silty fine to medium SAND, micaceous, occasional weathered rock pieces	12.0
2215	2,212.8	18.5	32	42	48						SS-6	M		
2210	2,207.8	23.5	18	13	9						SS-7	M		
2205	2,202.8	28.5	6	4	14						SS-8	M		
													Boring Terminated at Elevation 2,201.3	30.0

NCDOT BORE SINGLE DIV 14 BR 150.GPJ NC\_DOT\_GDT 8/22/17



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

WBS 17BP.14.R.157	TIP N/A	COUNTY Macon	GEOLOGIST J. Skytta, PE
SITE DESCRIPTION Bridge 550150 on SR 1528 (Little Ellijay Road) over South Prong Ellijay Creek			GROUND WTR (ft)
BORING NO. RW-2	STATION 13+58	OFFSET 11 ft RT	ALIGNMENT -L-
COLLAR ELEV. 2,230.9 ft	TOTAL DEPTH 26.8 ft	NORTHING 724,243	EASTING 552,806
DRILL RIG/HAMMER EFF./DATE CME-55/93%/2-22-15		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER AmeriDrill	START DATE 04/11/17	COMP. DATE 04/11/17	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)		
2235																	
2230	2,229.9	1.0													2,230.9	GROUND SURFACE	
	2,227.4	3.5	4	1	12										2,229.8	TOPSOIL 5 inches TOPSOIL having a root mat	
2225	2,224.9	6.0	15	4	1										2,225.9	ROADWAY EMBANKMENT Medium dense to loose brown slightly silty fine to medium SAND, with fine gravel, rock pieces	
	2,222.4	8.5	4	4	10										2,222.4	ROADWAY EMBANKMENT Stiff orange brown silty fine to medium SAND, micaceous, with rock pieces	
2220	2,217.4	13.5	3	3	10										2,218.9	ROADWAY EMBANKMENT Medium dense brown gray slightly silty fine to coarse SAND, with fragmented rock	
2215	2,214.1	16.8	10	12	16										2,214.1	RESIDUAL Medium dense dark gray silty fine to medium SAND, micaceous	
2210			30/0.0														CRYSTALLINE ROCK Recovery = 93%, RQD = 66%
2205															2,204.1	Boring Terminated at Elevation 2,204.1 ft in Crystalline Rock.	

NCDOT BORE SINGLE\_DIV 14 BR 150.GPJ\_NC\_DOT.GDT 8/22/17



# NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 17BP.14.R.157	TIP N/A	COUNTY Macon	GEOLOGIST J. Skytta, PE
SITE DESCRIPTION Bridge 550150 on SR 1528 (Little Ellijay Road) over South Prong Ellijay Creek			GROUND WTR (ft)
BORING NO. RW-2	STATION 13+58	OFFSET 11 ft RT	ALIGNMENT -L- 0 HR. 9.2
COLLAR ELEV. 2,230.9 ft	TOTAL DEPTH 26.8 ft	NORTHING 724,243	EASTING 552,806 24 HR. FIAD
DRILL RIG/HAMMER EFF./DATE CME-55/93%/2-22-15		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER AmeriDrill	START DATE 04/11/17	COMP. DATE 04/11/17	SURFACE WATER DEPTH N/A
CORE SIZE 1.875	TOTAL RUN 10.0 ft		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	ELEV. (ft)	DEPTH (ft)
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %				
2214.1		16.8	5.0	4:38/1.0 4:45/1.0 5:15/1.0 5:05/1.0 4:35/1.0	(4.9) 98%	(3.2) 64%		(9.3) 93%	(6.6) 66%		2,214.1	16.8	
2210	2,214.1										Begin Coring @ 16.8 ft <b>CRYSTALLINE ROCK</b> Medium gray to light gray, moderately fractured, moderately hard, slightly weathered, medium to coarse grained GNEISS		
2205	2,209.1	21.8	5.0	3:56/1.0 4:37/1.0 5:51/1.0 5:25/1.0 5:32/1.0	(4.4) 88%	(3.4) 68%					2,204.1	26.8	
	2,204.1	26.8									Boring Terminated at Elevation 2,204.1 ft in Crystalline Rock.		

