STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33344.1.1 (B-3909)	1	21

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33344.1.1 (B-3909) F.A. PROJ. BRZ-1968(1)

COUNTY STANLY

PROJECT DESCRIPTION BRIDGE 99 OVER LONG CREEK ON SR 1968

SITE DESCRIPTION

CONTENTS

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

PERSONNEL

R.W. TODD

M.L. SMITH

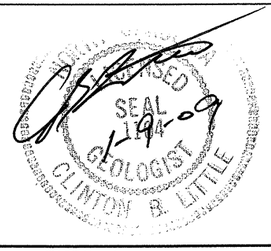
A.C. SMITH

INVESTIGATED BY J.P. ROGERS

CHECKED BY C.B. LITTLE

SUBMITTED BY C.B. LITTLE

DATE DECEMBER 2008



ID: B-3909

PROJECT: 33344.1.1

DRAWN BY: J.K. McCLURE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

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

PROJECT REFERENCE NO.	SHEET NO.
33344.1.1 (B-3909)	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 CLASS.	A-1		A-3	A-2				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	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7							
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				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	6 MX		NP	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 ($TONS/FT^2$)
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
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
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 / SPT DMT / 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 XBWL
- [ ] -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 GROVED 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.

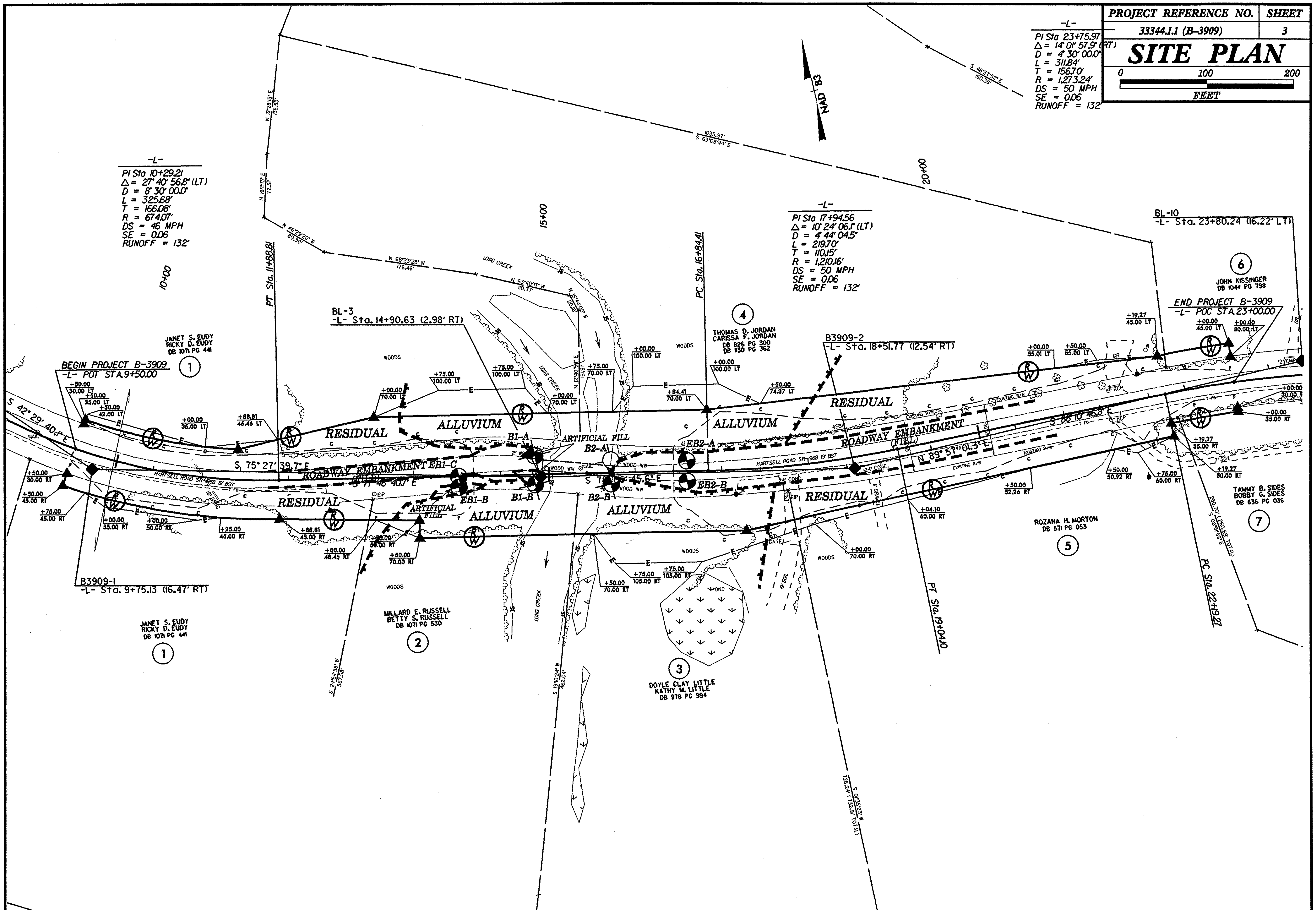
STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-3
STA. 14+91-L-
3.00 RT. ELEVATION: 337.97 FT.

NOTES:

REVISED 02/23/06


PROJECT REFERENCE NO.
33344.1.1 (B-3909)
SHEET
3
SITE PLAN
0
100
200
FEET
NAD 83
-L-
PI Sta 23+75.97
Δ = 14° 01' 57.9" (RT)
D = 4° 30' 00.0"
L = 311.84'
T = 156.70'
R = 1,273.24'
DS = 50 MPH
SE = 0.06
RUNOFF = 132'
-L-
PI Sta 10+29.21
Δ = 27° 40' 56.8" (LT)
D = 8° 30' 00.0"
L = 325.68'
T = 166.08'
R = 674.07'
DS = 46 MPH
SE = 0.06
RUNOFF = 132'
-L-
PI Sta 17+94.56
Δ = 10° 24' 06.1" (LT)
D = 4° 44' 04.5"
L = 219.70'
T = 110.15'
R = 1,210.16'
DS = 50 MPH
SE = 0.06
RUNOFF = 132'
BL-10
-L- Sta. 23+80.24 (16.22' LT)
BL-3
-L- Sta. 14+90.63 (2.98' RT)
B3909-2
-L- Sta. 18+51.77 (12.54' RT)
B3909-1
-L- Sta. 9+75.13 (16.47' RT)
BEGIN PROJECT B-3909
-L- POT STA.9+50.00
END PROJECT B-3909
-L- POC STA.23+00.00
PT Sta. 11+88.81
PC Sta. 16+84.41
PT Sta. 19+04.10
PC Sta. 22+19.27
10+00
15+00
20+00
RESIDUAL
ALLUVIUM
ARTIFICIAL FILL
ROADWAY EMBANKMENT
ROADWAY EMBANKMENT (FILL)
B1-A
B1-B
B2-A
B2-B
EB1-B
EB1-C
EB2-A
EB2-B
HARTSELL ROAD SR-1968
LONG CREEK
WOODS
POND
S 42° 29' 40.1" E
S 75° 27' 39.7" E
S 88° 10' 46.8" E
N 89° 57' 01.3" E
JANET S. EUDY
RICKY D. EUDY
DB 1071 PG 441
MILLARD E. RUSSELL
BETTY S. RUSSELL
DB 1071 PG 530
DOYLE CLAY LITTLE
KATHY M. LITTLE
DB 978 PG 994
THOMAS D. JORDAN
CARISSA F. JORDAN
DB 826 PG 300
DB 830 PG 362
ROZANA H. MORTON
DB 571 PG 053
JOHN KISSINGER
DB 1044 PG 798
TAMMY B. SIDES
BOBBY G. SIDES
DB 636 PG 036

