STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33782.1.1 (B-4580)	1	15

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33782.1.1 (B-4580) F.A. PROJ. BRZ-2804(2)

COUNTY MECKLENBURG

PROJECT DESCRIPTION BRIDGE OVER REEDY CREEK ON SR 2804 (REEDY CREEK ROAD) BETWEEN SR 2803 AND SR 2805

SITE DESCRIPTION BRIDGE #177 OVER REEDY CREEK ON SR 2804

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CAUTION NOTICE

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INVESTIGATED BY J. P. ROGERS

CHECKED BY C. B. LITTLE

SUBMITTED BY C. B. LITTLE

DATE JULY,2009

NORTH CAROLINA LICENSED SEAL 10267 GEOLOGIST CLINTON B. LITTLE

DRAWN BY: J. E. ROLFSMEYER

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PROJECT: 33782.1.1

ID: B-4580

PROJECT REFERENCE NO.	SHEET NO.
33782.1.1 (B-4580)	2

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION

SOIL IS CONSIDERED 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

SOIL LEGEND AND AASHTO CLASSIFICATION

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2	A-4, A-5	
CLASS.	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6	A-3	A-6, A-7	
SYMBOL														
% PASSING #10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		NP	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MX	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	No MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS 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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	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
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	26 OR MORE	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.

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)
GAP-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	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	>10%	>20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SOUNDING ROD
- SPT CPT DPT CMT VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF — SPT REFUSAL

SAMPLE DESIGNATIONS
S - BULK SAMPLE
SS - SPLIT SPOON SAMPLE
ST - SHELBY TUBE SAMPLE
RS - ROCK SAMPLE
RT - RECOMPACTED TRIAXIAL SAMPLE
CBR - CALIFORNIA BEARING RATIO SAMPLE

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
HI. - 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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [X] CME-550
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [X] TUNG.-CARBIDE INSERTS
- [X] CASING [X] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [X] TRICONE 2 15/16 " TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [X] -N Q
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

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:

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 YEILD 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 SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.)	ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.)	SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL*
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. *IF TESTED, YIELDS SPT N VALUES > 100 BPF*
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. *IF TESTED, YIELDS SPT N VALUES < 100 BPF*
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

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FEET
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 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.

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, 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 (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-10 R. R. SPIKE IN 18" TREE (SWEET GUM)
LOCATED AT -L- STA. 31+88.43 87.63' LEFT N 553507 E 1503696
ELEVATION: 607.45' FT.

NOTES:

REVISED 02/23/06

PROJECT REFERENCE NO.	SHEET
33782.1.1 (B-4580)	3

SITE PLAN

0 50 100
FEET

BRIDGE #177 SKEW=70

30+00

35+00

-L-

PI Sta 30+99.71
△ = 0° 50' 33.0" (LT)
D = 0° 05' 17.3"
L = 955.78'
T = 477.90'
R = 65,000.00'

GEORGE F. PEARSON
BETTY R. PEARSON
DB 4101 PG 332

JAMES R. STRYLOWSKI
JOAN M. STRYLOWSKI
DB 9222 PG 736

N 64°58'00" E 304.

N 70°07'48" E 460.40'

S 62°54'

215.

EIP

N 06°54'30" E 148.30' (TOTAL)

42.86'

105.44'

S 62°51'12" E 167.00'

S 62°51'12" E 77.52'

SANITARY SEWER MARKER POST

SANITARY SEWER MARKER POST

SANITARY SEWER MARKER POST

6" SSFM

JS

REEDY CREEK

N 64°58'00" E 189.55'

48" WW & 2-3" ELEC & ISBW

12" HDPE
12" HDPE

-L- PT Sta. 35+77.59

MTL GATE

4

JOHN W. TEMPLETO
JOYCE McCOLLUM TEMP
DB 5213 PG 351

NAD 83/92

BL-33
-BL- PINC 27+59.98

BM# 10
-BL- STA 27+10
89' LEFT
ELEV. 607.45'

5

CAROLINA WATER SERVICE
OF NORTH CAROLINA, INC.
DB 6202 PG 548

GR

CHAIN GATE

TEST HOLE #2

+11.24
32.05'

60" WW

15" RCP

S 28°08'58" E 124.94'

+99.79
33.60'

SEAT=607.59'

SEAT=607.64'

EB1-A

B1-A

EB2-A

WD WW

TO SR 2803 SR 2804 (REEDY CREEK RD.)

