STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

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# STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. <u>45348.1.21 (BD-5102U)</u> F.A. PROJ. <u>BRZ-1139(5)</u>

PROJECT DESCRIPTION BRIDGE NO. 69 ON SR 1139 (MOYE-TURNAGE ROAD) OVER MIDDLE SWAMP AT -L- STA. 17 + 20.50

N.C. BD-5102U 1 6

#### CAUTION NOTICE

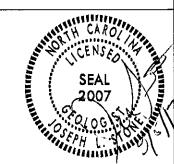
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED MERE MADE FOR THE PURPOSE OF STUDY, PLANING, AND DESIGN, AND HOT FOR CONSTRUCTION OR PAY PURPOSES. THE VAROUS FIELD BORHIG LOGS, ROCK CORES, AND SOL TEST DATA AVAILABLE MAY EE REVIEWED OF INSPECTED IN HALEDING Y CONTACTENS THE R. C. DEFASTIVENT OF TRANSPORTATION, CEDICUNICAL ENGINEERING URIT AT 1993 707-6850. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORNING LOGS, ROCK CORES, OR SOLL 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 NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNGS OR BETWEEN SAMPLED STRATA WITHIN THE BORENOLE. THE LASOPATION SAMPLE DATA AND THE IN STIL IN-PLACT TEST DATA CAN BE RELIED ON ONLY TO THE DECORE OF RELIABILITY INBERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOL MISSURFACE INVESTIGATIONS AND AS RECORDED AT THE THRE OF THE INVESTIGATION, THESE WATER LEVELS OR SOL MOISTURE CONDITIONS MORE THE OCCUMENTO. TO CLIMATE CONDITIONS INCLUDING THE MATER LEVELS OR SOLL MOISTURE CONDITIONS AND AND THE CONDITIONS OF THE MATER LEVELS OR SOLL MOISTURE CONDITIONS AND AVER CONSIDERABLY WHITH TAX ACCORDING TO CLIMATE COMPTIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CENTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FIRML DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PLRYPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN REFORMATION ON THAS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR CURRANTEE THE SUFFICIENCY OF ACCUMENT AS TO THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MAREHALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH MODERNORM SUBJECTED BY THE PROJECT. THE CONTRACTOR SHALL MAVE NO CLAMFOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR MAY PRESON RESULTING FROM THE ACTUAL CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE FOR THE ACTUAL CONDITIONS TO BE CONTRACTOR SHALL MAVE NO CLAMFOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR MAY PRESON RESULTING FROM THE ACTUAL CONDITIONS COUNTERED AT THE SITE DEFERRING FROM THOSE INDICATED.

| _              | C.M. WRIKE       |
|----------------|------------------|
| _              | F&R PERSONNEL    |
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| INVESTIGATED B | Y_J.L. STONE     |
| CHECKED BY     | D.N. ARGENBRIGHT |
| SUBMITTED BY_  | D.N. ARGENBRIGHT |

**PERSONNEL** 



AUGUST 2013

DRAWN BY: \_\_C.P. TURNER

348.

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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

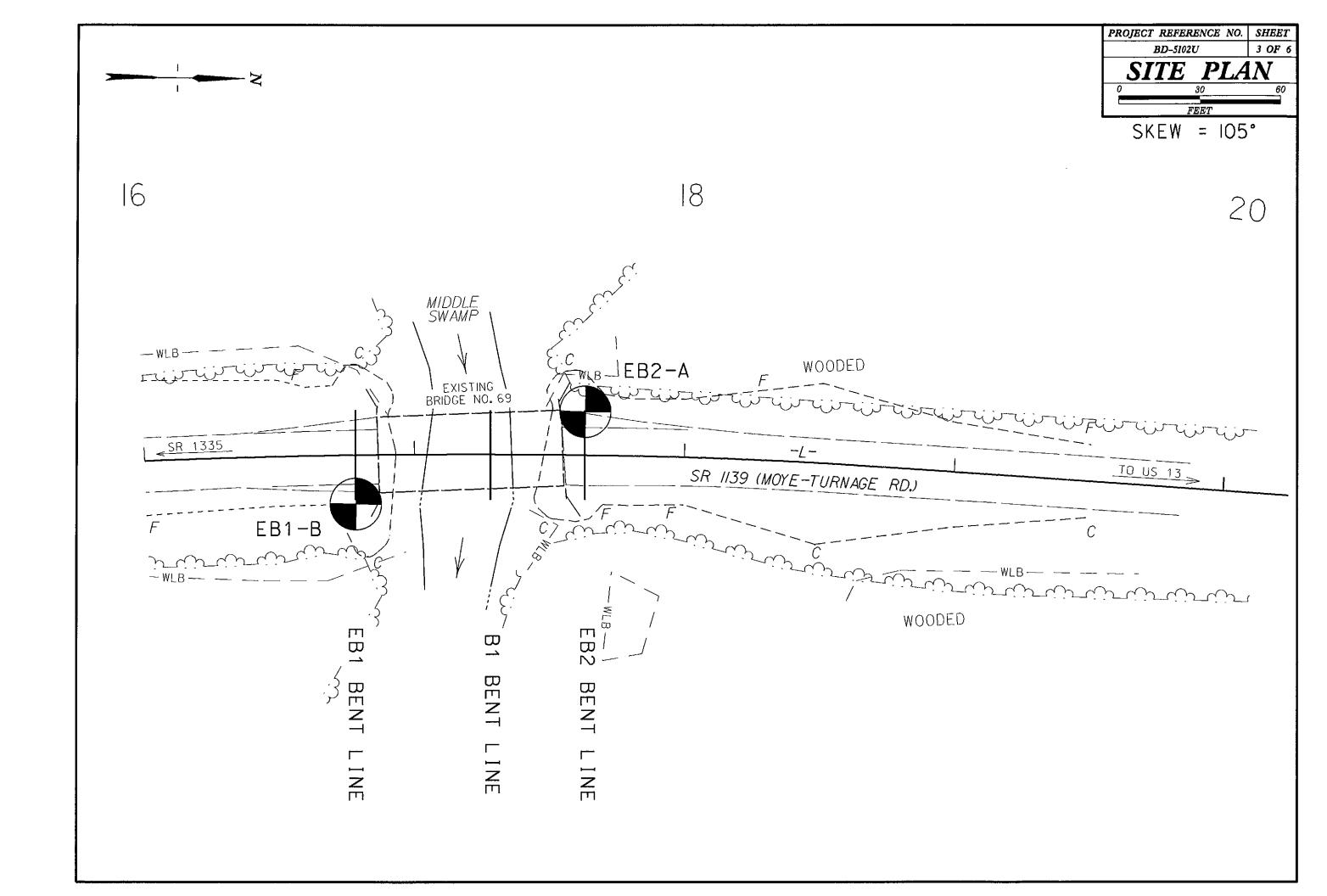
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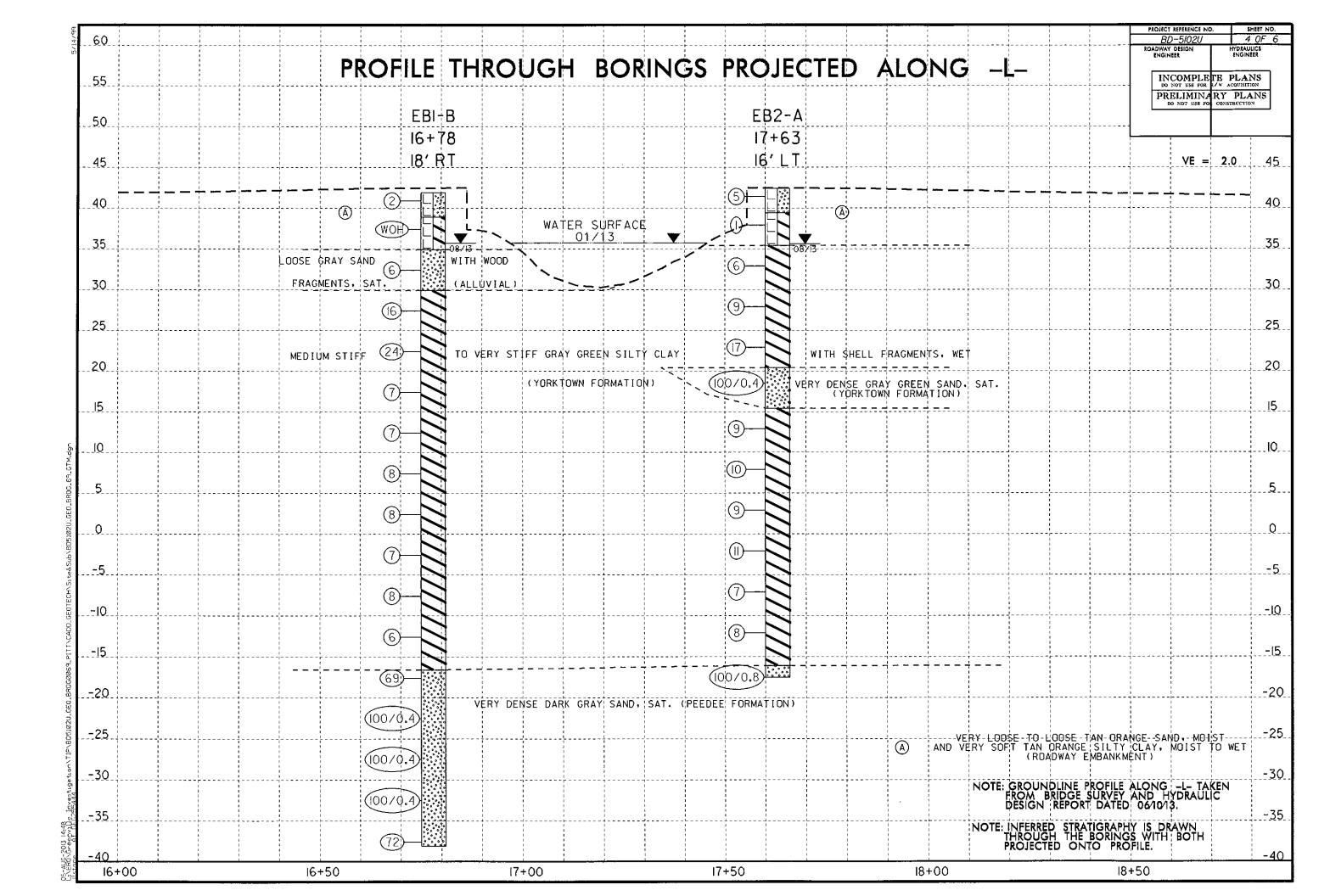
## SUBSURFACE INVESTIGATION