NCDOT CORE SINGLE DIV 14 BR 150.GPJ NC\_DOT.GDT 8/22/17

# Retaining Wall Cores Photographs

**Structure No. 150 over South Prong Ellijay Creek  
on SR 1528 (Little Ellijay Rd.)  
Macon County, North Carolina  
(17BP.14.R.157)**

Boring RW-2 (Core Runs 1 and 2)



# **APPENDIX C**

## **Provided Information**

## **Bottom of Culvert Elevations**

**Skytta, Jon**

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**From:** Melvin, Laura E  
**Sent:** Friday, August 18, 2017 10:20 AM  
**To:** Skytta, Jon  
**Cc:** Jones, Wesley  
**Subject:** 4017927: 17BP.14.R.157 Bottom of Culvert Elevations

Jon,

Below are the elevations of the bottom of the culvert at upstream and downstream locations:

Upstream: 2224.1

Downstream: 2223.3

**Laura (Morris) Melvin, E.I.**

STV Engineers, Inc.  
*Direct: (704) 319-5094*  
*Office: (704) 372-1885*  
*Fax: (704) 372-3393*  
900 W Trade St, Suite 715  
Charlotte, NC 28202

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Please consider the environment before printing this e-mail.

**Approved BSR**



*MSS*  
*10/24/16*

CULVERT SURVEY & HYDRAULIC DESIGN REPORT

N. C. DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
HYDRAULICS UNIT  
RALEIGH, N. C.

Stream ELLIJAY CREEK  
Struc. Inv. No. 150  
I.D. No. SF-550150  
Project No. 17.BP.14.R.157  
PDF File: 550150 2016 SF-550150 SO PRONG ELLIJAY CREEK SR1528.PDF

I.D. No. SF-550150 Project No. 17.BP.14.R.157 Proj. Station 15+25.00 -L-

County MACON Stream ELLIJAY CREEK Stru. No. 150  
SR 1528 SR 1001 SR 1163

On Highway LITTLE ELLIJAY ROAD Between ELLIJAY ROAD and PINE CREEK ROAD

Recommended Structure 2 - 10' X 6' REINFORCED CONCRETE BOX CULVERTS W/HEADWALLS  
WITH 6" TOP BEVEL

Recommended Width of Roadway 34' SHOULDER PT. TO SHOULDER PT. Skew 135 DEGREES

Recommended Location is (Up, At, Down) Stream from Existing Crossing. AT

Statewide Tier  Regional Tier  Sub-Regional Tier

Bench Mark is BM-1 10" SPIKE IN BASE OF 34" OAK TREE

-L- 12+58.68..14.60' RT Elev. 2231.76' ft. Datum: NAYD 88

Temporary Crossing STAGED CONSTRUCTION



Designed by: SHIRSHANT SHARMA, P.E.

Assisted by: DILLON BAWAYAN

Project Engineer: NIKKI HONEYCUTT, P.E.