PROJECT REFERENCE NO.	SHEET
33344.1.1 (B-3909)	4
PROFILE -L-	

0 100 200
FEET

BEGIN GRADE
STA. 9+50.00
EL. 378.84

PI = 12+00.00
EL = 355.34'
VC = 400'
K = 45
DS = 30 MPH

BEGIN BRIDGE
STA. 14+10.00

BM #2
-L- Sta. 14+62.92 (59.89' RT)
EL. 337.11
RR SPIKE IN BASE OF 22" WATER OAK

END GRADE
STA. 23+00.00
EL. 383.42

PI = 20+10.00
EL = 350.48'
VC = 500'
K = 42
DS = 30 MPH

HARTSELL ROAD SR-1968 19' BST

(-)9.4000%

(-)0.6000%

ROADWAY EMBANKMENT (FILL)

PROPOSED GRADE

SS-3
SS-4
EB1-C
13+96.00 -L-
CL

RS-1
B1-A
14+84.00 -L-
22.00 LT.

RS-2
B2-A
15+72.00 -L-
15.00 LT.

(-)0.6000%

SS-7
EB2-A
16+60.00 -L-
12.00 LT.

END BRIDGE
STA. 16+61.00

ROADWAY EMBANKMENT
BRN-TAN SOFT DRY
SANDY CLAYEY SILT (A-4)

(-)0.6000%

(+)11.3600%

EXISTING GROUND

BM #1
-L- Sta. 11+57.73 (37.66' RT)
EL. 360.39
RR SPIKE IN BASE OF 8" OAK

RESIDUAL

BRN, MED. STIFF TO V. STIFF, MOIST
MED. PLASTIC SANDY SILTY CLAY
(A-6, A-7-6)

ARTIFICIAL FILL
ARTIFICIAL FILL
BOULDERS (RIP-RAP)

HARTSELL ROAD SR-1968 19' BST

ROADWAY EMBANKMENT (FILL)

RESIDUAL

BRN-TAN STIFF DRY
SANDY CLAYEY SILT (A-4)
W/ROCK FRAGS.

EXISTING GROUND

8 (PI=17)

24 (PI=20)

AR
CRYSTALLINE ROCK NM
(10/1608)

REC=69%
RQD=0%

100/.1
10/08

CRYSTALLINE ROCK

AR
DRY CRYSTALLINE ROCK
(10/1608)

GRAY MOD. TO SLI. WEATH. MED. TO MOD. HARD
FELSIC META VOLCANIC FRACTURE SPACING=V. CLOSE TO MOD. CLOSE
REC=96% RQD=38%

GRAY-BRN MOD. SEV. WEATH.
MED. HARD FELSIC META. VOLCANIC
V. CLOSE TO CLOSE FRACTURE SPACING

GRAY SLI. WEATH. TO FRESH HARD
FELSIC META VOLCANIC
FRACTURE SPACING=CLOSE TO MOD. CLOSE
REC=100% RQD=100%

BT

GRAY MOD. SEV. WEATH.
MED. TO MOD. HARD
FELSIC META. VOLCANIC
V. CLOSE TO CLOSE
FRACTURE SPACING
REC=88% RQD=39%

GRAY MOD. TO SLI. WEATH.
MOD. HARD TO HARD FELSIC META. VOLCANIC
CLOSE TO MED. CLOSE FRACTURE SPACING
REC=100% RQD=100%

BT

BORING DESCRIPTIONS

(A) LOOSE WET CLAYEY SAND (A-2-6)
(ALLUVIUM)

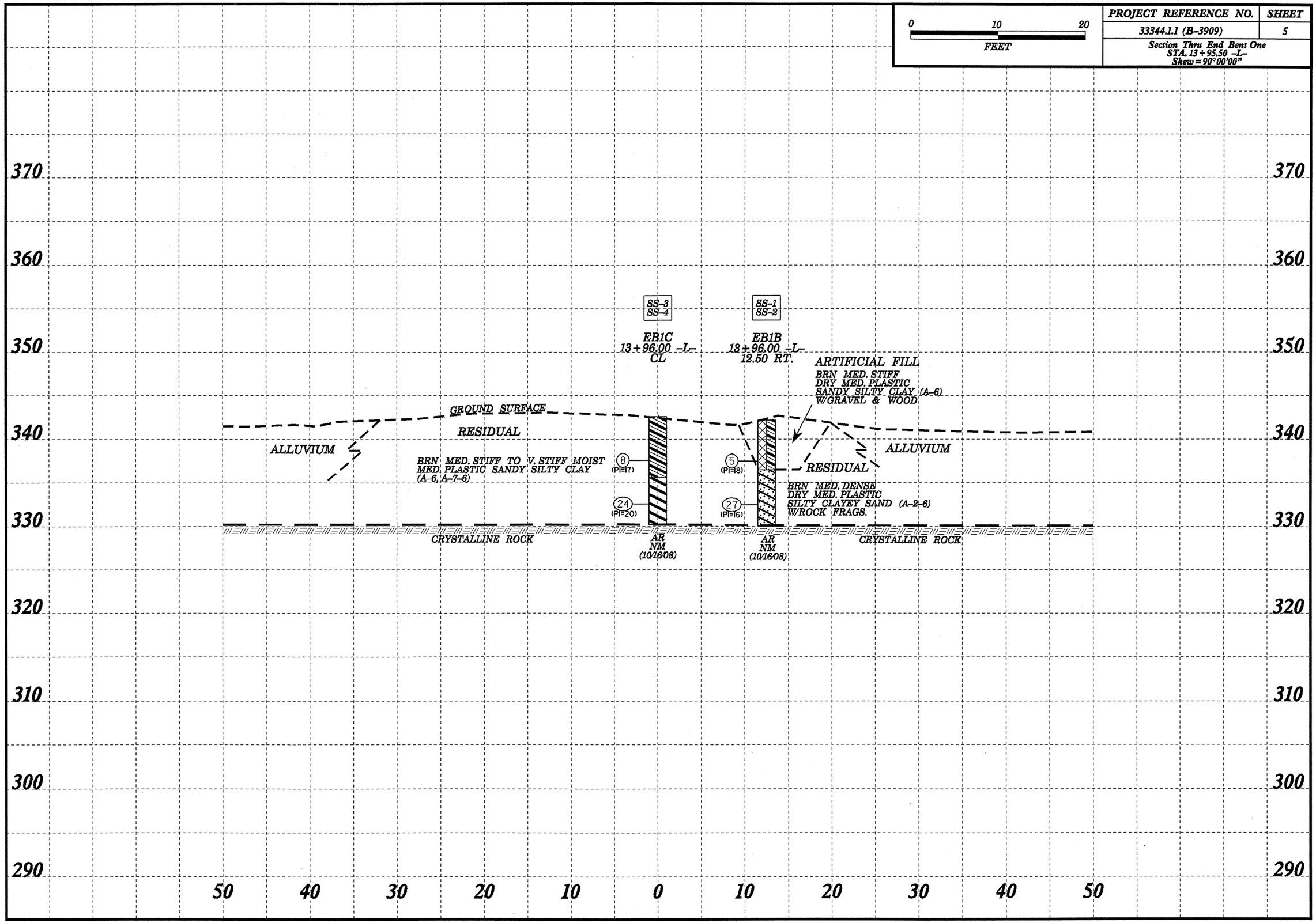
420 410 400 390 380 370 360 350 340 330 320 310 300 290 280 270 260 250 240

9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

0	10	20
FEET		

PROJECT REFERENCE NO.	SHEET
33344.1.1 (B-3909)	5

Section Thru End Bent One
STA. 13+95.50 -L-
Skew = 90°00'00"



0	10	20
FEET		

PROJECT REFERENCE NO.	SHEET
33344.1.1 (B-3909)	6

Section Thru Bent One
STA. 14+83.50 -L-
Skew=90°00'00"

RS-1
B1-A
14+84.00 -L-
22.00 LT.