TO SR 2805

4" HDP GAS

S 50° 58' 47.7" E

S 33° 11' 19.9" E

EB1-B

B1-B

EB2-B

TEST HOLE #1

6" PSF

WOOD RAILS
BST DECK
WOOD & STEEL BEAMS
WOOD & STEEL COLUMNS

1

USGS STREAM GAGING STATION

REEDY CREEK

48" WW & 18" WW & ISBW

+85.92
54.12'

+88.
00.17

END
POT

U4401-3
-BL- PINC 25+07.61

BEGIN APPROACH SLAB
-L- POC Sta. 32+31.06

BEGIN BRIDGE
-L- POC Sta. 32+55.00

END APPROACH SLAB
-L- POC Sta. 33+88.94

END BRIDGE
-L- POC Sta. 33+65.00

PROJECT REFERENCE NO.	SHEET
33782.1.1 (B-4580)	4
BRIDGE #177 OVER REEDY CREEK ON SR 2804 (REEDY CREEK RD.) BRIDGE #177 SKEW=70	

0 50 100 FEET

BM# 10 ELEV. 607.45'
N 553507. E 1503696.
-BL- STA 27+10 89' LEFT
= -L- STA. 31+88.43 87.63' LT.
RR SPIKE IN 18" SWEETGUM

-L- PROFILE

BORING DESCRIPTIONS

(A) GRAY V. DENSE WET CLAYEY SILTY SAND (A-1)

-L-
PI = 30+77.42
EL = 608.29'
VC = 200'
K = 81
DS = 45 mph

-L-
PI = 34+70.26
EL = 611.14'
VC = 189'
K = 26
DS = 25 mph

BEGIN BRIDGE
STA. 32+55.00

END BRIDGE
STA. 33+65.00

SS-7 | SS-1 SS-2 | SS-3

EB1-A
32+53.00 -L-
7.0 LT

B1-A
33+10.00 -L-
5.5 LT

EB2-A
33+63.00 -L-
6.0 LT

(-)11.7376% (+)0.7273% (+)0.7273% (+)8.0000%

ASPHALT PAVEMENT

ROADWAY EMBANKMENT
BRN MED. STIFF MOIST CLAYEY SANDY SILT (A-4)

ALLUVIUM
BRN LOOSE WET SAND (A-3)

RESIDUAL
OLIVE-TAN STIFF WET SILTY SANDY CLAY (A-7)

SEVERELY WEATHERED CRYSTALLINE ROCK

CRYSTALLINE ROCK

GRAY MODERATELY TO SLI. WEATHERED QUARTZ DIORITE

GRAY SLI. WEATHERED TO FRESH QUARTZ DIORITE

GROUND SURFACE

BT

TCR FIAD 06/09

ALLUVIUM
BRN-TAN MED. DENSE MOIST SAND (A-3)

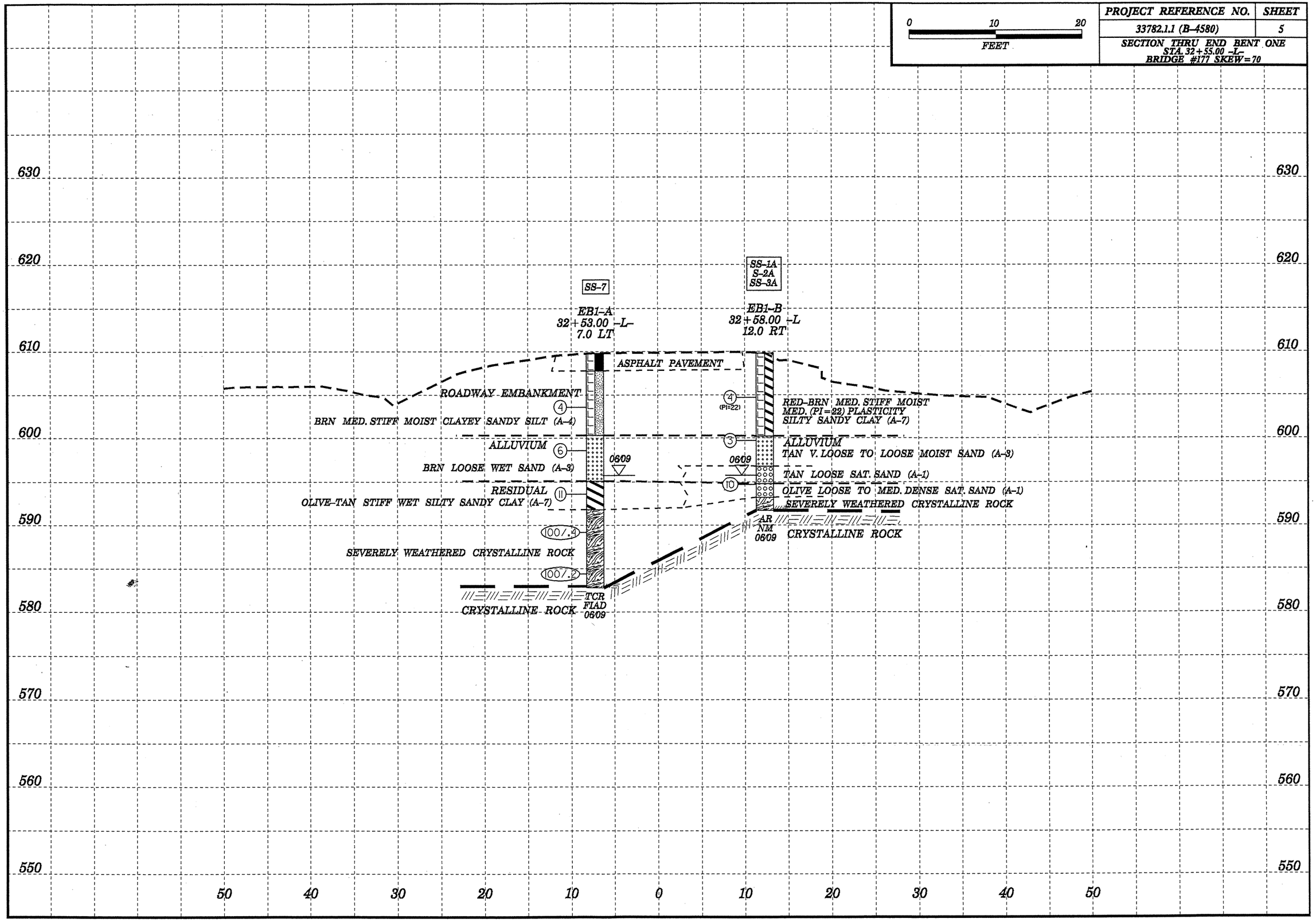
RESIDUAL
BRN-TAN-GRAY TO GRAY & WHITE MED. DENSE TO LOOSE TO V. DENSE WET CLAYEY SILTY SAND (A-1)