Reviewed by: *Mona T. Sharma, P.E.*

Date 10/20/2016



*10/20/16*



ADDITIONAL INFORMATION AND COMPUTATIONS

NOTE: BED MATERIAL IS BOULDERS, COBBLES, SAND AND GRAVEL

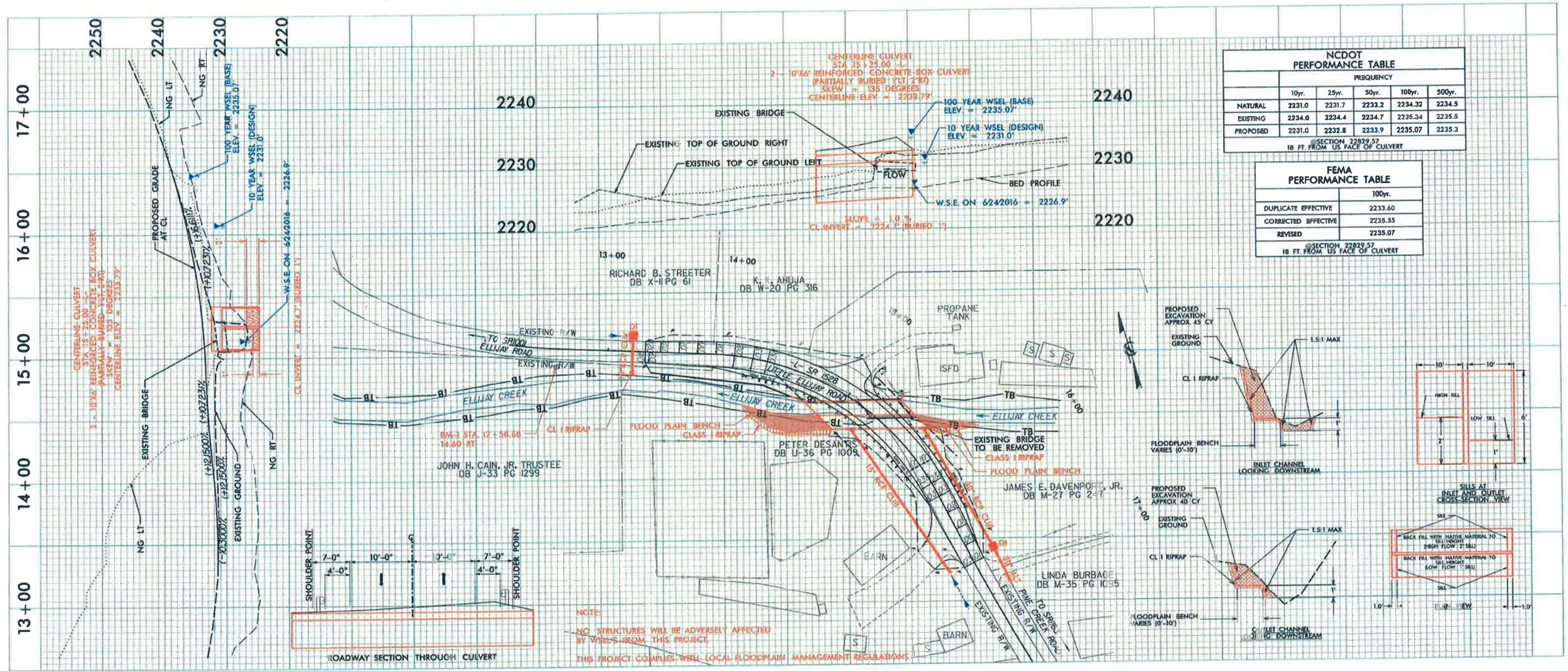
BANKS ARE VEGETATED AND STABLE

RURAL BLUE RIDGE

SIR 2009-5158

FEMA DISCHARGE

$Q_{10}$	= 288 (DA)	= 828 CFS (SAY 850)	
$Q_{25}$	= 398 (DA)	= 1125 CFS (SAY 1100)	-
$Q_{50}$	= 479 (DA)	= 1342 CFS (SAY 1300)	-
$Q_{100}$	= 575 (DA)	= 1600 CFS (USE FEMA DISCHARGE)	1840 CFS
$Q_{500}$	= 794 (DA)	= 2181 CFS (SAY 2200)	-

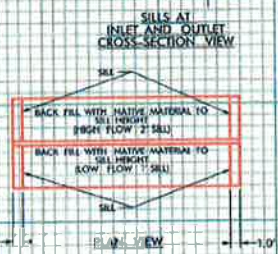
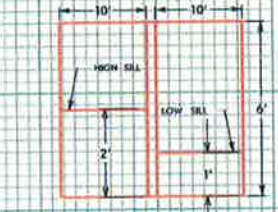


NCDOT PERFORMANCE TABLE					
	FREQUENCY				
	10yr.	25yr.	50yr.	100yr.	500yr.
NATURAL	2231.0	2231.7	2233.2	2234.32	2234.5
EXISTING	2234.0	2234.4	2234.7	2235.34	2235.5
PROPOSED	2231.0	2232.8	2233.9	2235.07	2235.3