SS-9
RS-3
B1-B
14+84.00 -L-
11.50 RT.

GROUND SURFACE

ALLUVIUM

BOULDERS (RIP-RAP)

100/.1

ROADWAY EMBANKMENT (FILL)

ARTIFICIAL FILL

BOULDERS (RIP-RAP)

100/.1

100/.2

ALLUVIUM

BRN MED. STIFF WET SANDY CLAYEY SILT (A-4) W/GRAVEL @ 6.0

10/08

10/08

GRAY-BRN MOD. SEV. WEATH. MED. HARD FELSIC META. VOLCANIC V. CLOSE TO CLOSE FRACTURE SPACING

REC=69%
RQD=0%

ALLUVIUM

CRYSTALLINE ROCK

WEATHERED ROCK
SEV. WEATH. CRYSTALLINE ROCK (FELSIC META VOLCANIC)

SREC=95%
SRQD=38%

GRAY MOD. TO SLI. WEATH. MED. HARD FELSIC META VOLCANIC V. CLOSE FRACTURE SPACING

GRAY MOD. SEV. WEATH. MED. TO MOD. HARD FELSIC META. VOLCANIC V. CLOSE TO CLOSE FRACTURE SPACING

SREC=88%
SRQD=29%

SREC=100%
SRQD=100%

BT

GRAY MOD. TO SLI. WEATH. MOD. HARD TO HARD FELSIC META. VOLCANIC CLOSE TO MED. CLOSE FRACTURE SPACING

SREC=100%
SRQD=74%

BT

370 360 350 340 330 320 310 300 290

50 40 30 20 10 0 10 20 30 40 50

PROJECT REFERENCE NO.	SHEET
33344.1.1 (B-3909)	7

Section Thru Bent Two
STA. 15+71.50 -L-
Skew = 90°00'00"

0 10 20
FEET

370
360
350
340
330
320
310
300
290

RS-2
B2-A
15+72.00 -L-
15.00 LT.

SS-8
RS-4
B2-B
15+72.00 -L-
12.50 RT.

GROUND SURFACE
ALLUVIUM
RESIDUAL
CRYSTALLINE ROCK

LOOSE WET CLAYEY SAND (A-2-6)

GRAY MOD. TO SLI. WEATH.
MED. TO MOD. HARD
FELSIC META VOLCANIC
V. CLOSE TO MOD. CLOSE
FRACTURE SPACING

SREC=95%
SRQD=38%

GRAY SLI. WEATH. TO FRESH
HARD FELSIC META VOLCANIC
FRACTURE SPACING=CLOSE
TO MOD. CLOSE

SREC=100%
SRQD=100%

BT

LOOSE WET CLAYEY SAND (A-2-6)
BRN MED. STIFF WET SILTY SANDY CLAY (A-6) W/ROCK FRAGS.
MOD. SEV. WEATH. FELSIC META VOLCANIC

GRAY FRESH HARD FELSIC META VOLCANIC
FRACTURE SPACING=CLOSE TO WIDE

SREC=97%
SRQD=92%

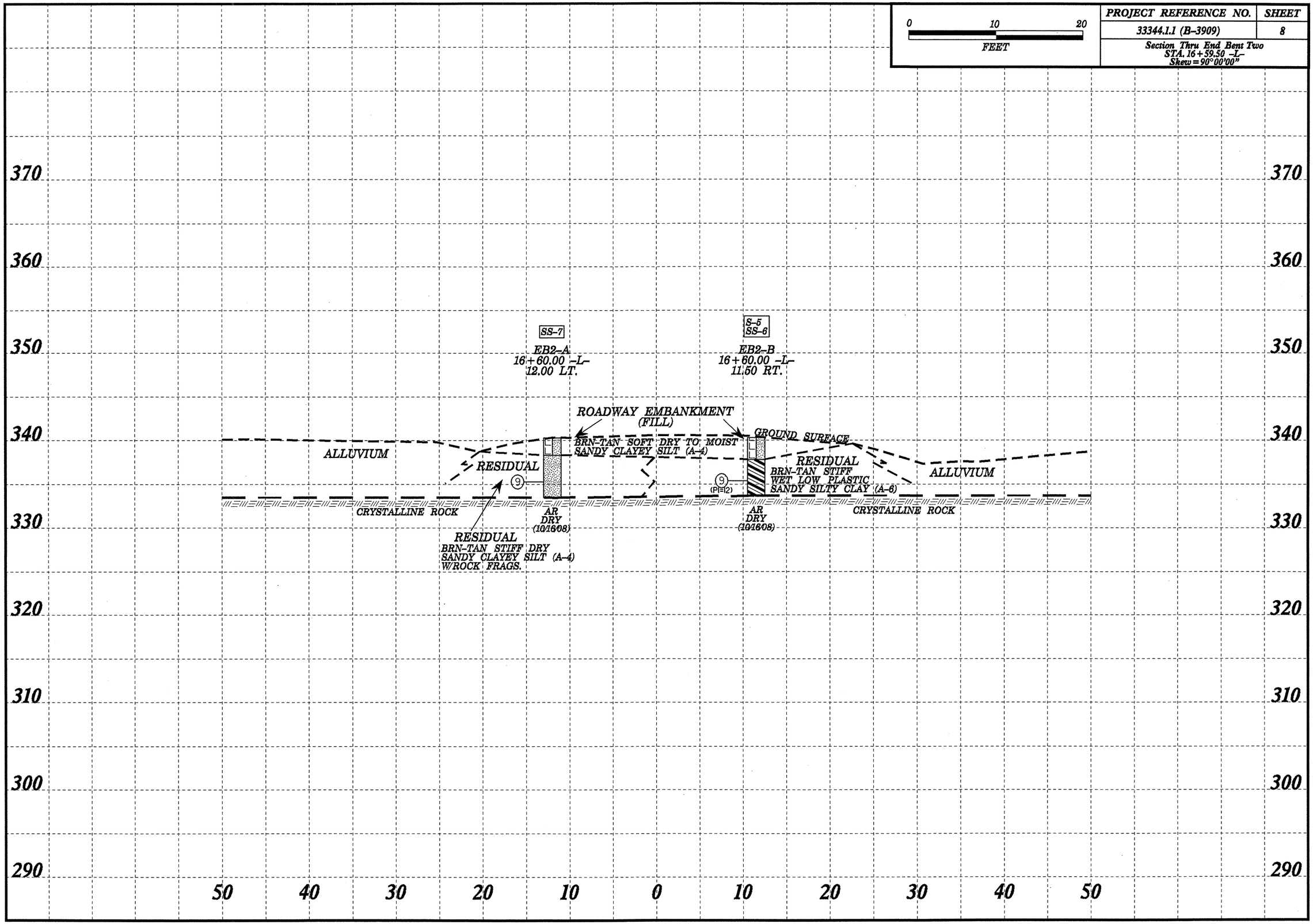
BT

50 40 30 20 10 0 10 20 30 40 50

0	10	20
FEET		

PROJECT REFERENCE NO.	SHEET
33344.1.1 (B-3909)	8

Section Thru End Bent Two
STA. 16+59.50 -L-
Skew = 90°00'00"



