

REFERENCE: 17BP.12.R.62

PROJECT: NA

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	17BP.12.R.62	1	18

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

**STRUCTURE
SUBSURFACE INVESTIGATION**

COUNTY CATAWBA
PROJECT DESCRIPTION DIVISION 12 BRIDGES

SITE DESCRIPTION BRIDGE NO. 057 ON SR 1002 (OLD
SHELBY ROAD) OVER CAMP CREEK

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15	ROCK TEST RESULTS

PERSONNEL
SUMMIT DRILLING
S. CARPENTER

INVESTIGATED BY ECS SOUTHEAST, LLP
DRAWN BY K. DE MONTBRUN, P.E.
CHECKED BY M. WALKO, P.E.
SUBMITTED BY ECS SOUTHEAST, LLP
DATE JULY 2019

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Prepared in the Office of:
ECS SOUTHEAST, LLP
1812 CENTER PARK DRIVE, SUITE D
CHARLOTTE, NC 28217
(704) 525-5152 [PHONE]
(704) 357-0023 [FAX]
NC REGISTERED
ENGINEERING
FIRM # F-1078



Michael J. Walko 7/26/19
SIGNATURE DATE

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
(PAGE 1 OF 2)

SOIL DESCRIPTION										GRADATION									
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 206, 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, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6										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.									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS									
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS										THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.									
GROUP CLASS. A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-3 A-4, A-5 A-6, A-7										MINERALOGICAL COMPOSITION									
SYMBOL										MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.									
% PASSING #10 #40 #200										COMPRESSIBILITY									
MATERIAL PASSING #40 LL PI										SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50									
GROUP INDEX										PERCENTAGE OF MATERIAL									
USUAL TYPES OF MAJOR MATERIALS										ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL									
GEN. RATING AS SUBGRADE										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									
PI OF A-7-5 SUBGROUP IS <= LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30										GROUND WATER									
CONSISTENCY OR DENSENESS										MISCELLANEOUS SYMBOLS									
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)										ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY									
GENERALLY GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE										DIP & DIP DIRECTION OF ROCK STRUCTURES SLOPE INDICATOR INSTALLATION TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION									
GENERALLY SILT-CLAY MATERIAL (COHESIVE) VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD										SPT DMT VST PMT CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE									
TEXTURE OR GRAIN SIZE										RECOMMENDATION SYMBOLS									
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										UNDERCUT UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL									
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)										SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK									
GRAIN SIZE MM 305 75 2.0 0.25 0.05 0.005 IN. 12 3										ABBREVIATIONS									
SOIL MOISTURE - CORRELATION OF TERMS										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 SILI. - SLIGHTLY FRAC. - FRACTURED, FRACTURES TCR - TRICONE REFUSAL FRAGS. - FRAGMENTS w - MOISTURE CONTENT HI. - HIGHLY v - VERY									
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION										VST - VANE SHEAR TEST WEA. - WEATHERED ? - UNIT WEIGHT ? - DRY UNIT WEIGHT									
LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE										SAMPLE ABBREVIATIONS									
PLASTIC RANGE (PI) PL PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE										S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO									
OM OPTIMUM MOISTURE SHRINKAGE LIMIT - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE										EQUIPMENT USED ON SUBJECT PROJECT									
SL - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE										DRILL UNITS: CME-45C CME-55 CME-550 VANE SHEAR TEST PORTABLE HOIST CME-450									
PLASTICITY										ADVANCING TOOLS: CLAY BITS 6' CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE STEEL TEETH TRICONE TUNG-CARB. CORE BIT									
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC										HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: -B -H -N Q2 HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST									
PLASTICITY INDEX (PI) DRY STRENGTH										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.									
COLOR																			





**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS (PAGE 2 OF 2)

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)		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, WOULD YIELD SPT N VALUES > 100 BPF</u>
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. <u>IF TESTED, WOULD YIELD 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 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 FINGERNAIL.

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 (ROQ) - 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 (SRQD) - 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: BM #1 - RR SPIKE IN 16' WALNUT 89' RIGHT OF -L- STA. 6+24 N-696165 E-1274530	
ELEVATION: 956.78 FEET	

NOTES:

SURVEY INFORMATION AND ROADWAY DESIGNS PROVIDED BY MATTEN AND CRAIG

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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SUBSURFACE INVESTIGATION

SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (PAGE 1 OF 2)

AASHTO LRFD Figure 10.4.6.4-1 — Determination of GSI for Jointed Rock Mass (Marinos and Hoek, 2000)

GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000)

From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis.

