STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4112	1	12

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. B-4112 F.A. PROJ. BRZ-1631(2)

COUNTY FORSYTH

PROJECT DESCRIPTION BRIDGE #30 ON SR 1631 OVER MUDDY CREEK BETWEEN SR 1611 AND SR 4002 (-L- STATION 16+07)

SITE DESCRIPTION

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CAUTION NOTICE

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PERSONNEL

J.K. STICKNEY

C.L. SMITH

K. WISE

INVESTIGATED BY J.E. BEVERLY

CHECKED BY C.B. LITTLE

SUBMITTED BY C.B. LITTLE

DATE APRIL 2006

NORTH CAROLINA LICENSED SEAL 1104 GEOLOGIST CLINTON B. LITTLE

PROJECT: 33467.1.1

ID: B-4112

DRAWN BY: J.E. BEVERLY

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.

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PROJECT REFERENCE NO.	SHEET NO.
B-4112	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-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				A-7-5 A-7-6			
SYMBOL														
% PASSING #10 #40 #200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
LIQUID LIMIT PLASTIC INDEX	6 MX		NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
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 LOOSE MEDIUM DENSE DENSE VERY DENSE	<4 4 TO 10 10 TO 30 30 TO 50 >50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	<2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 >30	<0.25 0.25 TO 0.50 0.5 TO 1.0 1 TO 2 2 TO 4 >4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	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) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- 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 DPT 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
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [ ] -N_____
- [ ] -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 #3 - RAILROAD SPIKE SET IN 14" ASH 234' LT. OF STA. 16+29 -L-
ELEVATION: 812.87 FT.

NOTES:

REVISED 02/23/06

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

LYNDO TIPPETT
SECRETARY

April 17, 2006

STATE PROJECT: 33467.1.1 (B-4112)
COUNTY: Forsyth
DESCRIPTION: Bridge #30 on SR 1631 (Mizpah Church Rd.) over Muddy Creek between SR 1611 and SR 4002 (-L- Station 16+07)

SUBJECT: Geotechnical Report – Bridge Foundation Investigation

This is a proposed bridge replacement for bridge number 30 on SR 1631 over Muddy Creek. The new structure will occupy the same location as the existing structure. The proposed structure will be a 100-foot single span box beam design on a 90-degree skew angle. Recommended width of roadway is 30 feet and proposed end bent slopes are 1.5:1 (H:V) with class II rip rap for slope protection.

Four foundation test borings were performed utilizing a CME-550X drill machine, hollow stem augers, and an automatic drop hammer. The field investigation for this project was conducted in March of 2006.

Physiography/Geology

The project is located in central-northern Forsyth County. The site area is gently sloping with wooded areas bounding the creek and open fields on either side of the floodplain. Geologically this area is part of the Sauratown Mountains Anticlinorium and is likely underlain by Cenozoic age metagraywacke rock.

Site specific soils noted during our investigation include existing roadway fill, alluvial, and residual types. Roadway fill soils associated with Mizpah Church Rd. consists of very soft to medium stiff micaceous silty sandy clay (A-7-5). Alluvial soils are very loose to loose gray sand (A-3), medium dense gray sand with gravel (A-1-b), and medium stiff micaceous silty sandy clay (A-6). Residual soils are medium dense to very dense silty sand (A-2-4), and medium stiff micaceous sandy silt (A-5).

Sheet 3

Foundation Materials

End Bent 1:
Two borings were performed west of Muddy Creek for this bent location. Borings encountered 8.5 – 14.5 feet of roadway fill consisting of very soft to medium stiff red-brown micaceous silty sandy clay (A-7-5). The fill contains rocks that elevated SPT values in at least one instance. Beneath fill between elevation 805 – 810 feet lies alluvial soil. Alluvium is composed of 5 feet of loose gray sand (A-3) with a 5 foot layer of medium stiff brown micaceous silty sandy clay (A-6) noted only in boring EB1-B. Residual soil begins beneath alluvium at elevation 800 feet. Residual soil is composed of 10 feet of medium stiff brown-gray micaceous very sandy silt (A-5) in boring EB1-A and 4 feet of medium dense gray-tan-white micaceous silty sand (A-2-4) in boring EB1-B. Each boring location next encountered the weathered rock horizon and terminated with auger refusal on hard crystalline rock. The following is a listing of weathered and crystalline rock elevations at each boring location:

Boring Location	Weathered Rock Elev. (feet)	Rock Elev. (feet)
EB1-A	789.70	780.51
EB1-B	796.24	795.94

