

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.9.R.3 (SF-280040)	1	22

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

**STRUCTURE
SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 17BP.9.R.3 (SF-280040) F.A. PROJ. NA
 COUNTY DAVIDSON
 PROJECT DESCRIPTION BRIDGE NO. 40 ON -L- SRI298
(GRIMES BLVD) OVER SWEARING CREEK

SITE DESCRIPTION _____

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CHECKED BY C. NORVILLE

SUBMITTED BY FALCON ENG.

DATE JANUARY 2013

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. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

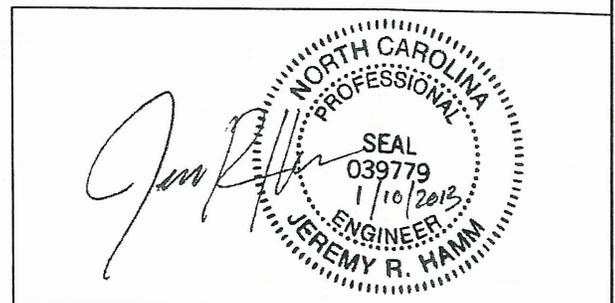
GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND 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 THIS 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: T. E. EVANS

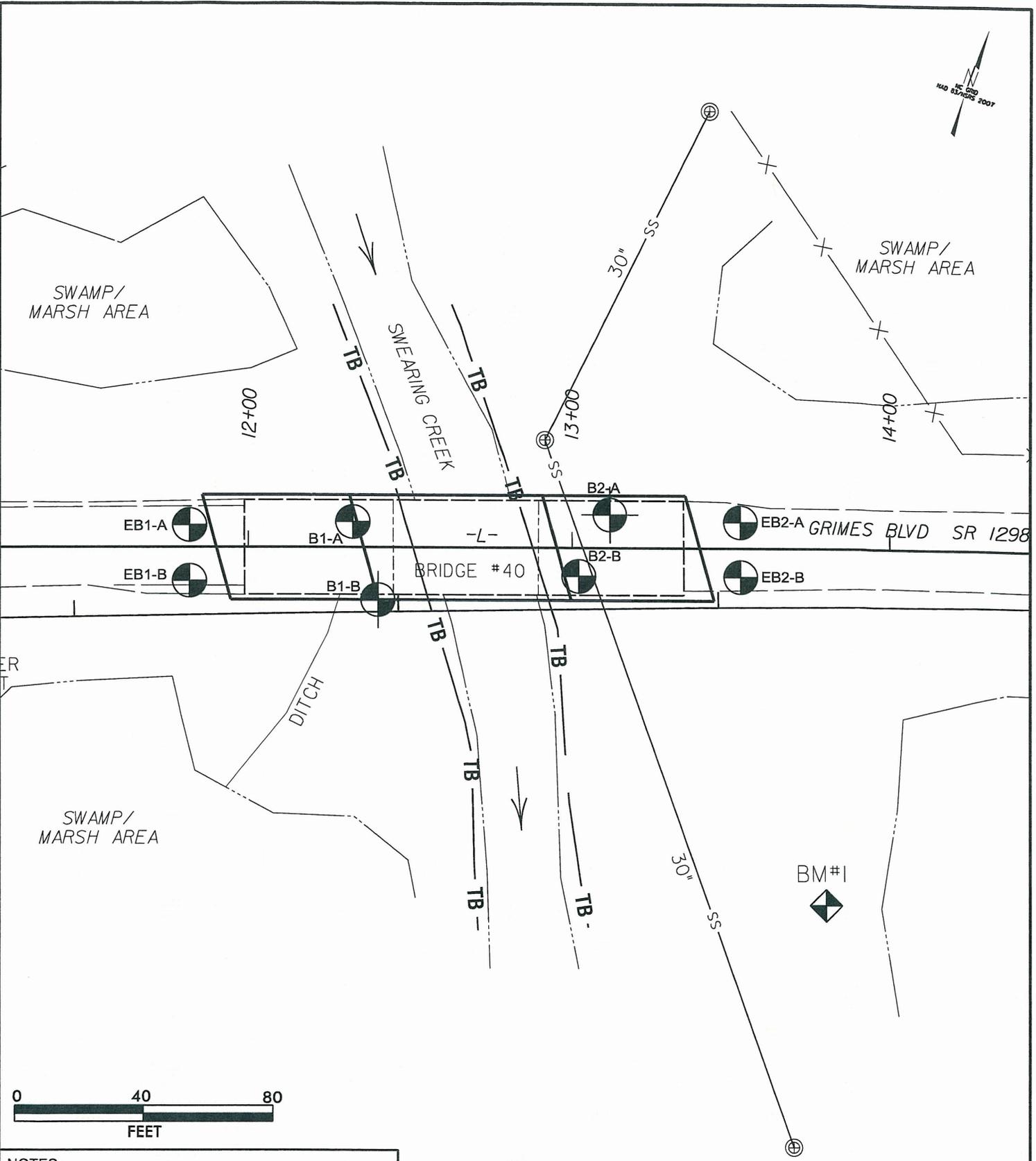


NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION									
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 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>										WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.									
THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS <u>ANGULAR</u> , <u>SUBANGULAR</u> , <u>SUBROUNDED</u> , OR <u>ROUNDED</u> .										ANGULARITY OF GRAINS									
SOIL LEGEND AND AASHTO CLASSIFICATION										MINERALOGICAL COMPOSITION									
GENERAL CLASS. GRANULAR MATERIALS (< 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.									
GROUP CLASS. A-1-a, A-1-b, A-3, A-2-4, A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7, A-7-5, A-7-6, A-1, A-2, A-3, A-4, A-5, A-6, A-7										COMPRESSIBILITY									
SYMBOL										SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50									
% PASSING # 10 # 40 # 200										PERCENTAGE OF MATERIAL									
LIQUID LIMIT PLASTIC INDEX										ORGANIC MATERIAL GRANULAR 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									
GROUP INDEX										GROUND WATER									
USUAL TYPES OF MAJOR MATERIALS										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									
GEN. RATING AS A 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										MISCELLANEOUS SYMBOLS									
CONSISTENCY OR DENSITY										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES									
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										SPT DMT VST PMT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD									
GENERALLY GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE										TEST BORING W/ CORE SPT N-VALUE SPT REFUSAL									
GENERALLY SILT-CLAY MATERIAL (COHESIVE) VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD										<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4									
TEXTURE OR GRAIN SIZE										ABBREVIATIONS									
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053										AR - AUGER REFUSAL MED. - MEDIUM BT - BORING TERMINATED MICA - MICACEOUS CL. - CLAY MOD. - MODERATELY CPT - CONE PENETRATION TEST NP - NON PLASTIC CSE. - COARSE ORG. - ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST DPT - DYNAMIC PENETRATION TEST SAP. - SAPROLITIC e - VOID RATIO SD. - SAND, SANDY F - FINE SL. - SILT, SILTY FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES TCR - TRICONE REFUSAL FRAGS. - FRAGMENTS w - MOISTURE CONTENT HI. - HIGHLY V - VERY									
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)										VST - VANE SHEAR TEST WEA. - WEATHERED U - UNIT WEIGHT U _d - DRY UNIT WEIGHT									
GRAIN SIZE MM 305 75 2.0 0.25 0.05 0.005 IN. 12 3										SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO									
SOIL MOISTURE - CORRELATION OF TERMS										EQUIPMENT USED ON SUBJECT PROJECT									
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:									
LL - LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE										<input checked="" type="checkbox"/> MOBILE B-57 <input type="checkbox"/> CLAY BITS <input checked="" type="checkbox"/> AUTOMATIC <input type="checkbox"/> MANUAL									