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33344.1.1	**ID.** B-3909	**COUNTY** STANLY	**GEOLOGIST** Todd, R. W.
SITE DESCRIPTION BRIDGE NO. 99 OVER LONG CREEK ON SR 1968			**GROUND WTR (ft)**
BORING NO. EB1C	**STATION** 13+96	**OFFSET** CL	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 342.6 ft	**TOTAL DEPTH** 12.4 ft	**NORTHING** 554,368	**EASTING** 1,624,704	**24 HR.** NM
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
START DATE 10/15/08	**COMP. DATE** 10/15/08	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 12.4 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)
345										342.6 GROUND SURFACE 0.0
340	338.6	4.0	2	4	4	8	SS-3	M		**RESIDUAL** BRN MED. STIFF TO STIFF MOIST MED. (PI=17) PLASTIC SANDY SILTY CLAY (A-6)
335	333.6	9.0	6	14	10	24	SS-4	M		335.6 7.0 **RESIDUAL** BRN V. STIFF MOIST MED. (PI=20) PLASTIC SANDY SILTY CLAY (A-7-6)
330										330.2 12.4 Boring Terminated BY AUGER REFUSAL at Elevation 330.2 ft ON CRYSTALINE ROCK
325										
320										
315										
310										
305										
300										
295										
290										
285										
280										
275										
270										
265										

NCDOT BORE SINGLE B3909_GEO_BH_BRDG0099.GPJ NC_DOT.GDT 12/17/08

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33344.1.1	**ID.** B-3909	**COUNTY** STANLY	**GEOLOGIST** Todd, R. W.
SITE DESCRIPTION BRIDGE NO. 99 OVER LONG CREEK ON SR 1968			**GROUND WTR (ft)**
BORING NO. EB1B	**STATION** 13+96	**OFFSET** 13ft RT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 342.2 ft	**TOTAL DEPTH** 12.1 ft	**NORTHING** 554,356	**EASTING** 1,624,701	**24 HR.** NM
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
START DATE 10/15/08	**COMP. DATE** 10/15/08	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 12.1 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)
345										342.2 GROUND SURFACE 0.0
340	338.5	3.7	2	2	3	5	SS-1	D		**ARTIFICIAL FILL** BRN MED. STIFF DRY MED. (PI=18) PLASTIC SANDY SILTY CLAY (A-6) W/ GRAVEL & WOOD
335	333.5	8.7	14	12	15	27	SS-2	D		336.5 5.7 **RESIDUAL** BRN MED. DENSE DRY MED. (PI=16) PLASTIC SILTY CLAYEY SAND (A-2-6) W/ ROCK FRAGS.
330										330.1 12.1 Boring Terminated BY AUGER REFUSAL at Elevation 330.1 ft ON CRYSTALINE ROCK ARTIFICIAL FILL: (DITCH BERM)
325										
320										
315										
310										
305										
300										
295										
290										
285										
280										
275										
270										
265										

NCDOT BORE SINGLE B3909_GEO_BH_BRDG0099.GPJ NC_DOT.GDT 12/17/08

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33344.1.1	**ID.** B-3909	**COUNTY** STANLY	**GEOLOGIST** Todd, R. W.
SITE DESCRIPTION BRIDGE NO. 99 OVER LONG CREEK ON SR 1968			**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 14+84	**OFFSET** 22ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 338.6 ft	**TOTAL DEPTH** 38.5 ft	**NORTHING** 554,371	**EASTING** 1,624,794	**24 HR.** 8.0
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ SPT Core		**HAMMER TYPE** Automatic	
START DATE 10/17/08	**COMP. DATE** 10/17/08	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 6.8 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)
340										
										338.6 / 0.0 GROUND SURFACE
335										ARTIFICIAL FILL BOULDERS (RIP-RAP)
	334.1	4.5	100/.1			100/.1				331.8 / 6.8
330										CRYSTALLINE ROCK GRAY-BRN MOD. SEV. WEATH. MED. HARD FELSIC META. VOLCANIC V. CLOSE TO CLOSE FRACTURE SPACING
325							RS-1			328.3 / 10.3
										CRYSTALLINE ROCK GRAY MOD. SEV. WEATH. MED. TO MOD. HARD FELSIC META. VOLCANIC V. CLOSE TO CLOSE FRACTURE SPACING
320										
315										
310										
305										304.7 / 33.9
										CRYSTALLINE ROCK GRAY MOD. TO SLI. WEATH. MOD. HARD TO HARD FELSIC META. VOLCANIC CLOSE TO MED. CLOSE FRACTURE SPACING
300										300.1 / 38.5
										Boring Terminated at Elevation 300.1 ft IN CRYSTALLINE ROCK NOTE: NUMEROUS 60deg.-90deg. FRACTURES FROM 6.80-30.10
295										
290										
285										
280										
275										
270										
265										
260										

NCDOT BORE SINGLE B3909_GEO_BH_BRDG0099.GPJ NC_DOT.GDT 12/17/08

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33344.1.1	**ID.** B-3909	**COUNTY** STANLY	**GEOLOGIST** Todd, R. W.	
SITE DESCRIPTION BRIDGE NO. 99 OVER LONG CREEK ON SR 1968				**GROUND WTR (ft)**
BORING NO. B1-A	**STATION** 14+84	**OFFSET** 22ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 338.6 ft	**TOTAL DEPTH** 38.5 ft	**NORTHING** 554,371	**EASTING** 1,624,794	**24 HR.** 8.0
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ SPT Core		**HAMMER TYPE** Automatic	
START DATE 10/17/08	**COMP. DATE** 10/17/08	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 6.8 ft	
CORE SIZE NXWL	**TOTAL RUN** 31.7 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)
331.8											Begin Coring @ 6.8 ft
330	331.8	6.8	3.5		(2.4) 69%	(0.0) 0%		(2.4) 69%	(0.0) 0%		331.8 / 6.8 CRYSTALLINE ROCK GRAY-BRN MOD. SEV. WEATH. MED. HARD FELSIC META. VOLCANIC V. CLOSE TO CLOSE FRACTURE SPACING R1=0, R2=3, R3=10, R4=6, R5=7 ROCK TYPE=E RMR=26 QU=1021 KSF
	328.3	10.3									328.3 / 10.3
325			5.0		(5.0) 100%	(3.1) 62%	RS-1	(20.8) 88%	(6.9) 29%		CRYSTALLINE ROCK GRAY MOD. SEV. WEATH. MED. TO MOD. HARD FELSIC META. VOLCANIC V. CLOSE TO CLOSE FRACTURE SPACING R1=4, R2=8, R3=10, R4=6, R5=7 ROCK TYPE=E RMR=35
	323.3	15.3									
320			5.0		(3.2) 64%	(0.0) 0%					
	318.3	20.3									
315			5.0		(5.0) 100%	(1.9) 38%					
	313.3	25.3									
310			4.8		(4.8) 100%	(0.5) 10%					
	308.5	30.1									
305			8.4		(8.4) 100%	(5.1) 61%					
								(4.6) 100%	(3.4) 74%		304.7 / 33.9 CRYSTALLINE ROCK GRAY MOD. TO SLI. WEATH. MOD. HARD TO HARD FELSIC META. VOLCANIC CLOSE TO MED. CLOSE FRACTURE SPACING R1=7, R2=20, R3=15, R4=6, R5=7 ROCK TYPE=E RMR=53
300	300.1	38.5									300.1 / 38.5
											Boring Terminated at Elevation 300.1 ft IN CRYSTALLINE ROCK NOTE: NUMEROUS 60deg.-90deg. FRACTURES FROM 6.80-30.10
295											
290											
285											
280											
275											
270											
265											
260											
255											

