

| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-------|-----------------------------|-----------|--------------|
| N.C. | R-2514D | 1 | 12 |

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34442.1.5 (R-2514D) F.A. PROJ. NHF-17(7)

COUNTY JONES

PROJECT DESCRIPTION US 17 FROM SOUTH OF NC 58 TO THE
NEW BERN BYPASS

SITE DESCRIPTION BRIDGE NO. 95 AND NO. 96 ON -L- (US 17
BYPASS) OVER -Y3- (US 58) AT -L- STA. 320+39.56

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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) 707-6850. 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: 34442.1.5 ID: R-2514D

PERSONNEL

C.M. WRIKE

R.E. SMITH

D.G. PINTER

J.D. GEMPERLINE

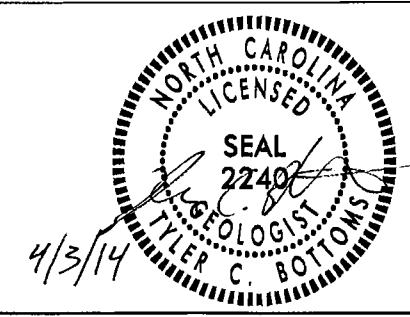
MIDATLANTIC PERSONNEL

INVESTIGATED BY T.C. BOTTOMS

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE APRIL 2014



DRAWN BY: C.P. TURNER

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.

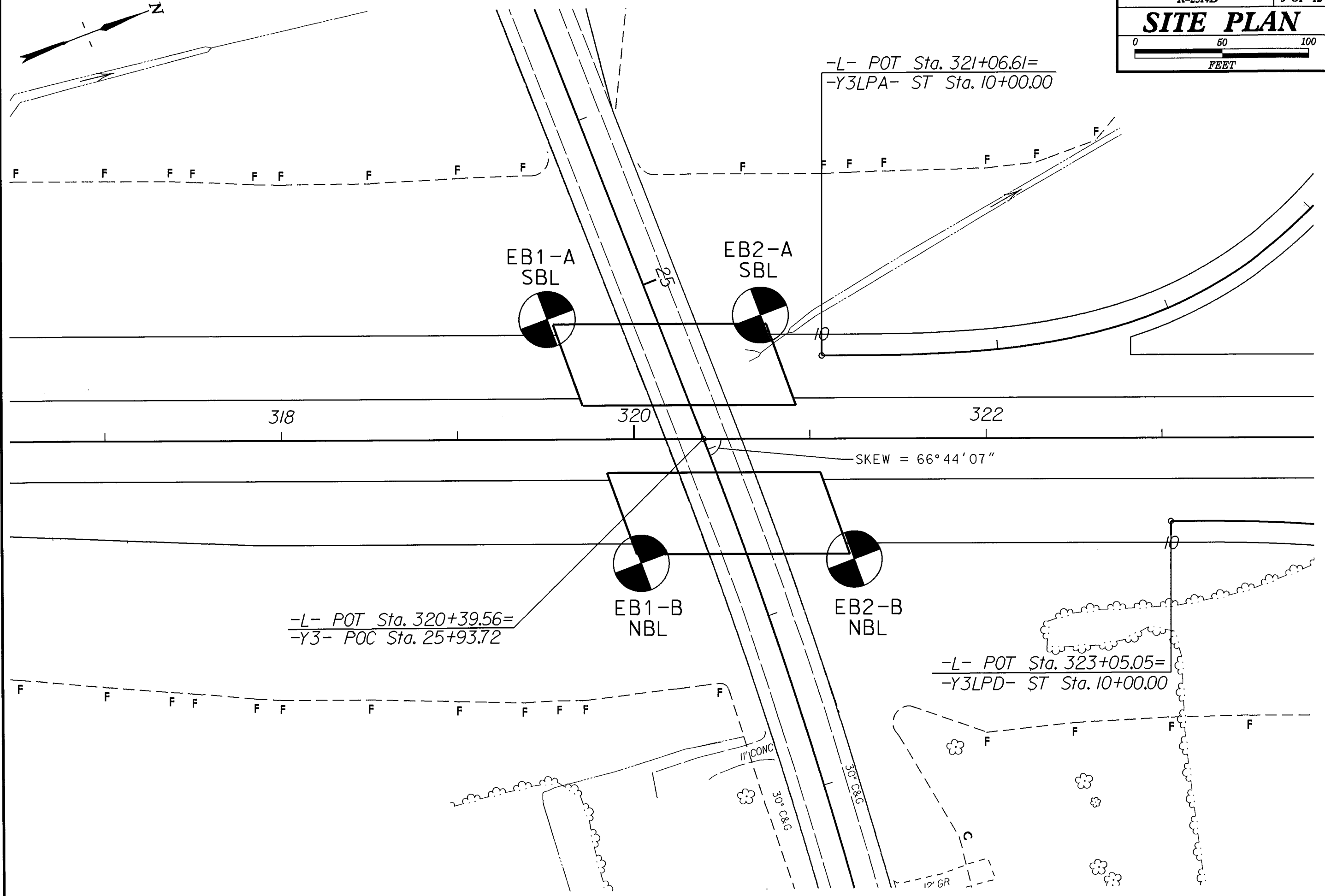
NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