SURFACE CONDITIONS

VERY GOOD
Very rough, fresh unweathered surfaces

GOOD
Rough, slightly weathered, iron stained surfaces

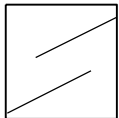
FAIR
Smooth, moderately weathered and altered surfaces

POOR
Slackensided, highly weathered surfaces with compact coatings or fillings or angular fragments

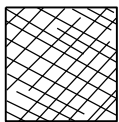
VERY POOR
Slackensided, highly weathered surfaces with soft clay coatings or fillings

DECREASING SURFACE QUALITY →

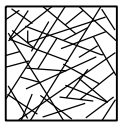
STRUCTURE



INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities



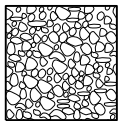
BLOCKY - well interlocked undisturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets



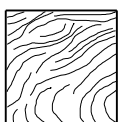
VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets



BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity



DISINTEGRATED - poorly interlocked, heavily broken rock mass with mixture of angular and rounded rock pieces



LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes

DECREASING INTERLOCKING OF ROCK PIECES



90

80

70

60

50

40

30

20

10

N/A

N/A

N/A

N/A

10

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

**SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES
 FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS (PAGE 2 OF 2)**

AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for Tectonically Deformed Heterogeneous Rock Masses (Marinos and Hoek, 2000)

GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos, P and Hoek E., 2000)

From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fair, poor and very poor conditions. Water pressure does not change the value of GSI and it is dealt with by using effective stress analysis.

SURFACE CONDITIONS OF DISCONTINUITIES (Predominantly bedding planes)

VERY GOOD - Very Rough, fresh unweathered surfaces

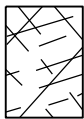
GOOD - Rough, slightly weathered surfaces

FAIR - Smooth, moderately weathered and altered surfaces

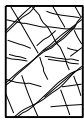
POOR - Very smooth, occasionally slickensided surfaces with compact coatings or fillings with angular fragments

VERY POOR - Very smooth, slickensided or highly weathered surfaces with soft clay coatings or fillings

COMPOSITION AND STRUCTURE



A. Thick bedded, very blocky sandstone. The effect of peltic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability.



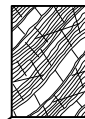
B. Sandstone with thin inter-layers of siltstone



C. Sandstone and siltstone in similar amounts



D. Siltstone or silty shale with sandstone layers



E. Weak siltstone or clayey shale with sandstone layers

C, D, E, and **G** - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to **F** and **H**.



F. Tectonically deformed, intensively folded/faulted, sheared clayey shale or siltstone with broken and deformed sandstone layers forming an almost chaotic structure

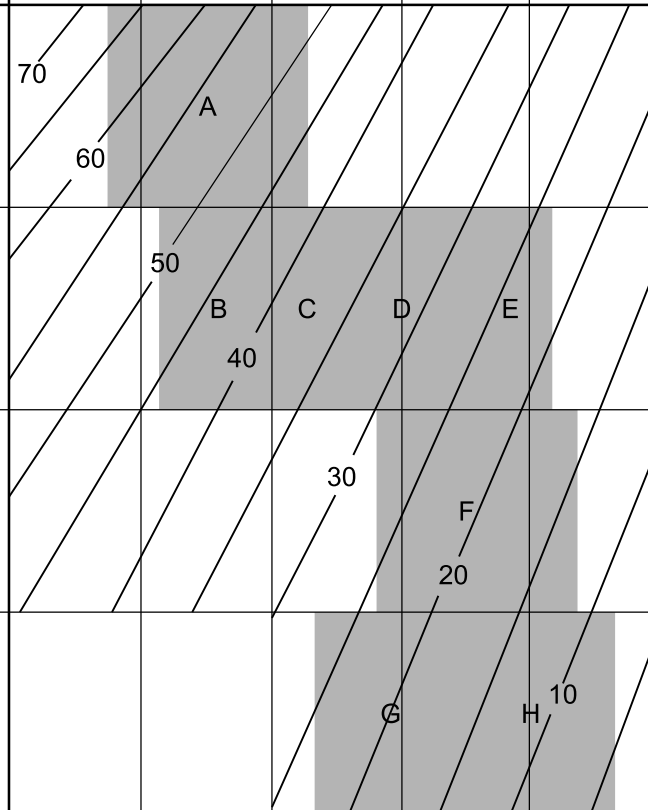


G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers



H. Tectonically deformed silty or clayey shale forming a chaotic structure with pockets of clay. Thin layers of sandstone are transformed into small rock pieces.

