

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.11.R.72	1	8

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.11.R.72 F.A. PROJ. N/A
COUNTY ASHE
PROJECT DESCRIPTION BRIDGE NO. 371 ON SR 1100
OVER UNNAMED TRIBUTARY TO
THREE TOP CREEK

CONTENTS

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PERSONNEL

B. SMITH, GIT

J. BARE

D. TENNEY

INVESTIGATED BY B. WORLEY, PG

CHECKED BY D. DEWEY, PE

SUBMITTED BY Summit Design and Engineering Services, PLLC

DATE NOVEMBER, 2013

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) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

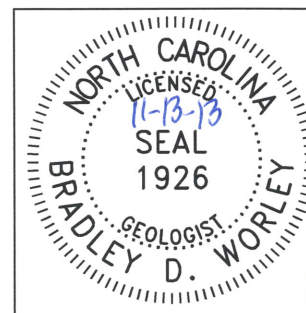
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NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

DRAWN BY: M. BRANDON, PLS and B. WORLEY, PG



Bradley D. Worley

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

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 (AASHTO T206, 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:
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

GRADATION

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)
CAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES 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 WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE
MODERATELY COMPRESSIBLE
HIGHLY COMPRESSIBLE

LIQUID LIMIT LESS THAN 31
LIQUID LIMIT EQUAL TO 31-50
LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL

GRANULAR SOILS

SILT - CLAY SOILS

OTHER MATERIAL

TRACE OF ORGANIC MATTER
LITTLE ORGANIC MATTER
MODERATELY ORGANIC
HIGHLY ORGANIC

2 - 3%
3 - 5%
5 - 10%
>10%

3 - 5%
5 - 12%
12 - 20%
>20%

TRACE
LITTLE
SOME
HIGHLY

1 - 10%
10 - 20%
20 - 35%
35% AND ABOVE

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.

GRANULAR MATERIALS
($\leq 35\%$ PASSING #200)

SILT-CLAY MATERIALS
($> 35\%$ PASSING #200)

ORGANIC MATERIALS

GROUP CLASS.

A-1

A-1-a

A-1-b

A-2

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

SYMBOL

% PASSING

10

40

200

50 MX

30 MX

50 MX

51 MN

35 MX

35 MX

35 MX

35 MX

35 MX

36 MN

36 MN

36 MN

36 MN

GRANULAR SOILS

SILT-CLAY SOILS

MUCK, PEAT

LIQUID LIMIT

PLASTIC INDEX

GROUP INDEX

6 MX

NP

40 MX

10 MX

41 MN

10 MX

40 MX

11 MN

41 MN

11 MN

40 MX

10 MX

41 MN

11 MN

40 MX

11 MN

41 MN

11 MN

SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER

HIGHLY ORGANIC SOILS

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 A SUBGRADE

EXCELLENT TO GOOD

FAIR TO POOR

FAIR TO POOR

POOR

UNSUITABLE

PI OF A-7-5 SUBGROUP IS $\leq$ LL - 30 ; PI OF A-7-6 SUBGROUP IS $>$ LL - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE

COMPACTNESS OR CONSISTENCY

RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE)

RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/F²)

GENERALLY GRANULAR MATERIAL (NON-COHESIVE)

VERY LOOSE
LOOSE
MEDIUM DENSE
DENSE
VERY DENSE

< 4
4 TO 10
10 TO 30
30 TO 50
>50

N/A

GENERALLY SILT-CLAY MATERIAL (COHESIVE)

VERY SOFT
SOFT
MEDIUM STIFF
STIFF
VERY STIFF
HARD

< 2
2 TO 4
4 TO 8
8 TO 15
15 TO 30
>30

< 0.25
0.25 TO 0.50
0.5 TO 1.0
1 TO 2
2 TO 4
>4

TEXTURE OR GRAIN SIZE

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

BOULDER (BLDR.)

COBBLE (COB.)

GRAVEL (GR.)

COARSE SAND (CSE, SD.)

FINE SAND (F SD.)

SILT (SL.)

CLAY (CL.)

GRAIN SIZE

MM

305

75

2.0

0.25

0.05

0.005

IN.

12

3

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)

FIELD MOISTURE DESCRIPTION

GUIDE FOR FIELD MOISTURE DESCRIPTION

LL

PLASTIC RANGE (PI)

PL

OM

SL

LIQUID LIMIT

PLASTIC LIMIT

OPTIMUM MOISTURE

SHRINKAGE LIMIT

- SATURATED - (SAT.)