SECTION 22829.57  
 18 FT FROM US FACE OF CULVERT

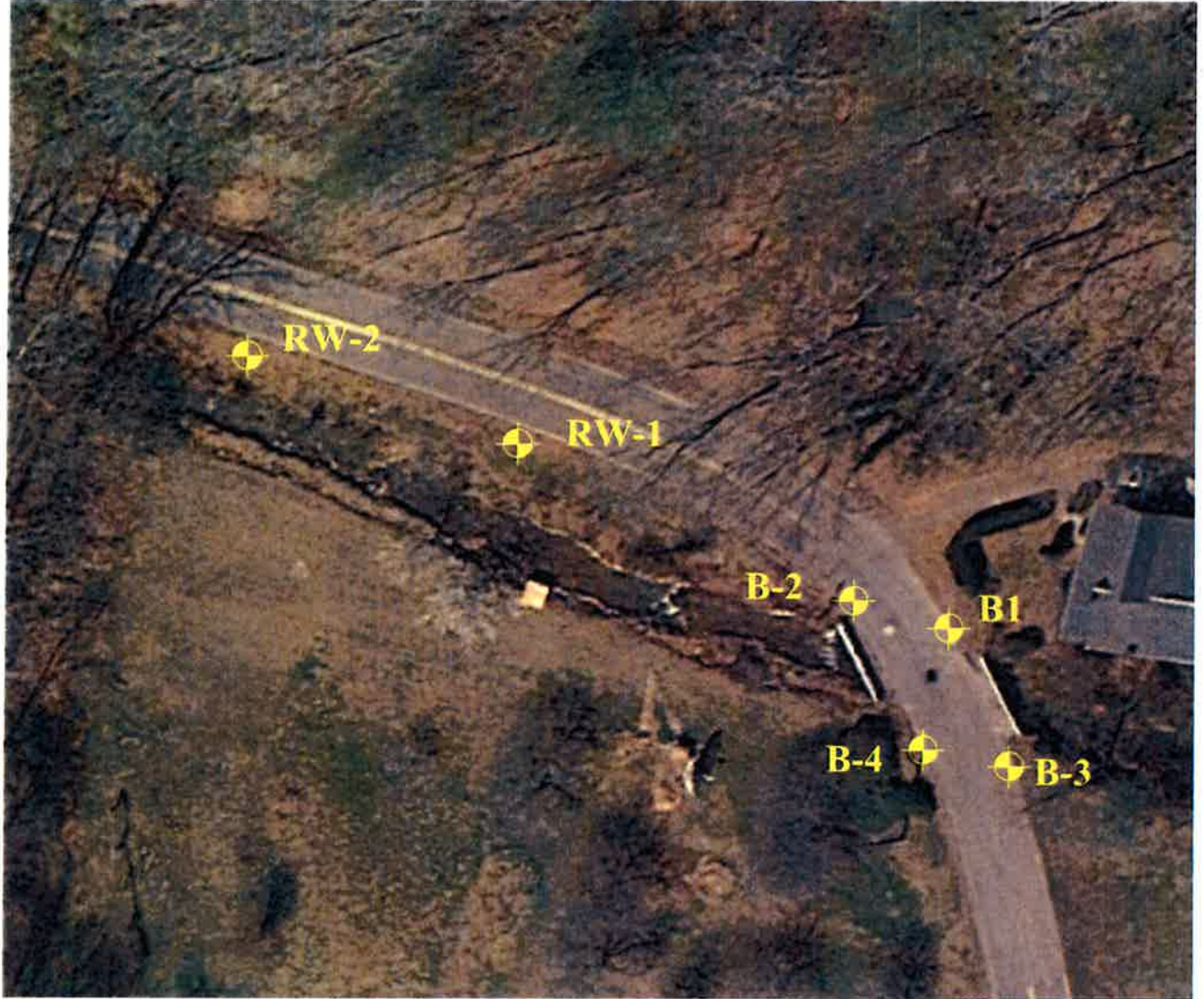
FEMA PERFORMANCE TABLE	
	100yr.
DUPLICATE EFFECTIVE	2233.60
CORRECTED EFFECTIVE	2235.35
REVISED	2235.07

SECTION 22829.57  
 18 FT FROM US FACE OF CULVERT



# **APPENDIX D**

## **Supporting Calculations**



Aerial Photograph obtained from Google earth. Date of photography: March 2017.