End Bent 2:
Two borings were performed east of Muddy Creek for this bent location. Borings encountered a uniform depth of 13.5 feet of roadway fill which consists of very soft to medium stiff red-brown micaceous silty sandy clay (A-7-5). Beneath fill at elevation 808 feet alluvial soil was encountered and is comprised of 6 – 7 feet of very loose gray sand (A-3) and medium dense gray sand with gravel (A-1-b). Below alluvium at elevation 801 to 802 feet residual soil is encountered. Residual soil consists of dense to very dense gray-white silty sand (A-2-4). Each boring location encountered the weathered rock horizon beneath residual soil and terminated with auger refusal on hard crystalline rock. The following is a listing of weathered and crystalline rock elevations at each boring location:

Boring Location	Weathered Rock Elev. (feet)	Rock Elev. (feet)
EB2-A	792.00	791.40
EB2-B	797.65	794.19

Groundwater

The only groundwater measurements made were immediately after drilling. Based on those reading and the water surface elevation of the creek we anticipate groundwater to be approximate elevation 805 – 806 feet.

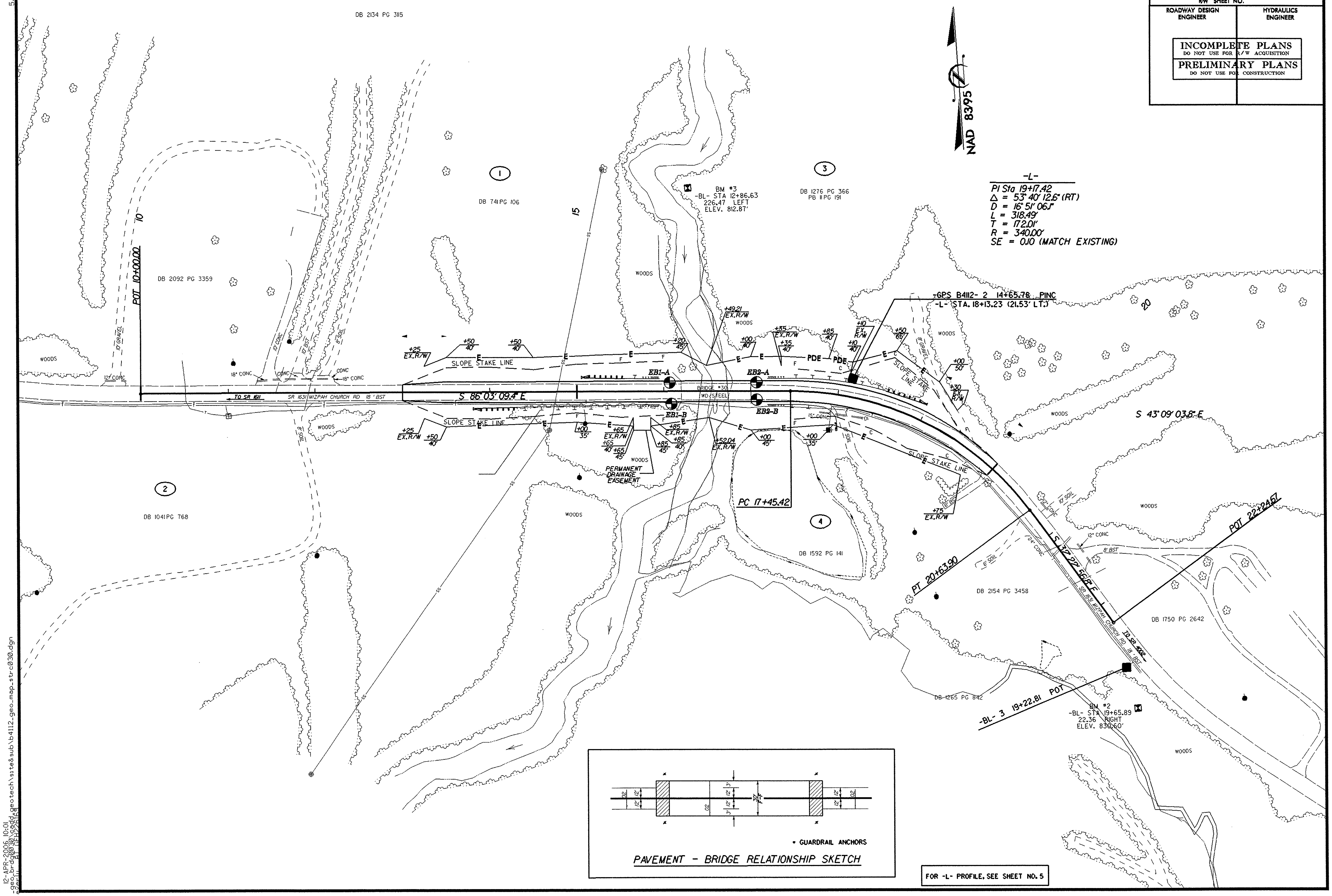
Respectfully submitted,

J.E. Beverly, Project Geologist

PROJECT REFERENCE NO.	SHEET NO.
B-4112	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

