

REFERENCE: HB-0002

PROJECT: 55041

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY HAYWOOD  
 PROJECT DESCRIPTION REPLACE BRIDGE NOS. 248 &  
249 ON I-40 OVER SR 1613

**CONTENTS**

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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	HB-0002	1	18

**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 (919) 707-6850. 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:
- 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.
  - 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**

D. KUBINSKI

B. NEUNSINGER

TRIGON EXPLORATION

INVESTIGATED BY S&ME, Inc.

Kleinfelder, Inc.

DRAWN BY J. SWARTLEY, T. WELLS

CHECKED BY J. DAILY

SUBMITTED BY S&ME, Inc.

DATE SEPTEMBER 2022



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 RALEIGH, NC 27616  
 (919) 872-2660



DocuSigned by:

*Thomas J. Daily*

9/7/2022

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SIGNATURE

DATE

**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

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

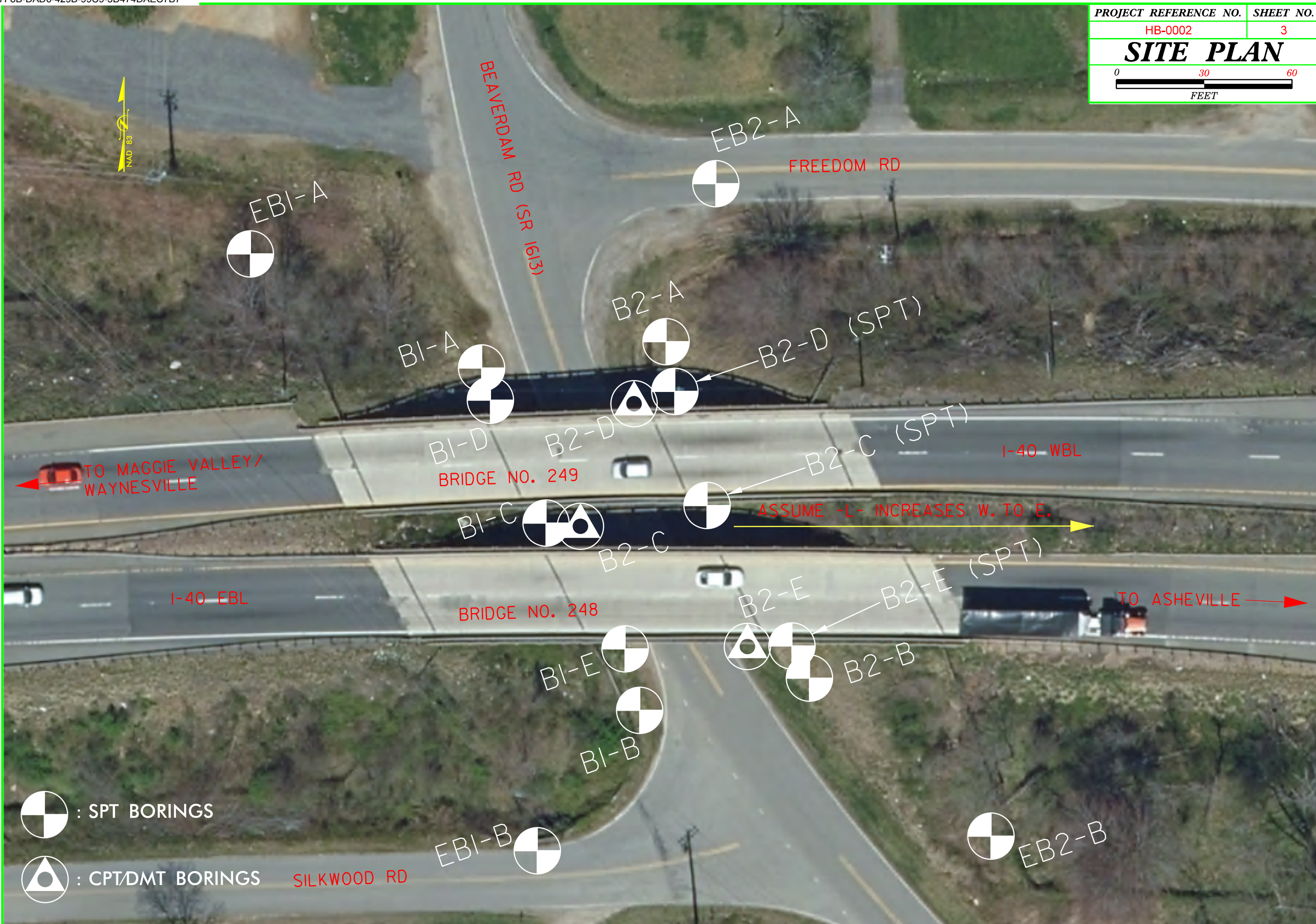
SOIL DESCRIPTION										
SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 208, ASTM D1586). SOIL CLASSIFICATION IS 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										
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX 10 MX	51 MN 35 MX 35 MX	35 MX 35 MX	36 MN 36 MN	36 MN 36 MN	36 MN 36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, FEAT
MATERIAL PASSING #40 LL PI	— 6 MX	— NP	40 MX 41 MN 10 MX 11 MN	40 MX 41 MN 10 MX 11 MN	40 MX 41 MN 10 MX 11 MN	40 MX 41 MN 10 MX 11 MN	40 MX 41 MN 10 MX 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER	HIGHLY ORGANIC SOILS	
GROUP INDEX	0	0	0	4 MX	8 MX	12 MX	16 MX	NO MX		
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS					
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD			FAIR TO POOR			FAIR TO POOR	POOR	UNSUITABLE	
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30										