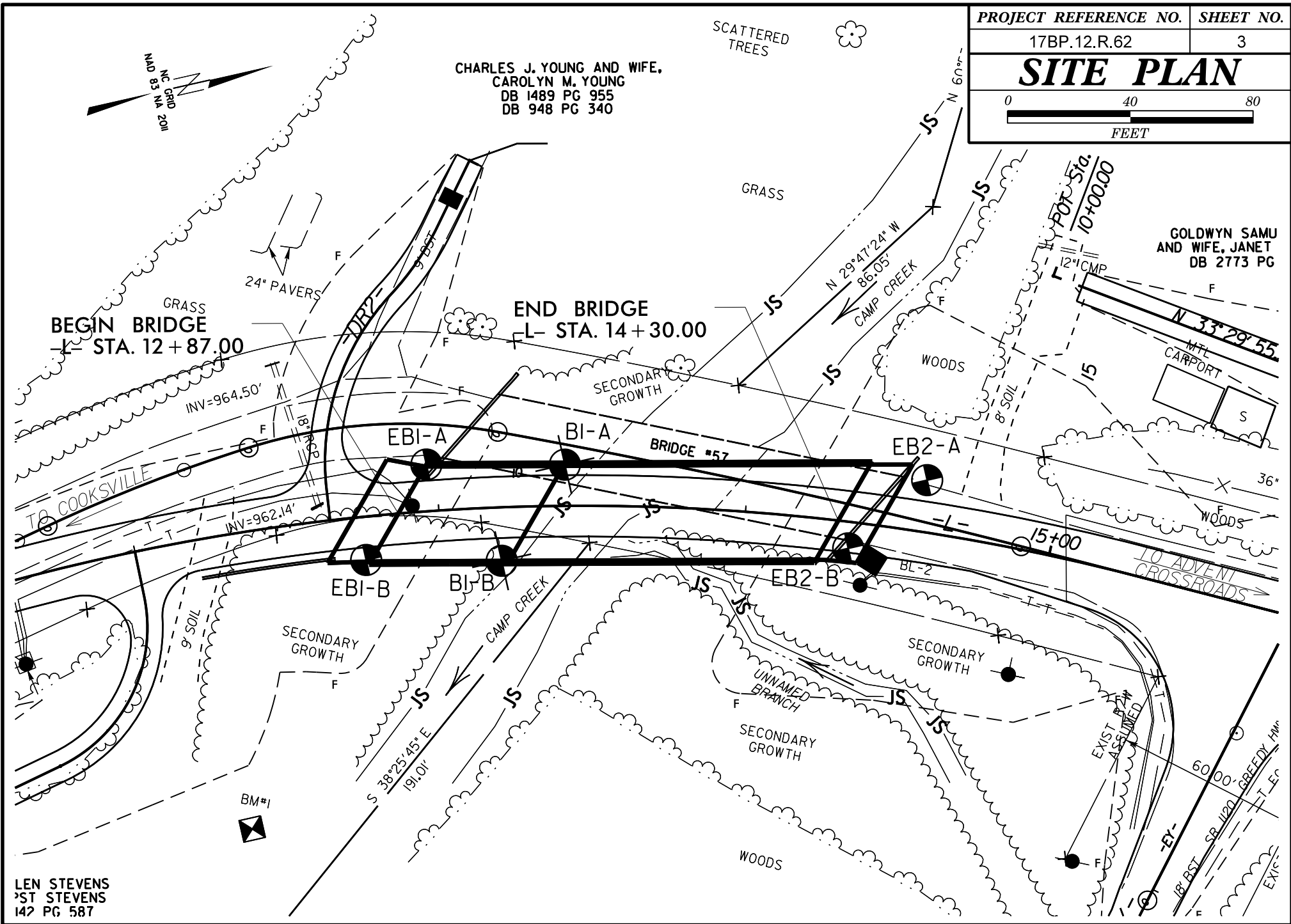
➔ Means deformation after tectonic disturbance