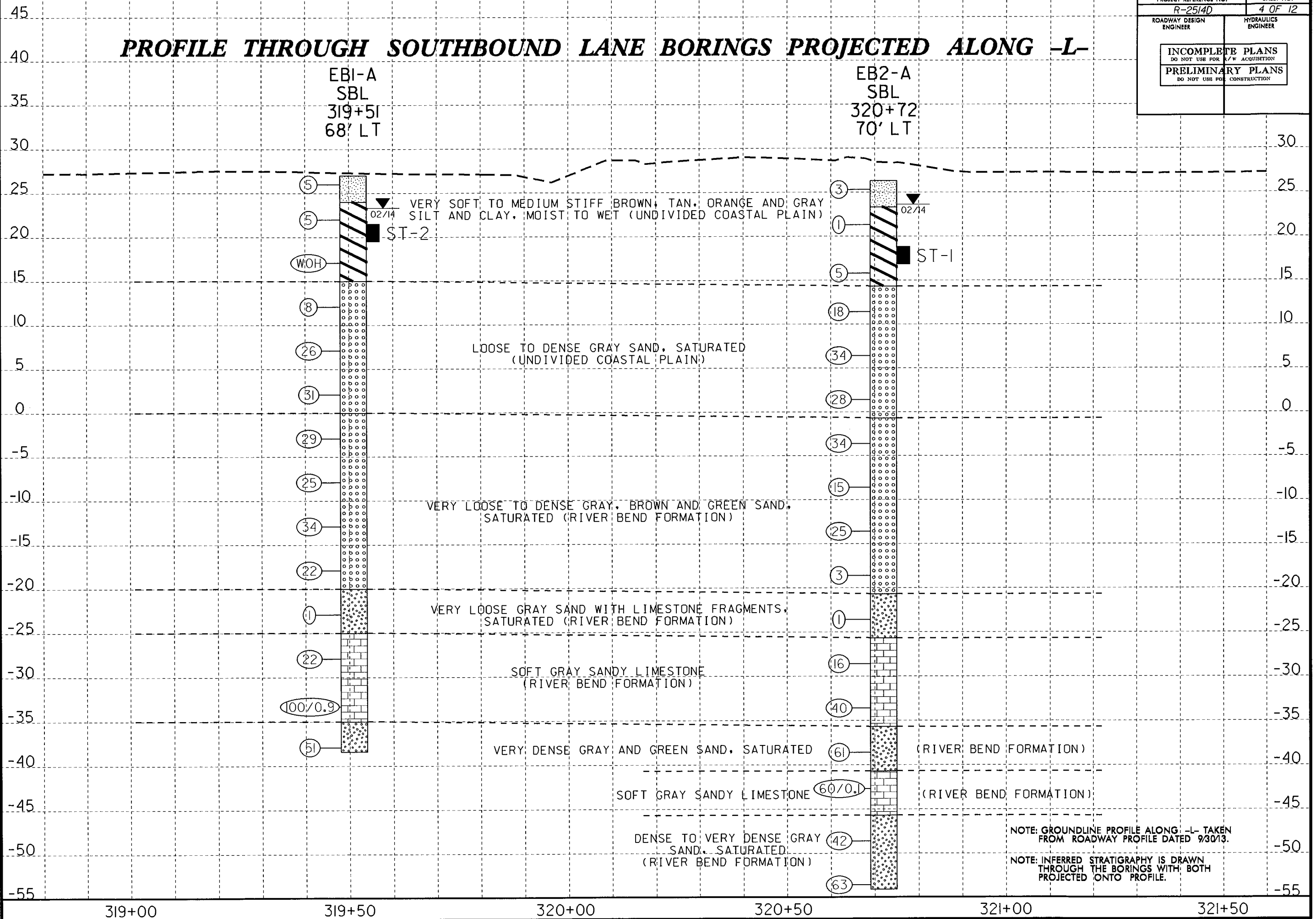
| SOIL DESCRIPTION | GRADATION | ROCK DESCRIPTION | TERMS AND DEFINITIONS |
|---|---|---|--|
| SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T208, 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, HIGH 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 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR) - NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. CRYSTALLINE ROCK (CR) - FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. NON-CRYSTALLINE ROCK (NCR) - FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLITE, 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. | 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 DISLOOGED 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 IN 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 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-4, A-5, A-7, A-7-5, A-7-6, A-7-7 SYMBOL % PASSING # 10, # 40, # 200 LIQUID LIMIT, PLASTIC INDEX GROUP INDEX USUAL TYPES OF MAJOR MATERIALS GEN. RATING AS A SUBGRADE | 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, MODERATELY COMPRESSIBLE, HIGHLY COMPRESSIBLE PERCENTAGE OF MATERIAL ORGANIC MATERIAL, GRANULAR SOILS, SILT-CLAY SOILS, OTHER MATERIAL TRACE OF ORGANIC MATTER, LITTLE ORGANIC MATTER, MODERATELY ORGANIC, HIGHLY ORGANIC | WEATHERING FRESH, VERY SLIGHT (V. SLI.), SLIGHT (SLI.), MODERATE (MOD.), MODERATELY SEVERE (MOD. SEV.), SEVERE (SEV.), VERY SEVERE (V. SEV.), COMPLETE ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. 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. 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. 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. 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. 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. 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. 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. | |
| CONSISTENCY OR DENSENESS PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE), RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/F ²) | 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, DIP & DIP DIRECTION OF ROCK STRUCTURES | TEST BORING SPT, DPT, DMT, VST, PHT, AUGER BORING, CORE BORING, MONITORING WELL, PIEZOMETER INSTALLATION, SLOPE INDICATOR INSTALLATION, CONE PENETROMETER TEST, SOUNDING ROD | |
| TEXTURE OR GRAIN SIZE U.S. STD. SIEVE SIZE OPENING (MM), BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CSE. SD.), FINE SAND (F. SD.), SILT (SL.), CLAY (CL.) | 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, PHT - 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, DRY UNIT WEIGHT, SAMPLE ABBREVIATIONS, S - BULK, SS - SPLIT SPOON, ST - SHELBY TUBE, RS - ROCK, RT - RECOMPACTED TRIAXIAL, CBR - CALIFORNIA BEARING RATIO | | |
| SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE (ATTERBERG LIMITS), FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION | EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: MOBILE B-51, BK-51, CME-45B, CME-55B, PORTABLE HOIST ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE 2 1/16" STEEL TEETH, TRICONE TUNG-CARB., CORE BIT | FRACTURE SPACING TERM, SPACING VERY WIDE, WIDE, MODERATELY CLOSE, CLOSE, VERY CLOSE | BEDDING TERM, THICKNESS VERY THICKLY BEDDED, THICKLY BEDDED, THINLY BEDDED, VERY THINLY BEDDED, THICKLY LAMINATED, THINLY LAMINATED |
| PLASTICITY NONPLASTIC, LOW PLASTICITY, MED. PLASTICITY, HIGH PLASTICITY | | INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED | NOTES: BENCH MARK: BM-15; RAILROAD SPIKE IN POWER POLE AT -L- STA. 323+74. 940' LT ELEVATION: 28.34 FT. |
| 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. | | | |