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 IN BORE HOLE IMMEDIATELY AFTER DRILLING		
	STATIC WATER LEVEL AFTER 24 HOURS		
	PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA		
	SPRING OR SEEP		
MISCELLANEOUS SYMBOLS			
	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION		
	SOIL SYMBOL		
	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT		
	INFERRED SOIL BOUNDARY		
	INFERRED ROCK LINE		
	ALLUVIAL SOIL BOUNDARY		
	25/025 DIP & DIP DIRECTION OF ROCK STRUCTURES		
	SPT DMT TEST BORE		
	AUGER BORING		
	CORE BORING		
	MONITORING WELL		
	PIEZOMETER INSTALLATION		
	SOUNDING ROD		
	TEST BORING WITH CORE		
	SPT N-VALUE		
RECOMMENDATION SYMBOLS			
	UNDERCUT		
	SHALLOW UNDERCUT		
	UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE		
	UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK		
	UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK		
ABBREVIATIONS			
AR - AUGER REFUSAL	MED. - MEDIUM	VST - VANE SHEAR TEST	
BT - BORING TERMINATED	MICA - MICACEOUS	WEA - WEATHERED	
CL - CLAY	MOD. - MODERATELY	UW - UNIT WEIGHT	
CPT - CONE PENETRATION TEST	NP - NON PLASTIC	UD - DRY UNIT WEIGHT	
CSE - COARSE	ORG. - ORGANIC	SAMPLE ABBREVIATIONS	
DMT - DILATOMETER TEST	PMT - PRESSUREMETER TEST	S - BULK	
DPT - DYNAMIC PENETRATION TEST	SAP. - SAPROLITE	SS - SPLIT SPOON	
e - VOID RATIO	SD. - SAND, SANDY	ST - SHELBY TUBE	
F - FINE	SL. - SILT, SILTY	RS - ROCK	
FOSS. - FOSSILIFEROUS	SLI. - SLIGHTLY	RT - RECOMPACTED TRIAXIAL	
FRAC. - FRACTURED, FRACTURES	TCR - TRICONE REFUSAL	CBR - CALIFORNIA BEARING RATIO	
FRAGS. - FRAGMENTS	w - MOISTURE CONTENT		
HI. - HIGHLY	V - VERY		
EQUIPMENT USED ON SUBJECT PROJECT			
DRILL UNITS:	ADVANCING TOOLS:	HAMMER TYPE:	
<input type="checkbox"/> CME-45C	<input type="checkbox"/> CLAY BITS	<input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL	
<input type="checkbox"/> CME-55	<input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER	CORE SIZE:	
<input type="checkbox"/> CME-550	<input checked="" type="checkbox"/> 8" HOLLOW AUGERS	<input type="checkbox"/> -B <input type="checkbox"/> -H	
<input type="checkbox"/> VANE SHEAR TEST	<input type="checkbox"/> HARD FACED FINGER BITS	<input type="checkbox"/> -N	
<input type="checkbox"/> PORTABLE HOIST	<input type="checkbox"/> TUNG-CARBIDE INSERTS	HAND TOOLS:	
<input checked="" type="checkbox"/> MOBILE B-57	<input type="checkbox"/> CASING <input type="checkbox"/> w/ ADVANCER	<input type="checkbox"/> POST HOLE DIGGER	
	<input type="checkbox"/> TRICONE <input type="checkbox"/> STEEL TEETH	<input type="checkbox"/> HAND AUGER	
	<input checked="" type="checkbox"/> TRICONE 2-7/8" TUNG-CARB.	<input type="checkbox"/> SOUNDING ROD	
	<input type="checkbox"/> CORE BIT	<input type="checkbox"/> VANE SHEAR TEST	

ROCK DESCRIPTION	
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:	
	WEATHERED ROCK (WR)
	CRYSTALLINE ROCK (CR)
	NON-CRYSTALLINE ROCK (INCR)
	COASTAL PLAIN SEDIMENTARY ROCK (CP)
WEATHERING	
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI)	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 (SLI)	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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i>
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. <i>IF TESTED, WOULD YIELD SPT N VALUES &gt; 100 BPF</i>
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. <i>IF TESTED, WOULD YIELD SPT N VALUES &lt; 100 BPF</i>
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	
TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET
BEDDING	
TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 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.

TERMS AND DEFINITIONS	
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 DISLODGED 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.	
BENCH MARK: N/A	
ELEVATION: N/A FEET	
<b>NOTES:</b>	
FIAD: FILLED IMMEDIATELY AFTER DRILLING	
BORING ELEVATIONS SURVEYED BY SEPI, INC. USING A GPS WITH SUB-CENTIMETER ACCURACY	

PROJECT REFERENCE NO.	SHEET NO.
HB-0002	3
<b>SITE PLAN</b>	
 0 30 60 FEET	



: SPT BORINGS

: CPT/DMT BORINGS

SILKWOOD RD



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 55041.1.1		TIP HB-0002		COUNTY HAYWOOD		GEOLOGIST B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613							GROUND WTR (ft)
BORING NO. B1-A		STATION N/A		OFFSET N/A		ALIGNMENT -L-	
COLLAR ELEV. 2,636.1 ft		TOTAL DEPTH 70.3 ft		NORTHING 679,234		EASTING 860,822	
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic			
DRILLER E. Estep		START DATE 02/08/22		COMP. DATE 02/08/22		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2640															
2635	2,636.1	0.0	3	3	3									2,636.1	GROUND SURFACE
														2,633.1	ROADWAY EMBANKMENT Olive to Olive Yellow, Silty CLAY with Trace Mica
	2,632.3	3.8	3	3	2									2,629.1	ROADWAY EMBANKMENT Light Olive Yellow, Clayey SAND with Trace Mica, Some Rock Fragments
2630														2,629.1	RESIDUAL Olive Yellow to Black to Dark Reddish Brown to Light Brownish Gray to White, Silty, Coarse to Fine SAND with Trace Mica, Little Quartz
2625	2,627.3	8.8	1	1	3										
2620	2,622.3	13.8	1	3	3										
2615	2,617.3	18.8	2	3	4										
2610	2,612.3	23.8	4	8	11										
2605	2,607.3	28.8	10	12	15										
2600	2,602.3	33.8	5	8	8										
2595	2,597.3	38.8	3	5	8										
2590	2,592.3	43.8	3	6	8										
2585	2,587.3	48.8	53	47/0.3										2,588.1	WEATHERED ROCK Light Brownish Gray to White, MICA SCHIST
2580	2,582.3	53.8	29	24	74									2,583.6	RESIDUAL Light Brownish Gray to Black to White, Silty, Coarse to Fine SAND with Trace Mica, Some Quartz
2575	2,577.3	58.8	43	57/0.3										2,578.6	WEATHERED ROCK Light Brownish Gray to White to Black to Reddish Brown MICA SCHIST
2570	2,572.3	63.8	57	43/0.2										2,569.1	RESIDUAL White, Black, Reddish Brown, Silty, Coarse to Fine SAND with Trace Mica and Some Quartz
	2,567.3	68.8	36	35	65									2,565.8	RESIDUAL White, Black, Reddish Brown, Silty, Coarse to Fine SAND with Trace Mica and Some Quartz
															Boring Terminated at Elevation 2,565.8 ft in RESIDUAL: Silty SAND