NCDOT CORE SINGLE B3909_GEO_BH_BRDG0098.GPJ NC_DOT.GDT 12/19/08

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33344.1.1	**ID.** B-3909	**COUNTY** STANLY		**GEOLOGIST** Todd, R. W.
SITE DESCRIPTION BRIDGE NO. 99 OVER LONG CREEK ON SR 1968				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 14+84	**OFFSET** 12ft RT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 337.5 ft	**TOTAL DEPTH** 26.4 ft	**NORTHING** 554,338	**EASTING** 1,624,787	**24 HR.** 8.0
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ SPT Core		**HAMMER TYPE** Automatic	
START DATE 10/20/08	**COMP. DATE** 10/20/08	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 10.1 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)
340										337.5 GROUND SURFACE	0.0
335										**ARTIFICIAL FILL** BOULDERS (RIP-RAP)	
	332.5	5.0	2	4	100/.1	100/.1	SS-9	W		332.5 **ALLUVIAL** BRN MED. STIFF WET SANDY CLAYEY SILT (A-4) W/ GRAVEL @ 6.0	5.0
330	329.5	8.0	100/.2			100/.2				330.5 **WEATHERED ROCK** SEV. WEATH. CRYSTALLINE ROCK (FELSIC META VOLCANIC)	7.0
325							RS-3			327.4 **CRYSTALLINE ROCK** GRAY MOD. TO SLI. WEATH. MED. HARD FELSIC META VOLCANIC V. CLOSE FRACTURE SPACING	10.1
320										324.3 **CRYSTALLINE ROCK** GRAY SLI. WEATH. TO FRESH HARD FELSIC META VOLCANIC CLOSE TO MOD. CLOSE FRACTURE SPACING	13.2
315											
310										311.1 Boring Terminated at Elevation 311.1 ft IN CRYSTALLINE ROCK	26.4
305											
300											
295											
290											
285											
280											
275											
270											
265											
260											

NCDOT BORE SINGLE B3909_GEO_BH_BRDG0099.GPJ NC_DOT.GDT 12/17/08

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33344.1.1	**ID.** B-3909	**COUNTY** STANLY		**GEOLOGIST** Todd, R. W.
SITE DESCRIPTION BRIDGE NO. 99 OVER LONG CREEK ON SR 1968				**GROUND WTR (ft)**
BORING NO. B1-B	**STATION** 14+84	**OFFSET** 12ft RT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 337.5 ft	**TOTAL DEPTH** 26.4 ft	**NORTHING** 554,338	**EASTING** 1,624,787	**24 HR.** 8.0
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ SPT Core		**HAMMER TYPE** Automatic	
START DATE 10/20/08	**COMP. DATE** 10/20/08	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 10.1 ft	
CORE SIZE NXWL	**TOTAL RUN** 16.3 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)
327.4											Begin Coring @ 10.1 ft	
325	327.4	10.1	4.2		(3.1) 74%	(1.1) 26%		(2.0) 65%	(0.0) 0%		327.4 **CRYSTALLINE ROCK** GRAY MOD. TO SLI. WEATH. MED. HARD FELSIC META VOLCANIC V. CLOSE FRACTURE SPACING R1=0, R2=3, R3=5, R4=0, R5=7 ROCK TYPE=E RMR=15	10.1
	323.2	14.3						(13.2) 100%	(13.2) 100%		324.3	13.2
320			4.5		(4.5) 100%	(4.5) 100%	RS-3				**CRYSTALLINE ROCK** GRAY SLI. WEATH. TO FRESH HARD FELSIC META VOLCANIC CLOSE TO MOD. CLOSE FRACTURE SPACING R1=7, R2=20, R3=15, R4=12, R5=7 ROCK TYPE=E RMR=61 QU=1741 KSF	
	318.7	18.8										
315			4.7		(4.7) 100%	(4.7) 100%						
	314.0	23.5										
310			2.9		(2.9) 100%	(2.9) 100%						
	311.1	26.4									311.1 Boring Terminated at Elevation 311.1 ft IN CRYSTALLINE ROCK	26.4
305												
300												
295												
290												
285												
280												
275												
270												
265												
260												
255												
250												

NCDOT CORE SINGLE B3909_GEO_BH_BRDG0099.GPJ NC_DOT.GDT 12/19/08

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33344.1.1	**ID.** B-3909	**COUNTY** STANLY		**GEOLOGIST** Todd, R. W.
SITE DESCRIPTION BRIDGE NO. 99 OVER LONG CREEK ON SR 1968				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 15+72	**OFFSET** 15ft LT	**ALIGNMENT** -L-	**0 HR.** 1.0
COLLAR ELEV. 334.2 ft	**TOTAL DEPTH** 20.2 ft	**NORTHING** 554,345	**EASTING** 1,624,879	**24 HR.** 1.0
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Core		**HAMMER TYPE** Automatic	
START DATE 10/16/08	**COMP. DATE** 10/16/08	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 1.7 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)
335										334.2 GROUND SURFACE	0.0
										332.5 **ALLUVIAL** LOOSE WET CLAYEY SAND (A-2-6)	1.7
330							RS-2			**CRYSTALLINE ROCK** GRAY MOD. TO SLI. WEATH. MED. TO MOD. HARD FELSIC META VOLCANIC V. CLOSE TO MOD. CLOSE FRACTURE SPACING	
325										323.0	11.2
320										**CRYSTALLINE ROCK** GRAY SLI. WEATH. TO FRESH HARD FELSIC META VOLCANIC FRACTURE SPACING=CLOSE TO MOD. CLOSE	
315										314.0	20.2
310										Boring Terminated at Elevation 314.0 ft IN CRYSTALLINE ROCK	
305											
300											
295											
290											
285											
280											
275											
270											
265											
260											
255											

NCDOT BORE SINGLE B3909_GEO_BH_BRDG0099.GPJ NC_DOT.GDT 12/17/08

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 33344.1.1	**ID.** B-3909	**COUNTY** STANLY		**GEOLOGIST** Todd, R. W.
SITE DESCRIPTION BRIDGE NO. 99 OVER LONG CREEK ON SR 1968				**GROUND WTR (ft)**
BORING NO. B2-A	**STATION** 15+72	**OFFSET** 15ft LT	**ALIGNMENT** -L-	**0 HR.** 1.0
COLLAR ELEV. 334.2 ft	**TOTAL DEPTH** 20.2 ft	**NORTHING** 554,345	**EASTING** 1,624,879	**24 HR.** 1.0
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ Core		**HAMMER TYPE** Automatic	
START DATE 10/16/08	**COMP. DATE** 10/16/08	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 1.7 ft	
CORE SIZE NXWL	**TOTAL RUN** 18.5 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)
332.5											Begin Coring @ 1.7 ft	
330	332.5	1.7	4.5		(4.5) 100%	(2.7) 60%	RS-2	(9.0) 95%	(3.6) 38%		332.5 **CRYSTALLINE ROCK** GRAY MOD. TO SLI. WEATH. MED. TO MOD. HARD FELSIC META VOLCANIC W/ 60-90 DEGREE FRACTURES. SOME FILLED, MOST OPEN. FRACTURE SPACING=V. CLOSE TO MOD. CLOSE R1=7, R2=8, R3=8, R4=6, R5=7 ROCK TYPE=E RMR=36 QU=1966 KSF	1.7
	328.0	6.2										
325			5.0		(4.5) 90%	(0.9) 18%						
	323.0	11.2									323.0	11.2
320			4.7		(4.7) 100%	(4.7) 100%		(9.0) 100%	(9.0) 100%		**CRYSTALLINE ROCK** GRAY SLI. WEATH. TO FRESH HARD FELSIC META VOLCANIC FRACTURE SPACING=CLOSE TO MOD. CLOSE R1=7, R2=25, R3=9, R4=20, R5=7 ROCK TYPE=E RMR=68	
	318.3	15.9										
315			4.3		(4.3) 100%	(4.3) 100%						
	314.0	20.2									314.0	20.2
310											Boring Terminated at Elevation 314.0 ft IN CRYSTALLINE ROCK	
305												
300												
295												
290												
285												
280												
275												
270												
265												
260												
255												