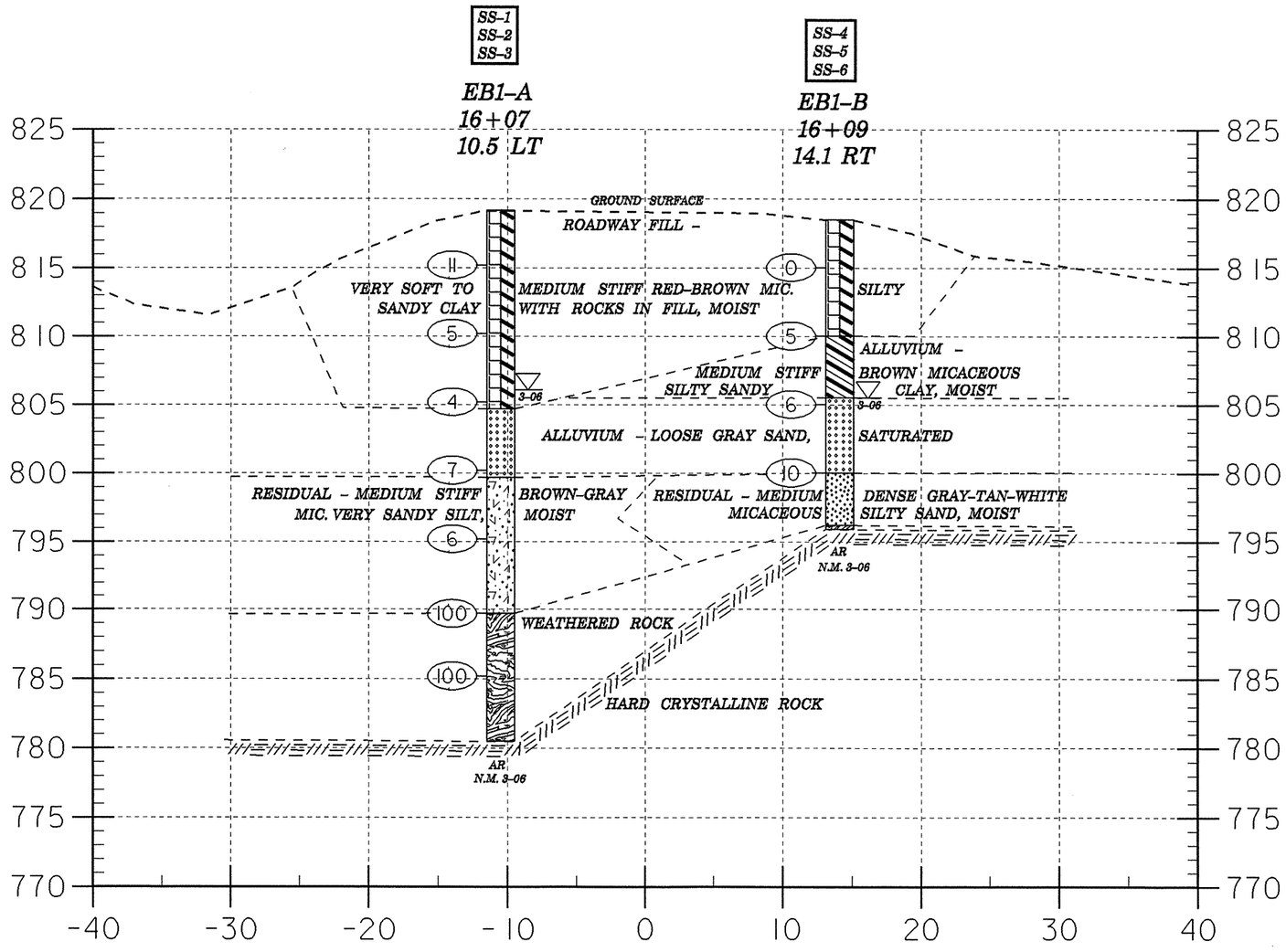


PAVEMENT - BRIDGE RELATIONSHIP SKETCH

12-APR-2006 10:01
geo_brdg\030\geotech\site&sub\b4112_geo_map-str-c030.dgn
5/14/99