NCDOT BORE DOUBLE HB002\_GEO BRDG248 BRDG249.GPJ\_NC\_DOT.GDT 8/3/22

WBS 55041.1.1		TIP HB-0002		COUNTY HAYWOOD		GEOLOGIST B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613							GROUND WTR (ft)
BORING NO. B1-D		STATION N/A		OFFSET N/A		ALIGNMENT -L-	
COLLAR ELEV. 2,635.6 ft		TOTAL DEPTH 69.3 ft		NORTHING 679,223		EASTING 860,825	
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic			
DRILLER E. Estep		START DATE 02/10/22		COMP. DATE 02/11/22		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2640															
2635	2,635.6	0.0	1	1	2									2,635.6	GROUND SURFACE
														2,633.1	ROADWAY EMBANKMENT Yellowish Brown, Coarse to Fine Sandy CLAY with Trace Mica
	2,632.0	3.6	1	2	2									2,628.1	RESIDUAL Olive Yellow to Olive Gray to Olive Brown to Light Olive Gray to Light Brownish Gray to Greenish Black to White, Silty, Coarse to Fine SAND with Little to Trace Mica
2630															
2625	2,627.0	8.6	2	4	4										
2620	2,622.0	13.6	2	2	4										
2615	2,617.0	18.6	2	4	5										
2610	2,612.0	23.6	2	3	4										
2605	2,607.0	28.6	5	5	6										
2600	2,602.0	33.6	5	7	9										
2595	2,597.0	38.6	4	5	7										
2590	2,592.0	43.6	3	9	14										
2585	2,587.0	48.6	10	12	13										
2580	2,582.0	53.6	16	35	56										
2575	2,577.0	58.6	100/0.4											2,578.6	WEATHERED ROCK White to Yellowish Brown to Black, MICA SCHIST
2570	2,572.0	63.6	65	35/0.2											
	2,567.3	68.3	66	34/0.2										2,566.3	Boring Terminated at Elevation 2,566.3 ft in WEATHERED ROCK: MICA SCHIST

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 55041.1.1		TIP HB-0002		COUNTY HAYWOOD		GEOLOGIST B. Neunsinger									
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613							GROUND WTR (ft)								
BORING NO. B1-C		STATION N/A		OFFSET N/A		ALIGNMENT -L-									
COLLAR ELEV. 2,635.2 ft		TOTAL DEPTH 65.5 ft		NORTHING 679,181		EASTING 860,844									
DRILL RIGHAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER E. Estep		START DATE 02/09/22		COMP. DATE 02/09/22		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2640															
2635	2,635.2	0.0	1	3	7									2,635.2	GROUND SURFACE 0.0
2630	2,631.2	4.0	WOH	1	2										RESIDUAL Olive Gray to Dark Brown to Olive Yellow to Dark Reddish Brown to Yellowish Brown to Reddish Black to Olive Gray to Light Brownish Gray to Black to White to Olive, Silty, Coarse to Fine SAND with Little to Trace Mica, Some to Highly Quartz
2625	2,626.2	9.0	1	1	3										
2620	2,621.2	14.0	1	2	3										
2615	2,616.2	19.0	1	2	3										
2610	2,611.2	24.0	1	1	2										
2605	2,606.2	29.0	3	7	8										
2600	2,601.2	34.0	19	21	34										
2595	2,596.2	39.0	23	40	54										
2590	2,591.2	44.0	27	53	47/0.3										
2585	2,586.2	49.0	64	36/0.2											
2580	2,581.2	54.0	7	7	13										
2575	2,576.2	59.0	100/0.4												
2570	2,571.2	64.0	30	30	53										

WBS 55041.1.1		TIP HB-0002		COUNTY HAYWOOD		GEOLOGIST B. Neunsinger									
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613							GROUND WTR (ft)								
BORING NO. B1-E		STATION N/A		OFFSET N/A		ALIGNMENT -L-									
COLLAR ELEV. 2,634.9 ft		TOTAL DEPTH 69.2 ft		NORTHING 679,138		EASTING 860,871									
DRILL RIGHAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		DRILL METHOD HSA/Mud Rotary		HAMMER TYPE Automatic											
DRILLER E. Estep		START DATE 02/09/22		COMP. DATE 02/10/22		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
2635	2,634.9	0.0	3	4	5									2,634.9	GROUND SURFACE 0.0
2630	2,631.2	3.7	13	8	9									2,632.4	ROADWAY EMBANKMENT Reddish Brown, Clayey SAND 2.5
2625	2,626.2	8.7	1	2	3									2,627.4	RESIDUAL Pink to White to Light Olive Yellow to Red, Gravelly, Coarse SAND with Quartz Fragments 7.5
2620	2,621.2	13.7	4	7	8										Reddish Yellow to Olive Gray to Olive to Yellowish Brown to Light Brownish Gray to White to Pink to Olive Yellow, Silty, Coarse to Fine SAND with Trace to Little Mica, with Little to Some Quartz
2615	2,616.2	18.7	10	12	15										
2610	2,611.2	23.7	12	19	28										
2605	2,606.2	28.7	20	23	25										
2600	2,601.2	33.7	16	21	27										
2595	2,596.2	38.7	38	47	53										
2590	2,591.2	43.7	15	20	20										
2585	2,586.2	48.7	10	12	10										
2580	2,581.2	53.7	12	17	23										
2575	2,576.2	58.7	55	45/0.3											
2570	2,571.2	63.7	33	67/0.4											
	2,566.2	68.7	100/0.5												