- WET - (W)

- MOIST - (M)

- DRY - (D)

USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE

SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE

SOLID; AT OR NEAR OPTIMUM MOISTURE

REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

NONPLASTIC

LOW PLASTICITY

MED. PLASTICITY

HIGH PLASTICITY

PLASTICITY INDEX (PI)

0-5

6-15

16-25

26 OR MORE

DRY STRENGTH

VERY LOW

SLIGHT

MEDIUM

HIGH

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.

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

DIP & DIP DIRECTION OF ROCK STRUCTURES

TEST BORING W/ CORE

SPT N-VALUE

SPT REFUSAL

AUGER BORING

CORE BORING

MONITORING WELL

PIEZOMETER INSTALLATION

SLOPE INDICATOR INSTALLATION

CONE PENETROMETER TEST

SOUNDING ROD

ABBREVIATIONS

AR - AUGER REFUSAL

BT - BORING TERMINATED

CL - CLAY

CPT - CONE PENETRATION TEST

CSE - COARSE

DMT - DILATOMETER TEST

DPT - DYNAMIC PENETRATION TEST

e - VOID RATIO

F - FINE

FOSS - FOSSILIFEROUS

FRAC - FRACTURED, FRACTURES

FRAGS - FRAGMENTS

HL - HIGHLY

MED. - MEDIUM

MICA - MICACEOUS

MOD. - MODERATELY

NP - NON PLASTIC

ORG. - ORGANIC

PMT - PRESSUREMETER TEST

SAP. - SAPROLITIC

SD. - SAND, SANDY

SL. - SILT, SILTY

SLI. - SLIGHTLY

TCR - TRICONE REFUSAL

w - MOISTURE CONTENT

V - VERY

VST - VANE SHEAR TEST

WEA. - WEATHERED

γ - UNIT WEIGHT

γ_d - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK

SS - SPLIT SPOON

ST - SHELBY TUBE

RS - ROCK

RT - RECOMPACTED TRIAXIAL

CBR - CALIFORNIA BEARING RATIO

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:

MOBILE B-____

BK-51

☒ CME-450

CME-55

PORTABLE HOIST

Diedrich D-50

ADVANCING TOOLS:

CLAY BITS

6" CONTINUOUS FLIGHT AUGER

☒ 6" HOLLOW AUGERS

HARD FACED FINGER BITS

TUNG.-CARBIDE INSERTS

CASING ☐ W/ ADVANCER

TRICONE _____ " STEEL TEETH

TRICONE _____ " TUNG.-CARB.

CORE BIT

HAMMER TYPE:

☒ AUTOMATIC ☐ MANUAL

CORE SIZE:

-B_____

-N_____

-H_____

HAND TOOLS:

☐ POST HOLE DIGGER

☐ HAND AUGER

☐ SOUNDING ROD

☐ VANE SHEAR TEST

REVISED 09/23/09

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

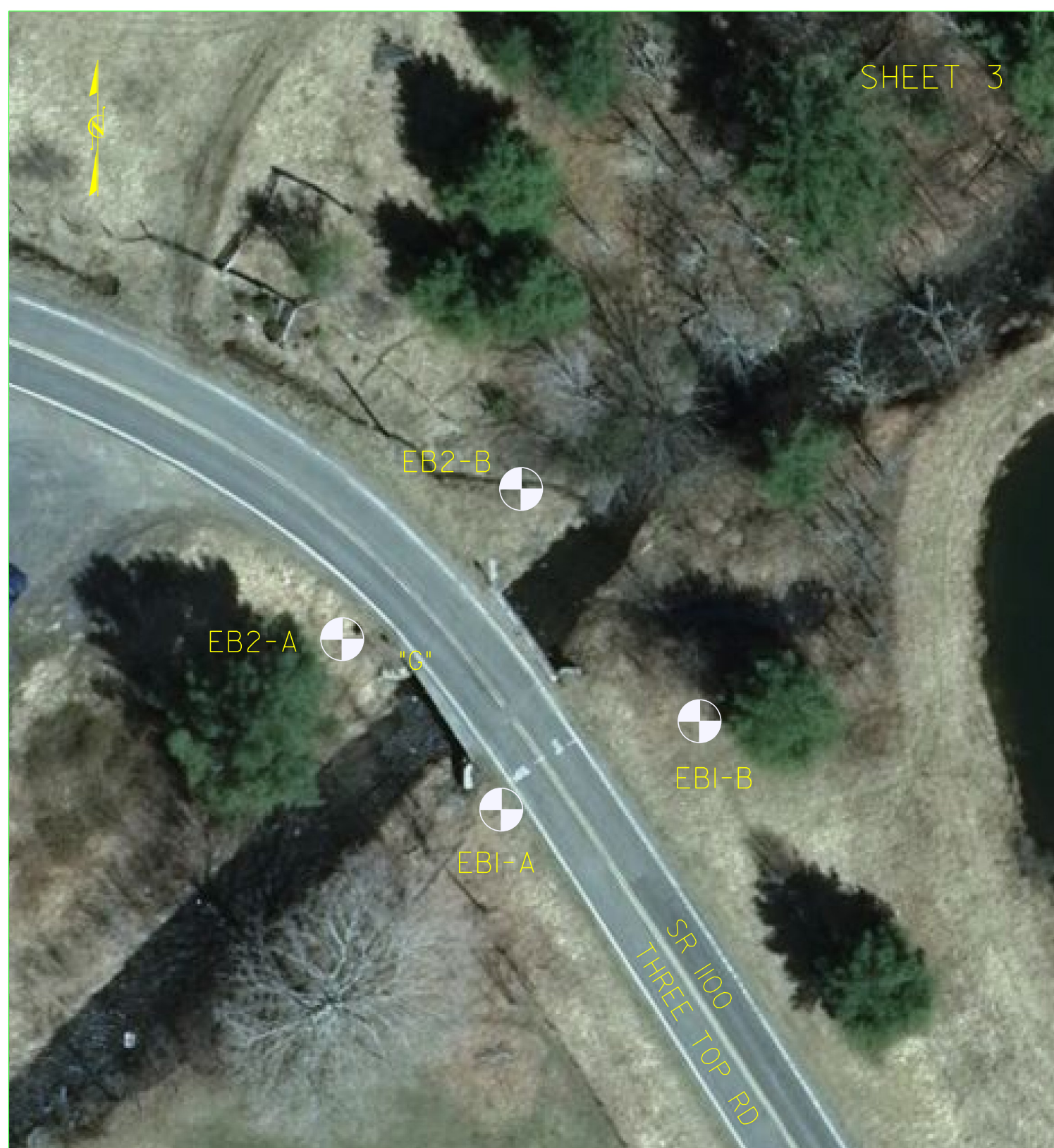
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

ROCK DESCRIPTION		TERMS AND DEFINITIONS	
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:		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 (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.	
WEATHERED ROCK (WR)		NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.	
CRYSTALLINE ROCK (CR)		FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.	
NON-CRYSTALLINE ROCK (NCR)		FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.	
COASTAL PLAIN SEDIMENTARY ROCK (CP)		COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	
WEATHERING			
FRESH	ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.		
VERY SLIGHT (V SL.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.		
SLIGHT (SL.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.		
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.		
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <u>IF TESTED, WOULD YIELD SPT REFUSAL</u>		
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. <u>IF TESTED, YIELDS SPT N VALUES > 100 BPF</u>		
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. <u>IF TESTED, YIELDS SPT N VALUES < 100 BPF</u>		
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 GROVED 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 FINGERNAIL.		
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.		

BENCH MARK: Established TBM "G" on NW corner existing bridge.	
ELEVATION: 100 FT.	
NOTES:	



BORING LOCATION DIAGRAM
BRIDGE #371 ON SR 1100
OVER UNNAMED TRIB TO THREE TOP CR
ASHE COUNTY, NC

PROJECT: I7BP.II.R.72

DRAWN BY: MTB

CHECKED BY: BW

DATE: OCTOBER 2013

SCALE: 30:1



FIRM NO. P-0339 and C-487

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NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET 4

WBS 17BP.11.R.72		TIP N/A		COUNTY ASHE		GEOLOGIST Smith, B.											
SITE DESCRIPTION Bridge 371 on SR 1100 over unnamed tributary to Three Top Creek							GROUND WTR (ft)										
BORING NO. EB1-A		STATION N/A		OFFSET N/A		ALIGNMENT N/A		0 HR. 6.5									
COLLAR ELEV. 100.2 ft		TOTAL DEPTH 49.9 ft		NORTHING 960,405		EASTING 1,237,088		24 HR. 5.5									
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 08/15/2013				DRILL METHOD H.S. Augers			HAMMER TYPE Automatic										
DRILLER Bare, J.		START DATE 09/17/13		COMP. DATE 09/17/13		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						ELEV. (ft)	
105																	
100															100.2	GROUND SURFACE	0.0
95	96.1	4.1	2	7	7											COLLUVIAL Brown to orange-brown and black, SILTY SAND (A-2-4), with rock fragments	
90	91.1	9.1	16	20	23												
85	86.1	14.1	20	28	29												
80	81.1	19.1	2	2	5											RESIDUAL Orange-brown to brown, saprolitic, highly micaceous, f. SANDY SILT (A-4)	
75	76.1	24.1	6	3	8												
70	71.1	29.1	7	12	22												
65	66.1	34.1	49	51/0.2												WEATHERED ROCK (mica schist)	
60	61.1	39.1	37	47	41												
55	56.1	44.1	32	26	21												
	51.1	49.1	54	46/0.3												RESIDUAL Orange-brown to brown, saprolitic, highly micaceous, f. SANDY SILT (A-4)	
																WEATHERED ROCK (mica schist)	
																Boring Terminated with Standard Penetration Test Refusal at Elevation 50.3 ft in Weathered Rock (mica schist)	