|  |  |  |  | SOIL AND RO  | CK LEGEND, TERM                        | is, symbols                       | 6, AND ABBREV   | IATIONS   |  |   |  |  |
|--|--|--|--|--|--|-----------------------------------|---|---|--|---|--|--|
|  | SOIL DESCRIPTION   |  |  | GRADATION  |  |                                   |   | DESCRIPTION   |  | TERMS AND DEFINITIONS   |  |  |
| SOIL IS CONSIDERED TO BE THE UNCO  | ONSOLIDATED, SEMI-CONSOLIDATED.  | OR WEATHERED EARTH MATERIALS                                       | UNIFORM - INDICATES THAT SO                                      | 0000 REPRESENTATION OF PARTICLE SIZES I<br>DIL PARTICLES ARE ALL APPROXIMATELY THI | ROM FINE TO COARSE.<br>SAME SIZE (ALSO | ROCK LINE INDICA                  | ATES THE LEVEL AT WHICH NON-                                | IAT IF TESTED, WOULD YIELD SPT I<br>-COASTAL PLAIN MATERIAL WOULD   | ALLUYIUM (ALLUY.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.   |   |  |  |
| THAT CAN BE PENETRATED WITH A CO<br>100 BLOWS PER FOOT ACCORDING TO S      | STANDARD PENETRATION TEST (AAS   | SHTD T206, ASTM D-1586). SOIL                                      | POORLY GRADED) GAP-GRADED - INDICATES A MI                       | XTURE OF UNIFORM PARTICLES OF TWO OR I   | MORE SIZES.                            |                                   |   | IN SAMPLER EQUAL TO OR LESS TH<br>ION BETWEEN SOIL AND ROCK IS C    |  | ADUIFER - A WATER BEARING FORMATION OR STRATA.  |  |  |
| CLASSIFICATION IS BASED ON THE AAR<br>CONSISTENCY, COLOR, TEXTURE, MOISTUR | JRE, AASHTO CLASSIFICATION, AND O  | OTHER PERTINENT FACTORS SUCH                                       |  | ANGULARITY OF GRAINS   |  | OF WEATHERED RO                   | OCK.<br>ARE TYPICALLY DIVIDED AS FO                         | LLDWS:  | AREMACEQUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.  ARGILLACEDUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, |   |  |  |
| AS MINERALOGICAL COMPOSITION, ANGU   | ULARITY, STRUCTURE. PLASTICITY. ET<br>Y CLAY, MOST WITH WITERBEDDED FAME SAMO LAVE |  | THE ANGULARITY OR ROUNDNES<br>SUBANGULAR, <u>SUBROUNDED</u> , OR | SS OF SOIL GRAINS IS DESIGNATED BY THE ROUNDED.                                    | TERMS: ANGULAR,                        | WEATHERED                         | SPICAPICA   | PLAIN MATERIAL THAT WOULD YIEL                                      | D SPT N VALUES > 100   | OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.  |  |  |
|  | ND AND AASHTO CLAS   |  |  | MINERALOGICAL COMPOSITION  | )N                                     | ROCK (VR)                         | BLOWS PER FO  | OOT IF TESTED.  |  | 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                          |  |  |
| GENERAL GRANULAR MATER   |  |  |  | TZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE I                                       |  | CRYSTALLINE<br>ROCK (CR)          | FINE TO COARS   | SE GRAIN IGNEOUS AND METAMORPH<br>SPT REFUSAL IF TESTED. ROCK TY    | IIC ROCK THAT<br>PE INCLUDES BRANITE,  | GROUND SURFACE.   |  |  |
| CLASS. (≤ 35% PASSING  |  | 5 *200)  | WHENEVER THEY ARE CONSIDER                                       |  | <del></del>                            |                                   | GNEISS, GABBRO  | D,SCHIST,ETC.<br>SE GRAIN METAMORPHIC AND NON-C                     | DASTAL PLAIN   | CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.   |  |  |
| GROUP A-1 A-3 CLASS. A-1-a A-1-b A-2-4 A                                   | A-2 A-4 A-5 A-<br>A-2-5 A-2-6 A-2-7  | 8-7-5 A D A C A-7  | SLIGHTLY COMPRESS  | COMPRESSIBILITY  | LESS THAN 31                           | NON-CRYSTALLINE<br>ROCK (NCR)     | SEDIMENTARY F   | ROCK THAT WOULD YEILD SPT REFL<br>LLITE, SLATE, SANDSTONE, ETC.     |  | COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM DF SLOPE.   |  |  |
| SYMBOL BOOODSOOD   |  | A-7-8 A-3 7 G, 7 7   | MODERATELY COMPRE  | SSIBLE LIQUID LIMIT  | EQUAL TO 31-50                         | COASTAL PLAIN<br>SEDIMENTARY ROCK | COASTAL PLAIN   | SEDIMENTS CEMENTED INTO ROCK  |  | CORE RECOVERY TRECT - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL  |  |  |
| Z PASSING  |  |  | HIGHLY COMPRESSIBL   | PERCENTAGE OF MATERIA  | GREATER THAN 50                        | (CP)                              | SHELL BEDS, ET  |   | SANDSTONE, CEMENTED  | LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.   |  |  |
| # 10 50 MX   |  | GRANULAR SILT-   | ORGANIC MATERIAL   | GRANULAR SILT - CLAY   | OTHER MATERIAL                         |                                   | WE  | EATHERING   |  | DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.  |  |  |
|  | 35 MX 35 HX 35 HX 36 MN 36 MN 36   | HN 36 HN SOILS SOILS PEAT  | TRACE OF ORGANIC MATTER  | SDILS SDILS<br>2 - 3% 3 - 5% TRI   | ACE 1 - 10%                            |                                   | FRESH, CRYSTALS BRIGHT, FEW . ER IF CRYSTALLINE.            | JOINTS MAY SHOW SLIGHT STAININ                                      | G. ROCK RINGS UNDER  | DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE   |  |  |
| LIGUIO LIMIT 48 HX 4   | 41 MN 48 MX 41 MN 48 MX 41 MN 48 I   | HX 41 PM SDILS WITH  | LITTLE DRGANIC MATTER MODERATELY DRGANIC                         | 3 - 5% 5 - 12% L11<br>5 - 10% 12 - 20% SOI   | TLE 10 - 20%<br>1E 20 - 35%            |                                   |   | INED, SOME JOINTS MAY SHOW THIN                                     | N CLAY COATINGS IF OPEN,   | HORIZONTAL.  DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR SEARING OF THE HORIZONTAL TRACE OF  |  |  |
|  | 10 HX 11 HN 11 HN 10 HX 10 HX 11 H   | IN 11 HN LITTLE OR HIGHLY  | HIGHLY DRGANIC   |  | HLY 35% AND ABOVE                      |                                   | TALS ON A BROKEN SPECIMEN FA<br>CRYSTALLINE NATURE,         | ACE SHINE BRIGHTLY. POCK RINGS                                      | UNDER HAMMER BLDWS 1F  | THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.   |  |  |
| GRDUP INDEX 8 9  | 4 MX 8 MX 12 MX 16 I   | MX No MX MODERATE DRGANIC SOILS                                    |  | GROUND WATER   |  | SLIGHT ROCK                       | GENERALLY FRESH, JOINTS STAI                                | INED AND DISCOLORATION EXTENDS                                      |  | FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO DISPLACEMENT OF THE  |  |  |
| USUAL TYPES STONE FRAGS. FINE SILT   |  | CLAYEY ORGANIC<br>SOILS MATTER                                     | _  | VEL IN BORE HOLE IMMEDIATELY AFTER I   | RILLING                                |                                   |   | LAY, IN GRANITOID ROCKS SOME OF<br>D. CRYSTALLINE ROCKS RING UNDER  |  | FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.   |  |  |
| MATERIALS SAND SAND ORRY GEN. RATING                                       | VEL HIND SHIND SUILS S   | SOILS  |  | STER LEVEL AFTER 24 HOURS  |  | MODERATE SIGNI                    | FICANT PORTIONS OF ROCK SHOW                                | W DISCOLORATION AND WEATHERING                                      | EFFECTS. IN  | FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM   |  |  |
| AS A EXCELLENT TO G  | GOOD FAIR TO P   | POOR FAIR TO POOR UNSUITABLE                                       | <u>∇PW</u> PERCHED   | WATER. SATURATED ZONE, OR WATER BEAR   | NG STRATA                              |                                   |   | ARE DULL AND DISCOLORED, SOME S<br>AND SHOWS SIGNIFICANT LOSS OF S  |  | PARENT MATERIAL.  |  |  |
| SUBGRADE DI DE A-7-E SUBCROUR II   | <br>IS ≤ LL - 30 : PI OF A-7-6   |  | O-M⊶ SPRING OF   | R SEEP   |  | HIW                               | FRESH ROCK.   |   |  | FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.   |  |  |
|  | NSISTENCY OR DENSE   |  | <b>V</b> 11  | MISCELLANEOUS SYMBOLS  | <u> </u>                               |                                   |   | ED OR STAINED. IN GRANITOID ROCI<br>HOW KADLINIZATION, ROCK SHOWS S |  | FORMATION IFM.1 - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN   |  |  |
| PRIMARY SOTI TYPE COMPACT  | TNESS OR RANGE OF STAN   | NDARD RANGE OF UNCONFINED  | ROADWAY EMBANKI  | _ FOT  |  |                                   | AN BE EXCAVATED WITH A GEOL                                 | LOGIST'S PICK. ROCK GIVES 'CLUNK                                    | SOUND WHEN STRUCK.   | THE FIELD.  |  |  |
| CONSI  | ISTENCY (N-VALUE)  |  | WITH SOIL DESCRI   | PTION VST PMT  | W/ CORE                                |                                   |   | <u>≔</u><br>ED DR STAINED.ROCK FA8RIC CLEA                          | AR AND EVICENT BUT REDUCED   | JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.  LEDGE - A SHELF-LIKE RIGGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SHALL COMPARED TO                           |  |  |
| GENERALLY VERY L   |  |  | SOIL SYMBOL  | AUGER BORING   | → SPT N-VALUE                          | (SEV.) IN ST                      | RENGTH TO STRONG SOIL. IN GR                                | RANITOID ROCKS ALL FELDSPARS A                                      | RE KAOLINIZED TO SOME  | ITS LATERAL EXTENT.   |  |  |
| MATERIAL MEDIUN  | M DENSE 10 TO 38   | N/A  | ARTIFICIAL FILL (  |  | (REF)— SPT REFUSAL                     |                                   | STED, YIELDS SPT N VALUES >                                 |   |  | LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.   |  |  |