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|---|----------------------|
| PROJECT REFERENCE NO. R-2514D | SHEET NO. 4 OF 12 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR ACQUISITION | |
| PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION | |

PROFILE THROUGH SOUTHBOUND LANE BORINGS PROJECTED ALONG -L-



NOTE: GROUNDLINE PROFILE ALONG -L- TAKEN FROM ROADWAY PROFILE DATED 9/30/13.

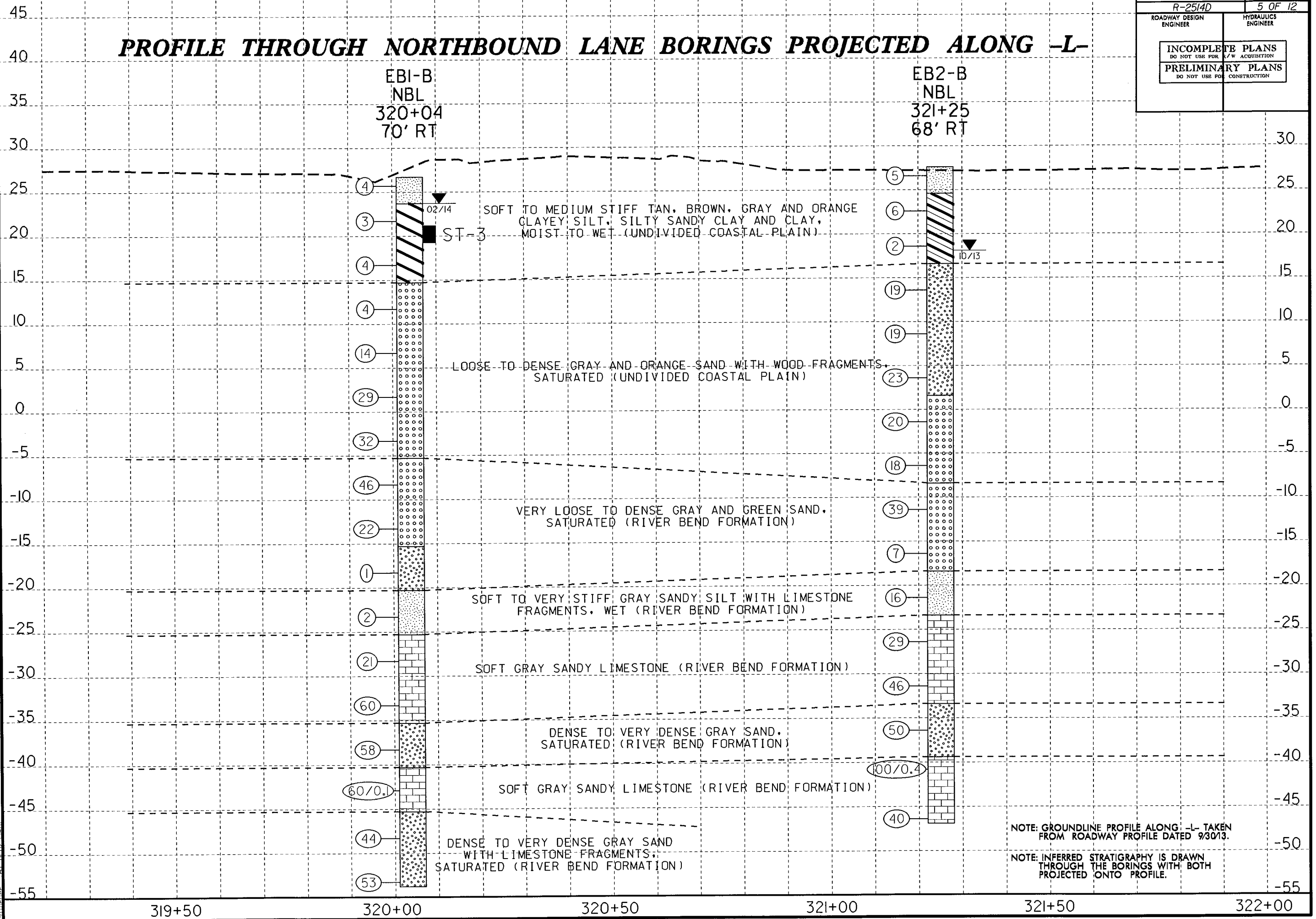
NOTE: INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO PROFILE.