NCDOT BORE DOUBLE HB002\_GEO BRDG248 BRDG249.GPJ\_NC\_DOT.GDT 8/3/22

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 55041.1.1		TIP HB-0002		COUNTY HAYWOOD		GEOLOGIST B. Neunsinger										
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613							GROUND WTR (ft)									
BORING NO. B1-B		STATION N/A		OFFSET N/A		ALIGNMENT -L-										
COLLAR ELEV. 2,634.4 ft		TOTAL DEPTH 75.3 ft		NORTHING 679,117		EASTING 860,876										
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER E. Estep		START DATE 01/27/22		COMP. DATE 01/28/22		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						
2635	2,634.4	0.0	1	4	5									2,634.4	0.0	GROUND SURFACE
														2,630.9	3.5	ROADWAY EMBANKMENT Red, Silty CLAY with Trace Mica
2630	2,630.2	4.2	1	1	2									2,627.4	7.0	RESIDUAL Olive Yellow, Silty CLAY
2625	2,625.2	9.2	1	1	2											Gray to Light Brownish Gray to Olive to Yellowish Brown to Brown and Gray, Silty, Coarse to Fine SAND with Little to Some Rock Fragments, Little to Trace Mica
2620	2,620.2	14.2	1	2	3											
2615	2,615.2	19.2	2	4	6											
2610	2,610.2	24.2	4	5	7											
2605	2,605.2	29.2	3	8	9											
2600	2,600.2	34.2	6	7	9											
2595	2,595.2	39.2	10	13	15											
2590	2,590.2	44.2	4	10	12											
2585	2,585.2	49.2	15	26	30											
2580	2,580.2	54.2	10	16	21											
2575	2,575.2	59.2	8	15	31											
2570	2,570.2	64.2	54	46/0.2										2,571.9	62.5	WEATHERED ROCK Black and White, MICA SCHIST
2565	2,565.2	69.2	100/0.2													
2560	2,560.2	74.2	14	78	22/0.1											
														2,559.1	75.3	Boring Terminated at Elevation 2,559.1 ft in WEATHERED ROCK: MICA SCHIST

NCDOT BORE DOUBLE HB002\_GEO BRDG248 BRDG249.GPJ\_NC\_DOT\_GDT 8/3/22

WBS 55041.1.1		TIP HB-0002		COUNTY HAYWOOD		GEOLOGIST B. Neunsinger										
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613							GROUND WTR (ft)									
BORING NO. B2-A		STATION N/A		OFFSET N/A		ALIGNMENT -L-										
COLLAR ELEV. 2,633.2 ft		TOTAL DEPTH 69.3 ft		NORTHING 679,243		EASTING 860,885										
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic												
DRILLER E. Estep		START DATE 02/07/22		COMP. DATE 02/08/22		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						
2635	2,633.2	0.0	1	3	10									2,633.2	0.0	GROUND SURFACE
														2,632.2	1.0	ROADWAY EMBANKMENT Brown to Gray, Silty CLAY with Trace Mica
2630	2,629.2	4.0	1	1	1									2,629.7	3.5	RESIDUAL White, Coarse SAND Light Brownish Gray to Olive Yellow, Clayey, Coarse to Fine SAND
2625	2,624.2	9.0	WOH	1	2											
2620	2,619.2	14.0	1	4	5											
2615	2,614.2	19.0	2	4	4											
2610	2,609.2	24.0	2	3	6											
2605	2,604.2	29.0	2	6	8											
2600	2,599.2	34.0	5	5	8											
2595	2,594.2	39.0	7	8	12											
2590	2,589.2	44.0	13	27	28											
2585	2,584.2	49.0	9	17	18											
2580	2,579.2	54.0	15	15	24											
2575	2,574.2	59.0	100/0.5													
2570	2,569.2	64.0	100/0.2													
2565	2,564.2	69.0	100/0.3													
														2,563.9	69.3	Boring Terminated at Elevation 2,563.9 ft in WEATHERED ROCK: MICA SCHIST

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 55041.1.1		TIP HB-0002		COUNTY HAYWOOD		GEOLOGIST B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613							GROUND WTR (ft)
BORING NO. B2-D		STATION N/A		OFFSET N/A		ALIGNMENT -L-	
COLLAR ELEV. 2,633.5 ft		TOTAL DEPTH 69.3 ft		NORTHING 679,226		EASTING 860,888	
DRILL RIGHAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic			
DRILLER E. Estep		START DATE 02/11/22		COMP. DATE 02/11/22		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
2635	2,633.5	0.0	1	3	8										2,633.5	GROUND SURFACE	0.0
2630	2,629.5	4.0	WOH 1 3												2,630.5	ROADWAY EMBANKMENT Brown to Reddish Brown, Clayey SILT	3.0
2625	2,624.5	9.0	2	3	5										2,616.0	RESIDUAL Olive Yellow to Brown to Reddish Brown to Olive to White, Silty, Coarse to Fine SAND with Trace Mica	17.5
2620	2,619.5	14.0	2	2	3										2,610.5	Olive Brown to Light Brownish Gray, Sandy SILT with Trace Mica	23.0
2615	2,614.5	19.0	1	1	3										2,591.5	Brown to Olive Brown to Olive to White to Olive Yellow to White to Black, Silty, Coarse to Fine SAND	42.0
2610	2,609.5	24.0	2	4	8										2,586.5	WEATHERED ROCK Black to White, MICA GNEISS	47.0
2605	2,604.5	29.0	5	6	7										2,585.4	RESIDUAL Black to White to Olive, Silty, Coarse to Fine SAND with Trace Mica	47.5
2600	2,599.5	34.0	8	10	10										2,579.2	Olive Yellow, Silty, Coarse to Fine SAND with Trace Mica, Some Quartz	53.7
2595	2,594.5	39.0	5	12	53										2,579.1	CRYSTALLINE ROCK MICA GNEISS	53.8
2590	2,589.5	44.0	16	84/0.4												Boring Terminated with Standard Penetration Test Refusal at Elevation 2,564.2 ft in WEATHERED ROCK: MICA GNEISS	
2585	2,584.5	49.0	8	13	28												
2580	2,579.5	54.0	9	11	14												
2575	2,574.5	59.0	100/0.3														
2570	2,569.5	64.0	100/0.4														
2565	2,564.5	69.0	100/0.3														