PROJECT REFERENCE NO.	SHEET NO.
17BP.12.R.62	3
SITE PLAN	

CHARLES J. YOUNG AND WIFE,
 CAROLYN M. YOUNG
 DB 1489 PG 955
 DB 948 PG 340

GOLDWYN SAMU
 AND WIFE, JANET
 DB 2773 PG



LEN STEVENS
 321 ST STEVENS
 142 PG 587

GEOTECHNICAL BORING REPORT

BORE LOG

WBS N/A		TIP 17BP.12.R.62		COUNTY CATAWBA		GEOLOGIST S. Carpenter												
SITE DESCRIPTION Bridge 57 on SR 1002 over Camp Creek							GROUND WTR (ft)											
BORING NO. EB1-A		STATION 12+97		OFFSET 15 ft LT		ALIGNMENT -L-	0 HR. 16.7											
COLLAR ELEV. 966.2 ft		TOTAL DEPTH 28.0 ft		NORTHING 696,247		EASTING 1,274,427	24 HR. 15.2											
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 81% 11/09/2016				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic												
DRILLER M. Mosely		START DATE 12/21/17		COMP. DATE 12/21/17		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				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)			
970																		
965	966.2	0.0	2	2	2										966.2	0.0	GROUND SURFACE	
	962.7	3.5	2	1	2										963.2	3.0	ROADWAY EMBANKMENT Soft, Red-Brown, Fine to Coarse Sandy SILT (A-4)	
960	960.2	6.0	1	1	1												Soft to Very Soft, Red-Brown, Clayey SILT (A-5) with trace mica and gravel	
	957.7	8.5	1	1	1													
955																		
	952.7	13.5	13	14	5										954.2	12.0	ALLUVIAL Very Stiff, Tan-Brown, Fine to Coarse Sandy SILT (A-4) with trace gravel	
950																		
	947.7	18.5	1	1	2										949.2	17.0	Very Soft, Gray, Fine Sandy CLAY (A-6)	
945																		
	942.7	23.5	30	32	19										944.2	22.0	RESIDUAL Hard, Gray-Tan-Brown, Fine to Coarse Sandy SILT (A-4) with trace rock fragments	
940																		
	938.2	28.0	60/0.0												938.2	28.0	Boring Terminated with Standard Penetration Test Refusal at Elevation 938.2 ft On Crystalline Rock (MICA SCHIST)	

NCDOT BORE SINGLE BRIDGE7_GEO_BORELOGS.GPJ NC_DOT_GDT 8/6/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS N/A		TIP 17BP.12.R.62		COUNTY CATAWBA		GEOLOGIST S. Carpenter														
SITE DESCRIPTION Bridge 57 on SR 1002 over Camp Creek							GROUND WTR (ft)													
BORING NO. EB1-B		STATION 12+75		OFFSET 14 ft RT		ALIGNMENT -L-	0 HR. Dry													
COLLAR ELEV. 960.0 ft		TOTAL DEPTH 16.6 ft		NORTHING 696,221		EASTING 1,274,453	24 HR. 9.4													
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 81% 11/09/2016				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic														
DRILLER M. Mosely		START DATE 12/21/17		COMP. DATE 12/21/17		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						
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)					
960	960.0	0.0	2	2	3									960.0	0.0	GROUND SURFACE				
955	956.5	3.5	2	3	4						M			957.0	3.0	ROADWAY EMBANKMENT Medium Stiff, Red-Brown, Clayey SILT (A-5) with trace gravel				
	954.0	6.0	16	12	7						M			952.0	8.0	RESIDUAL Medium Stiff to Very Stiff, Red-Brown, Clayey SILT (A-5) with trace gravel-sized rock fragments				
950	951.5	8.5	1	2	1						M						952.0	8.0	Very Loose, White-Tan-Brown, Silty Fine to Coarse Sand (A-2-6)	
	946.5	13.5	4	13	6						W			948.0	12.0	Very Stiff, Orange-Brown, Fine to Coarse, Sandy SILT (A-4)				
945	943.4	16.6	60/0.0								60/0.0					W		943.4	16.6	Boring Terminated with Standard Penetration Test Refusal at Elevation 943.4 ft On Crystalline Rock (MICA SCHIST)