PL - PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE										<input type="checkbox"/> BK-51 <input type="checkbox"/> 6" CONTINUOUS FLIGHT AUGER <input type="checkbox"/> CORE SIZE: <input type="checkbox"/> -B <input checked="" type="checkbox"/> -N Q2 <input type="checkbox"/> -H									
OM - OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE										<input type="checkbox"/> CME-45C <input type="checkbox"/> HARD FACED FINGER BITS <input type="checkbox"/> HAND TOOLS: <input type="checkbox"/> POST HOLE DIGGER <input type="checkbox"/> HAND AUGER <input type="checkbox"/> SOUNDING ROD <input type="checkbox"/> VANE SHEAR TEST									
SL - SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE										<input type="checkbox"/> CME-550 <input type="checkbox"/> TUNG-CARBIDE INSERTS <input type="checkbox"/> SOUNING ROD									
PLASTICITY PLASTICITY INDEX (PI) DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH										<input checked="" type="checkbox"/> PORTABLE HOIST <input checked="" type="checkbox"/> CASING <input type="checkbox"/> W/ ADVANCER <input checked="" type="checkbox"/> TRICONE 3 1/8" STEEL TEETH <input type="checkbox"/> TRICONE " TUNG-CARB. <input checked="" type="checkbox"/> CORE BIT									
NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH										<input type="checkbox"/> CME-55 ATV <input type="checkbox"/> CORE BIT									
COLOR										DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.									

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SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

ROCK DESCRIPTION		TERMS AND DEFINITIONS	
<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 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:</p>		<p>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, 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 IN 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.</p>	
<p>WEATHERED ROCK (WR)</p> 	<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p>		
<p>CRYSTALLINE ROCK (CR)</p> 	<p>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p>		
<p>NON-CRYSTALLINE ROCK (NCR)</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>COASTAL PLAIN SEDIMENTARY ROCK (CP)</p> 	<p>COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>		
WEATHERING			
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.		
VERY SLIGHT (V SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.		
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.		
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.		
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <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, YIELDS SPT N VALUES > 100 BPF</i>		
VERY SEVERE (V SEV.)	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, YIELDS SPT N VALUES < 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 PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.		
SOFT	CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.		
VERY SOFT	CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.		
FRACTURE SPACING		BEDDING	
TERM	SPACING	TERM	THICKNESS
VERY WIDE	MORE THAN 10 FEET	VERY THICKLY BEDDED	> 4 FEET
WIDE	3 TO 10 FEET	THICKLY BEDDED	1.5 - 4 FEET
MODERATELY CLOSE	1 TO 3 FEET	THINLY BEDDED	0.16 - 1.5 FEET
CLOSE	0.16 TO 1 FEET	VERY THINLY BEDDED	0.03 - 0.16 FEET
VERY CLOSE	LESS THAN 0.16 FEET	THICKLY LAMINATED	0.008 - 0.03 FEET
		THINLY LAMINATED	< 0.008 FEET
INDURATION			
FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE 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.		
<p>BENCH MARK: BM-1: RR SPIKE IN NORTHERN ROOT OF 18' OAK N: 746352, E: 1615917, EL STATION 13+79, 112' RIGHT ELEVATION: 656.43' FT.</p>			
<p>NOTES: FIAD - FILLED IMMEDIATELY AFTER DRILLING</p>			



NOTES:

- PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM ATKINS DATED JANUARY 3, 2013
- APPROXIMATE BORING LOCATIONS WERE LOCATED IN THE FIELD AS REQUESTED USING MEASUREMENTS TAKEN IN THE FIELD FROM EXISTING SITE FEATURES AND SURVEY MARKS PLACED BY OTHERS.

	FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 RALEIGH, NC 27607 PHONE: 919.871.0800 FAX: 919.871.0803		
	SITE PLAN BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK DAVIDSON COUNTY, NORTH CAROLINA WBS.: 17BP.9.R.3, TIF.: SF-280040		
JANUARY 2013	PROJECT NO.: G11034.01	SHEET 7	



