

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	33622.1.1 (B-4282)	1	20

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STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 33622.1.1 (B-4282) F.A. PROJ. BRSTP-0066(1)
 COUNTY STOKES
 PROJECT DESCRIPTION BRIDGE 54 ON NC 66 OVER PINCH GUT CREEK

SITE DESCRIPTION _____

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.

PROJECT: 33622.1.1 ID: B-4282

PERSONNEL

LITTLE

MURRAY

ESTEP

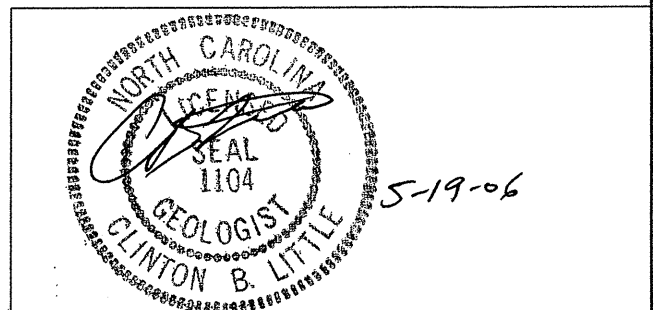
HARPER

INVESTIGATED BY MURRAY/LITTLE

CHECKED BY LITTLE

SUBMITTED BY LITTLE

DATE MAY, 2006



DRAWN BY: LITTLE

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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
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STRUCTURE
SUBSURFACE INVESTIGATION

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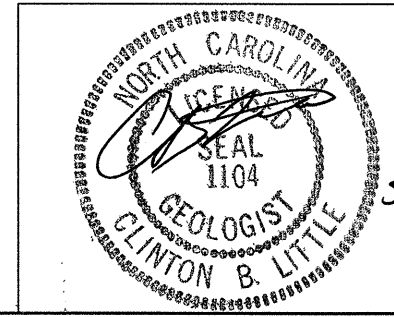
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PROJECT: 33622.1.1 ID: B-4282

PERSONNEL

- LITTLE
- MURRAY
- ESTEP
- HARPER

INVESTIGATED BY MURRAY/LITTLE
 CHECKED BY LITTLE
 SUBMITTED BY LITTLE
 DATE MAY, 2006



5-19-06

DRAWN BY: LITTLE

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. 33622.1.I (B-4282)	SHEET NO. 2
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SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
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: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>	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.	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 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. COASTAL PLAIN SEDIMENTARY ROCK (CPS) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.	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 DISLOADED 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.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	WEATHERING	
GENERAL CLASS. GRANULAR MATERIALS (< 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> 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. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i> 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. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> 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.	
COMPRESSIONIBILITY	PERCENTAGE OF MATERIAL	GROUND WATER	
SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	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	▽ 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	
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	ROCK HARDNESS	
PRIMARY SOIL TYPE COMPACTNESS OR PENETRATION RESISTANCE RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT ²)	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SOUNDING ROD	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 FINGER NAIL.	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 SPT CPT TEST BORING SPT DMT SPT VST SPT PHT AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION SPT N-VALUE SPT REFUSAL
TEXTURE OR GRAIN SIZE	ABBREVIATIONS	FRACUTURE SPACING	BEDDING
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053	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 ? - UNIT WEIGHT γ _d - DRY UNIT WEIGHT	VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.6 TO 1 FEET VERY CLOSE LESS THAN 0.6 FEET	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
SOIL MOISTURE - CORRELATION OF TERMS	EQUIPMENT USED ON SUBJECT PROJECT	INDURATION	
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	DRILL UNITS: MOBILE B-51, BK-51, CME-45C, CME-550, PORTABLE HOIST ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE STEEL TEETH, TRICONE TUNG-CARB., CORE BIT HAMMER TYPE: AUTOMATIC, MANUAL CORE SIZE: B, N, X, H HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST	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 VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.6 TO 1 FEET VERY CLOSE LESS THAN 0.6 FEET THICKNESS > 4 FEET 1.5 - 4 FEET 0.16 - 1.5 FEET 0.03 - 0.16 FEET 0.008 - 0.03 FEET < 0.008 FEET
PLASTICITY			
NONPLASTIC 0-5 DRY STRENGTH 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.			
			BENCH MARK: B4282-GPS-1N 992,177.5560 E 1,596,538.4670 -BYI- Sta 7+91.8=-BL- Sta 8+29.91 ELEVATION: 926.76 FT. NOTES:



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

May 12, 2006

STATE PROJECT: 33622.1.1 (B-4282)
FEDERAL PROJECT: BRSTP-0066(1)
COUNTY: Stokes
DESCRIPTION: Bridge 54 on NC 66 over Pinch Gut Creek
SUBJECT: Geotechnical Report – Bridge Foundation Investigation

The project is located in northwestern Stokes County, near the intersection of NC 66 and SR 1467. It is a bridge replacement project with an off-site detour. The proposed replacement structure is a three span bridge (1@45', 1@90', 1@30') with an overall width of 36'.

The Geotechnical investigation was conducted in March 2006 utilizing a CME-550 drill with NW casing and 2-7/8" roller cone bit on a casing advancer with water and NXWL rock coring tools, or 8" hollow stem augers. We conducted a total of eight borings, two at each proposed bent location. Rock core samples were obtained from Bent One.

The bridge crosses Pinch Gut Creek. The stream channel is about 40' wide at this point, with a floodplain approximately 450 to 500' wide. Depth of water at the time of our investigation was about one foot. The water surface elevation was 912.05'. The 100 year flood elevation is 928.3'. The roadway elevation is about 929'. Groundwater readings in the open boreholes were near elevation 913'.

The project area is in the western piedmont/foothills region of North Carolina. Geologically, it is in the Smith River Allochthon. The allochthon is a fault bounded tectonic block containing primarily biotite gneiss rocks with some amphibolite. Rock cores obtained on the project were mostly biotite gneiss.

Foundation Materials

The hard rock line falls significantly from End Bent One toward End Bent Two. Typical depth to rock was:

End Bent One – 15'

Bent One – 30'

Bent Two – 45'

End Bent Two: 50'

There is a thick layer of weathered rock at Bent Two. More detailed descriptions by Bent follow.

End Bent One:

The left side boring was conducted on the shoulder of the existing roadway and the right side near the toe of the existing slope. The existing roadway embankment fill is twelve feet thick and consists of loose silty

3/20
sand with gravel and cobbles. The fill rests on an alluvial layer of saturated sand and gravel, five thick. Below the alluvium is a one to three foot layer of very dense residual sand and/or weathered rock. Both borings terminated with auger refusal on rock. The top of rock elevation was 909.2' at EB1-A and 905.8' at EB1-B.

Static groundwater in the boreholes was at elevation 912.5' and 909.5'.

Bent One:

The borings were conducted just outside of the existing bridge, at the floodplain elevation. The surface layer is alluvial sand and gravel, five feet thick. The residual soil is saprolite of mica gneiss, micaceous silty sand and sandy silt. Soil density is variable. Standard Penetration Test blow counts ranged from 10 to 93. A one foot seam of rock was penetrated in boring B1-A, underlain by dense to medium dense silty sand soil. The overall thickness of the soil layer is 22' to 26'. Below the residual soil, hard rock was encountered at elevations 884 –887'. Below the top of rock, the borings were advanced with rock coring techniques. Core samples obtained were largely biotite gneiss with a small layer of amphibolite. Core recovery was generally good, greater than 90% in 7 of 10 core runs. There was a seven foot layer with low recovery values in the middle portion of the core sequence at B1-B. RQD values were universally low, influenced by parting along the gneissic foliation at 30° and to a lesser extent by weathering and high angle joint sets.