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| PROJECT REFERENCE NO. R-2514D | SHEET NO. 5 OF 12 |
| ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER |
| INCOMPLETE PLANS DO NOT USE FOR ACQUISITION | |
| PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION | |

PROFILE THROUGH NORTHBOUND LANE BORINGS PROJECTED ALONG -L-



319+50

320+00

320+50

321+00

321+50

322+00

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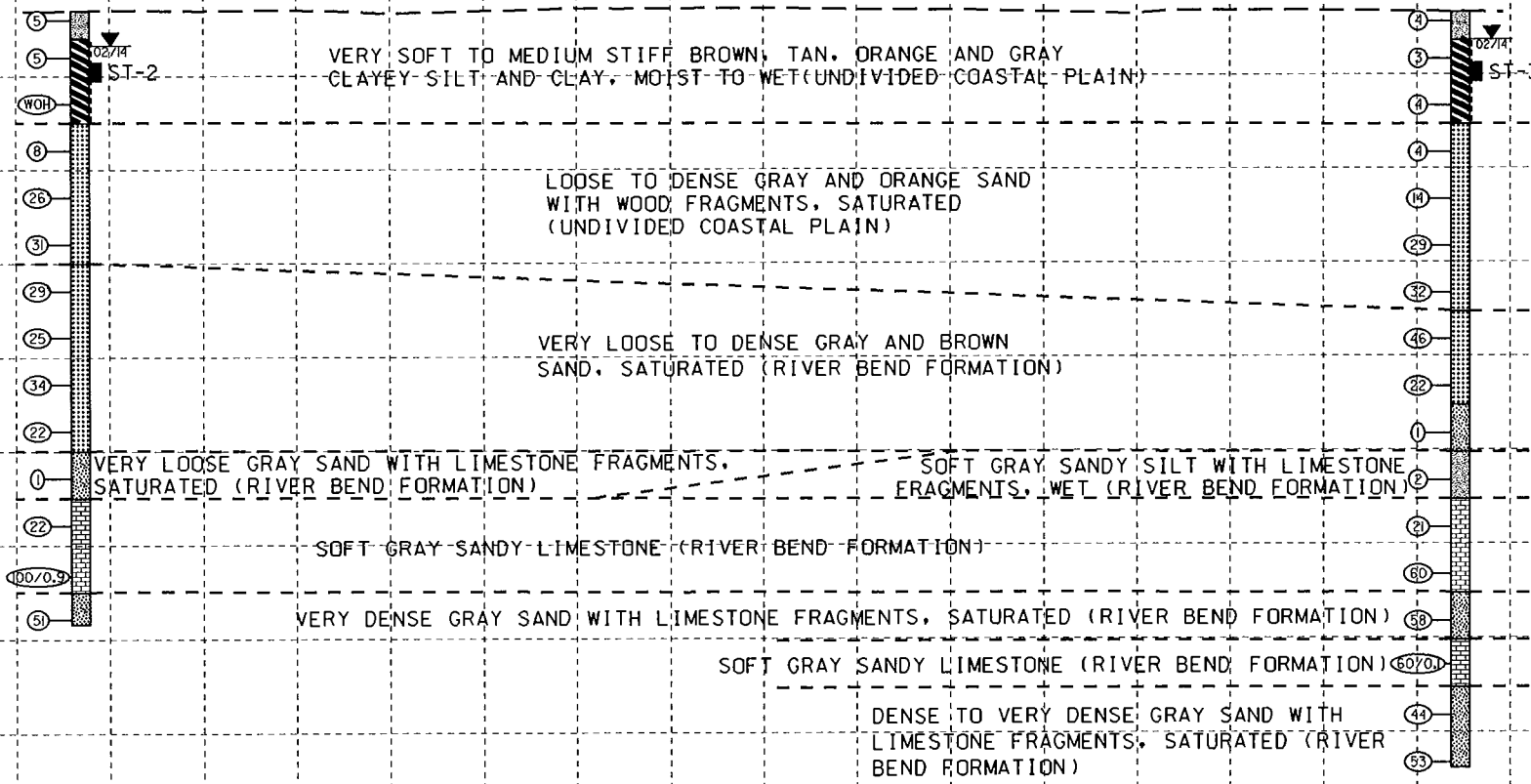