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.9.R.3			TIP SF-280040			COUNTY DAVIDSON			GEOLOGIST T. EVANS							
SITE DESCRIPTION BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK										GROUND WTR (ft)						
BORING NO. EB1-A			STATION 11+82			OFFSET 7 ft LT			ALIGNMENT -L-							
COLLAR ELEV. 668.2 ft			TOTAL DEPTH 53.8 ft			NORTHING 746,398			EASTING 1,615,692							
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic							
DRILLER S. GOWER			START DATE 05/01/12			COMP. DATE 05/01/12			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)		
670																
665	667.2	1.0	6	2	2	4							D	668.2	EXISTING PAVEMENT	0.0
	664.7	3.5											D	666.7	6" BITUMINOUS CONCRETE 12" CONCRETE	1.5
660	662.2	6.0	1	1	2	3							M		ROADWAY EMBANKMENT RED-BROWN AND DK. GRAY, SILTY CLAY (A-7) W/ TRACE MICA	
	659.7	8.5											M			
655			WOH	2	1	3							M			
	654.7	13.5											M			
650	649.7	18.5	1	2	2	4							M	650.2	ALLUVIAL BLUE-GRAY AND BROWN, SILTY CLAY (A-7) W/ TRACE ORGANICS	18.0
													M			
645	644.7	23.5	2	4	4	8							M	645.2	BLUE-GRAY AND BROWN, SLI. SILTY SAND (A-1-b)	23.0
													M	642.2	RESIDUAL BLUE-GRAY AND BROWN, SILTY SAND (A-2-4) SAPROLITIC	26.0
640	639.7	28.5	1	1	1	2							Sat.			
635	634.7	33.5	6	6	10	16							M	635.2	BLUE-GREEN GRAY AND BROWN, SILTY SAND (A-2-4) SAPROLITIC	33.0
													M			
630	629.7	38.5	4	8	14	22							M	630.2	BLUE-GREEN GRAY AND BROWN, SILTY SAND (A-2-4) SAPROLITIC	38.0
													M			
625	624.7	43.5	10	12	15	27							M	620.2	BLUE-GREEN GRAY AND RED, SILTY SAND (A-2-4) SAPROLITIC	38.0
													D			
620	624.7	43.5	14	12	13	25							D			
620	619.7	48.5												620.7	WEATHERED ROCK GRAY BLUE BROWN, META-GABBRO	47.5
615	614.7	53.5	100/0.3											614.4	Boring Terminated at Elevation 614.4 ft in WR (Meta-Gabbro)	53.8

NCDOT BORE SINGLE_G11034.01 BRIDGE 40.GPJ NC_DOT.GDT 1/9/13



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.9.R.3		TIP SF-280040		COUNTY DAVIDSON		GEOLOGIST T. EVANS										
SITE DESCRIPTION BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK							GROUND WTR (ft)									
BORING NO. EB1-B		STATION 11+82		OFFSET 11 ft RT		ALIGNMENT -L-		0 HR. 7.3								
COLLAR ELEV. 668.2 ft		TOTAL DEPTH 43.8 ft		NORTHING 746,381		EASTING 1,615,698		24 HR. FIAD								
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER S. GOWER		START DATE 05/01/12		COMP. DATE 05/01/12		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)		
670																
	667.2	1.0	3	2	1	3							M	668.2	EXISTING PAVEMENT	0.0
	664.7	3.5											M	666.7	2" BITUMINOUS CONCRETE 14" CONCRETE	1.5
	662.2	6.0	3	1	1	2							▽		ROADWAY EMBANKMENT RED-BROWN, SILTY CLAY (A-7) W/ TRACE ORGANICS, TRACE MICA	
	659.7	8.5	1	2	2	4							W	660.2		8.0
	654.7	13.5	1	1	1	2							W		ALLUVIAL DK. GRAY AND BROWN, F. SANDY SILT (A-4) W/ TRACE ORGANICS AND GRAVEL	
	650.2	18.5	1	1	1	2							M	655.2	DK. GRAY AND BROWN, F. SANDY CLAY (A-6) W/ TRACE ORGANICS	13.0
	649.7	18.5	2	3	5	8							M	650.2	BLUE-GRAY AND BROWN, F. SANDY CLAY (A-6)	18.0
	644.7	23.5	2	2	3	5							W			
	640.2	28.5	8	10	14	24							M	641.2	RESIDUAL GRAY BROWN AND RED, SILTY SAND (A-2-4) SAPROLITIC, W/ GRAVEL	27.0
	634.7	33.5	9	12	15								M			
	629.7	38.5	35	65/0.3						100/0.8				630.2		38.0
	624.7	43.5	100/0.3							100/0.3				624.4	WEATHERED ROCK BLUE-GRAY AND BROWN, META-GABBRO	43.8
															Boring Terminated at Elevation 624.4 ft in WR (Meta-Gabbro)	

NCDOT BORE SINGLE G11034.01 BRIDGE 40.GPJ NC_DOT_GDT 1/9/13



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.9.R.3		TIP SF-280040		COUNTY DAVIDSON		GEOLOGIST T. EVANS											
SITE DESCRIPTION BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK							GROUND WTR (ft)										
BORING NO. B1-A		STATION 12+31		OFFSET 8 ft LT		ALIGNMENT -L-		0 HR. N/A									
COLLAR ELEV. 655.1 ft		TOTAL DEPTH 44.6 ft		NORTHING 746,415		EASTING 1,615,738		24 HR. 1.7									
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic											
DRILLER W. WHICHARD		START DATE 05/04/12		COMP. DATE 05/04/12		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)		
660																	
655	655.1	0.0													655.1	GROUND SURFACE	0.0
	653.1	2.0	WOH	WOH	WOH	0									652.1	ROADWAY EMBANKMENT RED AND BROWN, SILTY CLAY (A-7)	3.0
650	649.1	6.0	1	1	2											ALLUVIAL GRAY, SILTY CLAY (A-7) W/ TRACE MICA	
	647.1	8.0	1	1	1												
645	645.6	9.5	2	3	2										645.6	GRAY AND BROWN, SANDY CLAY (A-6) W/ TRACE MICA, SAND LAYERS	9.5
			WOH	1	3												
640	640.6	14.5	7	12	19										641.1	RESIDUAL GRAY AND BROWN, SILTY SAND (A-2-4) W/ GRAVEL/ROCK FRAGS	14.0
635	635.6	19.5	15	12	10												
630	630.6	24.5	5	7	10										632.1	GRAY TAN AND BROWN, SILTY SAND (A-2-4) SAPROLITIC, W/ GRAVEL/ROCK FRAGS	23.0
625	625.6	29.5	12	13	20												
620	620.6	34.5	46	64/0.3											622.1	WEATHERED ROCK DK. GRAY WHITE AND TAN, META-GABBRO	33.0
615	615.6	39.5	100/0.3														
	610.6	44.5	60/0.1												610.6	Boring Terminated with Standard Penetration Test Refusal at Elevation 610.5 ft on CR (Meta-Gabbro)	44.5