Static groundwater occurred in the alluvial layer near elevation 912'.

Bent Two:

The borings were conducted on the floodplain outside of the existing bridge/roadway. They were offset more than the optimal distance due to conflict with the existing wingwalls. Alluvial soils were present from the surface to depths of ten and six feet. The sediment consisted of loose silty sand grading to sand and gravel. The top of the residual soil was encountered between elevation 908' and 911'. The residual soil is saprolite of biotite gneiss, micaceous sandy silt and silty sand. Soil density increased with depth to the weathered rock horizon. Thickness of the residual soil layer was 17' to 24'. The top of weathered rock was encountered at elevation 891' left and 887' right. The borings were advanced through weathered rock (and crystalline rock as defined by SPT refusal) by rotary/roller bit methods. Rock core drilling was not required or performed. Both borings were terminated around elevation 864 in material yielding SPT refusal, but neither boring achieved auger/roller bit refusal.

Static groundwater was not measured but is assumed to occur in the alluvial layer near elevation 912'.

End Bent Two

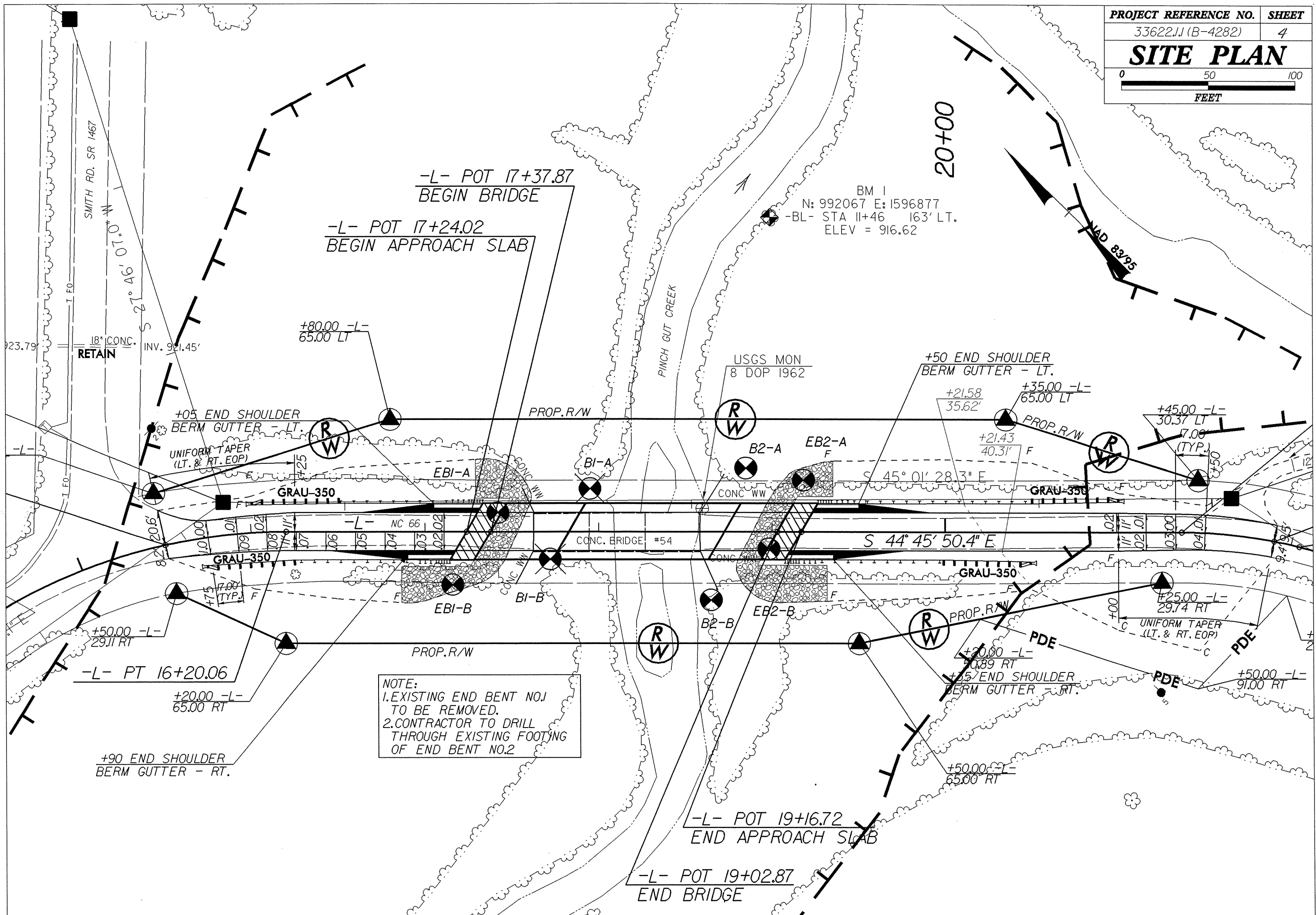
One boring was performed through the existing roadway embankment and the other at the toe of the slope. The fill thickness was 17' in the boring, but the typical fill height is about 12' based on the topography. The same alluvial layer encountered in all borings was present, here about 10' of loose sand with gravel at the base. The residual soil is again saprolite of gneiss, micaceous silty sand. The residual soil thickness was 25' to 30'. Both borings encountered hard rock (SPT and/or auger refusal) near elevation 880.

Static groundwater was at elevation 912'- 913'.