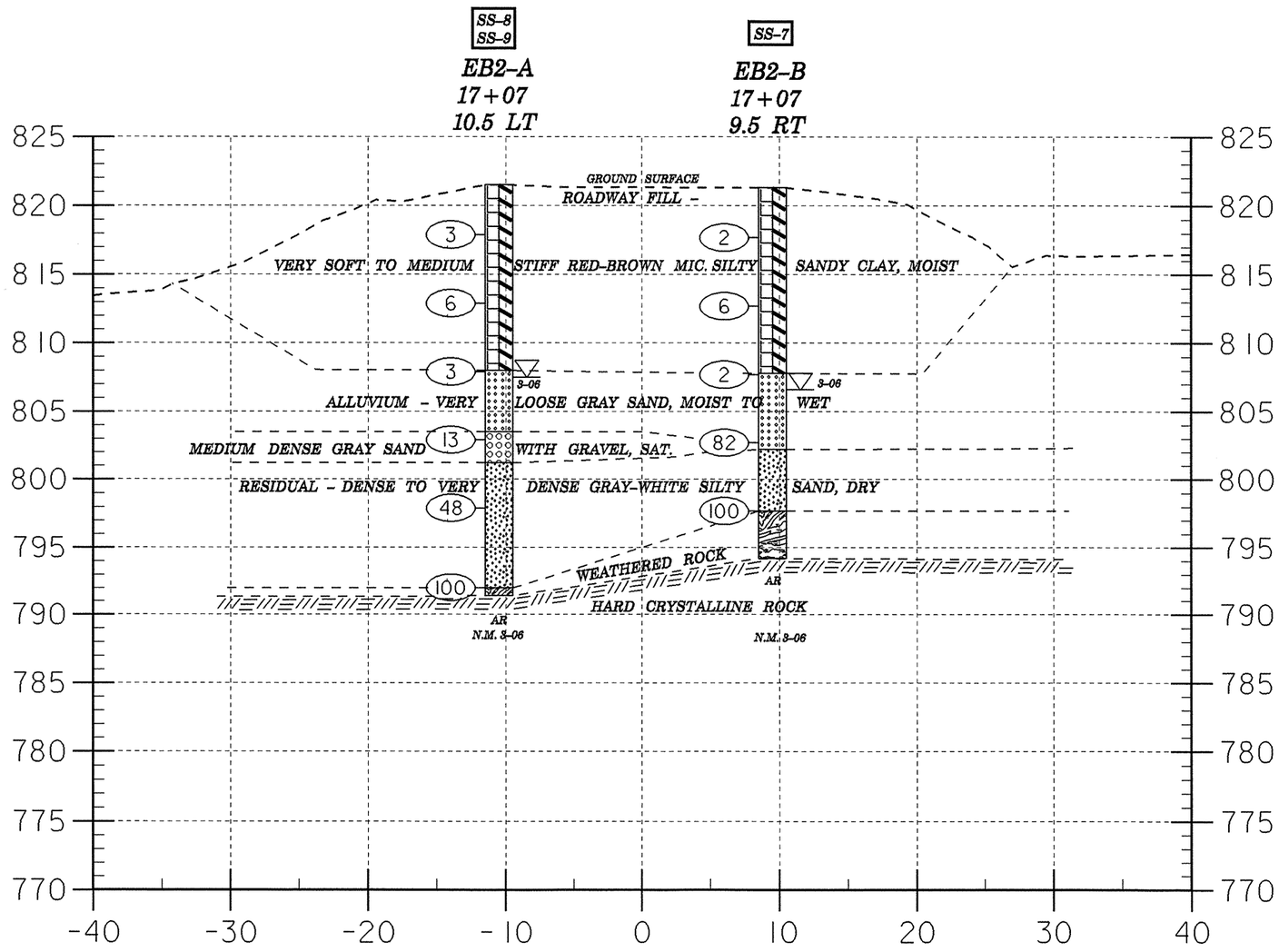
PROJECT REF. NO.	SHEET NO.	TOTAL SHEETS
B-4112	5	12