NCDOT BORE SINGLE_G11034.01_BRIDGE_40.GPJ_NC_DOT_GDT_1/9/13



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.9.R.3		TIP SF-280040		COUNTY DAVIDSON		GEOLOGIST T. EVANS										
SITE DESCRIPTION BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK							GROUND WTR (ft)									
BORING NO. B1-B		STATION 12+40		OFFSET 16 ft RT		ALIGNMENT -L-	0 HR. N/A									
COLLAR ELEV. 654.1 ft		TOTAL DEPTH 58.4 ft		NORTHING 746,395		EASTING 1,615,754	24 HR. 1.5									
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER W. WHICHARD		START DATE 05/03/12		COMP. DATE 05/03/12		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)		
655														654.1	0.0	GROUND SURFACE
	654.1	0.0	WOH	WOH	WOH	0							W	654.1		ALLUVIAL BROWN AND DK. GRAY, SILTY SAND (A-2-4) W/ TRACE MICA, ROOTS
	652.6	1.5	1	1	WOH								W			
650	651.1	3.0	1	WOH	1								W			
	648.3	5.8	3	2	1								M	649.1	5.0	TAN AND BROWN, SILTY SAND (A-2-4) W/ TRACE MICA
645	643.3	10.8	1	2	2								Sat.	644.1	10.0	TAN AND BROWN, SILTY SAND (A-2-4) W/ GRAVEL
640	638.3	15.8	7	10	13								W	641.1	13.0	TAN, SLI. SILTY POORLY-GRADED SAND (A-1-b)
635	633.3	20.8	8	12	12								W	639.1	15.0	RESIDUAL TAN BROWN AND BLUE-GRAY, SILTY SAND (A-2-4) W/ GRAVEL, ROCK FRAGS
630	628.3	25.8	21	31	32								W			
625	623.5	30.6	60/0.0							60/0.0			M	623.5	30.6	CRYSTALLINE ROCK GRAY AND WHITE, MOD. WEATHERED, HARD, CLOSE TO V. CLOSELY FRACTURED, META-GABBRO
620														619.9	34.2	CRYSTALLINE ROCK BROWN AND GRAY, SEV. WEATHERED, SOFT, V. CLOSELY FRACTURED, META-GABBRO
615																
610																
605																
600														601.6	52.5	CRYSTALLINE ROCK GRAY AND WHITE, SLIGHTLY WEATHERED, HARD, CLOSE TO MOD. CLOSELY FRACTURED, META-GABBRO
														595.7	58.4	Boring Terminated at Elevation 595.7 ft in CR (Meta-Gabbro)

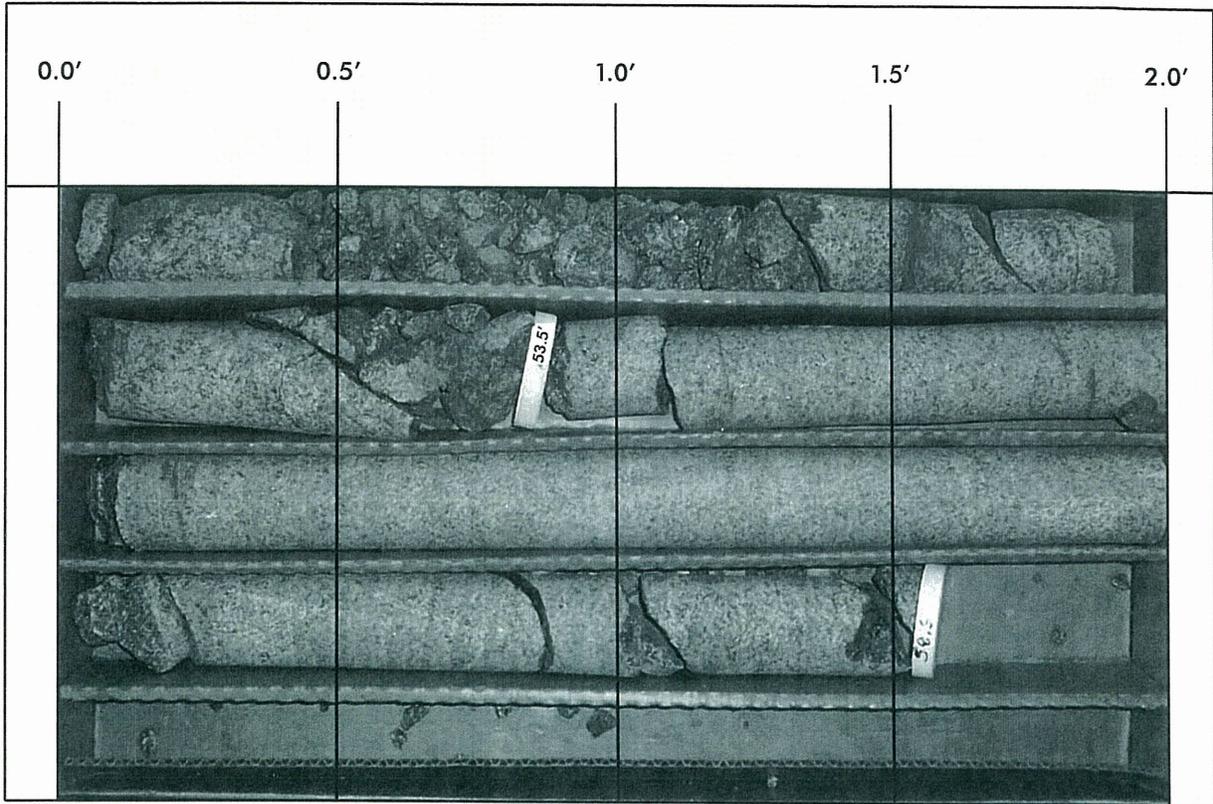
NCDOT BORE SINGLE G11034.01 BRIDGE 40.GPJ NC_DOT.GDT 1/9/13