Respectfully submitted,

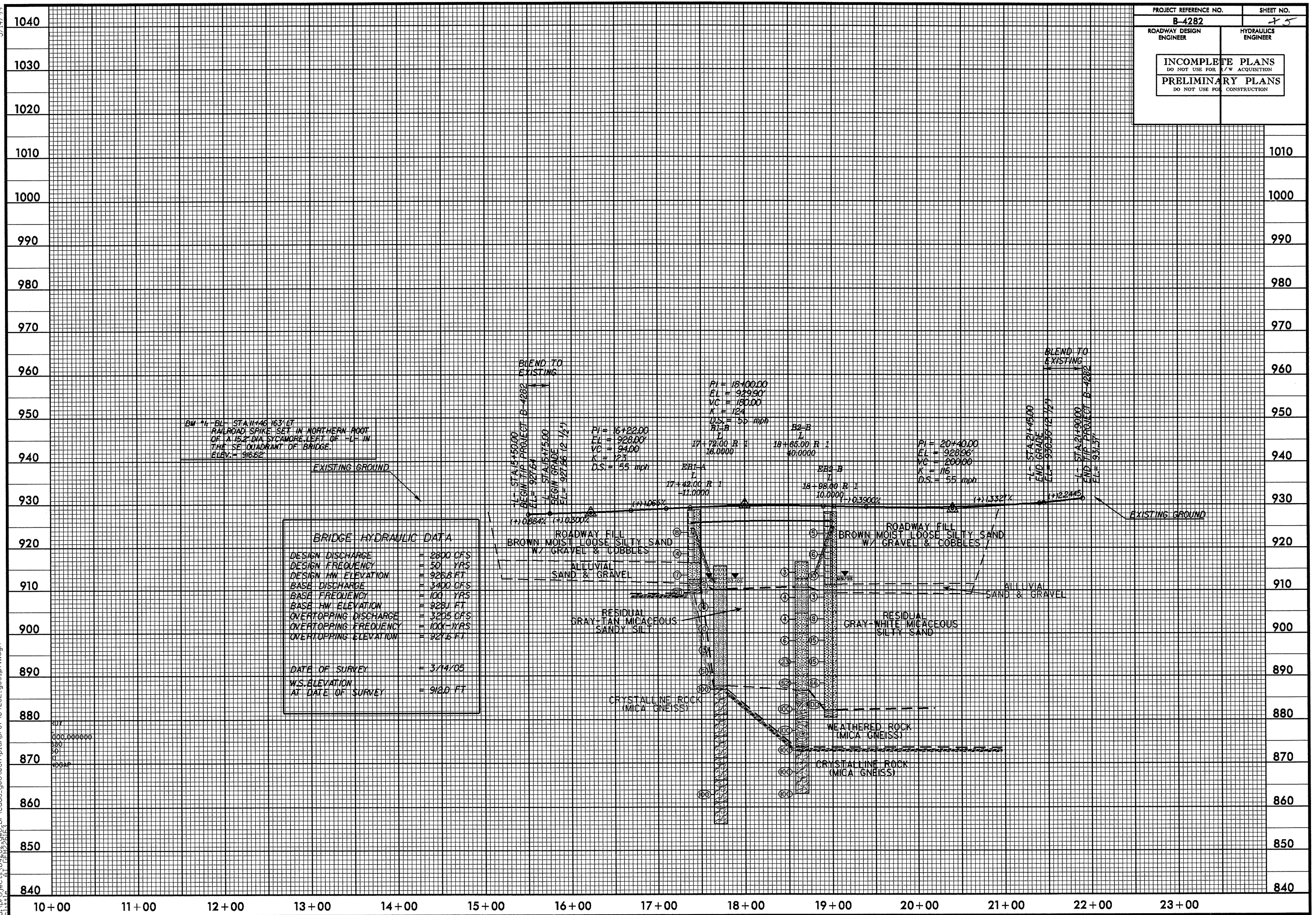
Clint Little

Project Engineering Geologist



NOTE:
 1. EXISTING END BENT NO.1
 TO BE REMOVED.
 2. CONTRACTOR TO DRILL
 THROUGH EXISTING FOOTING
 OF END BENT NO.2

05-MAY-2006 14:48
 d:\projects\B282\B282\B282\cadd-geotech\planproj\B4282-geo-pl1.dgn
 5/14/99



BM 14-BL STA 11+46.163 LT
 RAILROAD SPIKE SET IN NORTHERN FOOT
 OF LA 152" DIA SYCAMORE, LEFT OF -L- IN
 THE SE QUADRANT OF BRIDGE.
 ELEV. = 916.62

BRIDGE HYDRAULIC DATA	
DESIGN DISCHARGE	= 2800 CFS
DESIGN FREQUENCY	= 50 YRS
DESIGN HW ELEVATION	= 926.8 FT
BASE DISCHARGE	= 3400 CFS
BASE FREQUENCY	= 100 YRS
BASE HW ELEVATION	= 926.1 FT
OVERTOPPING DISCHARGE	= 3205 CFS
OVERTOPPING FREQUENCY	= 100 YRS
OVERTOPPING ELEVATION	= 921.6 FT
DATE OF SURVEY	= 3/14/05
W.S. ELEVATION AT DATE OF SURVEY	= 918.0 FT

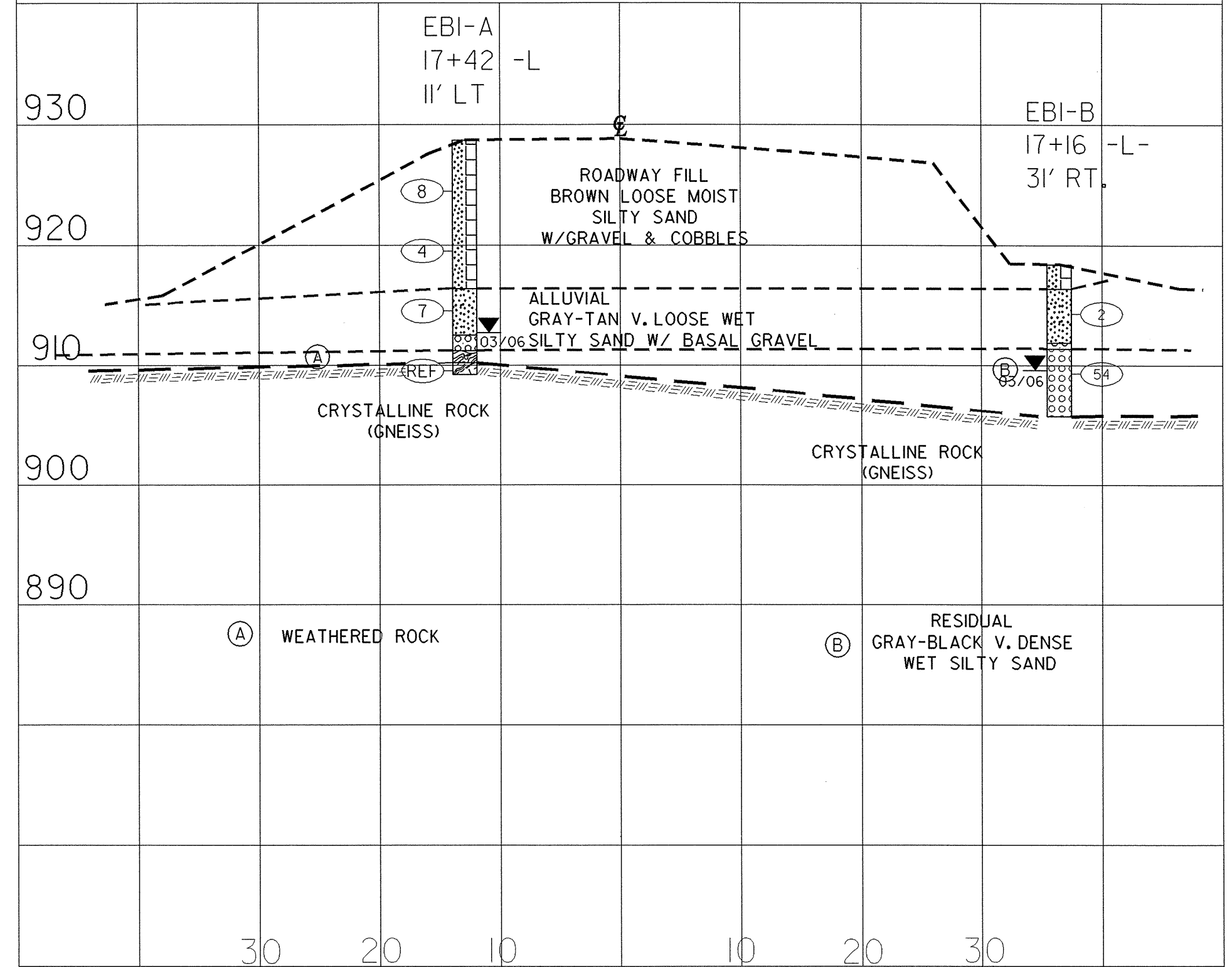
BLEND TO EXISTING
 STA 15+00
 BEGIN TYP PROJECT B-4282
 EL = 927.61
 STA 16+15.00
 BEGIN GRADE
 EL = 927.66 (2 1/2')
 PI = 16+22.00
 EL = 928.00
 VC = 94.00
 K = 123
 D.S. = 55 mph
 B1-A
 I
 17+42.00 R 1
 -11.0000
 B2-A
 I
 17+72.00 R 1
 16.0000
 PI = 18+00.00
 EL = 929.90
 VC = 180.00
 K = 124
 U.S. = 50 mph
 B1-B
 I
 18+66.00 R 1
 40.0000
 B2-B
 I
 18+98.00 R 1
 10.0000
 PI = 20+40.00
 EL = 928.06
 VC = 200.00
 K = 116
 D.S. = 55 mph
 STA 21+45.00
 END GRADE
 EL = 926.56 (2 1/2')
 STA 21+90.00
 END TYP PROJECT B-4282
 EL = 931.37