SECTION THROUGH EB1-A AND EB1-B



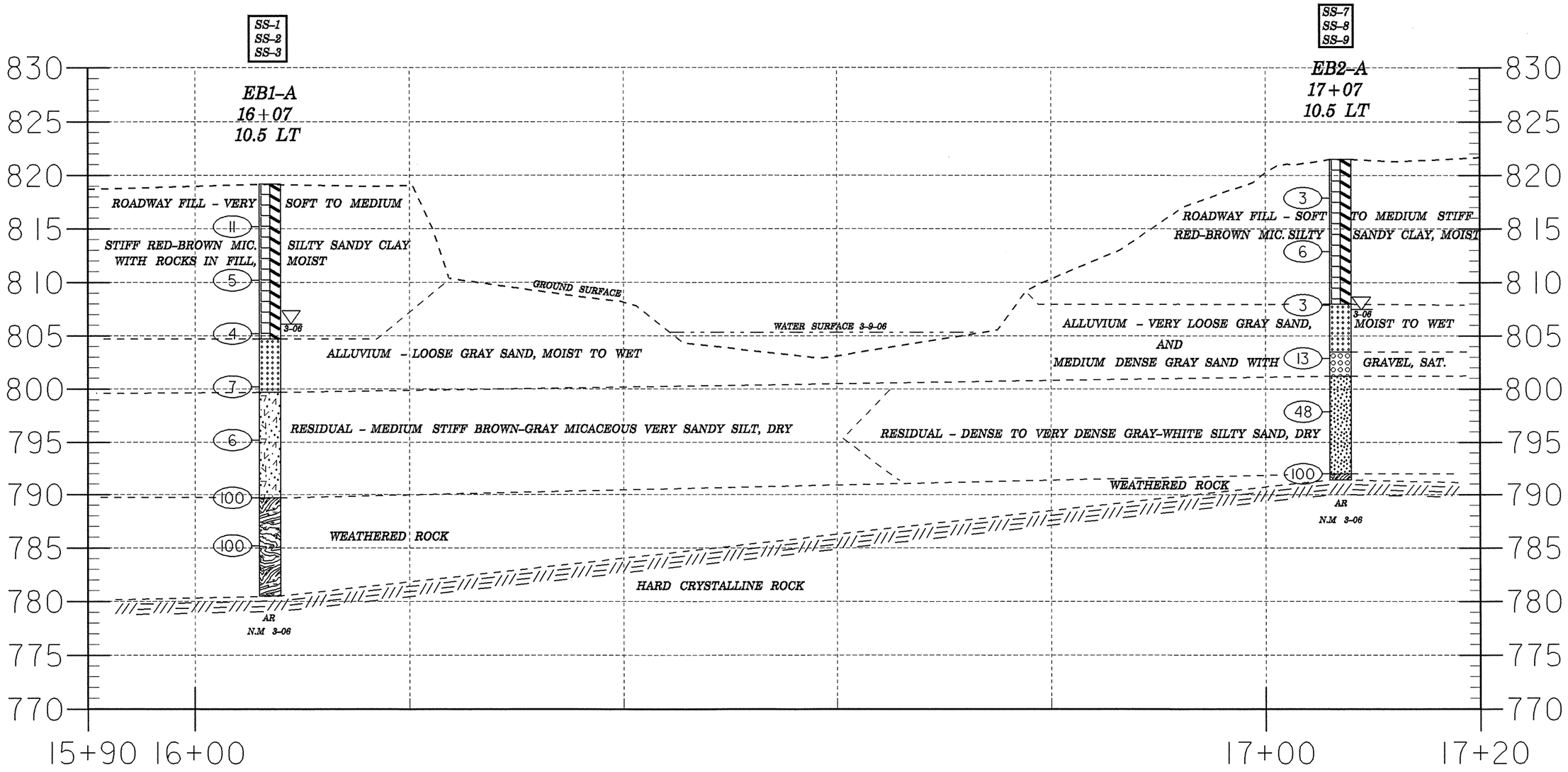
PROJECT REF. NO.	SHEET NO.	TOTAL SHEETS
B-4112	6	12

SECTION THROUGH EB2-A AND EB2-B



PROJECT REF. NO.	SHEET NO.	TOTAL SHEETS
B-4112	7	12

PROFILE 10.5 FEET LEFT OF -L-



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33467.1.1 | **ID** B-4112 | **COUNTY** FORSYTH | **GEOLOGIST** J.K. STICKNEY

SITE DESCRIPTION BRIDGE #30 ON HIGHWAY 1631 OVER MUDDY CREEK | **GND WATER**

BORING NO EB1-A | **NORTHING** 0.00 | **EASTING** 0.00 | **0 HR** 13.10ft

ALIGNMENT L | **BORING LOCATION** 16+07.000 | **OFFSET** 10.50ft LT | **24 HR** N/A

COLLAR ELEV 819.21ft | **TOTAL DEPTH** 38.70ft | **START DATE** 3/09/06 | **COMPLETION DATE** 03/09/06

DRILL MACHINE CME-550X | **DRILL METHOD** H.S. AUGERS | **HAMMER TYPE** AUTOMATIC

SURFACE WATER DEPTH | **DEPTH TO ROCK** 38.70ft | Log EB1-A, Page 1 of 1

ELEV	DEPTH	BLOW CT 6in	6in	6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
819.21						Ground Surface				
	4.00	0	1	10	1.0	11				ROADWAY FILL - VERY SOFT TO MEDIUM STIFF RED-BROWN MICACEOUS SILTY SANDY CLAY (ROCKS IN FILL)
810.00	9.00	1	2	3	1.0	5	SS-1	MOIST		
	14.00	2	2	2	1.0	4	SS-2	SAT		ALLUVIUM - LOOSE GRAY SAND
800.00	19.00	2	3	4	1.0	7	SS-3	MOIST		
	24.00	2	3	3	1.0	6		MOIST		RESIDUAL - MEDIUM STIFF BROWN-GRAY MICACEOUS VERY SANDY SILT
790.00	29.00	31	44	56	0.9	100				
	34.00	66	34		0.6	100				WEATHERED ROCK
780.51						AUGER REFUSAL ON CRYSTALLINE ROCK AT ELEVATION 780.51 FEET				

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33467.1.1 | **ID** B-4112 | **COUNTY** FORSYTH | **GEOLOGIST** J.K. STICKNEY