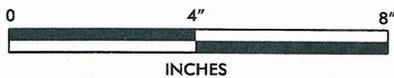
NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 17BP.9.R.3		TIP SF-280040		COUNTY DAVIDSON		GEOLOGIST T. EVANS					
SITE DESCRIPTION BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK							GROUND WTR (ft)				
BORING NO. B1-B		STATION 12+40		OFFSET 16 ft RT		ALIGNMENT -L-					
COLLAR ELEV. 654.1 ft		TOTAL DEPTH 58.4 ft		NORTHING 746,395		EASTING 1,615,754					
DRILL RIG/HAMMER EFF./DATE TRI0055 CME-55 70% 12/08/2011				DRILL METHOD Mud Rotary		HAMMER TYPE Automatic					
DRILLER W. WHICHARD		START DATE 05/03/12		COMP. DATE 05/03/12		SURFACE WATER DEPTH N/A					
CORE SIZE NQ2		TOTAL RUN 27.8 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		L O G	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %	SAMP. NO.	REC. (ft) %			
623.5										Begin Coring @ 30.6 ft	
	623.5	30.6	3.0	3:19/1.0 2:03/1.0 1:17/1.0	(2.0) 67%	(1.5) 50%	(2.8) 78%	(1.5) 42%		CRYSTALLINE ROCK GRAY AND WHITE, MOD. WEATHERED, HARD, CLOSE TO V. CLOSELY FRACTURED, META-GABBRO	30.6
620	620.5	33.6	5.0	1:51/1.0 1:10/1.0 1:41/1.0 0:35/1.0 1:11/1.0	(0.8) 16%	(0.0) 0%	(6.9) 38%	(0.0) 0%			34.2
615	615.5	38.6	5.0	0:58/1.0 1:11/1.0 1:09/1.0 1:11/1.0 2:01/1.0	(2.0) 40%	(0.0) 0%				CRYSTALLINE ROCK BROWN AND GRAY, SEV. WEATHERED, SOFT, V. CLOSELY FRACTURED, META-GABBRO	
610	610.5	43.6	5.0	1:20/1.0 1:12/1.0 2:20/1.0 2:10/1.0 2:50/1.0	(3.7) 74%	(0.0) 0%					
605	605.5	48.6	4.8	1:41/1.0 1:02/1.0 1:30/1.0 0:30/0.5 2:20/0.5 2:26/1.0	(2.5) 52%	(0.7) 15%					
600	600.7	53.4	5.0	2:13/1.0 3:03/1.0 2:9/1.0 2:51/1.0 2:52/1.0	(4.6) 92%	(3.8) 76%	(5.9) 100%	(4.5) 76%		CRYSTALLINE ROCK GRAY AND WHITE, SLIGHTLY WEATHERED, HARD, CLOSE TO MOD. CLOSELY FRACTURED, META-GABBRO	52.5
	595.7	58.4								Boring Terminated at Elevation 595.7 ft in CR (Meta-Gabbro)	58.4

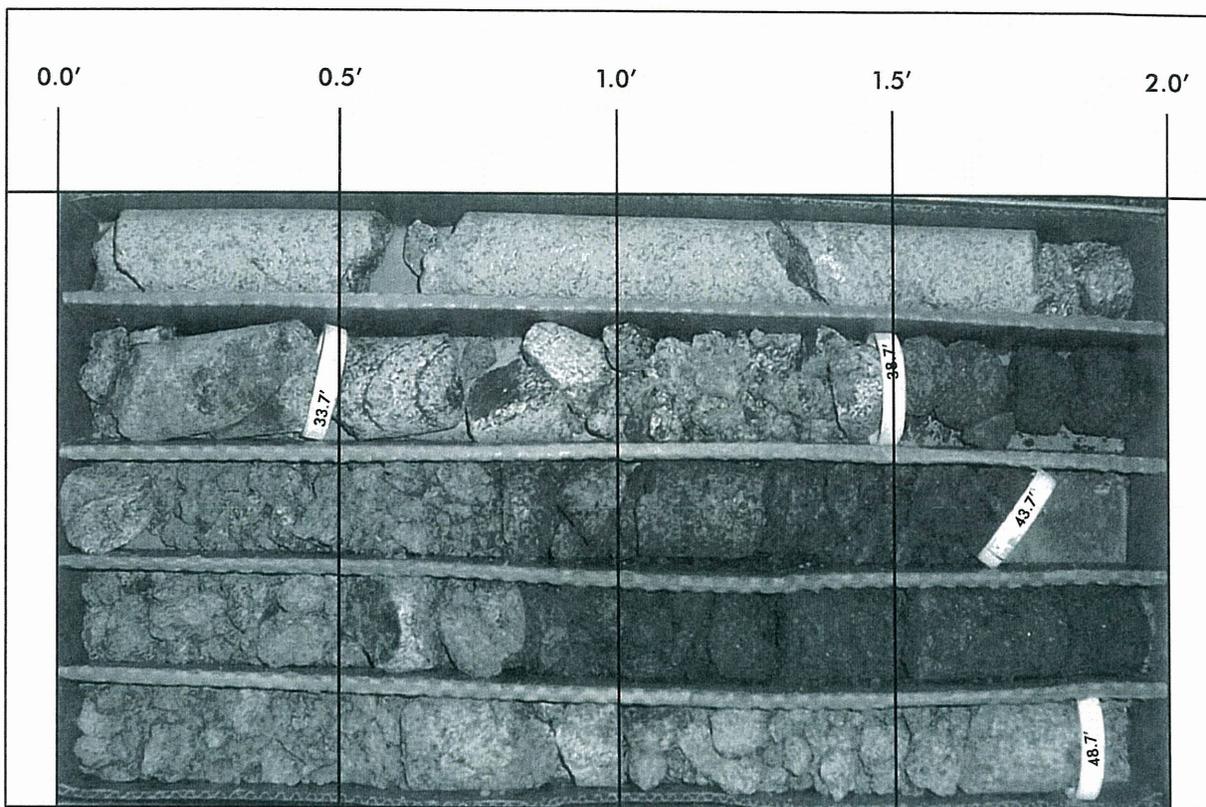
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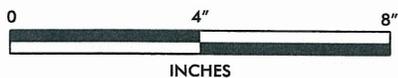
BORING B1-B, BOX 2 OF 2, 48.7 FEET TO 58.4 FEET.



 <p>FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 RALEIGH, NC 27607 PHONE: 919.871.0800 FAX: 919.871.0803</p>	ROCK CORE PHOTOS		
	BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK DAVIDSON COUNTY, NORTH CAROLINA WBS.: 17BP.9.R.3 , TIP.: SF-280040		
JANUARY 2013	PROJECT NO.: G11034.01	SHEET 13	



BORING B1-B, BOX 1 OF 2, 30.6 FEET TO 48.7 FEET.