ROADWAY FILL
 BROWN MOIST LOOSE SILTY SAND
 W/ GRAVEL & COBBLES
 ALLUVIAL SAND & GRAVEL
 RESIDUAL GRAY-TAN MICACEOUS SANDY SILT
 CRYSTALLINE ROCK (MICA GNEISS)

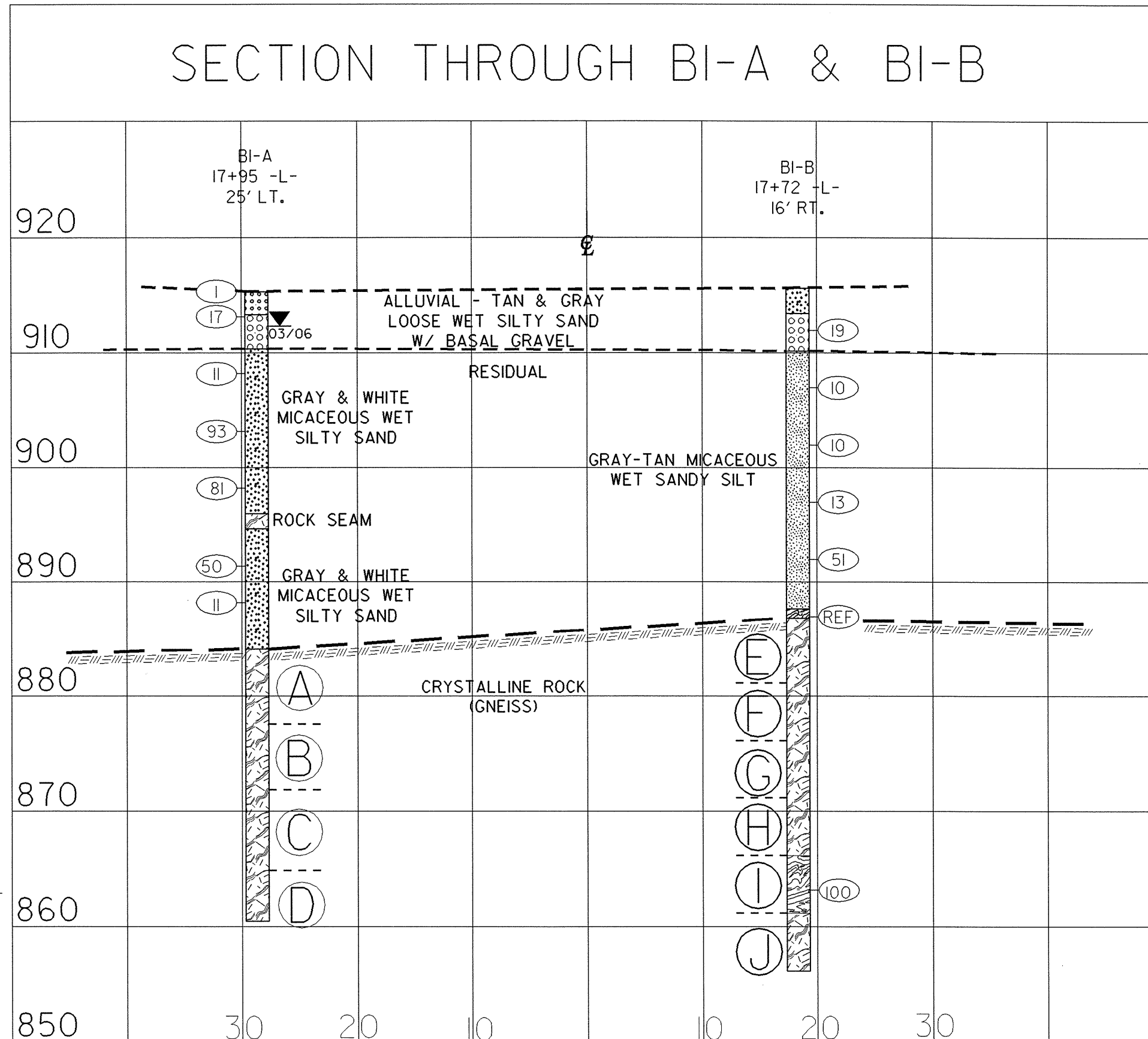
ROADWAY FILL
 BROWN MOIST LOOSE SILTY SAND
 W/ GRAVEL & COBBLES
 ALLUVIAL SAND & GRAVEL
 RESIDUAL GRAY-WHITE MICACEOUS SILTY SAND
 WEATHERED ROCK (MICA GNEISS)
 CRYSTALLINE ROCK (MICA GNEISS)

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 880
 80
 0
 8684

SECTION THROUGH EBI-A & EBI-B



SECTION THROUGH BI-A & BI-B



- (A)** BIOTITE GNEISS
SEV. TO MOD. WEATHERED
REC=76% RQD=0
FRACTURE SPACING = CLOSE
ALL BREAKS ON 30 DEG. FOLIATION

- (B)** BIOTITE GNEISS SLI. WEATHERED
REC= 96% RQD=0
FRACTURE SPACING = CLOSE
25 BREAKS ON 30 DEG. FOLIATION,
3 JOINTS @ 75 DEG.