NCDOT BORE DOUBLE HB002\_GEO\_BRDG248\_BRDG249.GPJ\_NC\_DOT\_GDT 8/3/22

WBS 55041.1.1		TIP HB-0002		COUNTY HAYWOOD		GEOLOGIST B. Neunsinger	
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613							GROUND WTR (ft)
BORING NO. B2-C		STATION N/A		OFFSET N/A		ALIGNMENT -L-	
COLLAR ELEV. 2,632.9 ft		TOTAL DEPTH 53.8 ft		NORTHING 679,187		EASTING 860,899	
DRILL RIGHAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021		DRILL METHOD Mud Rotary		HAMMER TYPE Automatic			
DRILLER E. Estep		START DATE 02/02/22		COMP. DATE 02/07/22		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
2635	2,632.9	0.0	1	2	2										2,632.9	GROUND SURFACE	0.0
2630	2,629.2	3.7	1	1	1										2,629.9	ROADWAY EMBANKMENT Silty, Coarse to Fine SAND with Trace Mica, Organics, Rock Fragments	3.0
2625	2,624.2	8.7	1	1	2										2,625.4	RESIDUAL Reddish Yellowish Brown, Clayey SILT with Trace Mica	7.5
2620	2,619.2	13.7	2	2	5										2,619.9	Reddish Yellow, Silty, Coarse to Fine SAND with Trace Mica	13.0
2615	2,614.2	18.7	3	5	5										2,610.9	Olive Yellow, Fine Sandy SILT with Trace Mica	22.0
2610	2,609.2	23.7	9	8	9										2,591.5	Olive Yellow to White to Black, Silty, Coarse to Fine SAND with Trace Mica and Trace to Little Quartz	42.0
2605	2,604.2	28.7	8	10	13										2,586.5	WEATHERED ROCK Black to White, MICA GNEISS	47.0
2600	2,599.2	33.7	8	10	13										2,585.4	RESIDUAL Black to White to Olive, Silty, Coarse to Fine SAND with Trace Mica	47.5
2595	2,594.2	38.7	6	7	9										2,579.2	Olive Yellow, Silty, Coarse to Fine SAND with Trace Mica, Some Quartz	53.7
2590	2,589.2	43.7	51	47	53/0.3										2,579.1	CRYSTALLINE ROCK MICA GNEISS	53.8
2585	2,584.2	48.7	34	26	8											Boring Terminated with Standard Penetration Test Refusal at Elevation 2,564.2 ft in WEATHERED ROCK: MICA GNEISS	
2580	2,579.2	53.7	60/0.1														







# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 55041.1.1		TIP HB-0002		COUNTY HAYWOOD		GEOLOGIST B. Neunsinger										
SITE DESCRIPTION BRIDGE NOS. 248 & 249 ON -L- (I-40) OVER SR 1613							GROUND WTR (ft)									
BORING NO. EB2-B		STATION N/A		OFFSET N/A		ALIGNMENT -L-										
COLLAR ELEV. 2,630.8 ft		TOTAL DEPTH 34.2 ft		NORTHING 679,074		EASTING 860,996										
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 82% 04/23/2021				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER E. Estep		START DATE 01/31/22		COMP. DATE 01/31/22		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION			
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			ELEV. (ft)	DEPTH (ft)		
2635																
2630	2,630.8	0.0												2,630.8	0.0	GROUND SURFACE
			WOH	1	1							M		2,626.8	4.0	ROADWAY EMBANKMENT Yellowish Brown, Silty, Coarse to Fine SAND
2625	2,626.6	4.2		2	2							SS-7	M			RESIDUAL Gray, Silty CLAY with Trace Mica
2620	2,621.6	9.2		5	5								W	2,622.3	8.5	Gray, Coarse to Fine SAND with Trace Rock Fragments
2615	2,616.6	14.2		8	6								W	2,617.3	13.5	Olive Yellow to Black to Olive Brown, Silty, Coarse to Fine SAND with Little Rock Fragments and Mica
2610	2,611.6	19.2		12	15								W			
2605	2,606.6	24.2		9	15								W			
2600	2,601.6	29.2		40	60/0.4									2,601.6	29.2	WEATHERED ROCK Olive Brown to Yellowish Brown, MICA SCHIST
	2,596.6	34.2		60/0.0										2,596.6	34.2	Boring Terminated with Standard Penetration Test Refusal at Elevation 2,596.6 ft in CRYSTALLINE ROCK: MICA SCHIST