 <p>FALCON ENGINEERING, INC.</p>	<p>FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 RALEIGH, NC 27607 PHONE: 919.871.0800 FAX: 919.871.0803</p>		<p>ROCK CORE PHOTOS</p>	
	<p>BRIDGE NO. 40 ON I- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK DAVIDSON COUNTY, NORTH CAROLINA WBS.: 17BP9.R.3, TIP: SF-280040</p>		<p>JANUARY 2013</p>	<p>PROJECT NO.: G11034.01</p>
			<p>SHEET 14</p>	



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.9.R.3	TIP SF-280040	COUNTY DAVIDSON	GEOLOGIST T. EVANS / J. HAMM
SITE DESCRIPTION BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK			GROUND WTR (ft)
BORING NO. B2-A	STATION 13+12	OFFSET 11 ft LT	ALIGNMENT -L-
COLLAR ELEV. 655.7 ft	TOTAL DEPTH 71.0 ft	NORTHING 746,445	EASTING 1,615,813
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. GOWER	START DATE 05/04/12	COMP. DATE 05/08/12	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	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)
660														
655	654.7	1.0												GROUND SURFACE 0.0
650	652.2	3.5	WOH	1	3									ALLUVIAL DK. GRAY AND BLUE, F. SANDY CLAY (A-6)
	649.7	6.0		2	2									5.0
645	647.2	8.5		1	1	WOH								GRAY AND TAN, SILTY SAND (A-2-4)
	642.2	13.5		2	2	2								12.0
640	637.2	18.5		2	4	5								RESIDUAL BROWN TAN AND GRAY, F. SANDY SILT (A-4) SAPROLITIC
	632.2	23.5		7	7	13								20.0
635	627.2	28.5		6	10	16								WHITE TAN GRAY AND BROWN, SILTY SAND (A-2-4)
	622.2	33.5		34	25	21								
620	617.2	38.5		11	14	57								
	612.2	43.5	60/0.1											38.5
615	612.2	43.5		40	48	52/0.4								WEATHERED ROCK BROWN GRAY AND TAN, META-GABBRO
	607.2	48.5		47	53/0.3									
610	602.2	53.5		31	27	73/0.4								
	597.9	57.8	60/0.0											57.8
605	602.2	53.5												CRYSTALLINE ROCK GRAY BROWN AND TAN, MOD. TO SLI. WEATHERED, MED. HARD TO HARD, V. CLOSELY TO CLOSELY FRACTURED, META-GABBRO
	597.9	57.8												
600	597.9	57.8												
	592.9	64.8												
595	592.9	64.8												
	587.9	70.8												
590	587.9	70.8												
	582.9	75.8												
585	582.9	75.8												
	584.7	71.0												Boring Terminated at Elevation 584.7 ft in CR (Meta-Gabbro)

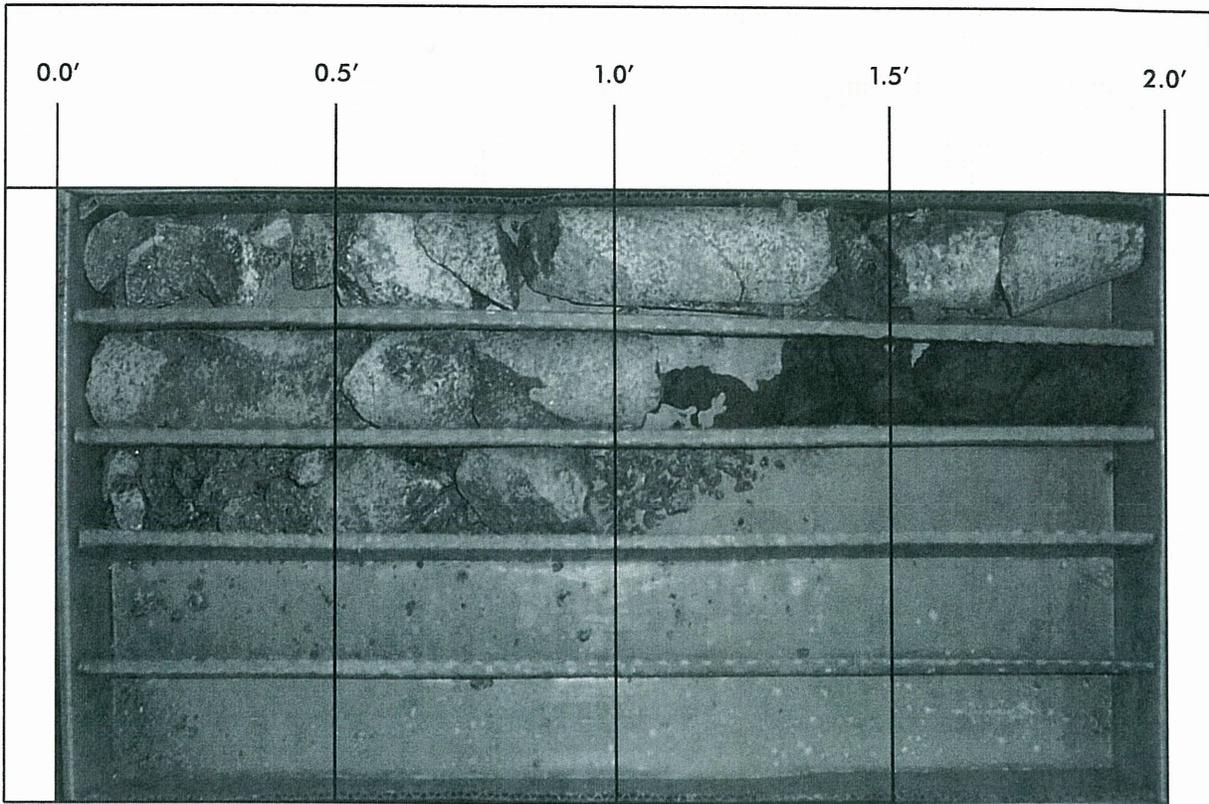
NCDOT BORE SINGLE G11034.01 BRIDGE 40.GPJ NC_DOT_GDT 1/9/13



NCDOT GEOTECHNICAL ENGINEERING UNIT CORE BORING REPORT

WBS 17BP.9.R.3		TIP SF-280040		COUNTY DAVIDSON		GEOLOGIST T. EVANS / J. HAMM						
SITE DESCRIPTION BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK									GROUND WTR (ft)			
BORING NO. B2-A		STATION 13+12		OFFSET 11 ft LT		ALIGNMENT -L-		0 HR. N/A				
COLLAR ELEV. 655.7 ft		TOTAL DEPTH 71.0 ft		NORTHING 746,445		EASTING 1,615,813		24 HR. 0.5				
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011				DRILL METHOD Mud Rotary			HAMMER TYPE Automatic					
DRILLER S. GOWER		START DATE 05/04/12		COMP. DATE 05/08/12		SURFACE WATER DEPTH N/A						
CORE SIZE NQ2		TOTAL RUN 13.2 ft										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %			
597.9											Begin Coring @ 57.8 ft	
595	597.9	57.8	4.2	2:10/1.0 3:22/1.0 2:10/1.0 1:50/1.0	(2.8) 67%	(0.8) 19%		(10.0) 76%	(3.0) 23%		597.9	57.8
	593.7	62.0	5.0	0:25/0.2 2:15/1.0 2:10/1.0 1:55/1.0 3:20/1.0 2:30/1.0	(3.2) 64%	(1.0) 20%					595	
590	588.7	67.0	4.0	8:10/1.0 3:20/1.0 4:20/1.0 5:00/1.0	(4.0) 100%	(1.2) 30%					590	
585	584.7	71.0									585	
											584.7	71.0
Boring Terminated at Elevation 584.7 ft in CR (Meta-Gabbro)												