| (NON-COHESIVE) OENS  |  |  | THAN ROADWAY EM  | MY   | •                                      |                                   |   | ED OR STAINED. ROCK FABRIC ELEN<br>TO SOIL STATUS.WITH ONLY FRAG    |  | MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.  |  |  |
| VERY 5   | 50FT <2  | ⟨∅,25  | INFERRED SOIL BO   | OUNDARY "ONITORING WE  | .L                                     | REMAI                             | NING, SAPROLITE IS AN EXAMPL                                | E OF ROCK WEATHERED TO A DEGR                                       | REE SUCH THAT ONLY MINOR   | PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN  |  |  |
| GENERALLY SOFT<br>SILT-CLAY MEDIUM   | T 2 TO 4<br>M STIFF 4 TO 8   | 0.25 TO 0.50<br>0.5 TO 1.0   | 訓記 INFERRED ROCK LI  | INE A PIEZOMETER INSTALLATION  |  |                                   |   | BRIC REMAIN. IF TESTED, YIELDS                                      |  | INTERVENING IMPERVIOUS STRATUM.  RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.   |  |  |
| MATERIAL STIF<br>(COHESIVE) VERY S   | FF B TO 15   | 1 TO 2   | ₹₹₽₽₹ ALLUVIAL SOIL 80   | OUNDARY SLOPE INDICATO   | R                                      |                                   |   | C NOT DISCERNIBLE, OR DISCERNIBL<br>MAY BE PRESENT AS DIKES OR S    |  | ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF   |  |  |
| HARC   |  | 2 TO 4   | 25/025 DIP & DIP DIRECT  |  |  | ALSO                              | AN EXAMPLE.   | C LIABBUEGO   |  | ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND   |  |  |
| Ţ  | <u> TEXTURE OR GRAIN SI</u>  | IZE  | ROCK STRUCTURES  | CONE PENETRON  | ETER TEST .                            |                                   |   | K HARDNESS  |  | EXPRESSED AS A PERCENTAGE.  SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE  |  |  |
| U.S. STD. SJEVE SIZE   | 4 10 40 60   | 200 270  |  | SOUNDING ROD   |  |                                   | KOT BE SCRATCHED BY KNIFE OF<br>RAL HARD BLOWS OF THE GEOLI | R SHARP PICK. BREAKING OF HAND<br>OGIST'S PICK.                     | SPECIMENS REQUIRES   | PARENT ROCK.  |  |  |
| OPENING (MM)   | ·  | 0.075 0.053  |  | ABBREVIATIONS  |  |                                   |   | ICK ONLY WITH DIFFICULTY, HARD I                                    | HAMMER 8LOWS REQUIRED  | SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL                           |  |  |
|  | GRAVEL COARSE SAND   | FINE SILT ELAY   | AR - AUGER REFUSAL   | MEO MEOIUM   | VST - VANE SHEAR TEST                  |                                   | DETACH HAND SPECIMEN.                                       |   |  | TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.  |  |  |
| (BLOR.) (COB.)   | (GR.) (CSE, SD.)   | (F SD.) (SL.) (CL.)  | BT - BORING TERMINATED CL CLAY                                   | MICA MICACEOUS<br>MOD MODERATELY   | WEA WEATHERED                          |                                   |   | ICK. GOUGES OR GROOVES TO 0.25<br>COLOGIST'S PICK. HAND SPECIMENS   |  | SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.   |  |  |
| GRAIN MM 395 75<br>SIZE IN 12 3  | 2.0 0.25   | 5 0.05 0.005   | CPT - CONE PENETRATION 1   | TEST NP - NON PLASTIC  | 7 DRY UNIT WEIGHT                      |                                   | 10DERATE BLOWS.   | INCHES DEEP BY FIRM PRESSURE O                                      | NE WATER OR RICK ROINT   | STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR BPF) OF  |  |  |
|  | STURE - CORRELATION  | I OF TERMS   | CSE COARSE  DMT - DILATOMETER TEST                               | ORG DRGANIC<br>PMT - PRESSUREMETER TEST  | SAMPLE ABBREVIATIONS                   | HARD CAN                          | BE EXCAVATED IN SMALL CHIPS                                 | B TO PEICES 1 INCH MAXIMUM SIZE                                     |  | A 140 LB, HAMMER FALLING 38 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH<br>A 2 INCH DUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS |  |  |
| SOIL MOISTURE SCALE  | FIELD MOISTURE GOT   | DE FOR FIELD MOISTURE DESCRIPTION                                  | DPT - DYNAMIC PENETRATIO<br>- VOID RATIO                         | ON TEST SAP SAPROLITIC<br>SD SAND, SANDY   | S ~ BULK<br>SS - SPLIT SPOON           | 1                                 | T OF A GEOLOGIST'S PICK.                                    | Y BY KNIFE OR PICK. CAN BE EXCA                                     | AVATED IN ERACMENTS  | THAN 0.1 FOOT PER 60 BLOWS.   |  |  |
| (ATTERBERG LIMITS)   | DESCRIPTION  | DE TOTT LEED TOTOTORE DESCRIPTION                                  | F - FINE   | SL SILT, SILTY   | ST - SHELBY TUBE                       | FROM                              | H CHIPS TO SEVERAL INCHES IN                                | SIZE BY MODERATE BLOWS OF A   |  | STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.  |  |  |
|  |  | UALLY LIQUID; VERY WET, USUALLY<br>OM BELOW THE GROUND WATER TABLE | FOSS FOSSILIFEROUS<br>FRAC FRACTURED, FRACTU                     | SLL - SLIGHTLY RES TCR - TRICONE REFUSAL   | RS - ROCK<br>RT - RECOMPACTED TRIAXIAL | 1                                 | ES CAN BE BROKEN BY FINGER                                  | PRESSURE.<br>E EXCAYATED READILY WITH POINT                         | DE BION BISCES I INCH  | STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK DUALITY DESCRIBED BY   |  |  |
| LL _ L10UID LIMIT  |  | OH BELOW INC BROOKS WHICH INDUE                                    | FRAGS FRAGMENTS  | W - MOISTURE CONTENT   | CBR - CALIFORNIA BEARING               | SOFT OR M                         | IDRE IN THICKNESS CAN BE 8RD                                | KEN BY FINGER PRESSURE, CAN BE                                      |  | TOTAL LENGTH OF ROCK SEGMENTS MITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.                                       |  |  |
| PLASTIC RANGE <  |  | MISOLID, REDUIRES DRYING TO  | KI HIGHLY  | v - very<br>IPMENT USED ON SUBJECT F   | RATIO                                  |                                   | URE SPACING   | BEOD  | ituc   | TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.  |  |  |
| (PI) PL PLASTIC LIMIT  | AT:  | TAIN OPTIMUM MOISTURE  |  |  | HAMMER TYPE:                           | TERM                              | SPACING   | TERM BEDD   | THICKNESS  | BENCH MARK: BM-I: RAILROAD SPIKE IN 24' OAK AT -L- STA, 16+43, 64' RT   |  |  |
|  | ~ MDIST ~ (M) S  | OLID: AT DR NEAR OPTIMUM MOISTURE                                  | DRILL UNITS:   | ADVANCING TOOLS:   | X AUTOMATIC MANUAL                     | VERY WIDE                         | MORE THAN 18 FEET   | VERY THICKLY BEODED   | > 4 FEET<br>1.5 - 4 FEET   | DENCH PHAN; DM I MAICHOAD SINC IN 24 OAK AT E STATIOTAS, OF KI  |  |  |
| OM OPTIMUM MOISTURE<br>SL SHRINKAGE LIMIT                                  | - MOIST - MPJ  | OCIDIAL DI HENT OF TRION POPULATE                                  | MOBILE B   | CLAY BITS  | X HOTOPIATIC TRANSPORT                 | WIDE<br>MODERATELY CLI            | 3 TO 10 FEET<br>OSE 1 TO 3 FEET                             | THICKLY BEDDED THINLY BEDDED  | 0.16 - 1,5 FEET  | ELEVATION: 39.25 FT.  |  |  |
|  |  | OUTRES ADDITIONAL WATER TO   | 1  | 6° CONTINUOUS FLIGHT AUGER   | CORE SIZE:                             | CLOSE                             | 0.16 TO 1 FEET  | VERY THINLY BEDDED<br>THICKLY LAMINATED                             | 0.03 - 0.16 FEET<br>0.008 - 0.03 FEET  | NOTES:  |  |  |
|  |  | TAIN OPTIMUM MOISTURE  | BK-51  | 8* HOLLOW AUGERS   | ☐· <b>в</b>                            | VERY CLOSE                        | LESS THAN 0.16 FEET   | THINLY LAMINATED  | < 0.008 FEET   |   |  |  |
|  | PLASTICITY   |  | CME-45C  | HARD FACED FINGER BITS   |  | EDD CEDIMENTARY D                 |   | DURATION  NING OF THE MATERIAL BY CEMEN                             | ITING HEAT ODECCHOS CTC  | -   |  |  |
| NONPLASTIC   | PLASTICITY INDEX (PI)  | DRY STRENGTH<br>VERY LOW   | X CME-55   | TUNGCARBIDE INSERTS  |  |                                   |   | RING OF THE MATERIAL BY CEMEN<br>IG WITH FINGER FREES NUMEROUS (    |  |   |  |  |
| LOW PLASTICITY   | 0-5<br>6-15  | SLIGHT   |  | X CASING W/ ADVANCER   | HAND TOOLS:                            | FRIABLE                           |   | E BLOW BY HAMMER DISINTEGRATES                                      |  |   |  |  |
| MED. PLASTICITY HIGH PLASTICITY  | 16-25<br>26 OR MORE  | MEDTUM<br>H1GH   | PORTABLE HOIST   | X TRICONE 2 15/16 STEEL TEETH  | POST HOLE DIGGER                       | MODERATE                          |   | CAN BE SEPARATED FROM SAMPLE  | E WITH STEEL PROBE;  |   |  |  |
|  | COLOR  |  |  | TRICONE TUNGCARB.  | HAND AUGER                             |                                   |   | S EASILY WHEN HIT WITH HAMMER.                                      |  |   |  |  |
| DESCRIPTIONS MAY INCLUDE DOLOR   |  | IN, RED, YELLOW-BROWN, BLUE-GRAY).                                 |  | CORE BIT   | SOUNDING ROD                           | INDURATE                          |   | S ARE DIFFICULT TO SEPARATE WIT<br>ULT TO BREAK WITH HAMMER.        | TH STEEL PROBE;  |   |  |  |
|  | ARK, STREAKED, ETC. ARE USED TO  |  |  | l 🗆  | VANE SHEAR TEST                        | EXTREMEL                          | Y INDURATED SHARP   | HAMMER BLOWS REDUIRED TO BRE  | AK SAMPLE;   |   |  |  |
| l <u> </u>   |  |  |  |  |  |                                   | SAMPLI  | E BREAKS ACROSS GRAINS.   |  |   |  |  |