640 630 620 610 600 590 580 570 560

30 31 32 33 34 35 36

0	10	20
FEET		

PROJECT REFERENCE NO.	SHEET
33782.1.1 (B-4580)	5
SECTION THRU END BENT ONE STA. 32+55.00 -L- BRIDGE #177 SKEW=70	



PROJECT REFERENCE NO.	SHEET
33782.1.1 (B-4580)	6
SECTION THRU BENT ONE STA. 33+10.00 -L- BRIDGE #177 SKEW=70	

0 10 20
FEET

630 620 610 600 590 580 570 560 550

SS-1

B1-A
33+10.00 -L-
5.5 LT

B1-B
33+12.00 -L-
5.1 RT

WATER SURFACE ELEVATION

ALLUVIUM
BRN-TAN LOOSE WET SAND (A-3)

BRN LOOSE SAT. SAND (A-3)

CRYSTALLINE ROCK (BOULDER)

RESIDUAL

(85)

GRAY V. DENSE WET CLAYEY SILTY SAND (A-1)

GRAY MODERATELY SEVERELY WEATHERED TO FRESH QUARTZ DIORITE & GABBRO

CRYSTALLINE ROCK

GRAY MODERATELY TO SLI. WEATHERED QUARTZ DIORITE

GRAY SLI. WEATHERED TO FRESH GABBRO & QUARTZ DIORITE

GRAY SLI. WEATHERED TO FRESH QUARTZ DIORITE

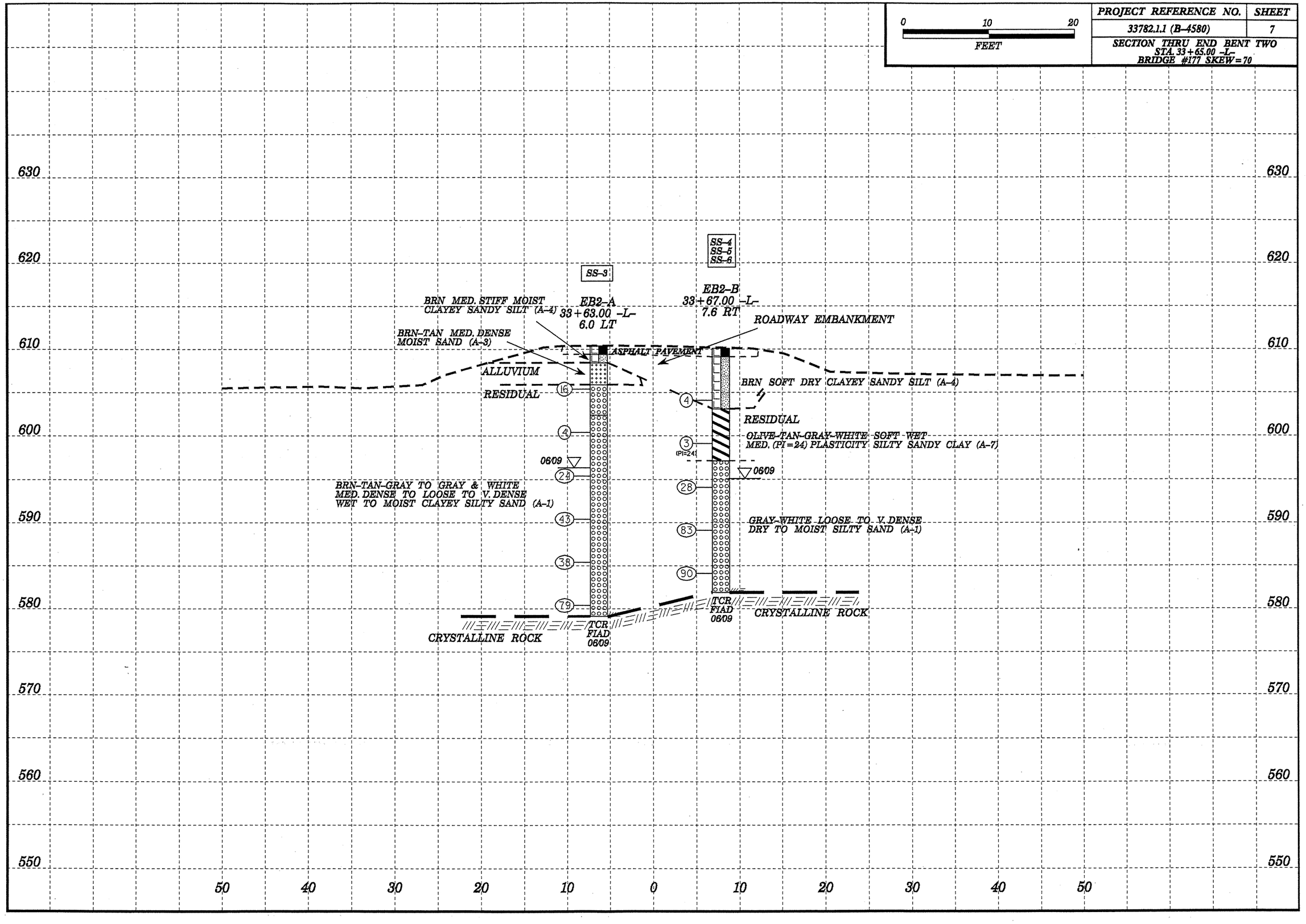
BT BT

50 40 30 20 10 0 10 20 30 40 50

PROJECT REFERENCE NO.	SHEET
33782.1.1 (B-4580)	7

SECTION THRU END BENT TWO
STA. 33+65.00 -L-
BRIDGE #177 SKEW=70

0 10 20
FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33782.1.1	**ID.** B-4580	**COUNTY** MECKLENBURG	**GEOLOGIST** Todd, R. W.
SITE DESCRIPTION BRIDGE #177 OVER REEDY CREEK ON SR 2804 (REEDY CREEK RD.)			**GROUND WTR (ft)**
BORING NO. EB1-A	**STATION** 32+53	**OFFSET** 7ft LT	**ALIGNMENT** -L-	**0 HR.** 14.0
COLLAR ELEV. 609.8 ft	**TOTAL DEPTH** 27.0 ft	**NORTHING** 553,407	**EASTING** 1,503,671	**24 HR.** FIAD
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer/ Tricone		**HAMMER TYPE** Automatic	
START DATE 06/11/09	**COMP. DATE** 06/11/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 27.0 ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
	610									609.8 GROUND SURFACE	0.0
										ROADWAY EMBANKMENT ASPHALT PVMT./ BASE GRAVEL LAYER 607.8	2.0
605	604.6	5.2	2	2	2	4		M		**ROADWAY EMBANKMENT** BRN MED. STIFF MOIST CLAYEY SANDY SILT (A-4)	