NCDOT BORE DOUBLE HB002\_GEO\_BRDG248\_BRDG249.GPJ NC\_DOT.GDT 8/3/22

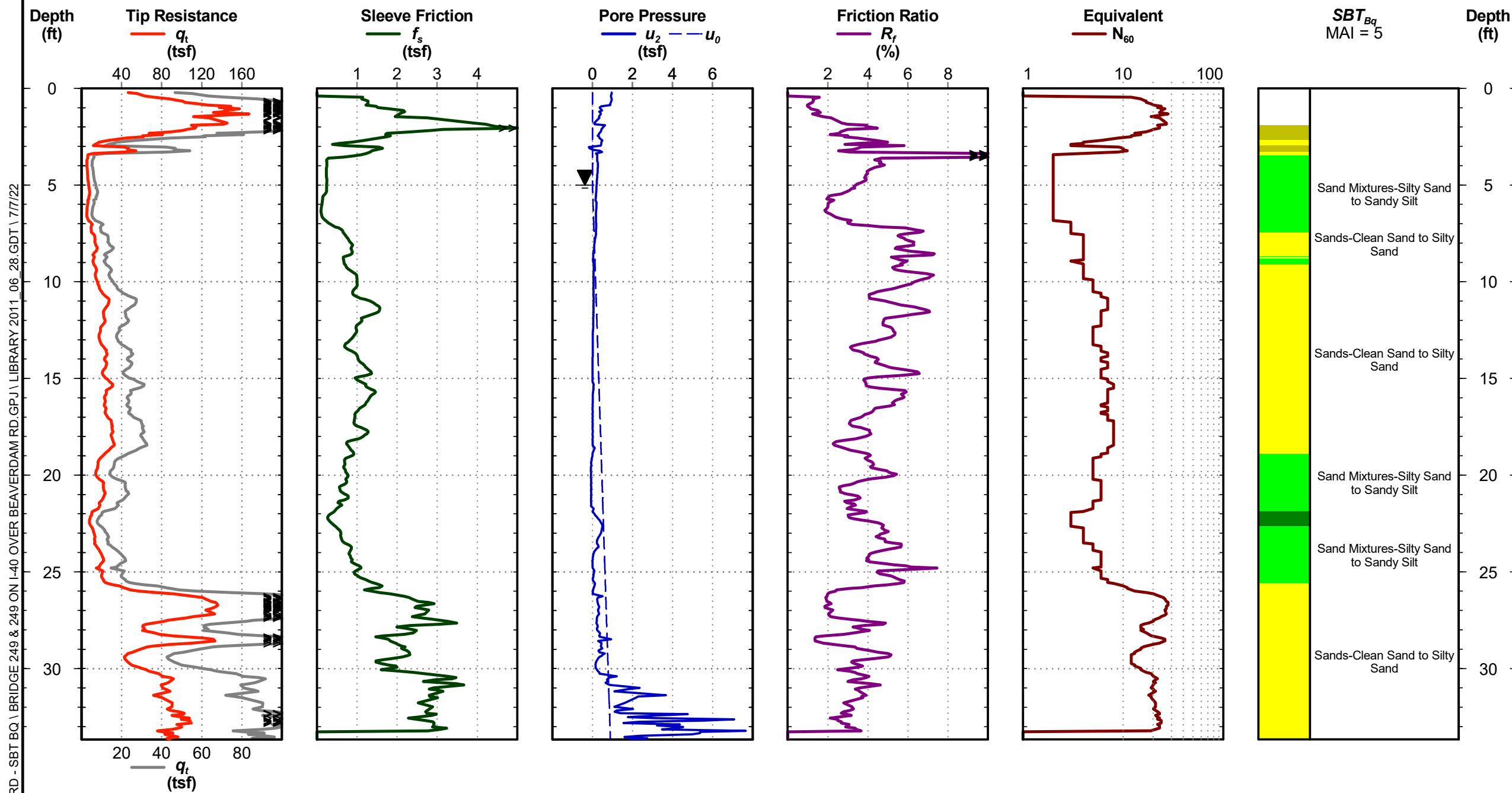


**Bridge 248 & 249 on I-40 over Beaverdam Rd**  
**Haywood County, North Carolina**  
**S&ME Project No: 22350010**

**Sounding ID: 248-B2-C**

Date: Jun. 22, 2022  
 Estimated Water Depth: 5 ft  
 Rig/Operator: ATV/MW | TC

Total Depth: 33.7 ft  
 Termination Criteria: Maximum Reaction Force  
 Cone Size: 1.75