NCDOT CORE SINGLE B3909_GEO_BH_BRDG0099.GPJ NC_DOT.GDT 12/19/08

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

SHEET

PROJECT NO. 33344.1.1	**ID.** B-3909	**COUNTY** STANLY	**GEOLOGIST** Todd, R. W.	
SITE DESCRIPTION BRIDGE NO. 99 OVER LONG CREEK ON SR 1968				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 15+72	**OFFSET** 13ft RT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 337.3 ft	**TOTAL DEPTH** 22.4 ft	**NORTHING** 554,319	**EASTING** 1,624,873	**24 HR.** 5.0
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ SPT Core		**HAMMER TYPE** Automatic	
START DATE 10/21/08	**COMP. DATE** 10/21/08	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 4.0 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)
340										
										337.3 GROUND SURFACE 0.0
335										**ALLUVIAL** LOOSE WET CLAYEY SAND (A-2-6)
	333.8	3.5								334.5 2.8
			6	100/.1		100/.1	SS-8			**RESIDUAL** 333.3 4.0
330										BRN MED. STIFF WET SILTY SANDY CLAY (A-6) W/ ROCK FRAGS. 331.1 6.2
										CRYSTALLINE ROCK MOD. SEV. WEATH. FELSIC META VOLCANIC
325							RS-4			**CRYSTALLINE ROCK** GRAY FRESH HARD FELSIC META VOLCANIC FRACTURE SPACING=CLOSE TO WIDE
320										
315										314.9 22.4
										Boring Terminated at Elevation 314.9 ft IN CRYSTALLINE ROCK
310										
305										
300										
295										
290										
285										
280										
275										
270										
265										
260										
255										

NCDOT BORE SINGLE B3909_GEO_BH_BRDG0099.GPJ NC_DOT.GDT 12/17/08

NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

SHEET 13

PROJECT NO. 33344.1.1	**ID.** B-3909	**COUNTY** STANLY	**GEOLOGIST** Todd, R. W.	
SITE DESCRIPTION BRIDGE NO. 99 OVER LONG CREEK ON SR 1968				**GROUND WTR (ft)**
BORING NO. B2-B	**STATION** 15+72	**OFFSET** 13ft RT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 337.3 ft	**TOTAL DEPTH** 22.4 ft	**NORTHING** 554,319	**EASTING** 1,624,873	**24 HR.** 5.0
DRILL MACHINE CME-550X	**DRILL METHOD** NW Casing w/ SPT Core		**HAMMER TYPE** Automatic	
START DATE 10/21/08	**COMP. DATE** 10/21/08	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 4.0 ft	
CORE SIZE NXWL	**TOTAL RUN** 16.2 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)
331.1											Begin Coring @ 6.2 ft
330	331.1	6.2	1.9		(1.9) 100%	(1.9) 100%		(15.7) 97%	(14.9) 92%		331.1 **CRYSTALLINE ROCK** 6.2
	329.2	8.1									GRAY FRESH HARD FELSIC META VOLCANIC
			5.0		(5.0) 100%	(5.0) 100%					FRACTURE SPACING=CLOSE TO WIDE
325											R1=7, R2=20, R3=20, R4=13, R5=7
	324.2	13.1					RS-4				ROCK TYPE=E RMR=67 QU=1594 KSF
			9.3		(8.8) 95%	(8.0) 86%					
320											
315	314.9	22.4									314.9 22.4
											Boring Terminated at Elevation 314.9 ft IN CRYSTALLINE ROCK
310											
305											
300											
295											
290											
285											
280											
275											
270											
265											
260											
255											

NCDOT CORE SINGLE B3909_GEO_BH_BRDG0099.GPJ NC_DOT.GDT 12/19/08

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33344.1.1	**ID.** B-3909	**COUNTY** STANLY	**GEOLOGIST** Todd, R. W.
SITE DESCRIPTION BRIDGE NO. 99 OVER LONG CREEK ON SR 1968			**GROUND WTR (ft)**
BORING NO. EB2-A	**STATION** 16+60	**OFFSET** 12ft LT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 340.3 ft	**TOTAL DEPTH** 6.8 ft	**NORTHING** 554,324	**EASTING** 1,624,964	**24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
START DATE 10/15/08	**COMP. DATE** 10/15/08	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 6.8 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)
345										
340										340.3 GROUND SURFACE 0.0
										ROADWAY EMBANKMENT
										338.3 BRN-TAN SOFT DRY SANDY CLAYEY SILT (A-4) 2.0
	336.3	4.0								**RESIDUAL**
335			1	2	7	9	SS-7			BRN-TAN STIFF DRY SANDY CLAYEY SILT (A-4) W/ ROCK FRAGS.
										333.5 6.8
										Boring Terminated BY AUGER REFUSAL at Elevation 333.5 ft ON CRYSTALINE ROCK
330										
325										
320										
315										
310										
305										
300										
295										
290										
285										
280										
275										
270										
265										

NCDOT BORE SINGLE B3909_GEO_BH_BRDG0099.GPJ NC_DOT.GDT 12/17/08

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 33344.1.1	**ID.** B-3909	**COUNTY** STANLY	**GEOLOGIST** Todd, R. W.
SITE DESCRIPTION BRIDGE NO. 99 OVER LONG CREEK ON SR 1968			**GROUND WTR (ft)**
BORING NO. EB2-B	**STATION** 16+60	**OFFSET** 12ft RT	**ALIGNMENT** -L-	**0 HR.** NM
COLLAR ELEV. 340.3 ft	**TOTAL DEPTH** 6.6 ft	**NORTHING** 554,301	**EASTING** 1,624,959	**24 HR.** Dry
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. Augers		**HAMMER TYPE** Automatic	
START DATE 10/15/08	**COMP. DATE** 10/15/08	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 6.6 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)
345										
340										340.3 GROUND SURFACE 0.0
										ROADWAY EMBANKMENT
							S-5	M		337.8 BRN SOFT MOIST SANDY CLAYEY SILT (A-4) 2.5
	336.4	3.9								**RESIDUAL**
335			1	2	7	9	SS-6	W		BRN-TAN STIFF WET LOW (PI=12) PLASTIC SANDY SILTY CLAY (A-6)
										333.7 6.6
										Boring Terminated BY AUGER REFUSAL at Elevation 333.7 ft ON CRYSTALINE ROCK
330										
325										
320										
315										
310										
305										
300										
295										
290										
285										
280										
275										
270										
265										