600	599.6	10.2	3	3	3	6	SS-7	W		600.3 **ALLUVIAL** BRN LOOSE WET SAND (A-3)	9.5
595	594.6	15.2	4	5	6	11		W		595.1 **RESIDUAL** OLIVE-TAN STIFF WET SILTY SANDY CLAY (A-7) 591.8	14.7 / 18.0
590	589.6	20.2	100/.4			100/.4		M		**WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK	
585	584.6	25.2	100/.2			100/.2		M		582.8 Boring Terminated TRICONE REFUSAL at Elevation 582.8 ft ON CRYSTALLINE ROCK	27.0
580											
575											
570											
565											
560											
555											
550											
545											
540											
535											
530											

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33782.1.1	**ID.** B-4580	**COUNTY** MECKLENBURG	**GEOLOGIST** Murray, C. C.
SITE DESCRIPTION BRIDGE #177 OVER REEDY CREEK ON SR 2804 (REEDY CREEK RD.)			**GROUND WTR (ft)**
BORING NO. EB1-B	**STATION** 32+58	**OFFSET** 12ft RT	**ALIGNMENT** -L-	**0 HR.** 14.0
COLLAR ELEV. 609.8 ft	**TOTAL DEPTH** 18.1 ft	**NORTHING** 553,391	**EASTING** 1,503,658	**24 HR.** NM
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
START DATE 11/04/05	**COMP. DATE** 11/04/05	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 18.1 ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
	610									609.8 GROUND SURFACE	0.0
	605.7	4.1								**ROADWAY EMBANKMENT** RED-BRN MED. STIFF MOIST MED. (PI=22) PLASTICITY SILTY SANDY CLAY (A-7)	
605			2	2	2	4	SS-1A	M			
600	600.7	9.1	2	2	1	3	S-2A	M		600.2 **ALLUVIAL** TAN V. LOOSE TO LOOSE MOIST SAND (A-3) 596.8	9.6 / 13.0
595	595.7	14.1	2	4	6	10	SS-3A	Sat.		594.8 **ALLUVIAL** TAN LOOSE SAT. SAND (A-1) 593.2 **RESIDUAL** OLIVE LOOSE TO MED. DENSE SAT. SAND (A-1) 591.7	15.0 / 16.6 / 18.1
590										**WEATHERED ROCK** SEVERELY WEATHERED CRYSTALLINE ROCK	
585										Boring Terminated BY AUGER REFUSAL at Elevation 591.7 ft ON CRYSTALLINE ROCK	
580											
575											
570											
565											
560											
555											
550											
545											
540											
535											
530											