NCDOT CORE SINGLE G11034.01 BRIDGE 40.GPJ NC_DOT_GDT 1/9/13

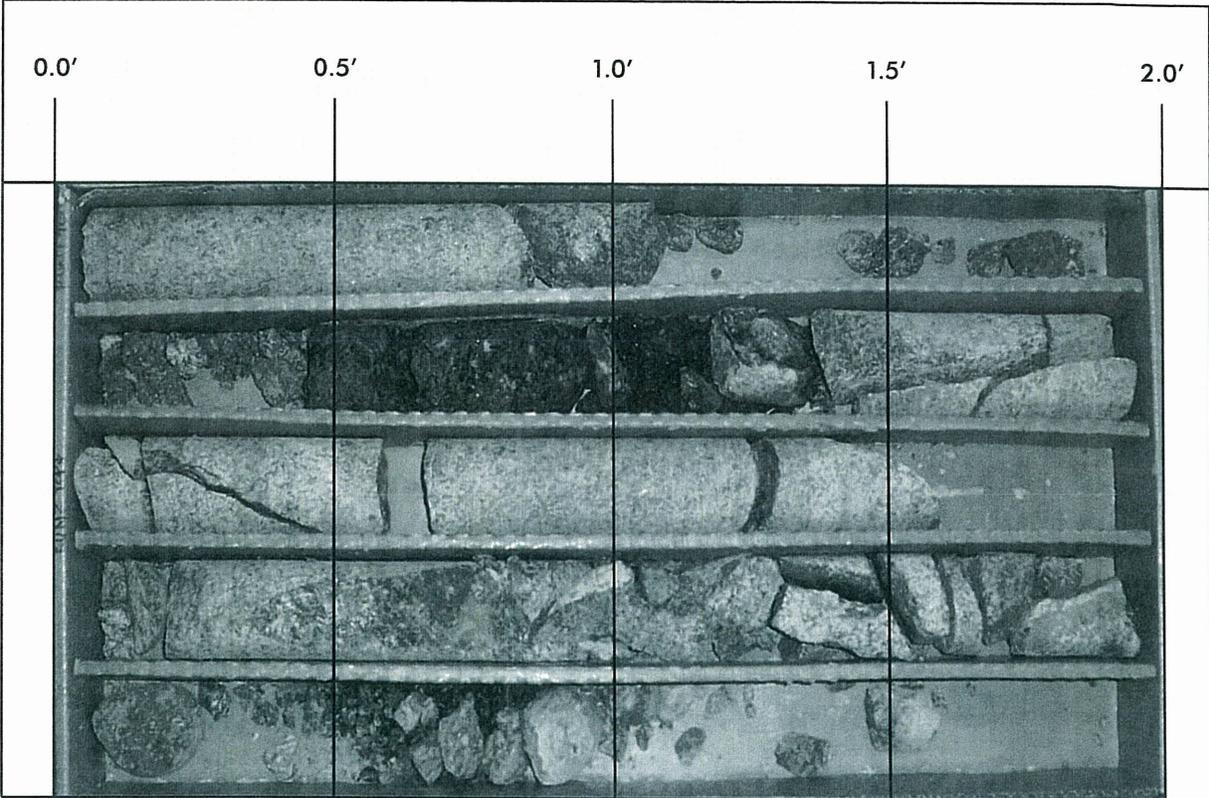


BORING B2-A, BOX 2 OF 2, 67.0 FEET TO 71.0 FEET.



FALCON
ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
RALEIGH, NC 27607
PHONE: 919.871.0800
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ROCK CORE PHOTOS		
BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK DAVIDSON COUNTY, NORTH CAROLINA WBS.: 17BP.9.R.3 , TIP: SF-280040		
JANUARY 2013	PROJECT NO.: G11034.01	SHEET 17



BORING B2-A, BOX 1 OF 2, 57.8 FEET TO 67.0 FEET.



 <p>FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 RALEIGH, NC 27607 PHONE: 919.871.0800 FAX: 919.871.0803</p>	ROCK CORE PHOTOS		
	BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK DAVIDSON COUNTY, NORTH CAROLINA WBS.: 17BP.9.R.3 , TIP.: SF-280040		
JANUARY 2013	PROJECT NO.: G11034.01	SHEET 18	



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 17BP.9.R.3	TIP SF-280040	COUNTY DAVIDSON	GEOLOGIST T. EVANS
SITE DESCRIPTION BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK			GROUND WTR (ft)
BORING NO. B2-B	STATION 13+02	OFFSET 9 ft RT	ALIGNMENT -L-
COLLAR ELEV. 655.7 ft	TOTAL DEPTH 39.5 ft	NORTHING 746,423	EASTING 1,615,810
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		DRILL METHOD Mud Rotary	HAMMER TYPE Automatic
DRILLER S. GOWER	START DATE 05/03/12	COMP. DATE 05/03/12	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				
660														
655	654.7	1.0											GROUND SURFACE	0.0
	652.2	3.5	1	2	2	4						W	ALLUVIAL DK. GRAY, SILTY F. SAND (A-2-4) W/ TRACE ORGANICS	3.0
650	649.7	6.0	1	1	2	3						W	BLUE-GRAY AND TAN, SANDY CLAY (A-6) W/ TRACE ORGANICS	
	647.2	8.5	1	1	1	2						M		8.5
645			4	11	11	22						M	RESIDUAL BROWN GRAY AND TAN, SILTY SAND (A-2-4) SAPROLITIC	
	642.2	13.5	4	8	10	18						M		
640												M		
	637.2	18.5	6	16	18	34						M		
635												M		
	632.2	23.5	7	11	9	20						M		
630												M		
	627.2	28.5	25	64	36/0.1					100/0.6			WEATHERED ROCK RED-BROWN PINK AND GRAY, META-GABBRO, W/ QUARTZ INTRUSIONS, MICACEOUS	29.0
625														
	622.2	33.5	24	35	57					92		D	RESIDUAL BROWN GRAY AND RED, SILTY SAND (A-2-4) SAPROLITIC, W/ QUARTZ GRAVEL	33.0
620														
	617.2	38.5	100/0.2							100/0.2			WEATHERED ROCK BROWN BLUE-GRAY AND TAN, META-GABBRO	38.0
	616.2	39.5	60/0.0							60/0.0			Boring Terminated by Tricone Refusal at Elevation 616.2 ft on CR (Meta-Gabbro)	39.5