**Boring Locations**

Structure No. 550150  
over South Prong Ellijay Creek  
on SR 1528 (Little Ellijay Rd.)  
Macon Co., North Carolina

State Project No. 17BP.14.R.157



**STV Engineers, Inc.**

Scale: 1"= 40' (approx.)  
Date: June 2017  
Project: 4017927-1003



# NCDOT GEOTECHNICAL ENGINEERING UNIT

## BORELOG REPORT

<b>WBS</b> 17BP.14.R.157		<b>TIP</b> N/A		<b>COUNTY</b> Macon		<b>GEOLOGIST</b> J. Skytta, PE	
<b>SITE DESCRIPTION</b> Bridge 550150 on SR 1528 (Little Ellijay Road) over South Prong Ellijay Creek							<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B-1		<b>STATION</b> 15+20		<b>OFFSET</b> 18 ft LT		<b>ALIGNMENT</b> -L-	
<b>COLLAR ELEV.</b> 2,232.3 ft		<b>TOTAL DEPTH</b> 8.0 ft		<b>NORTHING</b> 724,392		<b>EASTING</b> 552,737	
<b>DRILL RIG/HAMMER EFF./DATE</b> CME-55/93%/2-22-15				<b>DRILL METHOD</b> H.S. Augers		<b>HAMMER TYPE</b> Automatic	
<b>DRILLER</b> AmeriDrill		<b>START DATE</b> 06/22/16		<b>COMP. DATE</b> 06/22/16		<b>SURFACE WATER DEPTH</b> N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75					
2235														
2230	2,231.3	1.0	2	2	2					SS-1	M		GROUND SURFACE	0.0
	2,228.8	3.5	2	2	5					SS-2	M		PAVEMENT 3 inches asphalt on 2 inches stone	0.4
	2,226.3	6.0	7	9	14					SS-3	W		ROADWAY EMBANKMENT Soft to firm dark gray fine sandy SILT	5.5
2225	2,224.3	8.0											RESIDUAL Medium dense orange brown medium to coarse SAND and FRAGMENTED ROCK	8.0
													Boring Terminated by Auger Refusal at Elevation 2,224.3 ft	

non-scourable rock (NSR)  
thickness = 0.2'

Box @ Elev. 2227.1'

NCDOT BORE SINGLE DIV 14 BR 150.GPJ NC\_DOT\_GDT 8/18/17

**BORELOG REPORT**

<b>WBS</b> 17BP.14.R.157	<b>TIP</b> N/A	<b>COUNTY</b> Macon	<b>GEOLOGIST</b> J. Skytta, PE
<b>SITE DESCRIPTION</b> Bridge 550150 on SR 1528 (Little Ellijay Road) over South Prong Ellijay Creek			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B-2	<b>STATION</b> 15+07	<b>OFFSET</b> 5 ft LT	<b>ALIGNMENT</b> -L-
<b>COLLAR ELEV.</b> 2,233.2 ft	<b>TOTAL DEPTH</b> 7.8 ft	<b>NORTHING</b> 724,372	<b>EASTING</b> 552,744
<b>DRILL RIG/HAMMER EFF./DATE</b> CME-55/93%/2-22-15		<b>DRILL METHOD</b> H.S. Augers	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> AmeriDrill	<b>START DATE</b> 06/22/16	<b>COMP. DATE</b> 06/22/16	<b>SURFACE WATER DEPTH</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						ELEV. (ft)		
2235																		
	2,232.2	1.0													2,233.2	GROUND SURFACE	0.0	
2230	2,229.7	3.5	5	5	3							SS-1	M		2,229.7	PAVEMENT 3 inches asphalt on 3 inches stone	0.9	
	2,227.2	6.0	2	8	5							SS-2	M		2,227.2	ROADWAY EMBANKMENT Loose to medium dense orange brown silty fine to medium SAND, with rock pieces	6.0	
	2,225.4	7.8	9	23	20							SS-3	W		2,225.4	RESIDUAL Dense orange brown slightly silty fine to coarse SAND, with fragmented rock	7.8	
		50/0.0																
<p><i>Bottom of culvert 2223.3' ↓</i></p> <p><i>non-scourable Rock (NSR)</i></p> <p><i>thickness = 2.1'</i></p>																		