150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

CROSS SECTION ALONG END BENT 1 NBL AND SBL

EBI-A
SBL
319+51
68' LT

EBI-B
NBL
320+04
70' RT



319 + 77.97

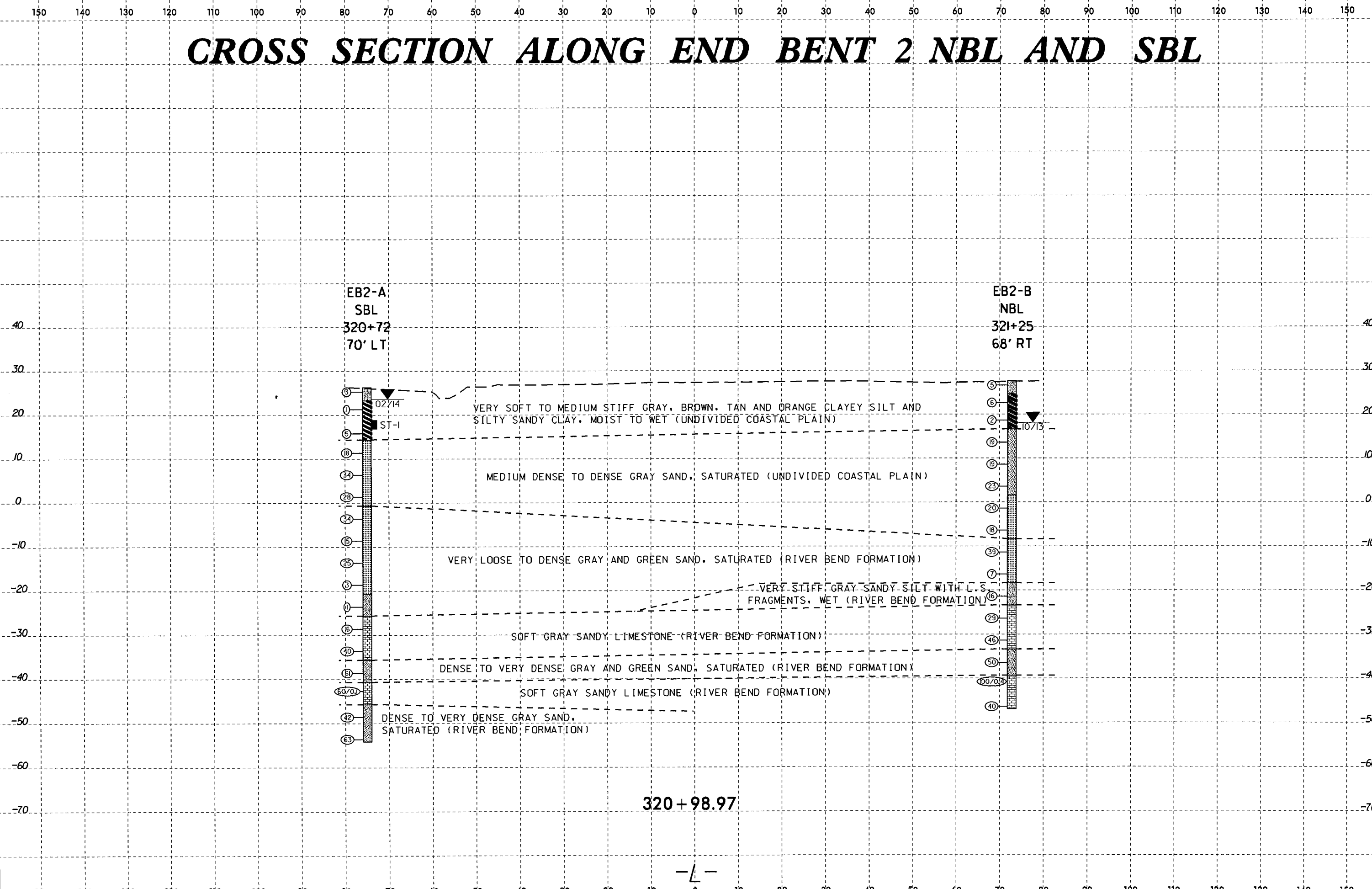
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CROSS SECTION ALONG END BENT 2 NBL AND SBL



320+98.97

-L-



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

| WBS 34442.1.5 | | TIP R-2514D | | COUNTY JONES | | GEOLOGIST Gemperline, J. D. | | | | | | | | | |
|--|-----------------|---------------------|------------|-------------------------|-------|-----------------------------|-----------------|----|----|-----|-----------|-----|---------------------------|---|------|
| SITE DESCRIPTION Bridge No. 95 on -L- (US 17 Bypass) over -Y3- (NC 58) | | | | | | | GROUND WTR (ft) | | | | | | | | |
| BORING NO. EB1-A SBL | | STATION 319+51 | | OFFSET 68 ft LT | | ALIGNMENT -L- | 0 HR. N/A | | | | | | | | |
| COLLAR ELEV. 27.0 ft | | TOTAL DEPTH 65.4 ft | | NORTHING 459,312 | | EASTING 2,529,090 | 24 HR. 3.7 | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 80.5% 12/26/2013 | | | | DRILL METHOD Mud Rotary | | HAMMER TYPE Automatic | | | | | | | | | |
| DRILLER Contract Driller | | START DATE 02/05/14 | | COMP. DATE 02/05/14 | | SURFACE WATER DEPTH N/A | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG | SOIL AND ROCK DESCRIPTION | DEPTH (ft) | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | |
| 30 | 27.0 | 0.0 | | | | | | | | | | | | GROUND SURFACE | 0.0 |
| 25 | 23.0 | 4.0 | 2 | 3 | 2 | | | | | | | | | UNDIVIDED COASTAL PLAIN BROWN AND TAN SILT, MOIST | 3.0 |
| 20 | 18.1 | 8.9 | 1 | 2 | 3 | | | | | | | | | UNDIVIDED COASTAL PLAIN GRAY AND ORANGE CLAY, MOIST TO WET | |
| 15 | 13.1 | 13.9 | WOH | WOH | WOH | | | | | | | | | UNDIVIDED COASTAL PLAIN GRAY SAND, SATURATED | 12.0 |
| 10 | 8.1 | 18.9 | | | | | | | | | | | | | |
| 5 | 3.1 | 23.9 | | | | | | | | | | | | | |
| 0 | -1.9 | 28.9 | | | | | | | | | | | | COASTAL PLAIN GRAY AND BROWN SAND, SATURATED (RIVER BEND FORMATION) | 27.0 |
| -5 | -6.9 | 33.9 | | | | | | | | | | | | | |
| -10 | -11.9 | 38.9 | | | | | | | | | | | | | |
| -15 | -16.9 | 43.9 | | | | | | | | | | | | | |
| -20 | -21.9 | 48.9 | WOH | WOH | 1 | | | | | | | | | COASTAL PLAIN GRAY SAND WITH LIMESTONE FRAGMENTS, SATURATED (RIVER BEND FORMATION) | 47.0 |
| -25 | -26.9 | 53.9 | | | | | | | | | | | | COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION) | 52.0 |
| -30 | -31.9 | 58.9 | | | | | | | | | | | | | |
| -35 | -36.9 | 63.9 | | | | | | | | | | | | COASTAL PLAIN GRAY SAND WITH LIMESTONE FRAGMENTS, SATURATED (RIVER BEND FORMATION) | 62.0 |
| | | | | | | | | | | | | | | Boring Terminated at Elevation -38.4 ft in Very Dense Sand | 65.4 |