NCDOT BORE SINGLE G11034.01 BRIDGE 40.GPJ NC_DOT_GDT 1/9/13



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.9.R.3		TIP SF-280040		COUNTY DAVIDSON		GEOLOGIST T. EVANS										
SITE DESCRIPTION BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 13+53		OFFSET 8 ft LT		ALIGNMENT -L-	0 HR. 17.4									
COLLAR ELEV. 668.2 ft		TOTAL DEPTH 63.8 ft		NORTHING 746,456		EASTING 1,615,852	24 HR. FIAD									
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER S. GOWER		START DATE 05/02/12		COMP. DATE 05/02/12		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)		
670																
665	666.6	1.6	7	3	1	4								668.2	0.0	EXISTING PAVEMENT
	664.7	3.5	2	1	1	2								666.6	1.6	5" BITUMINOUS CONCRETE
	662.2	6.0	2	1	2	3								666.2	2.0	14" PORTLAND CEMENT CONCRETE
660	659.7	8.5	1	1	3	4										ROADWAY EMBANKMENT
																GRAY, SILTY SAND (A-2-4) W/ GRAVEL
																RED-BROWN, SILTY CLAY (A-7) W/ GRAVEL, TRACE MICA
655	654.7	13.5	2	2	1	3								660.2	8.0	TAN AND RED-BROWN, F. SANDY SILT (A-4) W/ LITTLE MICA
														656.2	12.0	RED-BROWN, SILTY CLAY (A-7) W/ TRACE MICA
650	649.7	18.5	WOH	WOH	1	1								652.2	16.0	ALLUVIAL
																GRAY, SILT (A-5) W/ TRACE ORGANICS
645	644.7	23.5	1	1	3	4								646.2	22.0	GRAY, SILTY SAND (A-1-b)
640	639.7	28.5	6	5	6	11								642.2	26.0	GRAY, SANDY SILT (A-4) W/ SAND LAYERS
635	634.7	33.5	4	6	8	14								635.2	33.0	RESIDUAL
																GRAY BROWN AND TAN, SILTY SAND (A-2-4) SAPROLITIC, W/ TRACE MICA
630	629.7	38.5	8	15	24	39										
625	624.7	43.5	10	13	18	31										
620	619.7	48.5	10	12	17	29										
615	614.7	53.5	12	16	25	41										
610	609.7	58.5	100/0.4											610.7	57.5	WEATHERED ROCK
																TAN AND BROWN, META-GABBRO, W/ QUARTZ INTRUSIONS
605	604.7	63.5	100/0.3											604.4	63.8	Boring Terminated at Elevation 604.4 ft in WR (Meta-Gabbro)

NCDOT BORE SINGLE G11034.01 BRIDGE 40.GPJ NC_DOT.GDT 1/9/13



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 17BP.9.R.3	TIP SF-280040	COUNTY DAVIDSON	GEOLOGIST T. EVANS
SITE DESCRIPTION BRIDGE NO. 40 ON -L- (SR 1298, GRIMES BLVD) OVER SWEARING CREEK			GROUND WTR (ft)
BORING NO. EB2-B	STATION 13+53	OFFSET 9 ft RT	ALIGNMENT -L-
COLLAR ELEV. 668.2 ft	TOTAL DEPTH 59.2 ft	NORTHING 746,440	EASTING 1,615,858
DRILL RIG/HAMMER EFF./DATE TRI8016 MOBILE B-57 93% 12/08/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER S. GOWER	START DATE 05/02/12	COMP. DATE 05/02/12	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	100						
670																
	666.7	1.5														668.2 EXISTING PAVEMENT 0.0
	664.7	3.5	9	2	2											666.7 6" BITUMINOUS CONCRETE 1.5
665	664.7	3.5	1	2	2											12" AGGREGATE BASE COURSE
	662.2	6.0	1	2	2											ROADWAY EMBANKMENT
	659.7	8.5	1	3	3											RED-BROWN AND GRAY, SILTY CLAY (A-7) W/ TRACE MICA, SAND LAYERS
660	659.7	8.5	1	3	3											5.5 RED-BROWN AND TAN, F. SANDY SILT (A-4) W/ TRACE MICA
	654.7	13.5	1	2	2											ALLUVIAL
655	654.7	13.5	1	2	2											13.0 DK. GRAY, F. SANDY SILT (A-5) W/ TRACE MICA, SAND LAYERS, TRACE ORGANICS
	649.7	18.5	WOH	WOH	WOH											
650	649.7	18.5	WOH	WOH	WOH											
	644.7	23.5	3	3	4											
645	644.7	23.5	3	3	4											22.0 BLUE-GRAY AND TAN, SANDY CLAY (A-6) W/ CSE. SAND LAYERS
	639.7	28.5	5	11	4											
640	639.7	28.5	5	11	4											
	634.7	33.5	3	5	9											
635	634.7	33.5	3	5	9											32.0 RESIDUAL
	629.7	38.5	10	18	16											
630	629.7	38.5	10	18	16											WHITE TAN GRAY AND BROWN, F. SANDY SILT (A-4) SAPROLITIC
	624.7	43.5	11	17	22											
625	624.7	43.5	11	17	22											43.0 GRAY BROWN AND TAN, SILTY SAND (A-2-4) SAPROLITIC
	619.7	48.5	11	24	42											
620	619.7	48.5	11	24	42											
	614.4	53.8	100/0.4													
615	614.4	53.8	100/0.4													52.0 WEATHERED ROCK
	609.7	58.5	50	50/0.2												
610	609.7	58.5	50	50/0.2												59.2 GRAY BROWN AND TAN, META-GABBRO, W/ QUARTZ GRAVEL, TRACE MICA AND THIN RESIDUAL SOIL LAYERS
																Boring Terminated at Elevation 609.0 ft in WR (Meta-Gabbro)

NCDOT BORE SINGLE G11034.01 BRIDGE 40.GPJ NC_DOT.GDT 1/9/13