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

PROJECT NO. 33782.1.1	**ID.** B-4580	**COUNTY** MECKLENBURG	**GEOLOGIST** Todd, R. W.	
SITE DESCRIPTION BRIDGE #177 OVER REEDY CREEK ON SR 2804 (REEDY CREEK RD.)				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 33+10	**OFFSET** 6ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 596.6 ft	**TOTAL DEPTH** 21.5 ft	**NORTHING** 553,360	**EASTING** 1,503,704	**24 HR.** N/A
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer w/ Core/ Tricone		**HAMMER TYPE** Automatic	
START DATE 06/08/09	**COMP. DATE** 06/08/09	**SURFACE WATER DEPTH** 0.7ft	**DEPTH TO ROCK** 7.0 ft	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
	600									WATER SURFACE (06/08/09)	
										596.6 GROUND SURFACE	0.0
595	594.2	2.4								594.6 **ALLUVIAL** BRN LOOSE SAT. SAND (A-3)	2.0
			9	24	61	85	SS-1	W		**RESIDUAL** GRAY V. DENSE WET CLAYEY SILTY SAND (A-1)	
590										589.6	7.0
										CRYSTALLINE ROCK GRAY MODERATELY TO SLI. WEATHERED QUARTZ DIORITE	
585										583.4	13.2
										CRYSTALLINE ROCK GRAY SLI. WEATHERED TO FRESH QUARTZ DIORITE	
580											
575										575.1	21.5
										Boring Terminated at Elevation 575.1 ft IN CRYSTALLINE ROCK	
570											
565											
560											
555											
550											
545											
540											
535											
530											
525											
520											

NCDOT BORE SINGLE B4580_GEO_BH_BRDG0177.GPJ NC_DOT.GDT 07/16/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 9

PROJECT NO. 33782.1.1	**ID.** B-4580	**COUNTY** MECKLENBURG	**GEOLOGIST** Todd, R. W.	
SITE DESCRIPTION BRIDGE #177 OVER REEDY CREEK ON SR 2804 (REEDY CREEK RD.)				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 33+10	**OFFSET** 6ft LT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 596.6 ft	**TOTAL DEPTH** 21.5 ft	**NORTHING** 553,360	**EASTING** 1,503,704	**24 HR.** N/A
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer w/ Core/ Tricone		**HAMMER TYPE** Automatic	
START DATE 06/08/09	**COMP. DATE** 06/08/09	**SURFACE WATER DEPTH** 0.7ft	**DEPTH TO ROCK** 7.0 ft	
CORE SIZE NQ	**TOTAL RUN** 14.5 ft		**DRILLER** Smith, M. L.	

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
	589.6										Begin Coring @ 7.0 ft	
	589.6	7.0	4.5	10:48/4.5	(4.0) 89%	(2.4) 53%		(5.7) 92%	(3.8) 61%		589.6 **CRYSTALLINE ROCK** GRAY MODERATELY TO SLI. WEATHERED MODERATELY HARD TO HARD QUARTZ DIORITE FRACTURE SPACING CLOSE	7.0
585	585.1	11.5									Qu=2950 KSF R1=12 ,R2=8, R3=10, R4=6, R5=7, RMR=43 ROCK TYPE E	
			4.7	05:28/4.7	(4.7) 100%	(3.9) 83% 12.3-16.2 1 PIECE		(8.3) 100%	(7.8) 94%		583.4 **CRYSTALLINE ROCK** GRAY SLI. WEATHERED TO FRESH HARD QUARTZ DIORITE FRACTURE SPACING CLOSE	13.2
580	580.4	16.2									RS3 (14.2-15) Qu=2952 KSF RS4 (18.4-18.8) Qu=3744 KSF RMR=N/A ROCK TYPE E	
			5.3	08:29/5.3	(5.3) 100%	(3.9') GEO BROKE IT (5.3) 100%					575.1 Boring Terminated at Elevation 575.1 ft IN CRYSTALLINE ROCK	21.5
575	575.1	21.5										
570												
565												
560												
555												
550												
545												
540												
535												
530												
525												
520												
515												
510												