NCDOT BORE SINGLE BRIDGE57_GEO_BORELOGS.GPJ NC_DOT_GDT 8/6/18

GEOTECHNICAL BORING REPORT

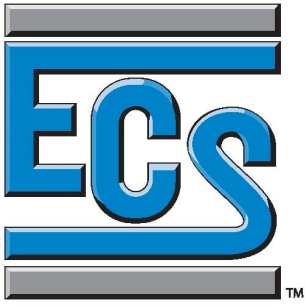
BORE LOG

WBS N/A		TIP 17BP.12.R.62		COUNTY CATAWBA		GEOLOGIST S. Carpenter											
SITE DESCRIPTION Bridge 57 on SR 1002 over Camp Creek							GROUND WTR (ft)										
BORING NO. B1-A		STATION 13+41		OFFSET 13 ft LT		ALIGNMENT -L-		0 HR. N/A									
COLLAR ELEV. 955.1 ft		TOTAL DEPTH 37.7 ft		NORTHING 696,291		EASTING 1,274,437		24 HR. FIAD									
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 81% 11/09/2016				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER M. Mosely		START DATE 01/04/17		COMP. DATE 01/04/17		SURFACE WATER DEPTH N/A											
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						ELEV. (ft)	
960																	
955	955.1	0.0	2	2	2										955.1	GROUND SURFACE ROADWAY EMBANKMENT	0.0
950	951.6	3.5	5	1	1										952.1	Loose, Brown, Silty Fine Sand (A-2-4) with trace mica	3.0
	949.1	6.0	2	28	8										947.1	Dense, Gray-Brown, Silty Fine to Coarse SAND (A-2-4)	8.0
945															947.1	Concrete and Rock Fragments (Possibly Bridge Footing)	
940	942.4	12.7	60/0.0												942.4	CRYSTALLINE ROCK Gray (MICA SCHIST)	12.7
935													RS-1				
930													RS-2				
925																	
920																	
															917.4	Boring Terminated at Elevation 917.4 ft In CRYSTALLINE ROCK (MICA SCHIST)	37.7

NCDOT BORE SINGLE BRIDGE57_GEO_BORELOGS.GPJ NC_DOT.GDT 8/6/18

GEOTECHNICAL BORING REPORT CORE LOG

WBS N/A				TIP 17BP.12.R.62		COUNTY CATAWBA			GEOLOGIST S. Carpenter			
SITE DESCRIPTION Bridge 57 on SR 1002 over Camp Creek										GROUND WTR (ft)		
BORING NO. B1-A				STATION 13+41		OFFSET 13 ft LT		ALIGNMENT -L-			0 HR. N/A	
COLLAR ELEV. 955.1 ft				TOTAL DEPTH 37.7 ft		NORTHING 696,291		EASTING 1,274,437			24 HR. FIAD	
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 81% 11/09/2016						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic			
DRILLER M. Mosely				START DATE 01/04/17		COMP. DATE 01/04/17		SURFACE WATER DEPTH N/A				
CORE SIZE NQ2				TOTAL RUN 25.0 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) %	REC. (ft) %	RQD (ft) %				
942.4	942.4	12.7	5.0	N=60/0.0 1:05/1.0 2:32/1.0 4:20/1.0 3:37/1.0 2:10/1.0	(3.8) 76%	(2.1) 42%	(23.1) 92%	(21.2) 85%	942.4	Begin Coring @ 12.7 ft	12.7	
940										<p style="text-align: center;">CRYSTALLINE ROCK Slightly Weathered to Fresh, Hard to Very Hard, Gray (MICA SCHIST) with Close Fracture Spacing</p> <p style="text-align: center;">RS-1: 17.8' - 18.2' Unit Weight: 176.0 pcf Unconfined Compressive Strength: 5,898 psi (849 ksf)</p> <p style="text-align: center;">RS-2: 20.5' - 20.9' Unit Weight: 172.8 pcf Unconfined Compressive Strength: 3,197 psi (460 ksf)</p> <p style="text-align: center;">GSI: 65 - 70</p>		
	937.4	17.7										
935			5.0	2:33/1.0 2:54/1.0 3:32/1.0 3:05/1.0 2:19/1.0	(5.0) 100%	(5.0) 100%						
	932.4	22.7										
930			5.0	2:31/1.0 6:51/1.0 10:01/1.0 8:03/1.0 8:23/1.0	(5.0) 100%	(5.0) 100%						
	927.4	27.7										
925			5.0	1:11/1.0 3:19/1.0 2:41/1.0 3:03/1.0 2:33/1.0	(4.5) 90%	(4.4) 88%						
	922.4	32.7										
920			5.0	3:21/1.0 2:30/1.0 3:16/1.0 3:35/1.0 2:10/1.0	(4.8) 96%	(4.7) 94%						
	917.4	37.7							917.4	Boring Terminated at Elevation 917.4 ft In CRYSTALLINE ROCK (MICA SCHIST)	37.7	