NCDOT BORE SINGLE B3909_GEO_BH_BRDG0099.GPJ NC_DOT.GDT 12/17/08

TEST RESULTS

PROJECT: 33344.1.1 (B-3909)
COUNTY: STANLY
SITE DESCRIPTION: BRIDGE NO. 99 OVER LONG CREEK ON SR 1968

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)
		EB1-C															
SS-3	CL	13+96	4.00-5.50	A-6(17)		40	17	0.6	13.0	37.8	48.6	100	100	91			
SS-4	CL	13+96	9.00-10.50	A-7-6(5)		42	20	11.3	14.0	32.1	42.6	57	51	45			
		EB1-B															
SS-1	12.50 RT	13+96	3.70-5.20	A-6(15)	4	39	18	1.6	16.4	37.4	44.6	97	96	85			
SS-2	12.50 RT	13+96	8.70-10.20	A-2-6(0)	8	39	16	35.5	9.3	16.7	38.5	39	27	22			
		B1-B															
SS-9	11.50 RT	14+84	5.00-6.10	A-4(0)		27	5	39.3	14.0	22.4	24.3	76	51	37			
		B2-B															
SS-8	12.50 RT	15+72	3.50-4.10	A-6(1)		36	15	38.3	11.3	20.0	30.4	68	46	36			
		EB2-A															
SS-7	12.00 LT	16+60	4.00-5.50	A-4(2)		29	7	9.5	10.7	43.3	36.5	71	66	60			
		EB2-B															
S-5	11.50 RT	16+60	0.00-2.50	A-4(3)		33	10	16.6	11.1	29.7	42.6	72	63	54			
SS-6	11.50 RT	16+60	3.90-5.40	A-6(5)		32	12	12.6	11.8	39.2	36.5	79	70	63			

TEST RESULTS

ROCK SAMPLE RESULTS

VOID RATIO	SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	RQD	UNIT WT LBF/FT3	Q(PSI) CORRECTED	E(MPa) (MPsi)
			B1-A					
	RS-1	22.00 LT	14+84 -L-		62%	173.7	7090	
			B1-B					
	RS-3	11.50 RT	14+84 -L-		100%	172.1	12090	
			B2-A					
	RS-2	15.00 LT	15+72 -L-		38%	159.6	13650	
			B2-B					
	RS-4	12.50 RT	15+72 -L-		100%	176.8	11070	

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL ENGINEERING UNIT

FIELD SCOUR REPORT

WBS: 33344.1.1 TIP: B-3909 COUNTY: STANLY

DESCRIPTION(1): BRIDGE NO. 99 ON SR 1968 OVER LONG CREEK.

EXISTING BRIDGE

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

Bridge No.: 99 Length: ____ Total Bents: 5 Bents in Channel: 5 Bents in Floodplain: 5
Foundation Type: FOOTING ON ROCK.

EVIDENCE OF SCOUR(2)

Abutments or End Bent Slopes: ABUTMENT SCOUR SEVERE - ROCK EXPOSED BELOW FOOTING.

Interior Bents: UNDERMINING AT ALL BENTS.

Channel Bed: NONE

Channel Bank: NONE

EXISTING SCOUR PROTECTION

Type(3): NONE

Extent(4): N/A

Effectiveness(5): N/A

Obstructions(6): VERY CLEAN SITE. VERY LITTLE DEBRIS. SMALL DEBRIS PILE FROM REC. FLOOD (B1A)

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.

DESIGN INFORMATION

Channel Bed Material(7): GRAVEL, BOULDERS, ROCK.

Channel Bank Material(8): SILTY CLAY (A-6) AS SS-3 ON WEST SIDE. SANDY SILT (A-4) AS SS-7 ON EAST SIDE.

Channel Bank Cover(9): TREES - VERY STABLE

Floodplain Width(10): APP. 125'

Floodplain Cover(11): WOODS

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

Channel Migration Tendency(13): NO OBSERVABLE TENDENCY.

Observations and Other Comments: ____

DESIGN SCOUR ELEVATIONS(14) Feet X Meters ____

	BENTS B1	B2									
100 YR	329	331									

Comparison of DSE to Hydraulics Unit theoretical scour:
DSE ELEVATIONS HAVE BEEN REVISED UPWARD FROM THE HYDRAULICS PREDICTION DUE TO PRESENCE OF CRYSTALLINE ROCK.