NCDOT CORE SINGLE B4580_GEO_BH_BRDG0177.GPJ NC_DOT.GDT 07/17/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33782.1.1	**ID.** B-4580	**COUNTY** MECKLENBURG	**GEOLOGIST** Todd, R. W.
SITE DESCRIPTION BRIDGE #177 OVER REEDY CREEK ON SR 2804 (REEDY CREEK RD.)			**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 33+12	**OFFSET** 5ft RT	**ALIGNMENT** -L- — **0 HR.** N/A
COLLAR ELEV. 597.0 ft	**TOTAL DEPTH** 21.2 ft	**NORTHING** 553,353	**EASTING** 1,503,696 — **24 HR.** N/A
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer w/ Core/ Tricone		**HAMMER TYPE** Automatic
START DATE 06/10/09	**COMP. DATE** 06/10/09	**SURFACE WATER DEPTH** 0.2ft	**DEPTH TO ROCK** 1.5 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (ft)	DEPTH (ft)
	600									597.0 WATER SURFACE (06/10/09)	0.0
595										595.5 **ALLUVIAL** BRN-TAN LOOSE WET SAND (A-3)	1.5
										594.7 **CRYSTALLINE ROCK** CRYSTALLINE ROCK (BOULDER)	2.3
590										590.2 **CRYSTALLINE ROCK** GRAY MODERATELY SEVERELY WEATHERED TO FRESH QUARTZ DIORITE & GABBRO	6.8
585										**CRYSTALLINE ROCK** GRAY SLI. WEATHERED TO FRESH GABBRO & QUARTZ DIORITE	
580											
575										575.8 Boring Terminated at Elevation 575.8 ft IN CRYSTALLINE ROCK	21.2
570											
565											
560											
555											
550											
545											
540											
535											
530											
525											
520											

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33782.1.1	**ID.** B-4580	**COUNTY** MECKLENBURG	**GEOLOGIST** Todd, R. W.	
SITE DESCRIPTION BRIDGE #177 OVER REEDY CREEK ON SR 2804 (REEDY CREEK RD.)				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 33+12	**OFFSET** 5ft RT	**ALIGNMENT** -L-	**0 HR.** N/A
COLLAR ELEV. 597.0 ft	**TOTAL DEPTH** 21.2 ft	**NORTHING** 553,353	**EASTING** 1,503,696	**24 HR.** N/A
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer w/ Core/ Tricone		**HAMMER TYPE** Automatic	
START DATE 06/10/09	**COMP. DATE** 06/10/09	**SURFACE WATER DEPTH** 0.2ft	**DEPTH TO ROCK** 1.5 ft	
CORE SIZE NQ	**TOTAL RUN** 18.9 ft	**DRILLER** Smith, M. L.		

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN REC. (ft) %	RUN RQD (ft) %	SAMP. NO.	STRATA REC. (ft) %	STRATA RQD (ft) %	LOG	DESCRIPTION AND REMARKS ELEV. (ft)	DEPTH (ft)
	594.7										Begin Coring @ 2.3 ft	
	594.7	2.3	4.5	04:30/4.5	(2.3) 51%	(2.3) 51%		(2.3) 51%	(2.3) 51%		594.7 **CRYSTALLINE ROCK** GRAY MODERATELY WEATHERED TO FRESH SOFT TO HARD QUARTZ DIORITE & GABBRO FRACTURE SPACING CLOSE TO MODERATELY CLOSE (WEATHERED SEAM 4.0'-6.2')	2.3
590	590.2	6.8									590.2 Qu=3283 KSF R1=12, R2=13, R3=15, R4=9, R5=7, RMR=56 ROCK TYPE E	6.8
			4.8	06:43/4.8	(4.7) 98%	(4.1) 85%		(14.2) 99%	(13.1) 91%		**CRYSTALLINE ROCK** GRAY SLI. WEATHERED TO FRESH HARD GABBRO & QUARTZ DIORITE FRACTURE SPACING CLOSE TO WIDE	
585	585.4	11.6									RS1 (9.6-10.4) Qu=3283 KSF RS2 (15.1-15.8) Qu=3614 KSF R1=12, R2=17, R3=22, R4=20,R5=7, RMR=N/A ROCK TYPE E	
			4.8	09:36/4.8	(4.8) 100%	(4.8) 100%						
580	580.6	16.4										
			4.8	08:38/4.8	(4.7) 98%	(4.2) 88%						
575	575.8	21.2									575.8 Boring Terminated at Elevation 575.8 ft IN CRYSTALLINE ROCK	21.2
570												
565												
560												
555												
550												
545												
540												
535												
530												
525												
520												
515												

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

PROJECT NO. 33782.1.1	**ID.** B-4580	**COUNTY** MECKLENBURG	**GEOLOGIST** Todd, R. W.
SITE DESCRIPTION BRIDGE #177 OVER REEDY CREEK ON SR 2804 (REEDY CREEK RD.)			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 33+63	**OFFSET** 6ft LT	**ALIGNMENT** -L- — **0 HR.** 14.0
COLLAR ELEV. 610.4 ft	**TOTAL DEPTH** 31.3 ft	**NORTHING** 553,318	**EASTING** 1,503,736 — **24 HR.** FIAD
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer/ Tricone		**HAMMER TYPE** Automatic
START DATE 06/09/09	**COMP. DATE** 06/09/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 31.3 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
610	615									610.4 GROUND SURFACE	0.0
										609.4 **ROADWAY EMBANKMENT** ASPHALT PAVEMENT	1.0
										608.4 **ROADWAY EMBANKMENT** BRN MED. STIFF MOIST CLAYEY SANDY SILT (A-4)	2.0
605	606.4	4.0	49	7	9	16	SS-3	W		605.9 **ALLUVIAL** BRN-TAN MED. DENSE MOIST SAND (A-3)	4.5
600	601.4	9.0	2	2	2	4		M		602.4 **RESIDUAL** BRN-TAN-GRAY MED. DENSE TO LOOSE WET CLAYEY SILTY SAND (A-1)	8.0
595	596.4	14.0	10	11	13	24		M		**RESIDUAL** GRAY-WHITE LOOSE TO V. DENSE MOIST SILTY SAND (A-1)	
590	591.4	19.0	15	21	22	43		M			
585	586.4	24.0	14	17	21	38		M			
580	581.4	29.0	18	35	44	79		M		579.1	31.3
575										Boring Terminated TRICONE REFUSAL at Elevation 579.1 ft ON CRYSTALLINE ROCK	
570											
565											
560											
555											
550											
545											
540											
535											