NCDOT BORE DOUBLE R-2514D GEO_BRDG_LOVRY3.GPJ NC_DOT_GDT 4/3/14

Other Samples:
ST-2 (5.5 - 7.5)

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

| WBS 34442.1.5 | | | TIP R-2514D | | | COUNTY JONES | | | GEOLOGIST Gemperline, J. D. | | | | | | | |
|--|-----------------|---------------------|---------------------|------------------|---------------------|-------------------------|-------------------------|------------|-----------------------------|-----|-----------|---------|-----|---------------------------|------------|------------|
| SITE DESCRIPTION Bridge No. 96 on -L- (US 17 Bypass) over -Y3- (NC 58) | | | | | | GROUND WTR (ft) | | | | | | | | | | |
| BORING NO. EB1-B NBL | | STATION 320+04 | | OFFSET 70 ft RT | | ALIGNMENT -L- | | 0 HR. N/A | | | | | | | | |
| COLLAR ELEV. 26.7 ft | | TOTAL DEPTH 80.5 ft | | NORTHING 459,313 | | EASTING 2,529,238 | | 24 HR. 3.0 | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 80.5% 12/26/2013 | | | | | | DRILL METHOD Mud Rotary | | | HAMMER TYPE Automatic | | | | | | | |
| DRILLER Contract Driller | | | START DATE 02/05/14 | | COMP. DATE 02/06/14 | | SURFACE WATER DEPTH N/A | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG MOI | LOG | SOIL AND ROCK DESCRIPTION | ELEV. (ft) | DEPTH (ft) |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | | |
| 30 | 26.7 | 0.0 | 1 | 2 | 2 | | | | | | | | | | 26.7 | 0.0 |
| 25 | 22.7 | 4.0 | 1 | 2 | 1 | | | | | | | | | | 23.7 | 3.0 |
| 20 | 17.7 | 9.0 | WOH | 2 | 2 | | | | | | | | | | 14.7 | 12.0 |
| 15 | 12.7 | 14.0 | | 3 | 2 | 2 | | | | | | | | | | |
| 10 | 7.7 | 19.0 | | 3 | 5 | 9 | | | | | | | | | | |
| 5 | 2.7 | 24.0 | | 3 | 17 | 12 | | | | | | | | | | |
| 0 | -2.4 | 29.0 | | 9 | 14 | 18 | | | | | | | | | | |
| -5 | -7.4 | 34.0 | | 8 | 17 | 29 | | | | | | | | | | |
| -10 | -12.4 | 39.0 | | 6 | 9 | 13 | | | | | | | | | | |
| -15 | -17.4 | 44.0 | | 1 | 0 | 1 | | | | | | | | | | |
| -20 | -22.4 | 49.0 | | 1 | 1 | 1 | | | | | | | | | | |
| -25 | -27.4 | 54.0 | | 6 | 10 | 11 | | | | | | | | | | |
| -30 | -32.4 | 59.0 | | 8 | 33 | 27 | | | | | | | | | | |
| -35 | -37.4 | 64.0 | | 20 | 27 | 31 | | | | | | | | | | |
| -40 | -42.4 | 69.0 | | 34 | 60/0.1 | | | | | | | | | | | |
| -45 | -47.4 | 74.0 | | 14 | 20 | 24 | | | | | | | | | | |