SHEET NO. 2 OF 6

PROJECT REFERENCE NO. BD-5102U





| WBS 45348.1.21 TIP BD-5102U COUNTY PITT             |   |  |                                      | GEOLOGIST Wrike, C. M.                       |                        | WBS      | <b>3</b> 45348.1.21 |           | 1         | TIP BD-5102U COUN           | TY PITT     |                           | GEOLOGIST Wrike, C. M.    |                                 |  |  |
|---|---|--|--------------------------------------|--|------------------------|----------|---------------------|-----------|-----------|-----------------------------|-------------|---------------------------|---------------------------|---------------------------------|--|--|
| SITE DESCRIPTION BRIDGE NO                          | D. 69 ON -L- (SR 1139) OVER MID   | DLE SWAMP  |                                      |  | GROUND WTR (ft)        | SITE     | DESCRIPTIO          | N BRIDG   | E NO. 6   | 69 ON -L- (SR 1139) OVER MI | DDLE SWAM   | 1P                        |                           | GROUND WTR (ft                  |  |  |
| BORING NO. EB1-B                                    | STATION 16+78   | OFFSET 18 ft                                     | RT                                   | ALIGNMENT -L-                                | 0 HR. N/A              | BOR      | RING NO. EB         | 1-B       |           | STATION 16+78               | OFFSET      | 18 ft RT                  | ALIGNMENT -L-             | 0 HR. N/A                       |  |  |
| COLLAR ELEV. 41.9 ft                                |   | NORTHING 65                                      |                                      | <b>EASTING</b> 2,432,775                     | <b>24 HR.</b> 6.2      | COL      | LAR ELEV. 4         | 11.9 ft   | 1         | TOTAL DEPTH 80.0 ft         | NORTHING    | 652,051                   | <b>EASTING</b> 2,432,775  | <b>24 HR.</b> 6.2               |  |  |
| DRILL RIG/HAMMER EFF./DATE F&R                      |   | r <del></del>                                    | L METHOD M                           | <del></del>                                  | IMER TYPE Automatic    |          |                     |           |           | 95 CME-55 84% 12/14/2012    |             | DRILL METHOD N            | · ·                       | HAMMER TYPE Automatic           |  |  |
| DRILLER Contract Driller                            | START DATE 08/02/13   | COMP. DATE                                       |                                      | SURFACE WATER DEPTH                          | N/A                    | 1        | LER Contra          |           |           | START DATE 08/02/13         | <del></del> | TE 08/02/13               | SURFACE WATER DEP         | TH N/A                          |  |  |
| ELEV Cft) DEPTH BLOW COUNTY (ft) (ft) 0.5ft 0.5ft 0 |   | 75 100 NO  | IP. V                                | SOIL AND ROCK DE                             |                        |          | DRIVE DEPT          | 0.5ft 0.6 | SOUNT     | BLOWS PER FOO<br>1 0 25 50  | 75 100      | SAMP. L<br>O<br>NO. MOI G |                           | CK DESCRIPTION                  |  |  |
| (ri) Sion Sion S                                    |   | 7   10   | MOI G                                | ELEV. (ft)                                   | DEPTH (ft)             | <u> </u> | (10)                | 0.010     | 511 0.511 |                             | <u> </u>    | NO. MOI G                 |                           | <del>11 </del>                  |  |  |
| 45  |   |  |                                      |  |                        | -35      |                     |           |           | Match Line                  |             |                           |                           |                                 |  |  |
| 7   |   |  |                                      | -  |                        | -55      | -36.6 78.5          |           |           |                             | 1.7         |                           | <del>-</del>              |                                 |  |  |
| 41.9 1 00 1 1 1                                     | 1 42  |  |                                      | 41.9 GROUND SUR ROADWAY EMBA                 |                        |          | <del></del>         | 42 3      | 2 40      |                             | <b>●</b> 72 |                           | 38.1<br>Boring Terminated | 80.<br>at Elevation -38.1 ft IN |  |  |
| 40 +  | •   |  |                                      | TAN ORANGE SAN                               | ID, MOIST              |          | 1 1                 |           |           |                             |             |                           | L VERY DE                 | ENSE SAND                       |  |  |
| 38.4 † 3.5 WOH WOH W                                | <i>т</i> он от тон от |  |                                      | ROADWAY EMBA<br>TAN ORANGE SILTY CI          | NKMENT<br>AY, MOIST TO |          | l I                 |           |           |                             |             |                           | [                         |                                 |  |  |
| 35  | \\.   |  |                                      | 34.9 WET                                     | 7.0                    |          |                     |           |           |                             |             |                           | <u></u>                   |                                 |  |  |
| 33.4 + 8.5 4 1                                      | 5   |  |                                      | ALLUVIAI<br>GRAY SAND WITH WOO               | L<br>D FRAGMENTS,      |          | ‡                   |           |           |                             |             |                           | <u>}</u>                  |                                 |  |  |
| 30 +  | •   • • • • • • • • • • • • • • • •   |  |                                      | SAT.   | 40.0                   |          | ‡                   |           |           |                             |             |                           | ‡                         |                                 |  |  |
| 28.4 7 13.5   |   | <del>                                     </del> |                                      | 29.9 COASTAL PI<br>GRAY GREEN SILTY CL       |                        |          |                     |           |           |                             |             |                           | <del>-</del><br>-         |                                 |  |  |
| 3 5   | 11 16   |  |                                      | FRAGMENTS, WET ( FORMATIO                    | YORKTOWN               |          | ‡                   |           |           |                             |             | 1 1 1                     | F                         |                                 |  |  |
| 25  |   | <del>                                     </del> |                                      | -  |                        |          | 1 - 🗄               |           |           |                             |             |                           | <del>[</del> -            |                                 |  |  |
| 23.4 7 18.5 3 11                                    | 13  |  |                                      |  |                        |          |                     |           |           |                             |             |                           | [                         |                                 |  |  |
| 20  | ,   |  |                                      | _  |                        |          | <u> </u>            |           |           |                             |             |                           | _                         |                                 |  |  |
| 18.4 + 23.5 2 3                                     | <del>-</del> -  : <u>.</u> /:: :::: ::::  |  |                                      |  |                        |          | ‡                   |           |           |                             |             |                           | <u> </u>                  |                                 |  |  |
| 15   †  |   |  |                                      |  |                        |          | ‡                   |           |           |                             |             |                           | <u>-</u>                  |                                 |  |  |
| 13.4 7.29.5   |   |  |                                      | -  |                        |          | †                   |           |           |                             |             |                           | -                         |                                 |  |  |
| 3 2   | -    - <b>**</b> * ・・  ・・・・  ・・・・   |  |                                      |  |                        |          | † ‡                 |           |           |                             |             |                           | <del>-</del>              |                                 |  |  |
| 10  |   |  |                                      |  |                        |          | ļ <u></u>           |           |           |                             |             |                           |                           |                                 |  |  |
| 8.4 + 33.5   3   3                                  | 5   |  |                                      |  |                        |          | <u> </u>            |           |           |                             |             |                           |                           |                                 |  |  |
| 5   1   |   |  |                                      | -  |                        |          | 1                   |           |           |                             |             |                           | -                         |                                 |  |  |
| 3.4 + 38.5 2 4                                      | <u>-</u>   : <u> </u> :   |  |                                      |  |                        |          | ‡                   |           |           |                             |             |                           | -                         |                                 |  |  |
|   | . • · · · · · · · · · · · · · · · · · ·   |  |                                      |  |                        |          | ‡                   |           |           |                             |             |                           | -<br> -                   |                                 |  |  |
| -1.6 + 43.5   |   |  |                                      | -  |                        |          | †                   |           |           |                             |             |                           | <del>-</del><br>-         |                                 |  |  |
| 2 3   | 4   |  |                                      |  |                        |          | ‡                   |           |           |                             |             |                           | -                         |                                 |  |  |
| _5  |   | <del>                                     </del> |                                      | -  |                        |          | 1 - 1               |           |           |                             |             |                           | <u>-</u>                  |                                 |  |  |
| -6.6  | 5   |  |                                      |  |                        |          | <u> </u>            |           |           |                             |             |                           | _                         |                                 |  |  |
| -10 +   | 1 .1  | · · · ·  |                                      | _  |                        |          |                     |           |           |                             |             |                           | -                         |                                 |  |  |
| -11.6 + 53.5  | $\frac{1}{3} \left  \begin{array}{c} \frac{1}{4} \cdot \cdot \cdot \cdot \\ \frac{1}{3} \cdot \cdot \cdot \cdot \end{array} \right  \cdot \cdot \cdot \cdot \cdot \cdot \left  \begin{array}{c} \cdot \cdot \cdot \cdot \cdot \\ \cdot \cdot \cdot \cdot \cdot \cdot \end{array} \right $   |  |                                      |  |                        |          | ‡                   |           |           |                             |             |                           | -                         |                                 |  |  |
| †   | •   |  |                                      |  |                        |          | ‡                   |           |           |                             |             |                           | <u>-</u><br>-             |                                 |  |  |
| -16.6 + 58.5  |   |  |                                      | - <u>16.6</u>                                | 58.5                   |          | ‡                   |           |           |                             |             |                           | <del>-</del><br>-         |                                 |  |  |
| 24 37 3   | 32  |  |                                      | COASTAL PI<br>DARK GRAY SAND, S.<br>FORMATIO | AIN<br>AT. (PEEDEE     |          | †                   |           |           |                             |             |                           | -                         |                                 |  |  |
|   |   |  |                                      | FORMATIO                                     | N)                     |          | <del> </del>        |           |           |                             |             |                           |                           |                                 |  |  |
| -21.6 † 63.5   85   100/0.4                         |   | 100/0.4  |                                      |  |                        |          | Ī                   |           |           |                             |             |                           | E                         |                                 |  |  |
| -25   |   |  | <u>                             </u> | -  |                        |          | 1 1                 |           |           |                             |             |                           | -                         |                                 |  |  |
| -26.6 <b>+</b> 68.5 38 100/0.4                      |   |  |                                      |  |                        |          | ‡                   |           |           |                             |             |                           | -                         |                                 |  |  |
| -15   |   | - 100/0.4  |                                      |  |                        |          | ‡                   |           |           |                             |             |                           | <del>-</del>              |                                 |  |  |
| -31.6 7.73.5  |   |  |                                      | •  |                        |          | ‡                   |           |           |                             |             |                           | -                         |                                 |  |  |
| 74 100/0.4  |   | 100/0.4  |                                      |  |                        |          | ‡                   |           |           |                             |             |                           | F                         |                                 |  |  |
| -35   †   |   | <u> </u>   |                                      |  |                        | L        | <u> </u>            |           |           |                             |             |                           | <u> </u>                  |                                 |  |  |