- (C)** BIOTITE GNEISS
V. SLI. WEATHERED
REC=83% RQD=14%
ALL BREAKS ON 30 DEG. FOLIATION

- (D)** BIOTITE GNEISS
SLITO V. SLIWEATH.
REC=98% RQD=0
FRAC. SPACING=CLOSE
25 BREAKS ON FOL, 1JT@80, 1@60

- (E)** BIOTITE GNEISS
SEV. TO MOD. WEATHERED
REC=92% RQD=58%
FRACTURE SPACING = CLOSE
ALL BREAKS ON FOLIATION

- (F)** BIOTITE GNEISS
SEV. TO MOD. WEATHERED
REC=96% RQD=40%
FRACTURE SPACING = CLOSE
ALL BREAKS ON FOLIATION

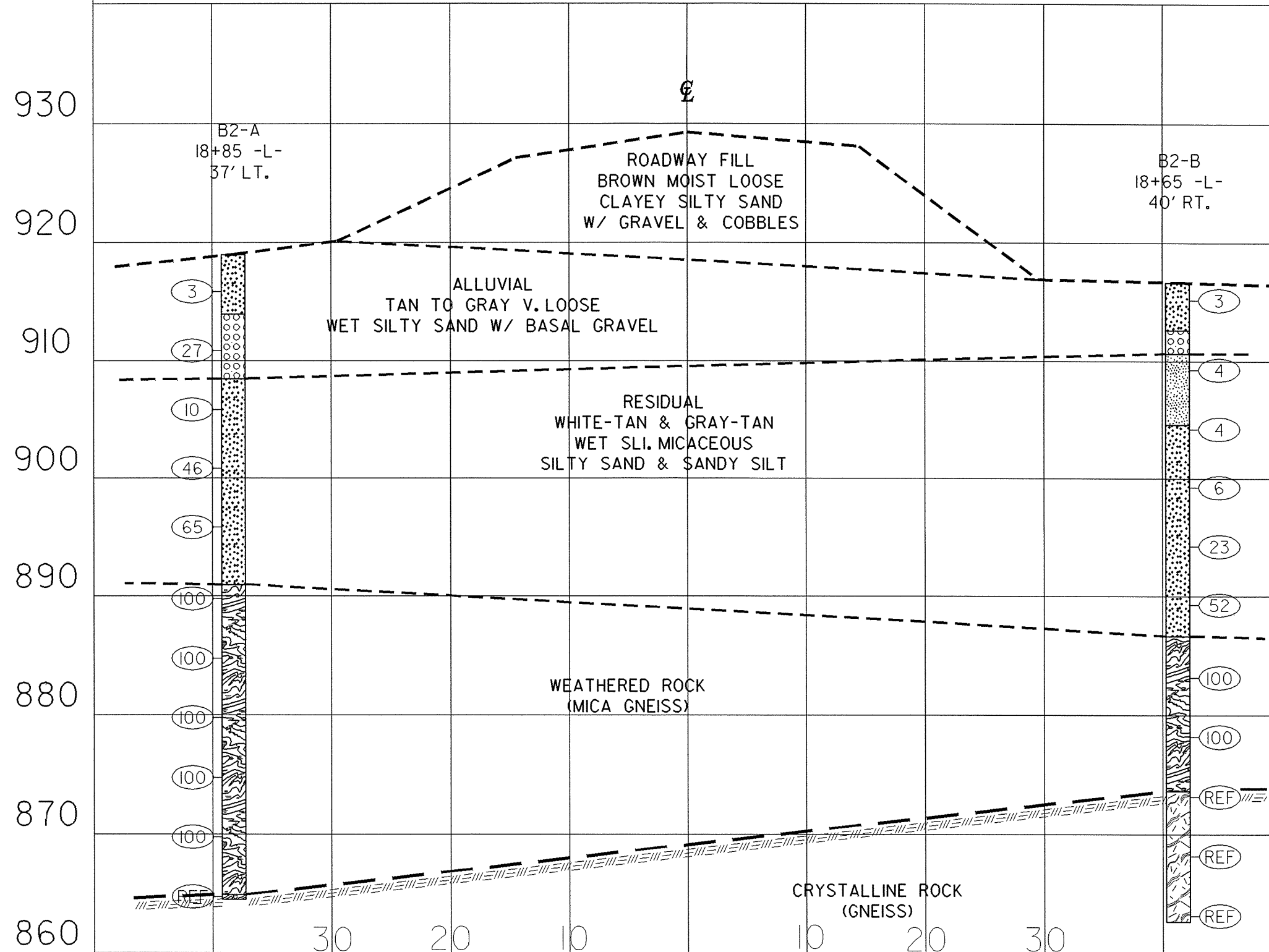
- (G)** BIOTITE GNEISS
SEV. TO MOD. WEATHERED
REC=96% RQD=46%
FRACTURE SPACING = CLOSE
ALL BREAKS ON FOLIATION

- (H)** BIOTITE GNEISS
SEV. TO MOD. WEATHERED
REC=34% RQD=0%
FRAC. SPACING = CLOSE
MOST BREAKS ON FOLIATION
2 JOINTS NEAR VERTICAL

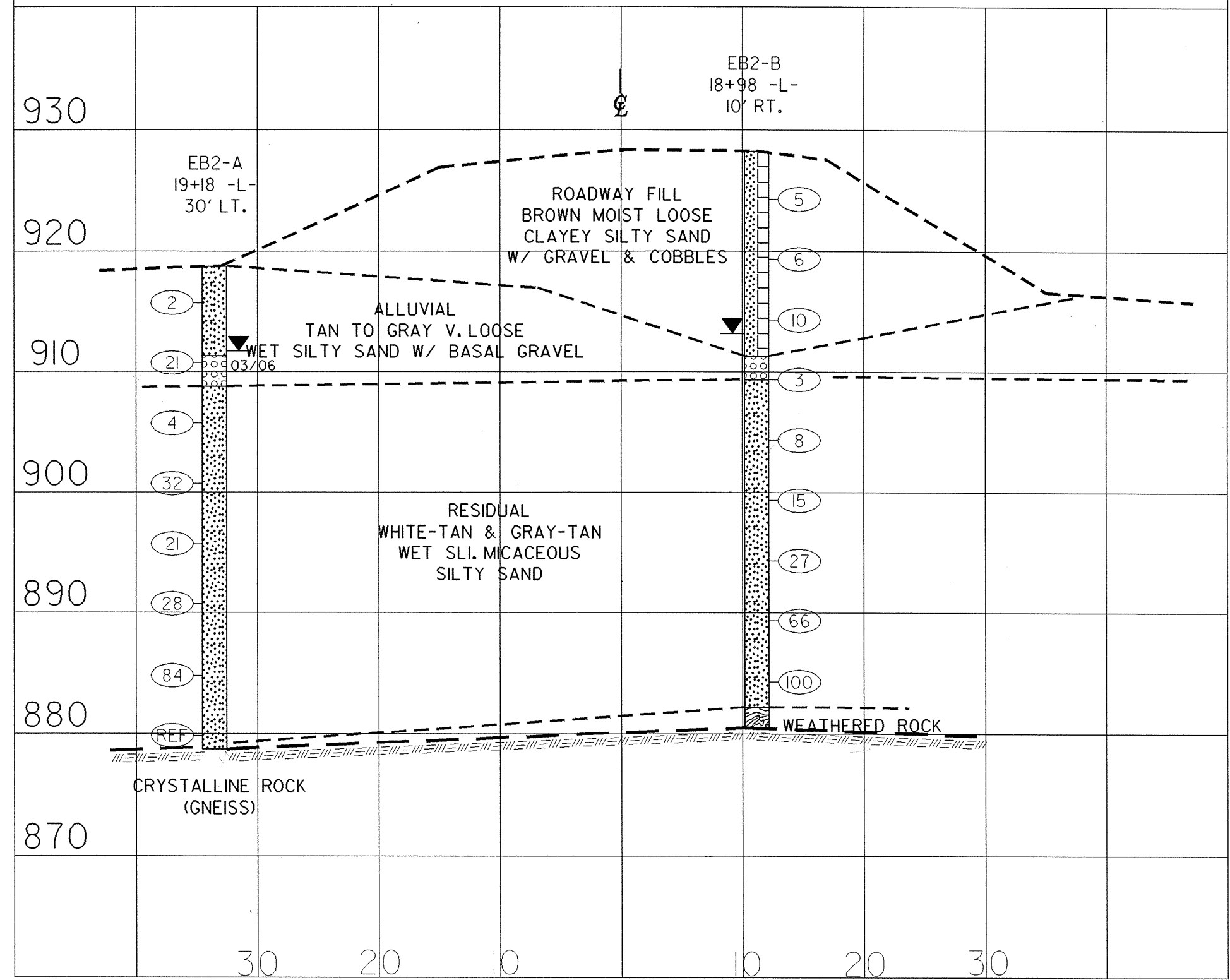
- (I)** TOP 2.5 NO REC
BOT 1.7' AMPHIBOLITE
SEV. WEATHERED
REC=100% RQD=0%

- (J)** BIOTITE GNEISS
SEV. TO MOD. WEATHERED
REC=96% RQD=44%
FRAC. SPACING = CLOSE
BREAKS ON FOLIATION
2 JOINTS NEAR VERT