SITE DESCRIPTION BRIDGE #30 ON HIGHWAY 1631 OVER MUDDY CREEK | **GND WATER**

BORING NO EB1-B | **NORTHING** 0.00 | **EASTING** 0.00 | **0 HR** 13.00ft

ALIGNMENT L | **BORING LOCATION** 16+09.000 | **OFFSET** 14.10ft RT | **24 HR** N/A

COLLAR ELEV 818.54ft | **TOTAL DEPTH** 22.60ft | **START DATE** 3/09/06 | **COMPLETION DATE** 03/09/06

DRILL MACHINE CME-550X | **DRILL METHOD** H.S. AUGERS | **HAMMER TYPE** AUTOMATIC

SURFACE WATER DEPTH | **DEPTH TO ROCK** 22.60ft | Log EB1-B, Page 1 of 1

ELEV	DEPTH	BLOW CT 6in	6in	6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
818.54						Ground Surface				
	3.50	0	0	0	1.0	0	SS-4	MOIST		ROADWAY FILL - VERY SOFT TO MEDIUM STIFF RED-BROWN MICACEOUS SILTY SANDY CLAY
810.00	8.50	2	2	3	1.0	5	SS-5	MOIST		ALLUVIUM - MEDIUM STIFF BROWN MICACEOUS SILTY SANDY CLAY
	13.50	2	3	3	1.0	6		SAT.		ALLUVIUM - LOOSE GRAY SAND
800.00	18.50	4	5	5	1.0	10	SS-6	MOIST		RESIDUAL - MEDIUM DENSE GRAY-TAN-WHITE MICACEOUS SILTY SAND
795.94						AUGER REFUSAL ON CRYSTALLINE ROCK AT ELEVATION 795.94 FEET				WEATHERED ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33467.1.1	**ID** B-4112	**COUNTY** FORSYTH	**GEOLOGIST** J.K. STICKNEY
SITE DESCRIPTION BRIDGE #30 ON HIGHWAY 1631 OVER MUDDY CREEK			**GND WATER**
BORING NO EB2-A	**NORTHING** 0.00	**EASTING** 0.00	**0 HR** 14.00ft
ALIGNMENT L	**BORING LOCATION** 17+07.000	**OFFSET** 10.50ft LT	**24 HR** ~~N/A~~ N.M.
COLLAR ELEV 821.50ft	**TOTAL DEPTH** 30.10ft	**START DATE** 3/09/06	**COMPLETION DATE** 03/09/06
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. AUGERS		**HAMMER TYPE** AUTOMATIC
SURFACE WATER DEPTH	**DEPTH TO ROCK** 30.10ft		Log EB2-A, Page 1 of 1

ELEV	DEPTH	BLOW CT 6in	6in	6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
821.50						Ground Surface				
820.00	3.60	0	1	2	1.0	3		MOIST		ROADWAY FILL - SOFT TO MEDIUM STIFF RED-BROWN MICACEOUS SILTY SANDY CLAY
	8.60	2	3	3	1.0	6		MOIST		
810.00	13.60	1	1	2	1.0	3		M/W		ALLUVIUM - VERY LOOSE GRAY SAND
	18.60	3	6	7	1.0	13	SS-8	SAT.		MEDIUM DENSE GRAY SAND WITH GRAVEL
800.00	23.60	26	28	20	1.0	48	SS-9	DRY		RESIDUAL - DENSE TO VERY DENSE GRAY-WHITE SILTY SAND
	28.60	18	66	34	0.6	100				
791.40						AUGER REFUSAL ON CRYSTALLINE ROCK AT ELEVATION 791.4 FEET				WEATHERED ROCK

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

Sheet 9

PROJECT NO 33467.1.1	**ID** B-4112	**COUNTY** FORSYTH	**GEOLOGIST** J.K. STICKNEY
SITE DESCRIPTION BRIDGE #30 ON HIGHWAY 1631 OVER MUDDY CREEK			**GND WATER**
BORING NO EB2-B	**NORTHING** 0.00	**EASTING** 0.00	**0 HR** 14.70ft
ALIGNMENT L	**BORING LOCATION** 17+07.000	**OFFSET** 9.50ft RT	**24 HR** ~~N/A~~ N.M.
COLLAR ELEV 821.29ft	**TOTAL DEPTH** 27.10ft	**START DATE** 3/09/06	**COMPLETION DATE** 03/09/06
DRILL MACHINE CME-550X	**DRILL METHOD** H.S. AUGERS		**HAMMER TYPE** AUTOMATIC
SURFACE WATER DEPTH N/A	**DEPTH TO ROCK** 27.10ft		Log EB2-B, Page 1 of 1