| BORI<br>COLI<br>DRILL | DESCR<br>ING NO<br>LAR ELI |             |         | IDGE I |        | ON -L- (SR 1139) OVER MIDDLE SWAMP   | GROUND WTR (ft     |
|-----------------------|----------------------------|-------------|---------|--------|--------|--|--------------------|
| DRILL<br>DRILL        |                            | . EB2       | Δ       |        |        |  | 1                  |
| DRILL<br>DRIL         | LAR ELI                    |             | ~~      |        | S      | ATION 17+63 OFFSET 16 ft LT ALIGNMENT -L-  | 0 HR. N/A          |
| DRIL<br>LEV           |                            | EV. 42      | 2.4 ft  |        | T      | TAL DEPTH         59.9 ft         NORTHING         652,135         EASTING         2,432,740 | <b>24 HR.</b> 6.8  |
| LEV                   | . RIG/HA                   | MMER E      | FF./DA  | TE F   | &R3495 | CME-55 84% 12/14/2012 DRILL METHOD Mud Rotary HAMM   | IER TYPE Automatic |
|                       | LER C                      | ontract     | Drille  | r      | S      | ART DATE 08/01/13 COMP. DATE 08/01/13 SURFACE WATER DEPTH N/                                 | /A                 |
| (ft)                  | DRIVE<br>ELEV              | DEPTH       | BLC     | ow co  | UNT    | BLOWS PER FOOT SAMP. V L O SOIL AND ROCK DESC  | CRIPTION           |
|                       | (ft)                       | (ft)        | 0.5ft   | 0.5ft  | 0.5ft  | 0 25 50 75 100 NO. MOI G ELEV.(ft)   | DEPTH              |
|                       |                            |             |         |        |        |  |                    |
| 45                    |                            | L           |         |        |        |  |                    |
|                       | 42.4                       | 0.0         |         |        |        | - 42.4 GROUND SURFA  | ACE 0              |
|                       | <del>4</del> 2.4           | - "         | 2       | 3      | 2      | ROADWAY EMBANI   | KMENT              |
| 40                    | 38.9                       | 3.5         |         |        |        | TAN ORANGE SAND  | <u> </u>           |
|                       | -                          | - 5.5       | 1       | WOH    | 1      | ROADWAY EMBANI   |                    |
| 35                    | -                          | Ī           |         | ļ      |        | WET  |                    |
|                       | 33.9                       | 8.5         | 2       | 2      | 4      | COASTAL PLA GRAY GREEN SILTY CLAY  | / WITH SHELL       |
|                       |                            |             |         | _      | •      | 6 FRAGMETNS (WET) YOUR FORMATION)  | ORKTOWN            |
| 30                    | -                          | _           |         |        |        | -\   | ,                  |
| -                     | 28.9                       | 13.5        | 2       | 5      | 4      |  |                    |
|                       | -                          | -           |         |        |        |  |                    |
| 25                    | 23.9                       |             |         |        |        |  |                    |
| Ī                     | 20.0                       | -           | 2       | 9      | 8      | 17   |                    |
| 20                    | -                          | -           |         |        |        | 20.4   | 22                 |
|                       | 18.9                       | 23.5        | 10010   |        |        | COASTAL PLA GRAY GREEN SAND, SAT.  | IN                 |
|                       | -                          |             | 100/0.4 | 1      |        | FORMATION)   |                    |
| 5                     | _                          | -           |         |        |        |  |                    |
|                       | _13.9                      | 28.5        | 3       | 3      | 6      | COASTAL PLA GRAY GREEN SILTY CLAY  | WITH SHELL         |
|                       | -                          | -           | "       | ľ      | Ů      | FRAGMETNS (WET) YO   |                    |
| 0                     | 1                          | _           |         |        |        | 1 Statution,   |                    |
| -                     | 8.9                        | - 33.5<br>- | 3       | 4      | 6      |  |                    |
|                       | -                          | -           |         |        |        |  |                    |
| 5                     | 39                         | 38.5        |         |        |        | <del></del>  |                    |
|                       | 0.0                        | -           | 2       | 4      | 5      |  |                    |
| 0                     | 1                          | -           |         |        |        |  |                    |
|                       | 1_1                        | 43.5        |         |        |        | <del>-::-   </del>     <b>&gt;</b> -   |                    |
|                       | -                          | _           | 3       | 5      | 6      | : • • • • • • • • • • • • • • • • • • •  |                    |
| 5                     |                            | _           |         |        |        | ·;····································   |                    |
| -                     | -6.1                       | 48.5        | 2       | 3      | 4      | <u> </u>   |                    |
|                       |                            | -           |         |        |        | *****   ****   ****   ****   <b>S</b> ************************************                   |                    |
| 10                    | 1, 1                       | - 60.5      |         |        |        | <del></del>  |                    |
| F                     | -11.1                      | _ 53.5<br>- | 2       | 3      | 5      |  |                    |
| 4.5                   | ‡                          | -<br>-      |         |        |        |  |                    |
| 15                    | -16.1                      | 58.5        |         |        |        |  | 58                 |
|                       |                            |             | 17      | 33     | 67/0.4 | 100/0.8 177.5 COASTAL PLA  | IN                 |
|                       | 1                          | -           |         |        |        | FORMATION)   | )                  |
|                       | 4                          | -           |         |        |        | Boring Terminated at Elevat  |                    |
|                       | ‡                          | -           |         |        |        |  |                    |
|                       | £                          | -           |         |        |        |  |                    |
|                       | 7                          | _           |         |        |        |  |                    |
|                       | 1                          | •           |         |        |        |  |                    |
|                       |                            | •<br>•      |         |        |        |  |                    |
|                       |                            |             |         | . '    |        | i i i i  |                    |
|                       | 1                          | -           |         |        |        |  |                    |

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

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| <b></b> |                    |
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| 3       | SITE PLAN          |
| 4       | PROFILE            |
| 5-7     | BORF LOGS          |

# **STRUCTURE** SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 17BP.2.R.51 (SF-390034) F.A. PROJ. COUNTY GREENE PROJECT DESCRIPTION BRIDGE NO. 34 ON SR 1344 (DARDEN FARM ROAD) OVER MIDDLE SWAMP OVERFLOW AT -L- STA. 14+81

STATE STATE PROJECT REFERENCE NO. SF-390034 N.C.

#### CAUTION NOTICE

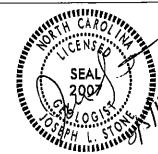
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PLAPPOSE OF STUDY, PLANING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE MARRIES BELLO BORNES LOOS, ROCK CORES, AND SOL TEST DATA AWALABLE MAY BE REVWEND OR HISSPOTTATION, CONTACTURED THE PLANING THE PLANING THANSPORTATION, COTTENING, LINCEPERN UNIT AT 1999 TO76-950, NETHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORNING LOOS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

CENERAL SOL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVALABLE. SUBSUBFACE DATA AND MAY NOT NECESSARLY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SWIFELD STRATA AIM THE BOREHOLE. THE LABORATION SAMPLE DATA AND THE MOSTUM REPEATED STRATA CAN BE RELIED ON ONLY TO THE DECKNEE OF RELABBLITY INSERENT IN THE STATUDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOL MOSTUME CONDITIONS INDICATED IN THE SUBSURFACE WIVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION, THESE WATER LEVELS OR SOL MOSTUME CONDITIONS MAY VARY CONSIDERABLE WHITH THE ACCORDING TO CLIMATE CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION, AND WHO, 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 FRAIL DESIGN DETAILS ARE DIFFERENT, FOR BIDDING MID CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FAIL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT MARRANT OR CUBARATIET THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR CHINON OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BEDDER OR NICESSARY TO SATIFFY HUSSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THIS PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL CONFENSION OF FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DEFERRING FROM THOSE INDICATED IN THE SUBSURFACE REFORMATION.

|              | F&R PERSONNEL     |
|--------------|-------------------|
|              | <del></del>       |
|              | ****              |
|              |                   |
|              |                   |
|              |                   |
|              |                   |
| INVESTIGATED | BY J.L. STONE     |
|              | D.N. ARGENBRIGHT  |
|              | YD.N. ARGENBRIGH: |
| DATE         | AUGUST 2013       |