**Bridge No. 057 on -L- SR 1002 (Old Shelby Road) over
Camp Creek**

TIP No. 17BP.12.R.62

ECS Southeast Project No. 08: 12250-D

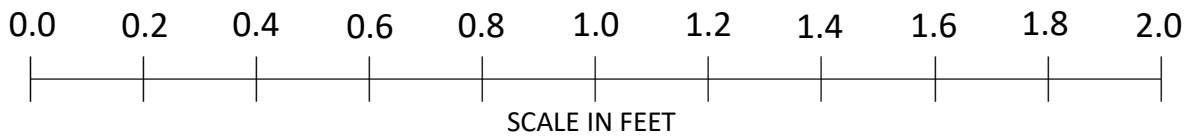
Rock Core Photographs: Boring - B1-A

Station: 13+41 Offset: 13' LT

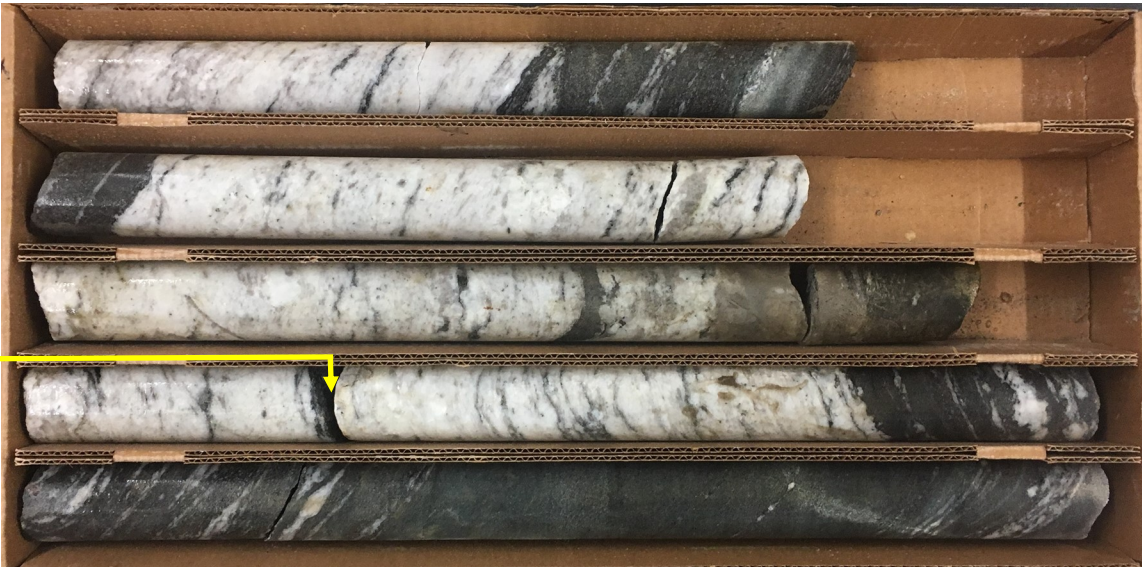
**Begin Run 1
12.7 ft**



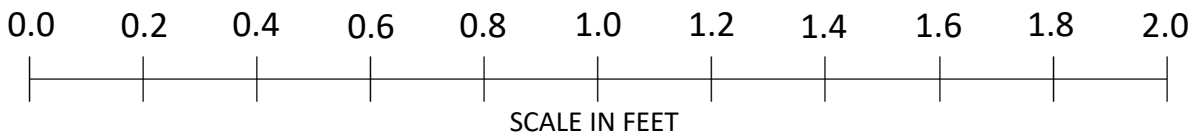
**Begin Run 2
17.7 ft**



**Begin Run 3
22.7 ft**



**Begin Run 4
27.7 ft**





**Bridge No. 057 on -L- SR 1002 (Old Shelby Road) over
Camp Creek**

TIP No. 17BP.12.R.62

ECS Southeast Project No. 08: 12250-D

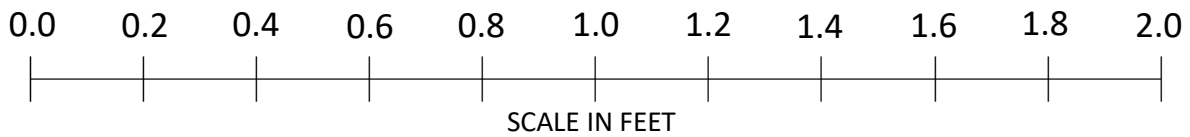
Rock Core Photographs: Boring - B1-A

Station: 13+41 Offset: 13' LT

**Begin Run 5
32.7 ft**



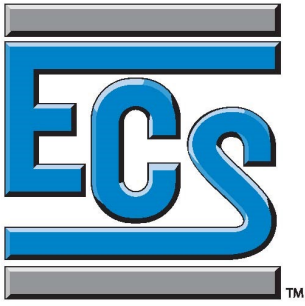
**End Run 5
37.7 ft**



GEOTECHNICAL BORING REPORT CORE LOG

WBS N/A			TIP 17BP.12.R.62			COUNTY CATAWBA			GEOLOGIST S. Carpenter		
SITE DESCRIPTION Bridge 57 on SR 1002 over Camp Creek										GROUND WTR (ft)	
BORING NO. B1-B			STATION 13+20			OFFSET 17 ft RT			ALIGNMENT -L-		
COLLAR ELEV. 956.6 ft			TOTAL DEPTH 31.2 ft			NORTHING 696,264			EASTING 1,274,463		
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 81% 11/09/2016						DRILL METHOD H.S. Augers			HAMMER TYPE Automatic		