ELEV	DEPTH	BLOW CT 6in	6in	6in	PEN (ft)	BLOWS PER FOOT 0 25 50 75 100	SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
821.29						Ground Surface				
	3.60	0	0	2	1.0	2	SS-7	MOIST		ROADWAY FILL - VERY SOFT TO MEDIUM STIFF RED-BROWN MICACEOUS SILTY SANDY CLAY
	8.60	2	3	3	1.0	6		MOIST		
810.00	13.60	1	1	1	1.0	2		M/W		ALLUVIUM - VERY LOOSE GRAY SAND
	18.60	3	12	70	1.0	82		WET		RESIDUAL - VERY DENSE GRAY-TAN-WHITE SILTY SAND
800.00	23.60	41	59		0.9	100/2				
794.19						AUGER REFUSAL ON CRYSTALLINE ROCK AT ELEVATION 794.19 FEET				WEATHERED ROCK

M & T Form 503

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY
MATERIALS & TESTS UNIT
SOILS LABORATORY

T. I. P. No. B-4112

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project	33467.1.1	**County**	FORSYTH	**Owner**	
Date: Sampled		**Received**	3/15/06	**Reported**	3/17/2006
Sampled from	BRIDGE			**By**	J E BEVERLY
Submitted by	N WAINAINA				1995 **Standard Specifications**

728692 TO 728700
7/5/06

TEST RESULTS

Proj. Sample No.		SS-1	SS-2	SS-3	SS-4	SS-5	SS-6
Lab. Sample No.		728692	728693	728694	728695	728696	728697
Retained #4 Sieve	%	-	-	-	-	-	-
Passing #10 Sieve	%	100	100	100	100	95	92
Passing #40 Sieve	%	92	87	91	93	80	69
Passing #200 Sieve	%	69	8	36	70	38	24

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%							
Coarse Sand Ret - #60	%	14.9	62.4	20.7	12.1	31.0	42.5
Fine Sand Ret - #270	%	19.5	31.0	51.3	21.7	35.0	37.6
Silt 0.05 - 0.005 mm	%	11.3	4.6	23.9	17.9	15.9	15.9
Clay < 0.005 mm	%	54.3	2.0	4.0	48.3	18.1	4.0
Passing #40 Sieve	%	-	-	-	-	-	-
LOCATION	%	EB1-A	EB1-A	EB1-A	EB1-B	EB1-B	EB1-B

L. L.	57	25	49	67	32	26
P. I.	33	NP	NP	24	11	NP
AASHTO Classification	A-7-6(22)	A-3(0)	A-5(0)	A-7-5(19)	A-6(1)	A-2-4(0)
Station	16+07	16+07	16+07	16+09	16+09	16+09
OFFSET	10.5 LT	10.5 LT	10.5 LT	14.1 RT	14.1 RT	14.1 RT
ALIGNMENT	L	L	L	L	L	L
Depth (Ft)	9.50	14.50	19.50	4.00	9.00	19.00
to	10.50	15.50	20.50	5.00	10.00	20.00

cc: J E BEVERLY
Soils File

Soils Engineer

M & T Form 503

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY
MATERIALS & TESTS UNIT
SOILS LABORATORY

T. I. P. No. B-4112

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project	33467.1.1	**County**	FORSYTH	**Owner**	
Date: Sampled		**Received**	3/15/06	**Reported**	3/17/2006
Sampled from	BRIDGE			**By**	J E BEVERLY
Submitted by	N WAINAINA				1995 **Standard Specifications**

728692 TO 728700
7/5/06

TEST RESULTS

Proj. Sample No.		SS-7	SS-8	SS-9			
Lab. Sample No.		728698	728699	728700			
Retained #4 Sieve	%	-	19	6			
Passing #10 Sieve	%	99	70	88			
Passing #40 Sieve	%	85	25	58			
Passing #200 Sieve	%	60	5	20			

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%							
Coarse Sand Ret - #60	%	21.7	77.7	50.1			
Fine Sand Ret - #270	%	21.5	16.5	33.2			
Silt 0.05 - 0.005 mm	%	18.5	3.8	14.7			
Clay < 0.005 mm	%	38.2	2.0	2.0			
Passing #40 Sieve	%	-	-	-			
LOCATION	%	EB2-A	EB2-A	EB2-A			

L. L.	57	22	24			
P. I.	27	NP	NP			
AASHTO Classification	A-7-5(15)	A-1-b(0)	A-2-4(0)			
Station	17+07	17+07	17+07			
OFFSET	9.5 RT	10.5 RT	10.5LT			
ALIGNMENT	L	L	L			
Depth (Ft)	4.10	19.10	24.10			
to	5.10	20.10	25.10			

Soils Engineer

33467.1.1 (B-4112)
FORSYTH COUNTY
BRIDGE # 30 ON SR 1631 OVER MUDDY CREEK

SITE PHOTOS

Looking West (creek flowing right to left)

Looking downstream (South)