NCDOT BORE SINGLE B4580_GEO_BH_BRDG0177.GPJ NC_DOT.GDT 07/17/09

SHEET
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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33782.1.1	**ID.** B-4580	**COUNTY** MECKLENBURG	**GEOLOGIST** Todd, R. W.
SITE DESCRIPTION BRIDGE #177 OVER REEDY CREEK ON SR 2804 (REEDY CREEK RD.)			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 33+67	**OFFSET** 8ft RT	**ALIGNMENT** -L- — **0 HR.** 15.0
COLLAR ELEV. 610.1 ft	**TOTAL DEPTH** 28.2 ft	**NORTHING** 553,307	**EASTING** 1,503,728 — **24 HR.** FIAD
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Advancer/ Tricone		**HAMMER TYPE** Automatic
START DATE 06/10/09	**COMP. DATE** 06/10/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 28.2 ft

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT 0.5ft	0.5ft	0.5ft	BLOWS PER FOOT 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION — ELEV. (ft)	DEPTH (ft)
610	615									610.1 GROUND SURFACE	0.0
										609.1 **ROADWAY EMBANKMENT** ASPHALT PAVEMENT	1.0
										ROADWAY EMBANKMENT BRN SOFT DRY CLAYEY SANDY SILT (A-4)	
605	605.1	5.0	2	2	2	4	SS-4	D		603.1	7.0
600	600.1	10.0	1	1	2	3	SS-5	W		**RESIDUAL** OLIVE-TAN-GRAY-WHITE SOFT WET MED. (PI=24) PLASTICITY SILTY SANDY CLAY (A-7)	
595	595.1	15.0	12	14	14	28	SS-6	D		597.1	13.0
590	590.1	20.0	18	34	49	83		M		**RESIDUAL** GRAY-WHITE LOOSE TO V. DENSE DRY TO MOIST SILTY SAND (A-1)	
585	585.1	25.0	19	44	46	90		M		581.9	28.2
580										Boring Terminated TRICONE REFUSAL at Elevation 581.9 ft ON CRYSTALLINE ROCK	
575											
570											
565											
560											
555											
550											
545											
540											
535											

NCDOT BORE SINGLE B4580_GEO_BH_BRDG0177.GPJ NC_DOT.GDT 07/16/09

TEST RESULTS

PROJECT: 33782.1.1 (B-4580)
COUNTY: MECKLENBURG
SITE DESCRIPTION: BRIDGE #177 OVER REEDY CREEK ON SR 2804 (REEDY CREEK RD.)

SOIL SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	N	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING SIEVES 10	40	200	% MOISTURE	% ORGANIC	UNIT WT. (d)	VOID RATIO
		EB1-A																
SS-7	7.0 LT	32+53 -L-	10.20-11.70	A-3(0)	6	25	NP	57.2	36.2	3.5	3.0	100	83	8				
		EB1-B																
SS-1A	12.0 RT	32+58 -L-	4.10-5.60	A-7-6(9)	4	45	22	26.5	17.3	15.5	40.7	88	74	53				
S-2A	12.0 RT	32+58 -L-	9.60-10.60	A-3(0)	N/A	24	NP	64.5	27.5	4.0	4.1	100	76	10				
SS-3A	12.0 RT	32+58 -L-	14.10-15.60	A-1-b(0)	10	24	NP	67.0	18.7	7.1	7.1	86	43	14				
		B1-A																
SS-1	5.5 LT	33+10 -L-	2.40-3.90	A-1-b(0)	85	44	5	35.2	27.7	27.0	10.1	51	38	22				
SS-2	5.5 LT	33+07 -L-	7.40-8.90	A-1-b(0)	N/A	25	6	56.6	20.6	16.7	6.1	53	29	14				
		EB2-A																
SS-3	6.0 LT	33+63 -L-	4.00-5.50	A-1-b(0)	16	23	4	58.6	19.4	11.8	10.1	83	48	21				
		EB2-B																
SS-4	7.6 RT	33+67 -L-	5.00-6.50	A-4(0)	4	31	6	29.3	29.9	22.5	18.2	93	76	44				
SS-5	7.6 RT	33+67 -L-	10.00-11.50	A-7-6(18)	3	43	24	2.6	28.1	28.8	40.4	100	99	77				
SS-6	7.6 RT	33+67 -L-	15.00-16.50	A-1-b(0)	28	24	NP	56.1	24.8	15.1	4.0	79	45	19				