NCDOT BORE SINGLE 17BP.11.R.72_GEO_BRDG0371_SUMMIT_GINT.GPJ NC_DOT.GDT 11/13/13



NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

SHEET 5

WBS 17BP.11.R.72		TIP N/A		COUNTY ASHE		GEOLOGIST Smith, B.						
SITE DESCRIPTION Bridge 371 on SR 1100 over unnamed tributary to Three Top Creek							GROUND WTR (ft)					
BORING NO. EB1-B		STATION N/A		OFFSET N/A		ALIGNMENT N/A	0 HR. 8.5					
COLLAR ELEV. 96.7 ft		TOTAL DEPTH 41.3 ft		NORTHING 960,424		EASTING 1,237,132	24 HR. 2.0					
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 08/15/2013				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic						
DRILLER Bare, J.		START DATE 09/17/13		COMP. DATE 09/17/13		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)
100												
95												96.7 GROUND SURFACE 0.0
90	92.5	4.2	22	25	24						M	COLLUVIAL Brown and black, SILTY SAND (A-2-4), with rock fragments, trace clay
85	87.5	9.2	20	24	22						M	
80	82.5	14.2	3	3	4						Sat.	RESIDUAL Orange-brown to dark brown, saprolitic, highly micaceous, f. SANDY SILT (A-4)
75	77.5	19.2	4	6	8						Sat.	
70	72.5	24.2	5	9	14						Sat.	
65	67.5	29.2	14	15	15						Sat.	
60	62.5	34.2	9	9	18						Sat.	
	57.5	39.2	10	55	45/0.0							WEATHERED ROCK (mica schist)
	55.4	41.3										60.0 36.7
												55.4 41.3
												Boring Terminated with Standard Penetration Test Refusal at Elevation 55.4 ft on Crystalline Rock (mica schist)

NCDOT BORE SINGLE 17BP.11.R.72_GEO_BRDG0371_SUMMIT_GINT.GPJ NC_DOT.GDT 11/13/13



WBS 17BP.11.R.72				TIP N/A		COUNTY ASHE				GEOLOGIST Smith, B.				
SITE DESCRIPTION Bridge 371 on SR 1100 over unnamed tributary to Three Top Creek										GROUND WTR (ft)				
BORING NO. EB2-A				STATION N/A			OFFSET N/A			ALIGNMENT N/A			0 HR. 6.7	
COLLAR ELEV. 100.0 ft				TOTAL DEPTH 47.7 ft			NORTHING 960,443			EASTING 1,237,053			24 HR. 7.0	
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 85% 08/15/2013							DRILL METHOD H.S. Augers				HAMMER TYPE Automatic			
DRILLER Bare, J.				START DATE 09/16/13			COMP. DATE 09/17/13			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				
100														100.0 GROUND SURFACE 0.0
95	96.2	3.8	4	4	7									COLLUVIAL Brown to brown and gray to brown and black, SILTY f. SAND (A-2-4), with rock fragments
90	91.2	8.8	10	3	4									
85	86.2	13.8	16	20	27									RESIDUAL Orange-brown to brown, saprolitic highly micaceous, SANDY SILT (A-4). with quartz fragments
80	81.2	18.8	3	4	6									
75	76.2	23.8	13	15	14									WEATHERED ROCK (mica schist)
70	71.2	28.8	30	70/0.4										
65	66.2	33.8	6	9	11									RESIDUAL Orange-brown to brown and orange-brown to dark gray, saprolitic, highly micaceous, SANDY SILT (A-2-4), with quartz fragments
60	61.2	38.8	5	9	12									
55	56.2	43.8	45	55/0.1										WEATHERED ROCK (mica schist)
	52.3	47.7	60/0.0											
														Boring Terminated with Standard Penetration Test Refusal at Elevation 52.3 ft on Crystalline Rock (mica schist)

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