NCDOT BORE DOUBLE R-2514D_GEO_BRDG_LOVRY3.GPJ_NC_DOT_GDT_4/3/14

| WBS 34442.1.5 | | | TIP R-2514D | | | COUNTY JONES | | | GEOLOGIST Gemperline, J. D. | | | | | | | |
|--|-----------------|---------------------|---------------------|------------------|---------------------|-------------------------|-------------------------|------------|-----------------------------|-----|-----------|---------|-----|---------------------------|------------|------------|
| SITE DESCRIPTION Bridge No. 96 on -L- (US 17 Bypass) over -Y3- (NC 58) | | | | | | GROUND WTR (ft) | | | | | | | | | | |
| BORING NO. EB1-B NBL | | STATION 320+04 | | OFFSET 70 ft RT | | ALIGNMENT -L- | | 0 HR. N/A | | | | | | | | |
| COLLAR ELEV. 26.7 ft | | TOTAL DEPTH 80.5 ft | | NORTHING 459,313 | | EASTING 2,529,238 | | 24 HR. 3.0 | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE CAT1314 CME-45B 80.5% 12/26/2013 | | | | | | DRILL METHOD Mud Rotary | | | HAMMER TYPE Automatic | | | | | | | |
| DRILLER Contract Driller | | | START DATE 02/05/14 | | COMP. DATE 02/06/14 | | SURFACE WATER DEPTH N/A | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | LOG MOI | LOG | SOIL AND ROCK DESCRIPTION | ELEV. (ft) | DEPTH (ft) |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | | | | |
| -50 | -52.4 | 79.0 | 17 | 20 | 33 | | | | | | | | | | -53.9 | 80.5 |
| Match Line | | | | | | | | | | | | | | | | |
| Boring Terminated at Elevation -53.9 ft in Very Dense Sand | | | | | | | | | | | | | | | | |
| Other Samples: ST-3 (5.5 - 7.5) | | | | | | | | | | | | | | | | |



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

| WBS 34442.1.5 | | TIP R-2514D | | COUNTY JONES | | GEOLOGIST Wrike, C. M. | | | | | | | | | | |
|--|-----------------|---------------------|------------|-------------------------|-------|-------------------------|-----------------|----|----|-----|-----------|-------|---------------------------|------------|------|---|
| SITE DESCRIPTION Bridge No. 96 on -L- (US 17 Bypass) over -Y3- (NC 58) | | | | | | | GROUND WTR (ft) | | | | | | | | | |
| BORING NO. EB2-B NBL | | STATION 321+25 | | OFFSET 68 ft RT | | ALIGNMENT -L- | | | | | | | | | | |
| COLLAR ELEV. 27.6 ft | | TOTAL DEPTH 74.5 ft | | NORTHING 459,427 | | EASTING 2,529,279 | | | | | | | | | | |
| DRILL RIG/HAMMER EFF./DATE GFO1042 CME-550 87% 09/03/2009 | | | | DRILL METHOD Mud Rotary | | HAMMER TYPE Automatic | | | | | | | | | | |
| DRILLER Smith, R. E. | | START DATE 10/14/13 | | COMP. DATE 10/14/13 | | SURFACE WATER DEPTH N/A | | | | | | | | | | |
| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT | | | BLOWS PER FOOT | | | | | SAMP. NO. | L O G | SOIL AND ROCK DESCRIPTION | | | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | 100 | | | ELEV. (ft) | DEPTH (ft) | | |
| 30 | | | | | | | | | | | | | | | | |
| | 27.6 | 0.0 | 2 | 2 | 3 | | | | | | | | | 27.6 | 0.0 | GROUND SURFACE |
| 25 | | | | | | | | | | | | | | | | |
| | 23.6 | 4.0 | 3 | 3 | 3 | | | | | | | | | 24.6 | 3.0 | UNDIVIDED COASTAL PLAIN TAN AND BROWN CLAYEY SILT, MOIST |
| | | | | | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | | | | | |
| | 19.6 | 8.0 | WOH | 1 | 1 | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | | | | |
| | 14.6 | 13.0 | 7 | 9 | 10 | | | | | | | | | 16.6 | 11.0 | UNDIVIDED COASTAL PLAIN GRAY SAND, SATURATED |
| | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | |
| | 9.6 | 18.0 | 7 | 9 | 10 | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | |
| | 4.6 | 23.0 | 8 | 11 | 12 | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| 0 | | | | | | | | | | | | | | | | |
| | -0.4 | 28.0 | 8 | 9 | 11 | | | | | | | | | 1.6 | 26.0 | |
| | | | | | | | | | | | | | | | | |
| -5 | | | | | | | | | | | | | | | | |
| | -5.4 | 33.0 | 6 | 8 | 10 | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| -10 | | | | | | | | | | | | | | | | |
| | -10.4 | 38.0 | 11 | 18 | 21 | | | | | | | | | -8.4 | 36.0 | COASTAL PLAIN GRAY AND GREEN SAND, SATURATED (RIVER BEND FORMATION) |
| | | | | | | | | | | | | | | | | |
| -15 | | | | | | | | | | | | | | | | |
| | -15.4 | 43.0 | 4 | 4 | 3 | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| -20 | | | | | | | | | | | | | | | | |
| | -20.4 | 48.0 | 7 | 13 | 3 | | | | | | | | | -18.4 | 46.0 | COASTAL PLAIN GRAY SANDY SILT WITH LIMESTONE FRAGMENTS, WET (RIVER BEND FORMATION) |
| | | | | | | | | | | | | | | | | |
| -25 | | | | | | | | | | | | | | | | |
| | -25.4 | 53.0 | 10 | 13 | 16 | | | | | | | | | -23.4 | 51.0 | COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION) |
| | | | | | | | | | | | | | | | | |
| -30 | | | | | | | | | | | | | | | | |
| | -30.4 | 58.0 | 21 | 26 | 20 | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| -35 | | | | | | | | | | | | | | | | |
| | -35.4 | 63.0 | 20 | 26 | 24 | | | | | | | | | -33.4 | 61.0 | COASTAL PLAIN GRAY SAND, SATURATED (RIVER BEND FORMATION) |
| | | | | | | | | | | | | | | | | |
| -40 | | | | | | | | | | | | | | | | |
| | -40.4 | 68.0 | 100/0.4 | | | | | | | | | | | -39.4 | 67.0 | COASTAL PLAIN GRAY SANDY LIMESTONE (RIVER BEND FORMATION) |
| | | | | | | | | | | | | | | | | |
| -45 | | | | | | | | | | | | | | | | |
| | -45.4 | 73.0 | 20 | 21 | 19 | | | | | | | | | -46.9 | 74.5 | Boring Terminated at Elevation -46.9 ft in Dense Sand |