PERSONNEL C.M. WRIKE



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

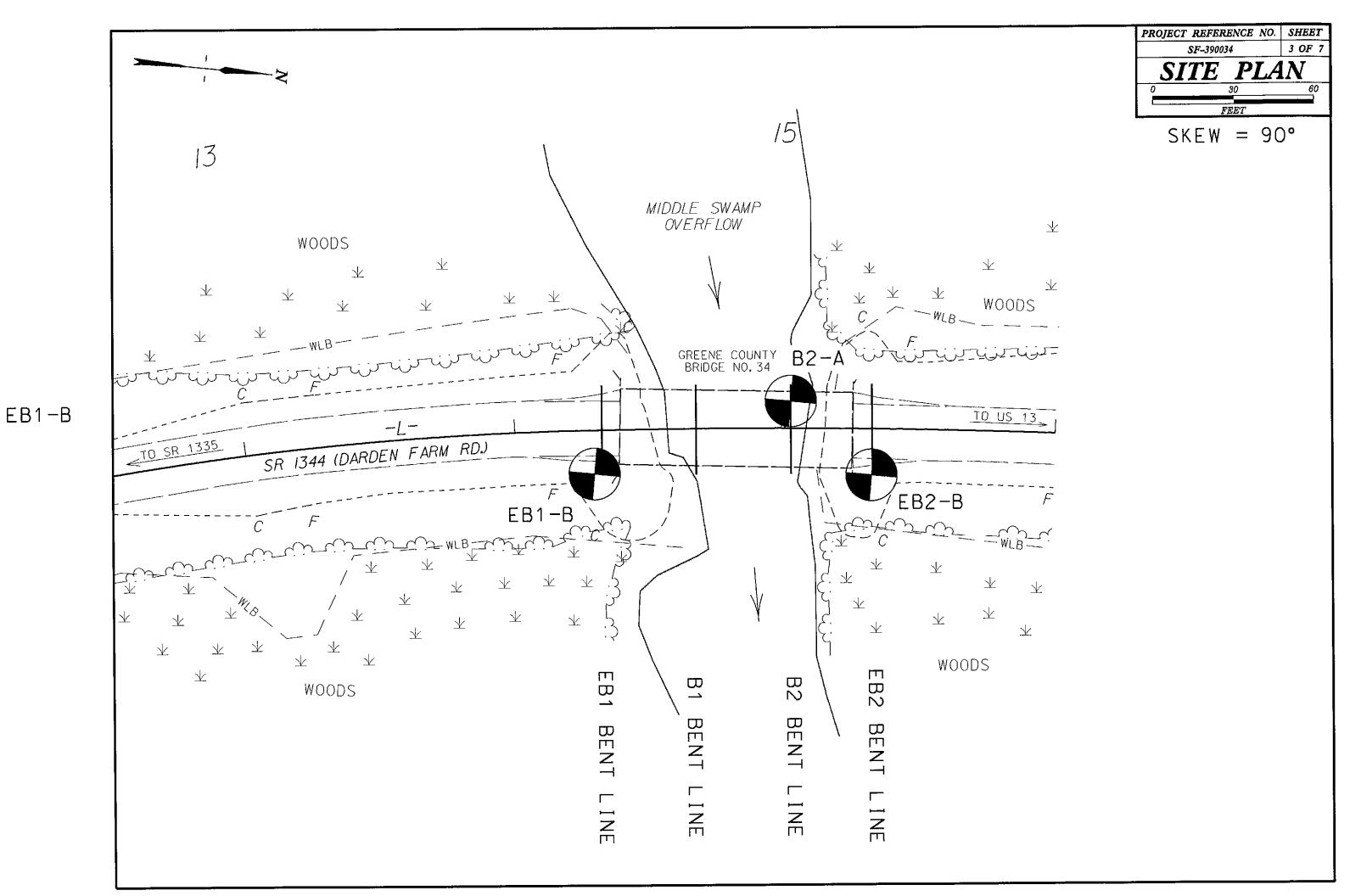
GEOTECHNICAL ENGINEERING UNIT

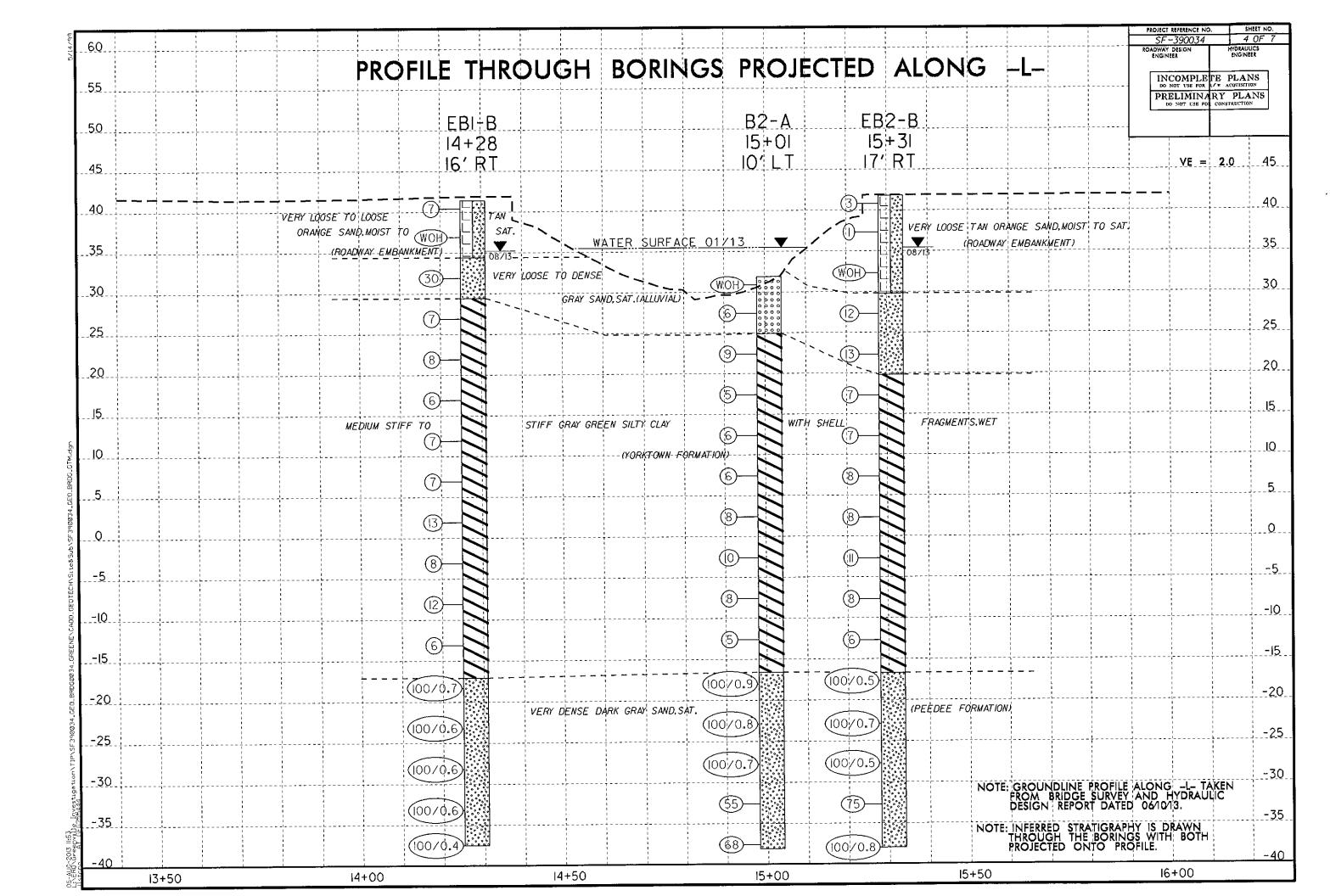
## SUBSURFACE INVESTIGATION

|  | SOIL AND ROCK LEGEND, TERM  | IS, SYMBOLS, AND ABBREVIATIONS   |  |
|--|---|--|--|
| SOIL DESCRIPTION   | GRADATION   | ROCK DESCRIPTION   | TERMS AND DEFINITIONS  |
| SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS   | MELL GRACED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO | 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.  | ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.   |
| THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN   | POORLY GRADEDI GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.  | SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN & 1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE  | ADUIFER - A WATER BEARING FORMATION OR STRATA.   |
| 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T205, ASTM 0-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE:   | ANGULARITY OF GRAINS  | OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:  | 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.                     |
| CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALDGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:  | THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR.   | SULLANDIA  | OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC.   |
| YERY STAFF, GRAY, SUTY CLAY, WAST WITH INTERBEDDED FAME SAMO LAVERS, MISHLY PLASTIC, A-7-6   | SUBANGULAR, SUBROUNDED, OR ROUNDED.   | MEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 ROCK (WR) 8LOWS PER FOOT IF TESTED.   | ARTESIAN - CROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL.   |
| SOIL LEGEND AND AASHTO CLASSIFICATION  | MINERALOGICAL_COMPOSITION   | CRYSTALLINE CONTROL OF THE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT   | AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.  |
| GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS DRGANIC MATERIALS   | MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KADLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.                               | ROCK (CR) WOULD YIELD SPT REFUSAL IF TESTED, ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.  | CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  |
| CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200)   | COMPRESSIBILITY   | NON-CRYSTALLINE FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YELLO SPT REFUSAL IF TESTED, ROCK TYPE  | COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM  |
| GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 A-6 A-7 A-1, A-2 A-4, A-5 A-6 A-7 A-1, A-2 A-4, A-5 A-6, A-7   | SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31   | ROCK (NCR) INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.   | OF SLOPE.  |
| SCHOOL STATE OF COLUMN STATE O | MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50   | COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SEDIMENTARY ROCK SPT REFUSAL, ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED  | CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDEO BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.                                    |
| SYMBOL BOOK BOOK BOOK BOOK BOOK BOOK BOOK B  | HIGHLY COMPRESSIBLE LIGUID LIMIT GREATER THAN 50  PERCENTAGE OF MATERIAL  | (CP) SHELL BEOS, ETC.  | DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT   |
| 7 PASSING SILT- GRANULAR SILT- MUCK,   | CRANII AR SUT - CLAY  | WEATHERING   | ROCKS OR CUTS MASSIVE ROCK.  |
| # 40 30 MX 50 MX 51 MN SOILS COILS PEAT  | ORGANIC MATERIAL SOILS SOILS SOILS TRACE  | FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER   | DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE  |
| ■ 200 15 MX 25 MX 18 MX 35 MX 35 MX 35 MX 36 MN 36 MN 36 MN 36 MN  | TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%  LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20%   | HAMMER IF CRYSTALLINE.  VERY SLICHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN.   | HORIZONTAL.  DIP_DIRECTION (DIP_AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF   |
| LICUJO LIMIT 48 HX 41 HN 48 HX 41 HN 48 HX 41 HN 48 HX 41 HN SOILS WITH PLASTIC INDEX 6 HX NP 18 HX 10 HX 11 HN 18 HX 18 HX 11 HN 11 HN LITTLE OR  | MODERATELY ORGANIC  | (V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF   | THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  |
| HIGHLY   | GROUND WATER  | OF A CRYSTALLINE NATURE.   | FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE   |
| AMOUNTS OF SOLIS   | ₩ATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING   | SLIGHT 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  | SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.  |
| THE MATTER CRAYEL AND FINE SILLY OR CERTET SILLY CERTET MATTER   |   | CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.   | FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  |
| MATERIALS SANO SHIND SHAVEE WIND SHIND SOLES SOLES   | STATIC WATER LEVEL AFTER 24 HOURS   | MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS  | FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM  |
| GEN. RATING AS A EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE  | PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA  | (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLURED, SUME SHOW CLAT. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED  | PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY   |
| SUBGRADE   | - O-MM→ SPRING OR SEEP  | WITH FRESH ROCK,   | THE STREAM.  |
| PI OF A-7-5 SUBGROUP IS  LL - 30 : PI OF A-7-6 SUBGROUP IS > LL - 30   | MISCELLANEOUS SYMBOLS   | MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELOSPARS DULL SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH  | FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN  |
| CONSISTENCY OR DENSENESS  RANGE OF STANDARD RANGE OF UNCONFINED  |   | (MOD, SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK.  | THE FIELD.   |
| PRIMARY SOIL TYPE COMPACTIVES OH PENETRATION RESISTENCE COMPRESSIVE STRENGTH   | ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION  ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION  ROADWAY EMBANKMENT (RE) W/ CORE  TEST BORING W/ CORE                    | IF TESTED, WOULD YIELD SPT REFUSAL   | JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.   |