SOIL ANALYSIS RESULTS FROM CHANNEL BED AND BANK MATERIAL

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

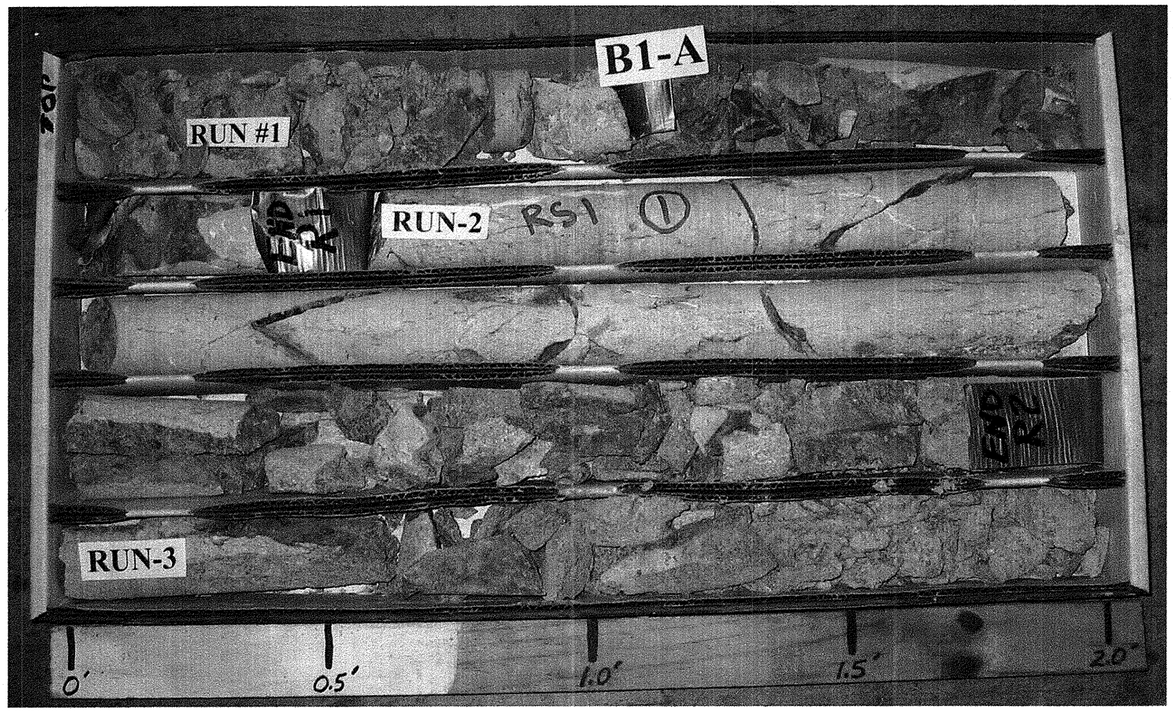
Template Revised 02/07/06

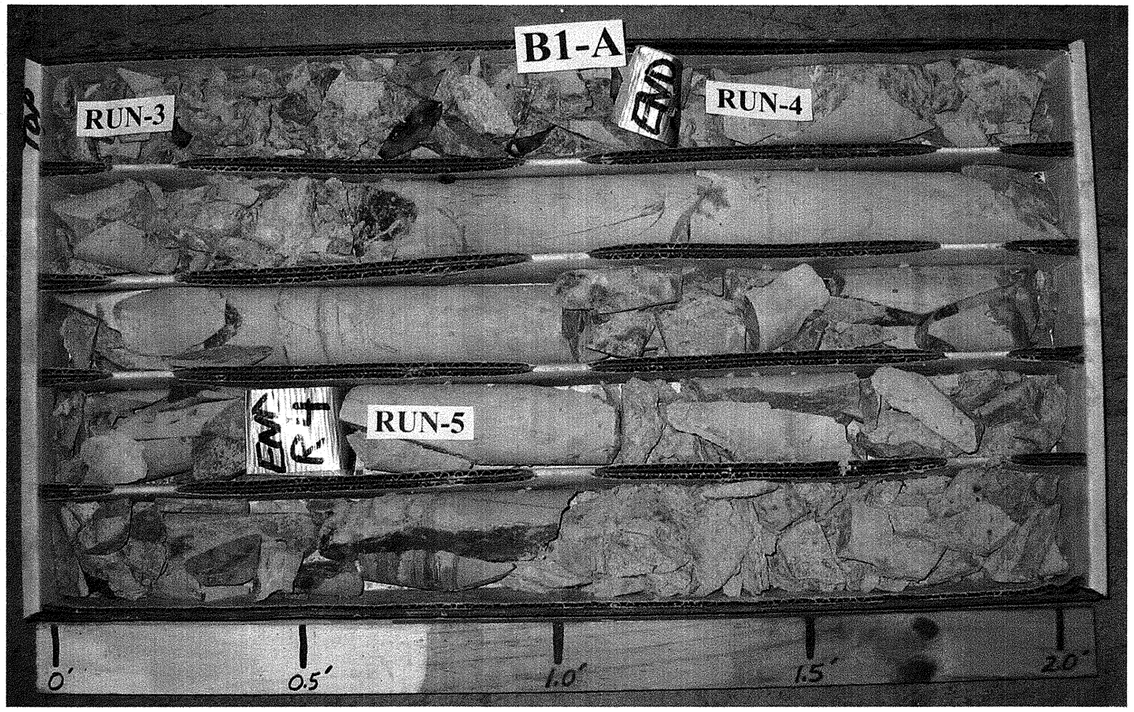
Reported by: RW TODD **Date:** 10/22/2008

33344.1.1 B-3909
STANLY COUNTY
BRIDGE NO. 99 OVER LONG CREEK ON SR 1968

PHOTOS

INSERT FIRST PICTURE HERE



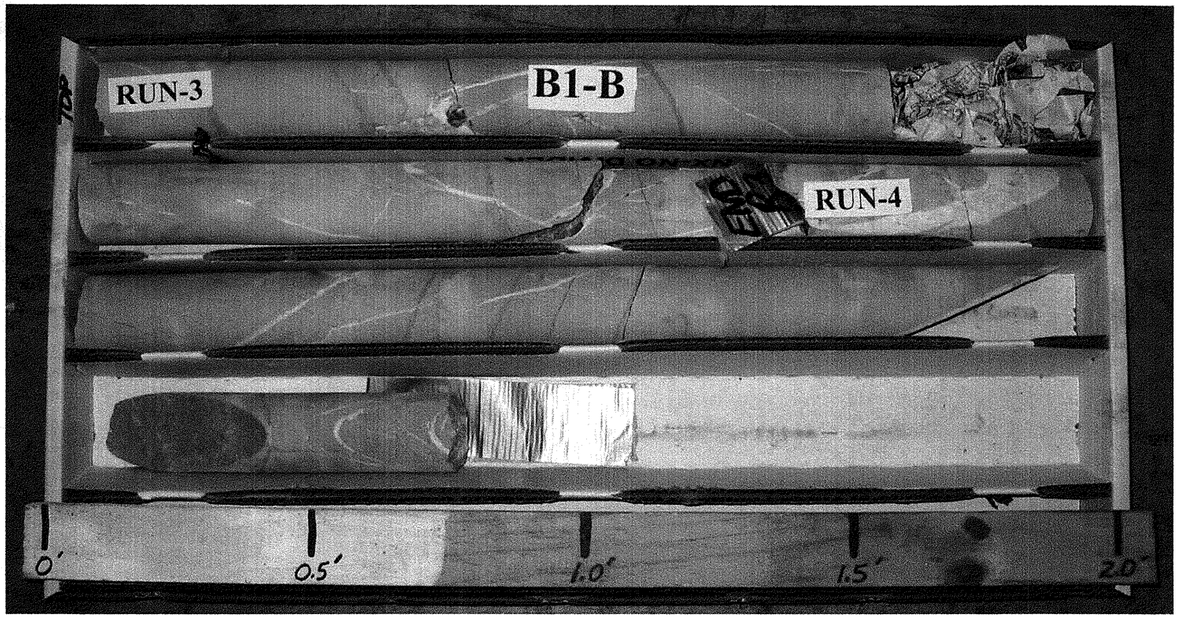


33344.1.1 B-3909
STANLY COUNTY
BRIDGE NO. 99 OVER LONG CREEK ON SR 1968

PHOTOS

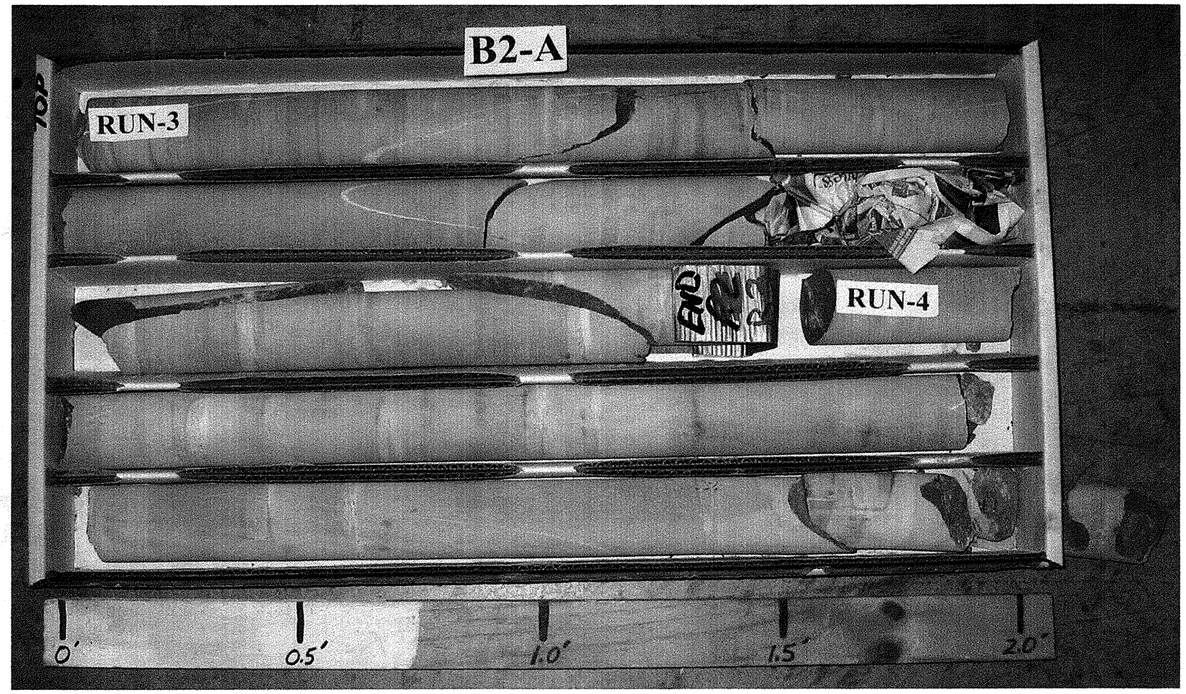
33344.1.1 B-3909
STANLY COUNTY
BRIDGE NO. 99 OVER LONG CREEK ON SR 1968

PHOTOS



33344.1.1 B-3909
STANLY COUNTY
BRIDGE NO. 99 OVER LONG CREEK ON SR 1968

PHOTOS



33344.1.1 B-3909
STANLY COUNTY
BRIDGE NO. 99 OVER LONG CREEK ON SR 1968

PHOTOS