NCDOT BORE DOUBLE R-2514D_GEO_BRDG_LOVRY3.GPJ_NC_DOT_GDT_4/3/14

**34442.5
R-2514D**

BRIDGE NO. 95 AND NO. 96 ON L- (US 17 BYPASS) OVER Y3- (US 58) AT L- STA. 320+39.56

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.T. | P.I. | % BY WEIGHT | | | | MOISTURE % | ORGANIC % | | |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|------------|-----------|----|----|
| | | | | | | | C.SAND | F.SAND | SILT | CLAY | | | | |
| SS-25 | 70 RT | 320+04 | 0.0-1.5 | A-4(5) | 27 | 6 | 0.6 | 12.5 | 62.7 | 24.2 | 100 | 100 | 94 | - |
| SS-26 | 70 RT | 320+04 | 9.0-10.5 | A-7-(6)(35) | 58 | 31 | 1.0 | 4.8 | 13.5 | 80.6 | 100 | 100 | 99 | 96 |
| SS-27 | 70 RT | 320+04 | 14.0-15.5 | A-3(0) | 16 | NP | 10.9 | 86.7 | 2.4 | 0.0 | 100 | 100 | 4 | - |
| SS-28 | 70 RT | 320+04 | 24.0-25.5 | A-3(0) | 55 | NP | 86.0 | 11.5 | 0.5 | 2.0 | 100 | 100 | 51 | 3 |
| SS-29 | 70 RT | 320+04 | 34.0-35.5 | A-3(0) | 17 | NP | 59.8 | 36.0 | 2.2 | 2.0 | 95 | 87 | 5 | - |
| SS-30 | 70 RT | 320+04 | 44.0-45.5 | A-2-4(0) | 25 | NP | 6.9 | 72.0 | 15.1 | 6.0 | 99 | 97 | 31 | - |
| SS-31 | 70 RT | 320+04 | 49.0-50.5 | A-4(0) | 20 | NP | 16.3 | 48.2 | 25.4 | 10.1 | 90 | 84 | 37 | - |
| SS-32 | 70 RT | 320+04 | 59.0-60.5 | A-1-0(0) | 16 | NP | 71.8 | 16.3 | 7.9 | 4.0 | 43 | 16 | 6 | - |
| SS-33 | 70 RT | 320+04 | 69.0-69.6 | A-1-0(0) | 17 | NP | 54.2 | 29.0 | 12.7 | 4.0 | 43 | 24 | 9 | - |
| SS-34 | 70 RT | 320+04 | 79.0-80.5 | A-2-4(0) | 22 | NP | 6.7 | 82.5 | 4.8 | 6.0 | 96 | 93 | 16 | - |

EB1-B NBL SOIL TEST RESULTS

| SAMPLE NO. | OFFSET | STATION | DEPTH INTERVAL | AASHTO CLASS. | L.T. | P.I. | % BY WEIGHT | | | | MOISTURE % | ORGANIC % | | |
|------------|--------|---------|----------------|---------------|------|------|-------------|--------|------|------|------------|-----------|----|---|
| | | | | | | | C.SAND | F.SAND | SILT | CLAY | | | | |
| SS-1 | 68 RT | 321+25 | 0.0-1.5 | A-4(1) | 25 | 2 | 0.6 | 16.3 | 62.9 | 20.1 | 100 | 100 | 93 | - |
| SS-2 | 68 RT | 321+25 | 4.0-5.5 | A-6(13) | 36 | 17 | 0.2 | 35.6 | 27.9 | 36.3 | 100 | 100 | 82 | - |
| SS-3 | 68 RT | 321+25 | 13.0-14.5 | A-2-4(0) | 25 | NP | 1.8 | 87.5 | 5.6 | 5.0 | 100 | 100 | 21 | - |
| SS-4 | 68 RT | 321+25 | 28.0-29.5 | A-3(0) | 16 | NP | 62.3 | 32.5 | 2.1 | 3.0 | 100 | 86 | 7 | - |
| SS-5 | 68 RT | 321+25 | 38.0-39.5 | A-3(0) | 20 | NP | 58.1 | 38.6 | 1.3 | 2.0 | 100 | 93 | 4 | - |
| SS-6 | 68 RT | 321+25 | 48.0-49.5 | A-4(0) | 21 | NP | 7.5 | 52.4 | 24.1 | 16.1 | 100 | 98 | 48 | - |
| SS-7 | 68 RT | 321+25 | 53.0-54.5 | A-1-b(0) | 20 | NP | 46.7 | 36.0 | 12.3 | 5.0 | 67 | 44 | 14 | - |
| SS-8 | 68 RT | 321+25 | 63.0-64.5 | A-2-4(0) | 25 | NP | 4.6 | 86.6 | 4.7 | 4.0 | 100 | 98 | 12 | - |
| SS-9 | 68 RT | 321+25 | 68.0-68.4 | | | | 56.0 | 21.8 | 10.2 | 12.1 | 38 | 21 | 10 | - |

EB2-B NBL SOIL TEST RESULTS