CPT REPORT - STANDARD - SBT BQ \ BRIDGE 249 & 249 ON I-40 OVER BEAVERDAM RD.GPJ \ LIBRARY 2011\_06\_28.GDT \ 7/7/22

**Cone Penetration Test**

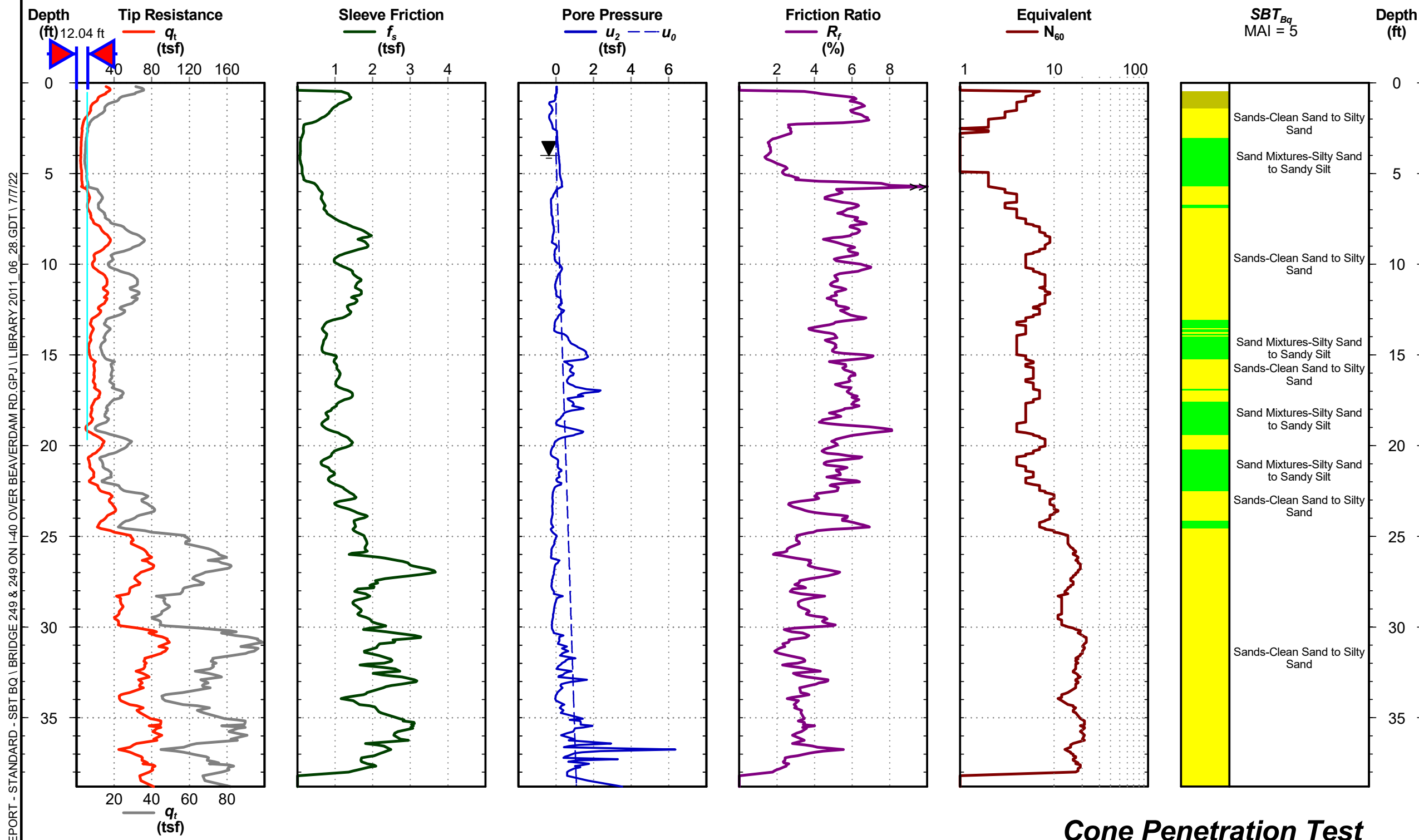


**Bridge 248 & 249 on I-40 over Beaverdam Rd**  
**Haywood County, North Carolina**  
**S&ME Project No: 22350010**

**Sounding ID: 248-B2-D**

**Date:** Jun. 22, 2022  
**Estimated Water Depth:** 4 ft  
**Rig/Operator:** ATV/MW | TC

**Total Depth:** 38.8 ft  
**Termination Criteria:** Maximum Reaction Force  
**Cone Size:** 1.75



CPT REPORT - STANDARD - SBT BQ \ BRIDGE 249 & 249 ON I-40 OVER BEAVERDAM RD.GPJ \ LIBRARY 2011\_06\_28.GDT \ 7/7/22

**Cone Penetration Test**

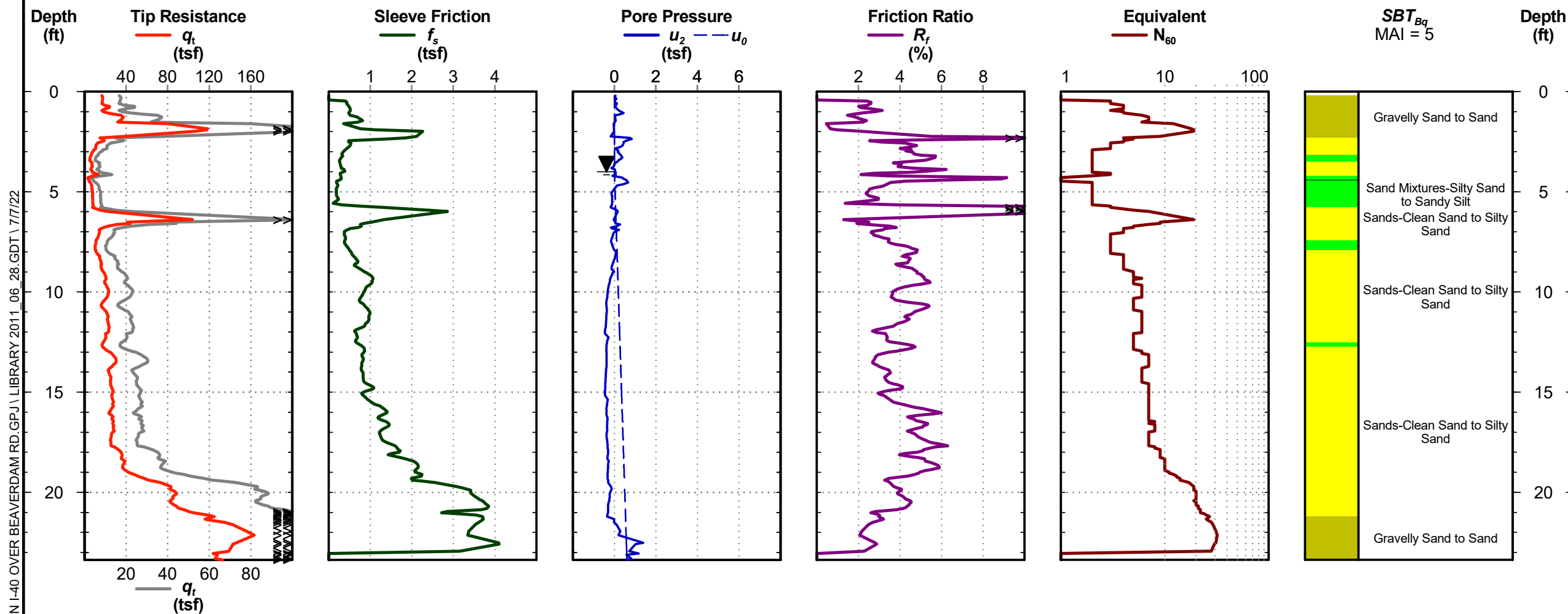


**Bridge 248 & 249 on I-40 over Beaverdam Rd**  
**Haywood County, North Carolina**  
**S&ME Project No: 22350010**

**Sounding ID: 248-B2-E**

**Date:** Jun. 22, 2022  
**Estimated Water Depth:** 4 ft  
**Rig/Operator:** ATV/MW | TC

**Total Depth:** 23.4 ft  
**Termination Criteria:** Maximum Reaction Force  
**Cone Size:** 1.75



CPT REPORT - STANDARD - SBT BQ | BRIDGE 249 & 249 ON I-40 OVER BEAVERDAM RD.GPJ | LIBRARY 2011\_06\_28.GDT | 7/7/22

**Cone Penetration Test**

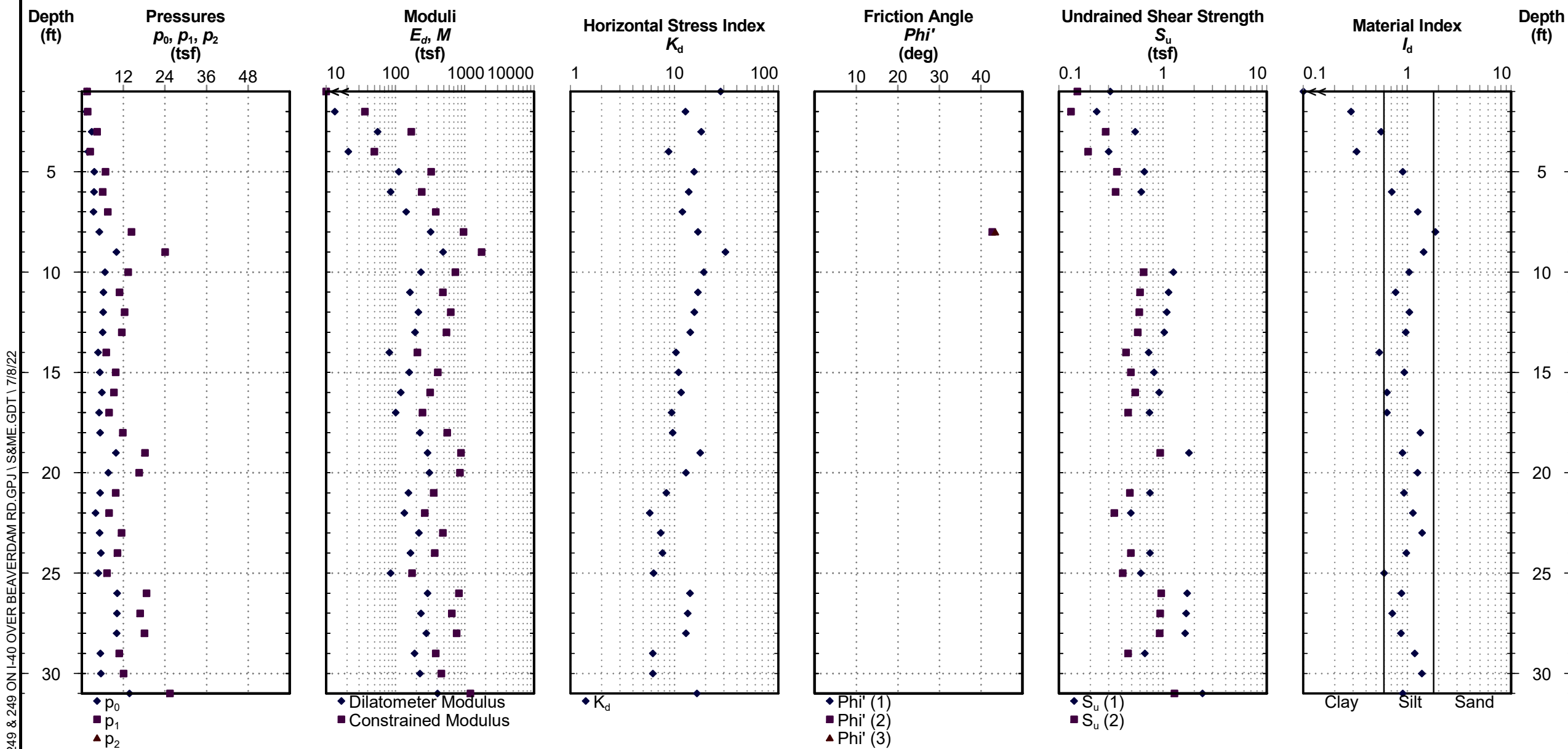


**Bridge 248 & 249 on I-40 over Beaverdam Rd**  
**Haywood County, North Carolina**  
**S&ME Project No: 22350010**

**Sounding ID: 248-B2-D**

Date: Jun. 22, 2022  
 Estimated Water Depth: 4 ft  
 Rig/Operator: ATV/MW | TC

Total Depth: 31.0 ft  
 Termination Criteria: Maximum Reaction Force  
 Membrane Type: H-25



DMT REPORT - DYNAMIC | BRIDGE 249 & 249 ON I-40 OVER BEAVERDAM RD.GPJ | S&ME.GDT | 7/8/22