DRILLER M. Mosely			START DATE 01/02/17			COMP. DATE 01/03/17			SURFACE WATER DEPTH N/A		
CORE SIZE NQ2			TOTAL RUN 16.5 ft								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %		
941.9	941.9	14.7	1.5	N=60/0.0	(0.8)	(0.0)		(14.6)	(10.7)		Begin Coring @ 14.7 ft
940	940.4	16.2	5.0	8:31/1.0 6:01/0.5	53%	0%		88%	65%		941.9 CRYSTALLINE ROCK 14.7 Freshly Weathered, Moderately Hard to Hard, Gray, (MICA SCHIST), with Close Fracture Spacing
935	935.4	21.2	5.0	5:23/1.0 3:03/1.0 2:54/1.0 4:39/1.0 1:12/1.0	(4.8) 96%	(3.7) 74%	RS-3				RS-3: 20.1' - 20.5' Unit Weight: 159.4 pcf Unconfined Compressive Strength: 16,772 psi (2,415 ksf)
930	930.4	26.2	5.0	0:54/1.0 2:48/1.0 4:44/1.0 7:47/1.0 3:38/1.0	(4.0) 80%	(2.5) 50%	RS-4				RS-4: 23-0' - 23.4' Unit Weight: 170.3 pcf Unconfined Compressive Strength: 8,014 psi (1,154 ksf)
	925.4	31.2		8:01/1.0 7:32/1.0 6:09/1.0 3:03/1.0 3:32/1.0	(5.0) 100%	(4.5) 90%					925.4 Boring Terminated at Elevation 925.4 ft In CRYSTALLINE ROCK (MICA SCHIST) 31.2

NCDOT CORE SINGLE BRIDGE57 GEO_BORELOGS.GPJ NC_DOT.GDT 7/26/19



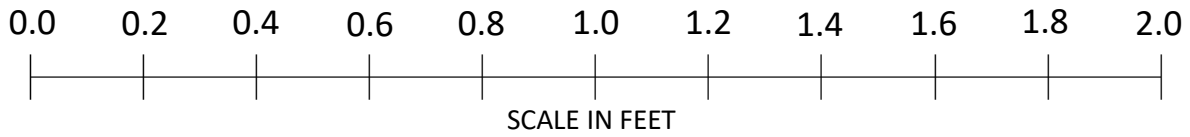
**Bridge No. 057 on -L- SR 1002 (Old Shelby Road) over
Camp Creek**
WBS - N/A TIP No. 17BP.12.R.62
ECS Southeast Project No. 08: 12250-D
Rock Core Photographs: Boring - B1-B
Station: 13+20 Offset: 17' RT