NCDOT BORE SINGLE DIV 14 BR 150.GPJ NC\_DOT.GDT 8/18/17



**BORELOG REPORT**

<b>WBS</b> 17BP.14.R.157	<b>TIP</b> N/A	<b>COUNTY</b> Macon	<b>GEOLOGIST</b> J. Skytta, PE
<b>SITE DESCRIPTION</b> Bridge 550150 on SR 1528 (Little Ellijay Road) over South Prong Ellijay Creek			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B-3	<b>STATION</b> 15+52	<b>OFFSET</b> 15 ft LT	<b>ALIGNMENT</b> -L-
<b>COLLAR ELEV.</b> 2,232.1 ft	<b>TOTAL DEPTH</b> 5.8 ft	<b>NORTHING</b> 724,407	<b>EASTING</b> 552,707
<b>DRILL RIG/HAMMER EFF./DATE</b> CME-55/93%/2-22-15		<b>DRILL METHOD</b> H.S. Augers	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> AmeriDrill	<b>START DATE</b> 06/22/16	<b>COMP. DATE</b> 06/22/16	<b>SURFACE WATER DEPTH</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
2235																	
2230	2,231.1	1.0	4	4	4							SS-1	M		2,232.1	GROUND SURFACE	0.0
	2,228.6	3.5	1	2	4							SS-2	Sat.		2,229.1	PAVEMENT 2 inches asphalt on 2 inches stone ROADWAY EMBANKMENT	3.0
	2,226.3	5.8	50/0.0												2,226.3	Loose orange brown silty fine to medium SAND RESIDUAL	5.8
															2,224.1	Loose dark gray silty silty fine SAND Boring Terminated by Auger Refusal at Elevation 2,226.3 ft	

*Bottom of Culvert @ Elev. 2224.1'*

*NSR = 2.2'*

NCDOT BORE SINGLE DIV 14 BR 150.GPJ NC\_DOT.GDT 8/18/17

**BORELOG REPORT**

<b>WBS</b> 17BP.14.R.157	<b>TIP</b> N/A	<b>COUNTY</b> Macon	<b>GEOLOGIST</b> J. Skytta, PE
<b>SITE DESCRIPTION</b> Bridge 550150 on SR 1528 (Little Ellijay Road) over South Prong Ellijay Creek			<b>GROUND WTR (ft)</b>
<b>BORING NO.</b> B-4	<b>STATION</b> 15+38	<b>OFFSET</b> 2 ft LT	<b>ALIGNMENT</b> -L-
<b>COLLAR ELEV.</b> 2,232.3 ft	<b>TOTAL DEPTH</b> 7.9 ft	<b>NORTHING</b> 724,388	<b>EASTING</b> 552,710
<b>DRILL RIG/HAMMER EFF./DATE</b> CME-55/93%/2-22-15		<b>DRILL METHOD</b> H.S. Augers	<b>HAMMER TYPE</b> Automatic
<b>DRILLER</b> AmeriDrill	<b>START DATE</b> 06/22/16	<b>COMP. DATE</b> 06/22/16	<b>SURFACE WATER DEPTH</b> N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2235																
2230	2,231.3	1.0	1	3	2											
	2,228.8	3.5	WOH	WOH	WOH											
2225	2,226.3	6.0														
	2,224.4	7.9	11	13	25											
		50/0.0														

Bottom of CULVERT @ Elev. 2223.3' ↗

NSR = 1.1'

2,232.3	GROUND SURFACE	0.0
2,229.8	SHOULDER 3 inches gravel	2.5
2,226.3	ROADWAY EMBANKMENT Firm orange brown fine to medium sandy SILT	6.0
2,224.4	RESIDUAL Very soft dark brown fine to medium sandy SILT	7.9
2,223.3	Dense brown slightly silty fine to coarse SAND, with rock fragments Boring Terminated by Auger Refusal at Elevation 2,224.4 ft	