ROCK SAMPLE RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	RQD	UNIT WT	Q(MPa) (MPsi)	E(MPa) (MPsi)
		B1-A					
RS-3	5.5 LT	33+10 -L-	14.20-15.00	95%	176.3		9.88
RS-4	5.5 LT	33+10 -L-	18.40-18.80	95%	177.8		11.02
		B1-B					
RS-1	5.1 RT	33+12 -L-	9.60-10.40	91%	182.5		10.06
RS-2	5.1 RT	33+12 -L-	15.10-15.80	91%	174.8		10.49

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 33781.1.1 TIP: B-4580 COUNTY: MECKLENBURG

DESCRIPTION(1): BRIDGE NO. 177 OVER REEDY CREEK ON SR 2804.

EXISTING BRIDGE

Information from: Field Inspection X Microfilm ____ (reel ____ pos: ____)
Other (explain) ____

Bridge No.: 177 Length: 70.5 Total Bents: 3 Bents in Channel: 3 Bents in Floodplain: 3
Foundation Type: END BENTS - PILES, INTERIOR BENT - FOOTING

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: MODERATE SCOUR AT END BENT ABUTMENTS.

Interior Bents: NO

Channel Bed: NO

Channel Bank: CHANNEL BANKS SHOW SEVERE SCOURING.

EXISTING SCOUR PROTECTION

Type(3): NONE

Extent(4): N/A

Effectiveness(5): N/A

Obstructions(6): BOULDERS AND HOUSEHOLD APPLIANCES

DESIGN INFORMATION

Channel Bed Material(7): BRN. COARSE SAND (A-3) AS SS-7

Channel Bank Material(8): BRN. COARSE SAND (A-3) AS SS-7

Channel Bank Cover(9): TREES. SEVERE LEANING TOWARDS CREEK. ROOTS EXPOSED.

Floodplain Width(10): APP. 500'

Floodplain Cover(11): WOODS AND UTILITIES

Stream is(12): Aggrading ____ Degrading ____ Static X

Channel Migration Tendency(13): MODERATE TENDENCY FOR EAST/NORTHEAST MIGRATION.

Observations and Other Comments: CREEK LEVEL CHANGES RAPIDLY DURING INVESTIGATION. VERY SANDY CONDITIONS CAUSING SEVERE EROSION OF CHANNEL BANKS.

DESIGN SCOUR ELEVATIONS(14) Feet X Meters ____

	BENTS B1
100 YR.	589

Comparison of DSE to Hydraulics Unit theoretical scour:
THE DSE HAS BEEN REVISED UPWARD FROM THE HYDRAULICS UNIT PREDICITION DUE TO THE PRESENCE OF CRYSTALLINE ROCK.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

Bed or Bank							
Sample No.							
Retained #4		SEE	SAMPLE	RESULTS			
Passed #10							
Passed #40							
Passed #200							
Coarse Sand							
Fine Sand							
Silt							
Clay							
LL							
PI							
AASHTO							
Station							
Offset							
Depth							

Template Revised 02/07/06

Reported by: RW TODD **Date:** 6/11/2009

INSTRUCTIONS

1. Describe the specific site's location, including route number and body of water crossed.
2. Note scour evidence at existing end bents or abutments (e.g. undermining, sloughing, degradations).
3. Note existing scour protection (e.g. rip rap).
4. Describe extent of existing scour protection.
5. Describe whether or not the scour protection appears to be working.
6. Note obstructions such as dams, fallen trees, debris at bents, etc.
7. Describe the channel bed material based on observation and/or samples. Include any lab results with report.
8. Describe the channel bank material based on observation and/or samples. Include any lab results with report.
9. Describe the material covering the banks (e.g. grass, trees, rip rap, none).
10. Determine the approximate floodplain width from field observation or a topographic map.
11. Describe the material covering the floodplain (e.g. grass, trees, crops).
12. Use professional judgement to specify if the stream is degrading, aggrading, or static.
13. Describe potential and direction of the stream to migrate laterally during the bridge's life (approx. 100 years).
14. Give the design scour elevation (DSE) expected over the life of the bridge (approx. 100 years). This elevation can be given as a range across the site, or for each bent. Discuss the relationship between the Hydraulics Unit theoritical scour and the DSE. If the DSE is dependent on scour counter measures, explain (e.g. rip rap armoring on slopes). The DSE is based on the erodability of materials, giving consideration to the influence of joints, foliation, bedding characteristics, % core recovery, % RQD, differential weathering, shear strength, observations at existing structures, other tests deemed appropriate, and overall geologic conditions at the site.

CORE PHOTOS

33782.1.1 (B-4580)
MECKLENBURG COUNTY
BRIDGE #177 OVER REEDY CREEK ON SR 2804 (REEDY CREEK RD.)

CORE PHOTOS