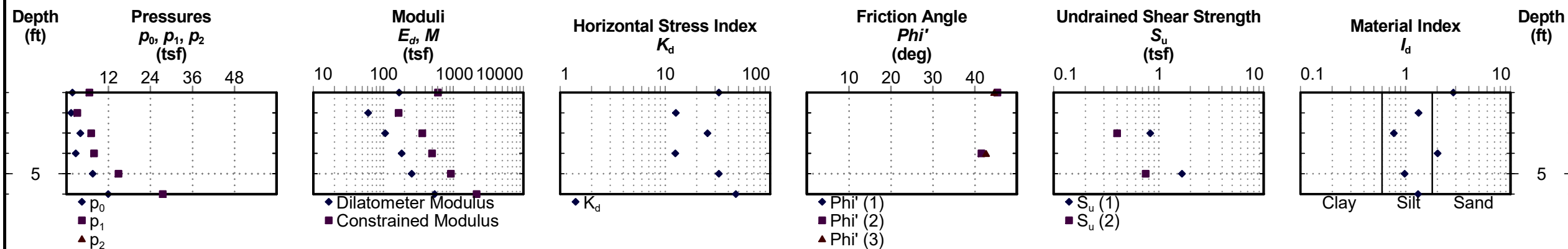


**Bridge 248 & 249 on I-40 over Beaverdam Rd**  
**Haywood County, North Carolina**  
**S&ME Project No: 22350010**

**Sounding ID: 248-B2-E**

Date: Jun. 22, 2022  
 Estimated Water Depth: 4 ft  
 Rig/Operator: ATV/MW | TC

Total Depth: 6.0 ft  
 Termination Criteria: Maximum Reaction Force  
 Membrane Type: H-25



DMT REPORT - DYNAMIC | BRIDGE 249 & 249 ON I-40 OVER BEAVERDAM RD.GPJ | S&ME.GDT | 7/8/22



### LABORATORY SUMMARY SHEET FOR SOIL SAMPLES

**WBS NO. (TIP NO.): 55041.1.1 (HB-0002)**

**PROJECT ID: 38834**

**COUNTY: HAYWOOD**

**DESCRIPTION: REPLACE BRIDGE NOS. 248 & 249 ON I-40 OVER SR 1613**

Sample No.	Boring Number	Alignment	Station	Offset	Sample Depth (ft.)	AASHTO Class.	N-Value (blows/ ft.)	Atterberg Limits			Gradation Results							
								L.L.	P.L.	P.I.	Retained #4 Sieve	Pass #10 Sieve	Pass #40 Sieve	Pass #200 Sieve	Coarse Sand (%)	Fine Sand (%)	Silt (%)	Clay (%)
SS-1	EB1-A	-L-	N/A	N/A	8.5 - 10.0	A-2-4	1	NP	NP	NP	1.0	99.0	78.0	22.2	39.9	43.3	10.7	6.1
SS-2	EB1-B	-L-	N/A	N/A	38.3 - 39.8	A-2-4	73	NP	NP	NP	0.0	5.0	77.0	26.8	34.3	44.3	15.3	6.0
SS-3	B1-C	-L-	N/A	N/A	54.0 - 55.5	A-2-4	20	NP	NP	NP	0.0	96.0	68.0	24.0	45.1	35.4	12.3	7.2
SS-4	B1-E	-L-	N/A	N/A	38.7 - 40.2	A-2-4	100	NP	NP	NP	0.0	99.0	78.0	22.2	39.9	43.3	10.7	16.1
SS-5	B2-B	-L-	N/A	N/A	24.1 - 25.6	A-2-4	16	NP	NP	NP	3.0	91.0	67.0	22.1	43.6	37.4	13.0	6.1
SS-6	EB2-A	-L-	N/A	N/A	18.6 - 20.1	A-4	5	NP	NP	NP	0.0	1.0	91.0	58.1	16.3	34.9	36.4	12.3
SS-7	EB2-B	-L-	N/A	N/A	4.2 - 5.7	A-7-5	4	55	30	25	0.0	100.0	99.0	84.0	3.3	22.0	19.0	55.7

# SITE PHOTOGRAPH

Replace Bridge Nos. 248 & 249 on -L- (I-40) over SR 1613



Looking South Along SR 1613