| We tell DET  | ALICCO PRIDING COMPANY SPI N-VALUE  | SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED (SEY.) IN STRENGTH TO STRONG SOIL, IN GRANITOID ROCKS ALL FELDSPARS ARE KADLINIZED TO SOME   | LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.  |
| GENERALLY LOOSE 4 TO 18  | SOIL SYMBOL THOSEN BOATHO   | EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN.  | LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  |
| MATERIAL MEDIUM DENSE 10 10 30   | ARTIFICIAL FILL (AF) OTHER - CORE BORING RED SPT REFUSAL THAN ROADWAY EMBANKMENT  | JF TESTED, YIELDS SPI N VALUES > 100 BPF  VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT   | MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN  |
| (NON-COHESIVE) VERY DENSE >50  | MO MONITORNIC VELI  | (V SSV) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK   | 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                           |
| VERY SOFT <2 <0.25   | - In this sair poolesis   | REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT DNLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF  | INTERVENING IMPERVIOUS STRATUM.  |
| GENERALLY   SOFT   2 TO 4   0.25 TO 0.50   | INFERRED ROCK LINE  A PIEZOMETER INSTALLATION   | COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND   | RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.   |
| MATERIAL STIFF 8 TO 15 1 TO 2  |   | SCATTERED CONCENTRATIONS, DUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS  | ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF  |
| (COHESIVE) VERY STIFF 15 TO 39 2 TO 4 HARD >30 >4  | 25/925 DIP & DIP DIRECTION OF   | ALSO AN EXAMPLE.   | ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.   |
| TEXTURE OR GRAIN SIZE  | ROCK STRUCTURES   | ROCK HARDNESS  | SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE   |
|  | 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.  | PARENT ROCK,   |
| 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   |   | THE PROPERTY OF THE PROPERTY O | SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL                      |
| COARSE FINE CHY  | ABBREVIATIONS   | HARD CAN BE BERATCHED BY KNIFE OR PICK UNLY WITH DIFFICULIT, HARD HAMMER BLOWS REGULARD  TO DETACH HAND SPECIMEN.  | TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.   |
| BOULDER COBBLE GRAVEL SAND SAND SIL! CLAY  | AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST 8T - BORING TERMINATED MICA MICACEOUS WEA WEATHERED   | MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE   | SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR  |
| (652, 363) (17 303   | CL CLAY MOD MODERATELY 7- UNIT WEIGHT   | HARD EXCAVATED BY HARD BLDW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLDWS.   | SLIP PLANE.  |
| GRAIN MM 305 75 2,0 0.25 0.05 0.005<br>SIZE IN. 12 3   | CPT - CONE PENETRATION TEST NP - NON PLASTIC 7 <sub>d</sub> - DRY UNIT WEIGHT CSE CDARSE ORG ORGANIC  | MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT.  | 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 |
| SOIL MOISTURE - CORRELATION OF TERMS   | DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREYIATIONS  | HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.   | A 2 INCH DUTSIDE DIAMETER SPLIT SPOON SAMPLER, SPT REFUSAL IS PENETRATION EQUAL TO OR LESS   |
| COL MAINTINE CON F. STEIN MOISTINE   | DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK  | SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS   | THAN 9.1 FOOT PER 68 BLOWS.  |
| SUIT MOISTURE SCREE FIELD MOISTURE DESCRIPTION  GUIDE FOR FIELD MOISTURE DESCRIPTION   | e - VOIO RATIO SD SANDY SS - SPLIT SPUUN F - FINE SL SILT, SILTY ST - SHELBY TUBE   | FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN  | STRATA CORE RECOVERY ISRECU- TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.   |
| - SATURATED - USUALLY LIQUID; VERY WET, USUALLY  | FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK   | PIECES CAN BE BROKEN BY FINGER PRESSURE.  IL VERY CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH   | STRATA ROCK QUALITY DESIGNATION (SROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY  |
| (SAT.) FROM BELOW THE GROUND WATER TABLE   | FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIA FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING                                |  | 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.                                  |
| PLASTIC SEMISOLID, REQUIRES DRYING TO  | HL - HIGHLY V - VERY RATIO  | FINGERNAIL.  | TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.   |
| RANGE < - WET - (W) ATTAIN OPTIMILING MOISTURE   | EQUIPMENT USED ON SUBJECT PROJECT   | FRACTURE SPACING BEDDING TERM THICKNESS  |  |
| (PI) PL PLASTIC LIMIT  | DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:  | TERM SPALING MEDICAL PROPER 3.4 FEFT   | BENCH MARK: 8M-I: RAILROAD SPIKE IN 24' OAK AT -L- STA. 16+43, 64' RT  |
| DM DPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE   | CLAY BITS X AUTOMATIC MANUAL  | YEAT WIDE MURE INHAN IN FEET THICKLY SEODED 1.5 - 4 FEET   | ELEVATION: 39.25 FT.   |
| SL SHRINKAGE LIMIT   |   | MODERATELY CLOSE 1 TO 3 FEET VERY TRIM Y ASDISO 2.03 - 2.16 FFET   |  |
| REDUIRES ADDITIONAL WATER TO   | 6° CONTINUOUS FLIGHT AUGER CORE SIZE  | CLOSE 8.16 TO 1 FEET THICKLY LAMINATED 8.888 - 8.83 FEET YERY CLOSE LESS THAN 8.16 FEET THINKY LAMINATED < 8.808 FEET  | NOTES:   |
| - DRY - (D) ATTAIN OPTIMUM MOISTURE  | BK-51 8* HOLLOW AUGERS -B   | THINLY LAMINATED C 8,008 FEET  INDURATION  | 4  |
| PLASTICITY   | CME-45C HARD FACED FINGER BITS  | FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.  | 1  |
| PLASTICITY INDEX (PI) DRY STRENGTH   | TUNG,-CARBIDE INSERTS   | DIODING WITH FINISCO COLEC NIMEDONIC GRAINS.   |  |
| NONPLASTIC 8-5 VERY LOW  | A LMC-99  | FRIABLE GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.  |  |
| MED, PLASTICITY 16-25 MEDIUM   | PORTABLE HOIST X TRICONE 2 15/6 STEEL TEETH POST HOLE DISGER  | MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;   |  |
| HIGH PLASTICITY 26 OR MORE HIGH  |   | BREAKS EASILY WHEN HIT WITH HAMMER.  |  |
| COLOR  | SQUINDING ROD   | INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE;   |  |
| DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).  | CORE BIT VANE SHEAR TEST  | DIFFICULT TO BREAK WITH HAMMER.  |  |
| MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.   |   | EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.  |  |
|  |   |  | 00.000.00  |