SECTION THROUGH B2-A & B2-B



SECTION THROUGH EB2-A & EB2-B



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33622.1.1		ID B-4282		COUNTY STOKES		GEOLOGIST MURRAY						
SITE DESCRIPTION BRIDGE 54 OVER PINCH GUT CREEK ON NC 66							GND WATER					
BORING NO EB1-A		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT L		BORING LOCATION 17+42.000		OFFSET 11.00ft LT		24 HR 16.00ft						
COLLAR ELEV 928.71ft		TOTAL DEPTH 19.50ft		START DATE 3/29/06		COMPLETION DATE 03/29/06						
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK 18.50ft			Log EB1-A, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
928.71												Ground Surface
	4.20	3	3	5	1.0					SS-17	M	TAN TO MOIST LOOSE OLIVE CLAYEY SILTY SAND (ROADWAY FILL)
	9.20	2	2	2	1.0						M	TAN TO GRAY V. LOOSE WET SILTY SAND (ALLUVIUM)
	14.20	2	3	4	1.0							TAN & GRAY LOOSE WET SILTY SAND (ALLUVIUM)
918.00	19.20	100			0.1							GRAVEL
909.21												WEATHERED ROCK (GNEISS)
												CRYSTALLINE ROCK (GNEISS)

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33622.1.1		ID B-4282		COUNTY STOKES		GEOLOGIST MURRAY						
SITE DESCRIPTION BRIDGE 54 OVER PINCH GUT CREEK ON NC 66							GND WATER					
BORING NO EB1-B		NORTHING 0.00		EASTING 0.00		0 HR N/A						
ALIGNMENT L		BORING LOCATION 17+16.000		OFFSET 31.00ft RT		24 HR 8.80ft						
COLLAR ELEV 918.39ft		TOTAL DEPTH 12.60ft		START DATE 3/28/06		COMPLETION DATE 03/28/06						
DRILL MACHINE CME-550			DRILL METHOD H.S. AUGERS			HAMMER TYPE AUTOMATIC						
SURFACE WATER DEPTH			DEPTH TO ROCK 12.60ft			Log EB1-B, Page 1 of 1						
ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
918.39												Ground Surface
	4.10	0	1	1	1.0					SS-15	M	BRN MOIST LOOSE OLIVE CLAYEY SILTY SAND (ROADWAY FILL)
	9.10	24	39	15	1.0						W	TAN TO GRAY V. LOOSE WET SILTY SAND (ALLUVIUM)
	905.79										W	GRAY TO BLK V. DENSE WET SILTY SAND (RESIDUAL)
												GRAVEL
												AUGER REFUSAL ON ROCK AT 12.6' ELEVATION 905.79

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33622.1.1	ID B-4282	COUNTY STOKES	GEOLOGIST MURRAY
SITE DESCRIPTION BRIDGE 54 OVER PINCH GUT CREEK ON NC 66			GND WATER
BORING NO B1-A	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT L	BORING LOCATION 17+95.000	OFFSET 25.00ft LT	24 HR N/A
COLLAR ELEV 915.38ft	TOTAL DEPTH 54.90ft	START DATE 3/16/06	COMPLETION DATE 03/16/06
DRILL MACHINE CME 550	DRILL METHOD NWCAS/NXWL	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH		DEPTH TO ROCK N/A	

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
915.38	0.00	1	1	0	1.0							Ground Surface
	2.20	12	8	9	1.0					SS-5	D	ALLUVIAL WHITE V. LOOSE SAND
	7.20	3	4	7	1.0					SS-6	W	GRAY SAND & GRAVEL
	12.20	21	48	45	1.0							RESIDUAL GRAY-WHITE SLI. MICACEOUS SILTY SAND
	17.20	15	33	48	1.0						W	MOD. SEV. WEATHERED BIOTITE GNEISS
	24.00	39	27	23	1.0							RESIDUAL GRAY-WHITE SLI. MICACEOUS SILTY SAND
	27.20	5	5	6	1.0					SS-7	W	BIOTITE GNEISS SEV. TO MOD. WEATHERED REC=76% RQD=0 FRACTURE SPACING = CLOSE ALL BREAKS ON 30 DEG. FOLIATION
												BIOTITE GNEISS SLI. WEATHERED REC= 96% RQD=0 FRACTURE SPACING = CLOSE 25 BREAKS ON 30 DEG. FOLIATION, 3 JOINTS @ 75 DEG.
												BIOTITE GNEISS V. SLI. WEATHERED REC=83% RQD=14% ALL BREAKS ON 30 DEG. FOLIATION
												BIOTITE GNEISS SLI TO V. SLI WEATH. REC=98% RQD=0 FRAC. SPACING=CLOSE 25 BREAKS ON FOL, 1 JT@80, 1@60

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33622.1.1	ID B-4282	COUNTY STOKES	GEOLOGIST MURRAY
SITE DESCRIPTION BRIDGE 54 OVER PINCH GUT CREEK ON NC 66			GND WATER
BORING NO B1-A	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT L	BORING LOCATION 17+95.000	OFFSET 25.00ft LT	24 HR N/A
COLLAR ELEV 915.38ft	TOTAL DEPTH 54.90ft	START DATE 3/16/06	COMPLETION DATE 03/16/06
DRILL MACHINE CME 550	DRILL METHOD NWCAS/NXWL	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH		DEPTH TO ROCK N/A	

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75			
860.48												TERMINATED IN CRYSTALLINE ROCK AT 54.9' ELEVATION 860.48

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33622.1.1	ID B-4282	COUNTY STOKES	GEOLOGIST MURRAY
SITE DESCRIPTION BRIDGE 54 OVER PINCH GUT CREEK ON NC 66			GND WATER
BORING NO B1-B	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT L	BORING LOCATION 17+72.000	OFFSET 16.00ft RT	24 HR 3.00ft
COLLAR ELEV 915.68ft	TOTAL DEPTH 59.50ft	START DATE 3/15/06	COMPLETION DATE 03/15/06
DRILL MACHINE CME-550	DRILL METHOD NWCAS/NXWL	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH		DEPTH TO ROCK 28.80ft	

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION				
		6in	6in	6in		0	25	50	75	100								
915.68																		
																	Ground Surface	
	3.70	11	10	9	1.0										SS-1	W	GRAY LOOSE MOIST TO WET SAND W/ GRAVEL AT BOTTOM (ALLUVIUM)	
	8.70	5	4	6	1.0										SS-2	W	GRAY TAN STIFF TO HARD WET SANDY SILT (RESIDUAL)	
	13.70	7	5	5	1.0													
	18.70	10	6	7	1.0													
	23.70	6	10	41	1.0										SS-3	W		
	28.70	100			0.1										SS-4	W		
	28.70	100			0.1												WEATHERED ROCK	
																		BIOTITE GNEISS SEV. TO MOD. WEATHERED REC=92% RQD=58% FRACTURE SPACING CLOSE ALL BREAKS ON FOLIATION
																		BIOTITE GNEISS SEV. TO MOD. WEATHERED REC=96% RQD=40% FRACTURE SPACING = CLOSE ALL BREAKS ON FOLIATION
																		BIOTITE GNEISS SEV. TO MOD. WEATHERED REC=96% RQD= 46% FRACTURE SPACING = CLOSE ALL BREAKS ON FOLIATION
	52.50	100			0.3													BIOTITE GNEISS SEV. TO MOD. WEATHERED REC=34% RQD=0% FRACT SPACING = CLOSE ALL BREAKS ON FOLIATION 2 JOINTS NEAR VER
																		TOP 2.5 NO REC BOT 1.7' AMPHIBOLITE SEV. WEATHERED REC=100% RQD=0%
																		Continued on the next page