Begin Run 1
14.7 ft

Begin Run 2
16.2 ft

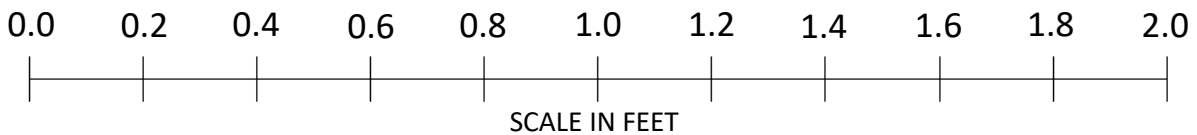


Begin Run 3
21.2 ft



Begin Run 4
26.2 ft

End Run 4
31.2 ft



GEOTECHNICAL BORING REPORT

BORE LOG

WBS N/A		TIP 17BP.12.R.62		COUNTY CATAWBA		GEOLOGIST S. Carpenter										
SITE DESCRIPTION Bridge 57 on SR 1002 over Camp Creek									GROUND WTR (ft)							
BORING NO. EB2-A		STATION 14+57		OFFSET 17 ft LT		ALIGNMENT -L-		0 HR. Dry								
COLLAR ELEV. 966.5 ft		TOTAL DEPTH 18.0 ft		NORTHING 696,405		EASTING 1,274,468		24 HR. Dry								
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 81% 11/09/2016				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER M. Mosely		START DATE 12/22/17		COMP. DATE 12/22/17		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	L O G	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
970																
	966.5	0.0												966.5	0.0	GROUND SURFACE
965	963.0	3.5	2	3	3	6							M			ROADWAY EMBANKMENT Medium Stiff to Very Soft, Black-Brown, Fine to Coarse Sandy SILT (A-4) with trace mica
	960.5	6.0	1	1	1	2							M			
960	958.0	8.5	1	2	1	3							M			Very Soft, Brown, Clayey SILT (A-5) with trace rock fragments
			2	1	1								M	958.5	8.0	
955	953.0	13.5	3	24	27								M	954.5	12.0	RESIDUAL Hard, Brown, Clayey SILT (A-5) with trace gravel-sized rock fragments
950	948.5	18.0												948.5	18.0	Boring Terminated with Standard Penetration Test Refusal at Elevation 948.5 ft On Crystalline Rock (MICA SCHIST)
			60/0							60/0						

NCDOT BORE SINGLE BRIDGE7_GEO_BORELOGS.GPJ NC_DOT.GDT 8/6/18

GEOTECHNICAL BORING REPORT

BORE LOG

WBS N/A		TIP 17BP.12.R.62		COUNTY CATAWBA		GEOLOGIST S. Carpenter										
SITE DESCRIPTION Bridge 57 on SR 1002 over Camp Creek							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 14+35		OFFSET 8 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 966.3 ft		TOTAL DEPTH 27.1 ft		NORTHING 696,375		EASTING 1,274,484										
DRILL RIG/HAMMER EFF./DATE SUM3359 CME-450 81% 11/09/2016				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER M. Mosely		START DATE 12/22/17		COMP. DATE 12/22/17		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				ELEV. (ft)	DEPTH (ft)	
970																
965	966.3	0.0	2	2	1	3							M		966.3	0.0
	962.8	3.5	1	1	1								M			
960	960.3	6.0	1	1	1								M		960.8	5.5
	957.8	8.5	1	1	3								M			
955													M			
	952.8	13.5	1	1	3								M		954.3	12.0
950													M			
	947.8	18.5	1	26	14								M		947.3	19.0
945													M			
	942.8	23.5	12	16	24								W			
940																
	939.2	27.1	60/0.0							60/0.0					939.2	27.1
															Boring Terminated with Standard Penetration Test Refusal at Elevation 939.2 ft On Crystalline Rock (MICA SCHIST)	

NCDOT BORE SINGLE BRIDGE57_GEO_BORELOGS.GPJ NC_DOT_GDT 8/6/18

PROJECT REFERENCE NO. SHEET NO.

17BP.12.R.62

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ROCK TEST RESULTS

17BP.12.R.62 ROCK TEST RESULTS

SAMPLE NO.	BORING	STATION	OFFSET	DEPTH INTERVAL	LENGTH (IN.)	DIAMETER (IN.)	RUN RQD	ROCK TYPE	UNIT WEIGHT LB/FT ³	UNCONFINED COMPRESSIVE STRENGTH (PSI/KSF)
RS-1	B1-A	13+41	13' LT	17.8' - 18.2'	4.349	1.856	100%	Mica Schist	176.0	5,898 psi / 849 ksf
RS-2	B1-A	13+41	13' LT	20.5' - 20.9'	4.420	1.864	100%	Mica Schist	172.8	3,197 psi / 460 ksf
RS-3	B1-B	13+20	17' RT	20.1' - 20.5'	4.414	1.862	74%	Mica Schist	159.4	16,772 psi / 2,415 ksf
RS-4	B1-B	13+20	17' RT	23.0' - 23.4'	4.475	1.861	40%	Mica Schist	170.3	8,014 psi / 1,154 ksf

RS = NQ2 Rock Core Barrel Sample (ASTM D-2113)