GEOTECHNICAL UNIT FIELD SCOUR REPORT

PROJECT: *33467.1.1* TIP NO.: *B-4112* COUNTY: *Forsyth*

DESCRIPTION(1): *Bridge #30 on SR 1631 ove rMuddy Creek*

♦ ***INFORMATION ON EXISTING BRIDGES*** Information obtained from ☒ Field Inspection
☐ Microfilm (Reel: Position:)
☐ Other

COUNTY BRIDGE NO. *30* BRIDGE LENGTH *80'* NO. BENTS *3* NO. BENTS IN: CHANNEL *1* FLOODPLAIN *3*

FOUNDATION TYPE: *Timber piles and timber caps - timber abutments*

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: *Erosion from runoff on upstream side of EB1 and downstream side of EB2*

INTERIOR BENTS: *None*

CHANNEL BED: *None*

CHANNEL BANKS: *Undercut with trees leaning toward creek channel*

♦ ***EXISTING SCOUR PROTECTION:***

TYPE(3): *None*

EXTENT(4): *N/A*

EFFECTIVENESS(5): *N/A*

OBSTRUCTIONS(6) (DAMS, DEBRIS, ETC.): *Logs, limbs, branches on upstream side at Bent 1*

♦ ***DESIGN INFORMATION***

CHANNEL BED MATERIAL(7) (Sample Results Attached): *Coarse sand (A-1-b) Ref. SS-8*

CHANNEL BANK MATERIAL(8) (Sample Results Attached): *Sand (A-3) Ref. SS-2*

CHANNEL BANK COVER(10): *Trees, shrubs and grass*

FLOOD PLAIN WIDTH(11): *appx. 250' (to station 17+50)*

FLOOD PLAIN COVER(12): *trees, grass and shrubs*

STREAM IS: ☒ DEGRADING ☐ AGGRADING (13)

OTHER OBSERVATIONS AND COMMENTS: *Interior bent piles have been repaired*

♦

♦

♦

♦ ***DESIGN INFORMATION CONT.***

CHANNEL MIGRATION TENDENCY(14): *moderate to high*

GEOTECHNICAL ADJUSTED SCOUR ELEVATIONS (15):

NCDOT Hydro Report predicts Q100 maximum channel scour at elevation 798 feet. Proposed bridge is a larger single span design. No End Bent scour is anticipated.

REPORTED BY: *JKS / JEB* DATE: *April 2006*

INSTRUCTIONS

(1) GIVE THE DESCRIPTION OF THE SPECIFIC SITE GIVING ROUTE NUMBER AND BODY OF WATER CROSSED.
(2) NOTE ANY EVIDENCE OF SCOUR AT THE EXISTING END BENTS OR ABUTMENTS (UNDERMINING, SLOUGHING, SCOUR LOCATIONS DEGRADATIONS, ETC.)
(3) NOTE ANY EXISTING SCOUR PROTECTION (RIPRAP, ETC.)
(4) DESCRIBE THE EXTENT OF ANY EXISTING SCOUR PROTECTION.
(5) DESCRIBE WHETHER OR NOT THE SCOUR PROTECTION APPEARS TO BE WORKING.
(6) NOTE ANY DAMS, FALLEN TREES, DEBRIS AT BENTS, ETC.
(7) DESCRIBE THE CHANNEL BED MATERIAL; A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
(8) DESCRIBE THE CHANNEL BANK MATERIAL; A SAMPLE SHOULD BE TAKEN FOR GRAIN SIZE DISTRIBUTION, ATTACH LAB RESULTS.
(9) DESCRIBE THE FOUNDATION BEARING MATERIAL
(10) DESCRIBE THE BANK COVERING (GRASS, TREES, RIPRAP, NONE, ETC.)
(11) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
(12) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
(13) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING.
(14) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE LATERALLY DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
(15) GIVE THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION EXPECTED OVER THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS). THIS CAN BE GIVEN AS AN ELEVATION RANGE ACROSS THE SITE, OR ON A BENT BY BENT BASIS WHERE VARIATIONS EXIST. DISCUSS RELATIONSHIP BETWEEN THE HYDRAULICS THEORETICAL SCOUR AND THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION. IF THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION IS DEPENDENT ON SCOUR COUNTER MEASURES, EXPLAIN. (RIPRAP ARMORING ON SLOPES, ETC.) THE GEOTECHNICAL ADJUSTED SCOUR ELEVATION IS BASED ON THE ERODABILITY OF MATERIALS WITH CONSIDERATION FOR JOINTING, FOLIATION, BEDDING ORIENTATION AND FREQUENCY; CORE RECOVERY PERCENTAGE; PERCENT RQD; DIFFERENTIAL WEATHERING; SHEAR STRENGTH; OBSERVATIONS AT EXISTING STRUCTURES; OTHER TESTS DEEMED APPROPRIATE; AND OVERALL GEOLOGIC CONDITIONS AT THE SITE.