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33622.1.1	ID B-4282	COUNTY STOKES	GEOLOGIST MURRAY
SITE DESCRIPTION BRIDGE 54 OVER PINCH GUT CREEK ON NC 66			GND WATER
BORING NO B1-B	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT L	BORING LOCATION 17+72.000	OFFSET 16.00ft RT	24 HR 3.00ft
COLLAR ELEV 915.68ft	TOTAL DEPTH 59.50ft	START DATE 3/15/06	COMPLETION DATE 03/15/06
DRILL MACHINE CME-550	DRILL METHOD NWCAS/NXWL	HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH		DEPTH TO ROCK 28.80ft	

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT					SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION				
		6in	6in	6in		0	25	50	75	100								
861.68																		
860.00																		
856.18																		BIOTITE GNEISS SEV. TO MOD. WEATHERED REC=96% RQD=44% FRACT SPACING = CLOSE BREAKS ON FOLIATION 2 JOINTS NEAR VERT
																		TERMINATED IN CRYSTALLINE ROCK AT 59.5' ELEVATION 856.18

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33622.1.1		ID B-4282		COUNTY STOKES		GEOLOGIST MURRAY	
SITE DESCRIPTION BRIDGE 54 OVER PINCH GUT CREEK ON NC 66							GND WATER
BORING NO B2-A		NORTHING 0.00		EASTING 0.00		0 HR N/A	
ALIGNMENT L		BORING LOCATION 18+85.000		OFFSET 37.00ft LT		24 HR N/A	
COLLAR ELEV 918.96ft		TOTAL DEPTH 54.40ft		START DATE 3/22/06		COMPLETION DATE 03/22/06	
DRILL MACHINE CME 550			DRILL METHOD NWCAS/NXWL			HAMMER TYPE AUTOMATIC	
SURFACE WATER DEPTH			DEPTH TO ROCK N/A			Log B2-A, Page 1 of 1	

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75				
918.96													
													Ground Surface
	3.10	2	1	2	1.0								ALLUVIAL TAN SILTY SAND
	8.10	2	14	13	1.0								COARSE SAND & GRAVEL
	13.10	2	3	7	1.0								RESIDUAL GRAY-WHITE MICACEOUS SILTY SAND
	18.10	9	18	28	1.0								
	23.10	12	25	40	1.0								
	29.20	20	80		0.9								WEATHERED ROCK (BIOTITE-QUARTZ GNEISS)
	34.20	100			0.4								
	39.20	100			0.4								
	44.20	100			0.5								
	49.20	100			0.4								
	54.20	100			0.2								CRYSTALLINE ROCK (SPT REFUSAL)
						TERMINATED ON CRYSTALLINE ROCK (SPT REFUSAL) AT 54'-4" ELEVATION 864.56							

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33622.1.1	ID B-4282	COUNTY STOKES	GEOLOGIST MURRAY
SITE DESCRIPTION BRIDGE 54 OVER PINCH GUT CREEK ON NC 66			GND WATER
BORING NO B2-B	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT L	BORING LOCATION 18+65.000	OFFSET 40.00ft RT	24 HR N/A
COLLAR ELEV 916.66ft	TOTAL DEPTH 53.50ft	START DATE 3/22/06	COMPLETION DATE 03/22/06
DRILL MACHINE CME 550		DRILL METHOD NWCAS/NXWL	HAMMER TYPE AUTOMATIC
SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A	Log B2-B, Page 1 of 2

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION	
		6in	6in	6in		0	25	50	75					100
916.66													Ground Surface	
	1.50	1	2	1	1.0								3	ALLUVIAL TAN SILTY SAND
	7.40	2	2	2	1.0								4	GRAVEL
	12.40	1	2	2	1.0								4	RESIDUAL TAN SANDY SILT
	17.40	2	3	3	1.0								6	OLIVE-TAN-WHITE SILTY SAND
	22.40	2	9	14	1.0								23	
	27.40	6	18	34	1.0								52	
	33.50	22	50	50	0.8								100	WEATHERED ROCK (QUARTZ-BIOTITE GNEISS)
	38.50	35	60	40	0.7								100	SS-11
	43.50	100			0.2								100	
	48.50	100			0.2								100	CRYSTALLINE ROCK AS ABOVE (SPT REFUSAL)
863.16	53.49	100			0.2								100	

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
 GEOTECHNICAL UNIT BORING LOG

PROJECT NO 33622.1.1	ID B-4282	COUNTY STOKES	GEOLOGIST MURRAY
SITE DESCRIPTION BRIDGE 54 OVER PINCH GUT CREEK ON NC 66			GND WATER
BORING NO B2-B	NORTHING 0.00	EASTING 0.00	0 HR N/A
ALIGNMENT L	BORING LOCATION 18+65.000	OFFSET 40.00ft RT	24 HR N/A
COLLAR ELEV 916.66ft	TOTAL DEPTH 53.50ft	START DATE 3/22/06	COMPLETION DATE 03/22/06
DRILL MACHINE CME 550		DRILL METHOD NWCAS/NXWL	HAMMER TYPE AUTOMATIC
SURFACE WATER DEPTH N/A		DEPTH TO ROCK N/A	Log B2-B, Page 2 of 2

ELEV	DEPTH	BLOW CT			PEN (ft)	BLOWS PER FOOT				SAMPLE NO	MOI	LOG	SOIL AND ROCK DESCRIPTION
		6in	6in	6in		0	25	50	75				
863.16													TERMINATED ON CRYSTALLINE ROCK (SPT REFUSAL) AT 53.5' ELEVATION 863.16

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

T. I. P. No. B-4282

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project 33622.1.1 County STOKES Owner _____
 Date: Sampled 3/15/06 Received 3/21/06 Reported 3/23/2006
 Sampled from _____ By C C MURRAY
 Submitted by N WAINAINA _____ 1995 Standard Specifications

728774 TO 728780
 5/11/06

TEST RESULTS

Proj. Sample No.	SS-1	SS-2	SS-3	SS-4	SS-5	SS-6
Lab. Sample No.	728774	728775	728776	728777	728778	728779
Retained #4 Sieve %	55	-	-	1	-	-
Passing #10 Sieve %	36	100	98	93	100	96
Passing #40 Sieve %	23	83	86	73	95	80
Passing #200 Sieve %	7	38	41	39	9	33

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	53.8	30.8	26.0	31.4	34.4	33.2
Fine Sand Ret - #270 %	32.3	42.1	42.5	35.4	59.9	41.6
Silt 0.05 - 0.005 mm %	9.9	21.0	23.5	21.1	3.7	19.1
Clay < 0.005 mm %	4.0	6.0	8.0	12.1	2.0	6.0
Passing #40 Sieve %	-	-	-	-	-	-
Passing #200 Sieve %	-	-	-	-	-	-

L. L.	21	27	28	31	29	28
P. I.	NP	NP	NP	1	NP	NP
AASHTO Classification	A-1-a(0)	A-4(0)	A-4(0)	A-4(0)	A-3(0)	A-2-4(0)
Station	17+72	17+72	17+72	17+72	17+95	17+95
OFFSET	16 RT	16 RT	16 RT	16 RT	25 LT	25 LT
ALIGNMENT	L	L	L	L	L	L
Depth (Ft)	3.70	8.70	20.20	23.70	0.00	7.20
to	5.20	10.20	21.70	25.20	1.50	8.70

cc: C C MURRAY
 Soils File

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 Sampled from _____ By C C MURRAY
 Submitted by N WAINAINA _____ 1995 Standard Specifications

728774 TO 728780
 5/11/06

TEST RESULTS

Proj. Sample No.	SS-7					
Lab. Sample No.	728780					
Retained #4 Sieve %	1					
Passing #10 Sieve %	94					
Passing #40 Sieve %	74					
Passing #200 Sieve %	29					

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60 %	38.3					
Fine Sand Ret - #270 %	38.3					
Silt 0.05 - 0.005 mm %	17.3					
Clay < 0.005 mm %	6.0					
Passing #40 Sieve %	-					
Passing #200 Sieve %	-					

L. L.	27					
P. I.	NP					
AASHTO Classification	A-2-4(0)					
Station	17+95					
OFFSET	25 LT					
ALIGNMENT	L					
Depth (Ft)	27.20					
to	29.00					

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
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T. I. P. No. B-4282

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project 33622.1.1 County STOKES Owner _____
 Date: Sampled 3/22/06 Received 3/28/06 Reported 3/30/2006
 Sampled from _____ By C C MURRAY
 Submitted by N WAINAINA _____ 1995 Standard Specifications

728865 TO 728868
 5/11/06

TEST RESULTS

Proj. Sample No.	SS-8	SS-9	SS-10	SS-11		
Lab. Sample No.	728865	728866	728867	728868		
Retained #4 Sieve	%	-	-	-	-	
Passing #10 Sieve	%	100	100	100	96	
Passing #40 Sieve	%	85	83	82	66	
Passing #200 Sieve	%	42	32	31	27	

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60	%	25.8	31.9	34.5	45.6	
Fine Sand Ret - #270	%	43.0	46.8	44.4	33.9	
Silt 0.05 - 0.005 mm	%	27.1	19.3	19.1	18.5	
Clay < 0.005 mm	%	4.0	2.0	2.0	2.0	
Passing #40 Sieve	%	-	-	-	-	
Passing #200 Sieve	%	-	-	-	-	

L. L.	35	33	26	24		
P. I.	NP	NP	NP	NP		
AASHTO Classification	A-4(0)	A-2-4(0)	A-2-4(0)	A-2-4(0)		
Station	18+65	18+65	18+65	18+65		
OFFSET	40 RT	40 RT	40 RT	40 RT		
ALIGNMENT	L	L	L	L		
Depth (Ft)	7.40	12.40	27.40	38.50		
	to	8.90	13.90	28.90	40.00	

cc: C C MURRAY
 Soils File

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

T. I. P. No. B-4282

REPORT ON SAMPLES OF SOILS FOR QUALITY

Project 33622.1.1 County STOKES Owner _____
 Date: Sampled 3/29/06 Received 4/3/06 Reported 4/5/2006
 Sampled from _____ By C C MURRAY
 Submitted by N WAINAINA _____ 1995 Standard Specifications

728904 TO 728920
 5/11/06

TEST RESULTS

Proj. Sample No.	SS-12	SS-13	SS-14	SS-15	SS-16	SS-17
Lab. Sample No.	728915	728916	728917	728918	728919	728920
Retained #4 Sieve	%	1	-	13	-	23
Passing #10 Sieve	%	99	98	84	100	67
Passing #40 Sieve	%	93	77	73	95	49
Passing #200 Sieve	%	28	29	27	28	22

MINUS NO. 10 FRACTION

SOIL MORTAR - 100%						
Coarse Sand Ret - #60	%	20.7	34.9	31.1	22.5	40.5
Fine Sand Ret - #270	%	62.5	44.6	42.6	55.2	35.5
Silt 0.05 - 0.005 mm	%	14.8	17.5	14.2	13.2	20.0
Clay < 0.005 mm	%	2.0	3.0	12.1	9.1	4.0
Passing #40 Sieve	%	-	-	-	-	-
Passing #200 Sieve	%	-	-	-	-	-

L. L.	38	31	26	25	23	27
P. I.	NP	NP	4	NP	NP	7
AASHTO Classification	A-2-4(0)	A-2-4(0)	A-2-4(0)	A-2-4(0)	A-1-b(0)	A-2-4(0)
Station	19+18	19+18	18+98	17+16	17+16	17+42
	30 LT	30 LT	10 RT	31 LT	31 LT	11 LT
Hole No.	L	L	L	L	L	L
Depth (Ft)	18.00	28.00	13.90	4.10	9.10	4.20
	to	19.50	29.50	15.40	5.60	10.60

GEOTECHNICAL UNIT FIELD SCOUR REPORT

SHEET OF

2

SHEET OF

18

PROJECT: 33622.1.1 TIP NO.: B-4282 COUNTY: STOKES

DESCRIPTION(1): BR 54 OVER PINCH GUT CR ON NC 66

→ **INFORMATION ON EXISTING BRIDGES** Information obtained from Field Inspection
 Microfilm (Reel: Position:)
 Other HYDRO

COUNTY BRIDGE NO. 54 BRIDGE LENGTH 97' NO. BENTS 4 NO. BENTS IN: CHANNEL 2 FLOODPLAIN 2

FOUNDATION TYPE: CONCRETE ABUTS, UNKNOWN FOUNDATION

EVIDENCE OF SCOUR(2):

ABUTMENTS OR END BENT SLOPES: CENTER & BOTH WW OF EB2

INTERIOR BENTS: LOCAL ABOUT B1 & B2 - Minor

CHANNEL BED: N/O

CHANNEL BANKS: EB2 SIDE OF CREEK UP & DOWNSTREAM, NOTE OLD LEANING TREES

→ **EXISTING SCOUR PROTECTION:**

TYPE(3): CONCRETE WINGWALLS

EXTENT(4): 25'

EFFECTIVENESS(5): GOOD

OBSTRUCTIONS(6) (DAMS, DEBRIS, ETC.): MINOR DEBRIS @ B2

→ **DESIGN INFORMATION**

CHANNEL BED MATERIAL(7) (Sample Results Attached): ROCKS (COBBLESIZE) TO SAND

CHANNEL BANK MATERIAL(8) (Sample Results Attached): SAND

MS-5

CHANNEL BANK COVER(9): WOODS

FLOOD PLAIN WIDTH(10): 500'+/-

FLOOD PLAIN COVER(11): FALLOW FIELDS & WOODS

STREAM IS: DEGRADING AGGRADING (12)

OTHER OBSERVATIONS AND COMMENTS:

◆ DESIGN INFORMATION CONT.

CHANNEL MIGRATION TENDENCY(13): SIGNIFICANT, TOWARD THE EB2 SIDE

DESIGN SCOUR ELEVATIONS (14):

Bent One: The Hydraulics Theoretical Scour Elevation of 912.5 is higher than the recent alluvial boundary elevation of 910.

Design Scour Elevation = 905

Bent Two: The Hydraulics Theoretical Scour Elevation of 914 is higher than the recent alluvial boundary elevation of 908.

Design Scour Elevation = 905

REPORTED BY: CCM/cbl DATE: 5-12-06

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 BANK COVERING (GRASS, TREES, RIPRAP, NONE, ETC.)
- (10) GIVE THE APPROXIMATE FLOOD PLAIN WIDTH (ESTIMATE).
- (11) DESCRIBE THE FLOOD PLAIN COVERING (GRASS, TREES, CROPS, ETC.)
- (12) CHECK THE APPROPRIATE SPACE AS TO WHETHER THE STREAM IS DEGRADING OR AGGRADING.
- (13) DESCRIBE THE POTENTIAL OF THE BODY OF WATER TO MIGRATE Laterally DURING THE LIFE OF THE BRIDGE (APPROXIMATELY 100 YEARS).
- (14) GIVE THE DESIGN 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 DESIGN SCOUR ELEVATION. IF THE DESIGN SCOUR ELEVATION IS DEPENDENT ON SCOUR COUNTER MEASURES, EXPLAIN. (RIPRAP ARMORING ON SLOPES, ETC.) THE DESIGN 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.



B-4282
SITE PHOTOS