SHEET NO. 2 OF 7

PROJECT REFERENCE NO. SF-390034





|  | U                | B                   | DRE     | ELO      | 3 REP  | ORT       |                    |             |                  |        |                |                           |                        |              |           |       |               |            |           |           |               |           |         |          |         |       |            |               |               |            |           |
|--|------------------|---------------------|---------|----------|--|-----------|--------------------|-------------|------------------|--------|----------------|---------------------------|------------------------|--------------|-----------|-------|---------------|------------|-----------|-----------|---------------|-----------|---------|----------|---------|-------|------------|---------------|---------------|------------|-----------|
| WBS 1                                    |                  |                     |         |          | P SF-3900                                      |           | 1                  | r GREEN     | E                |        | GEO            | LOGIST Wrike,             | C. M.                  |              |           | WBS   | 17BP.2.       | R.51       |           | TIP       | SF-390034     | cc        | DUNTY G | REENE    |         |       | GEOL       | LOGIST Wrik   | e, C. M.      |            |           |
| SITE DE                                  | SCRIPT           | ION B               | RIDGE   | NO. 34   | ON -L- (SR                                     | 1344) O'  | VER MID            | DLE SWA     | VIP OVE          | RFLOW  | !              |                           |                        | GROUND W     | TR (ft)   | SITE  | DESCRIP       | TION BR    | IDGE NO   | _         | ON -L- (SR 13 |           |         |          |         | FLOW  |            | <del></del>   |               | 4          | ND WTR (  |
| BORING                                   | NO. E            | B1-B                |         | s        | TATION 14                                      | +28       |                    | OFFSET      | 16 ft RT         |        | ALIG           | NMENT -L-                 |                        | 0 HR.        | N/A       | BORI  | ING NO.       | EB1-B      | ,         | STA       | TION 14+2     | 8         | OFF     | SET 16   | ft RT   |       | ALIGI      | NMENT -L-     |               | 0 HR.      | N/        |
| COLLAR                                   | ELEV.            | 41.4 f              | 1       | T        | OTAL DEPT                                      | H 78.9 ft | t                  | NORTHIN     | <b>G</b> 651,8   | 303    | EAST           | TING 2,432,790            | )                      | 24 HR.       | 6.2       | COLL  | LAR ELEV      | 41.4 ft    |           | TOT       | AL DEPTH      | 78.9 ft   | NOR     | THING    | 651,80  | 03    | EAST       | TING 2,432,79 |               | 24 HR.     | 6.        |
| DRILL RIC                                | 3/HAMM           | ER EFF./I           | DATE    | F&R3495  | CME-55 84%                                     | 12/14/201 | 2                  |             | DRILL            | METHOD | Mud Rotary     |                           | НАММЕ                  | ER TYPE Auto | matic     | DRILL | . RIG/HAMN    | ER EFF./DA | TE F&R    | 3495 CI   | ME-55 84% 12  | 2/14/2012 |         | t        | ORILL M | ETHOD | Mud Rotary |               | HAMM          | ER TYPE    | Automatic |
| DRILLER                                  | ₹ Conf           | ract Dril           | ler     | S        | TART DATE                                      | 07/31/1   | 3                  | COMP. DA    | ATE 07/          | 31/13  | SURF           | ACE WATER DI              | EPTH N/                | A            |           |       | LER Con       |            | er        | STA       | RT DATE 0     | 7/31/13   | COM     | IP. DATI |         | 31/13 | SURF       | ACE WATER     | DEPTH N       | <u>/A</u>  |           |
| ELEV DR                                  | RIVE DE          | PTH B               | LOW C   | OUNT     |  |           | PER FOOT           |             | SAMP.            |        | L              | SOIL AND F                | ROCK DESC              | RIPTION      |           | ELEV  | DRIVE DI      | EPTH BLO   | OW COUN   |           |               | LOWS PER  |         |          | SAMP.   |       | 0          | SOIL AN       | ROCK DESC     | CRIPTION   | ı         |
| (ft) (ft)                                | ft)              | (ft) <sub>0.5</sub> | ft 0.5f | ft 0.5ft | 0 2  | 5 5       | 50                 | 75 100      | NO.              | MOI    | G ELEV. (f     | 1)                        |                        | DI           | EPTH (ft) | (ft)  | (ft)          | (ft) 0.5ft | 0.5ft   0 | 0.5ft   C | 0 25          | 50<br>    | 75      | 100      | NO.     | /MOI  | G          |               |               |            |           |
|  |                  |                     |         |          |  |           |                    |             |                  |        |                |                           |                        |              |           |       |               |            |           |           |               |           |         |          |         |       |            |               |               |            |           |
| 45                                       |                  | ľ                   |         |          |  |           |                    |             |                  |        | F              |                           |                        |              |           | -35   |               |            | +         | +}        |               | Match Li  |         |          |         |       |            |               |               |            |           |
|  | ‡                |                     |         |          |  |           |                    |             |                  |        | F              | ODO!                      | IND CUDEA              | OF.          |           |       | -37.1         | 78.5       | 4         |           |               |           |         | 100/0.4  |         |       | 37.5       | Boring Termin | ated at Flova | tion -37.5 | ft IN     |
| 40                                       | 1.4 1.4          | 0.0                 | 3       | 4        | · <b>1</b> ; · ·                               |           | 1                  | · · · · · · | <del>   </del> - |        | + 41.4<br>     | ROADWA                    | JND SURFA<br>AY EMBANK | MENT         | 0.0       |       |               |            |           |           |               |           |         |          |         |       | Ł          | VE            | RY DENSE SA   | AND        |           |
|  | 7.9              | 3.5                 |         |          | <i>J.</i>                                      |           |                    |             |                  |        |                | TAN ORANGE                | SAND, MOI              | IST TO SAT.  |           |       | l Ŧ           |            |           |           |               |           |         |          |         |       | -          |               |               |            |           |
|  | <del> </del>     | y.5 WC              | H WO    | н woн    | <b>₹</b> 0                                     |           |                    |             |                  | _      | <u> </u>       |                           |                        |              |           |       | l             |            |           |           |               |           |         |          |         |       | -          |               |               |            |           |
| 35                                       | ‡                |                     |         | 1        | \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\         |           |                    |             |                  |        | 34.4           |                           |                        |              |           |       | l             |            |           |           |               |           |         |          |         |       | -          |               |               |            |           |
|  | 2.9 🕇 8          | 3.5 R               | 13      | 17       | ::::``\$\                                      |           |                    |             |                  |        |                |                           | ALLUVIAL<br>Y SAND, SA | λT.          |           |       | l Ŧ           |            |           |           |               |           |         |          | İ       |       | E          |               |               |            |           |
| 30                                       | ‡                | ľ                   | "       | ''       | : : : :  | 30        |                    |             |                  |        |                |                           |                        |              | 40.0      |       | ΙΞ            |            |           |           |               |           |         |          |         |       | -          |               |               |            |           |
|  | 7.9 1            | 3.5                 |         |          |  | : : : :   |                    |             |                  |        | 29.4           | COA                       | STAL PLAI              | N            | 12.0      |       | ΙŦ            |            |           | ŀ         |               |           |         |          |         |       | -          |               |               |            |           |
|  | + + +            | 2                   | 3       | 4        | <b>√</b> 7                                     |           |                    |             |                  |        | 3              | GRAY GREEN S<br>FRAGMENTS | S, WET (YO             | RKTOWN       |           |       | Ŧ             |            |           |           |               |           |         |          |         |       | ţ          |               |               |            |           |
| 25                                       | +                |                     |         |          |  |           | 1                  |             |                  |        | <b>X</b> -     | FC                        | ORMATIÓN)              |              |           |       | 1 +           | ĺ          |           |           |               |           |         |          |         |       | -          |               |               |            |           |
| _22                                      | 2.9 1            | 8.5                 | 3       | 5        |  |           |                    | : : : :     |                  |        | 7              |                           |                        |              |           |       | 1 1           |            |           |           |               |           |         |          |         |       | <u> </u>   |               |               |            |           |
| 20                                       | Ŧ                |                     |         |          | <b>.</b> • • • • • • • • • • • • • • • • • • • |           |                    | 1           |                  |        | 7              |                           |                        |              |           |       | 1             |            |           |           |               |           |         |          | İ       |       | Ł          |               |               |            |           |
|  | 7.9. I 2         | 3.5                 |         |          |  |           |                    |             |                  |        | <b>S</b>       |                           |                        |              |           |       | 1             |            |           |           |               |           |         |          |         |       | -          |               |               |            |           |
|  | ' <u> </u>       | 2                   | 3       | 3        | <b>●</b> 6                                     |           |                    |             |                  |        | 3              |                           |                        |              |           |       | 1             |            |           |           |               |           |         |          |         |       | -          |               |               |            |           |
| 15                                       | Ŧ                |                     |         |          |  |           |                    | 1           |                  |        | 3              |                           |                        |              |           |       | +             |            |           |           |               |           |         |          |         |       | -          |               |               |            |           |
| 12                                       | 2.9 7 2          | 8.5_                | 3       | 4        | 1  |           |                    |             |                  |        | 3              |                           |                        |              |           |       | ‡             |            |           |           |               |           |         |          |         |       | ţ          |               |               |            |           |
| 10                                       | $\pm$            |                     |         |          | 1  |           |                    |             |                  |        | 3              |                           |                        |              |           |       | ‡             |            |           |           |               |           |         |          |         |       | Ė          |               |               |            |           |
|  | 9 + 3            | 3.5                 |         |          |  |           |                    |             |                  |        | 3              |                           |                        |              |           |       | † ‡           |            |           |           |               |           |         |          |         |       | ţ          |               |               |            |           |
|  | <u> </u>         | 2                   | 3       | 4        | <b>→</b> 7 · ·                                 |           |                    |             |                  |        | 3              |                           |                        |              |           |       | ‡             |            |           |           |               |           |         |          |         |       | ļ          |               |               |            |           |
| 5  | +                |                     |         |          |  |           |                    | 1           | -                |        | 3-             |                           |                        |              | ;         | 1     | ‡             |            |           |           |               |           |         |          |         |       | F          |               |               |            |           |
| 2  | 2.9   3          | 8.5                 | 6       | 7        | 13.  |           |                    |             |                  |        | 3              |                           |                        |              |           |       | ‡             |            |           |           |               |           |         |          |         |       | ļ.         |               |               |            |           |
| 0  | ‡                |                     |         |          |  |           |                    |             | ]                |        | <b>S</b> -     |                           |                        |              |           |       | ‡             |            |           |           |               |           |         |          |         |       | F          |               |               |            |           |
| 2  | 2.1 + 4          | 3.5                 |         |          |  |           |                    |             |                  |        | 3              |                           |                        |              |           |       | ‡             |            |           |           |               |           |         |          |         |       | F          |               |               |            |           |
|  | ‡                | 3                   | 3       | 5        | : <b>\</b> 8 : :                               |           |                    |             |                  |        | 3              |                           |                        |              |           |       | ‡             |            |           |           |               |           |         |          |         |       | F          |               |               |            |           |
| -5                                       | _ ‡              | _                   |         |          |  |           |                    |             | 1                | }      | 3              |                           |                        |              |           |       | ‡             |            |           |           |               |           |         |          |         |       | E          |               |               |            |           |
| -7                                       | 7.1 + 4          | 8.5                 | 6       | 6        | 12.  |           |                    |             |                  |        | 3              |                           |                        |              |           |       | ‡             |            |           |           |               |           |         |          |         |       | E          |               |               |            |           |
| -10                                      | ‡                |                     |         |          | 1  |           | ļ                  |             | <b>.</b>         |        | 3              |                           |                        |              |           |       | ‡             |            |           |           |               |           |         |          |         |       | F          |               |               |            |           |
| <u>-1</u>                                | 2.1 + 5          | 3.5.                | 3       | 3        | :/: : :  |           |                    |             |                  |        | 3              |                           |                        |              |           |       | l Ŧ           |            |           |           |               |           |         |          |         |       | E          |               |               |            |           |
| b -15                                    | ‡                |                     | ľ       |          | •6   |           |                    |             |                  |        | 3              |                           |                        |              |           |       | Ţ             |            |           |           |               |           |         |          |         |       | Ŀ          |               |               |            |           |
| 5 1                                      | , † <sub>.</sub> | ه ا                 |         |          |  |           |                    |             | 11               |        | -17.1          |                           |                        |              | 58.5      |       | Ţ             |            |           |           |               |           |         |          |         | İ     | Ŀ          |               |               |            |           |
|  | 7.1 + 5          | 8.5                 | 45      | 55/0.2   |  | ::::      |                    | 100/0.7     | <b>↓</b>         |        | <b>%</b> -     | DARK GRAY                 | ASTAL PLA              | IN PEEDEE    |           |       | ]             |            |           |           |               |           |         |          |         |       | Ł          |               |               |            |           |
| <u>-20</u>                               | ‡                |                     |         |          |  |           | <b> </b> • • • • • |             | <del> </del>     |        | <b>%</b> -     | DARK GRAY<br>FO           | ORMATION)              | )            |           |       |               |            |           |           |               |           |         |          |         |       | -          |               |               |            |           |
| SS -2                                    | 2.1 - 6          | 3.5                 | ) 67    | 33/0.1   |  |           | : : : :            |             | !                |        | <b>%</b>       |                           |                        |              |           |       | l             |            |           |           |               |           |         |          |         |       | Ł          |               |               |            |           |
| -15 -15 -15 -1 -1 -1 -15 -15 -15 -15 -15 | ‡                | "                   | "       | 30.0.1   | : : : :  |           |                    | 100/0.6     | 1                |        | A.             |                           |                        |              |           |       | $\frac{1}{2}$ |            |           | ļ         |               |           |         |          |         |       | Ł          |               |               |            |           |
| S I                                      | 7.1 1 6          | 8.5                 |         |          |  |           |                    |             | ]                |        | WF             |                           |                        |              |           |       | $ $ $\exists$ | k          |           |           |               |           |         |          |         |       | ļ.         |               |               |            |           |
| la la                                    | ··· † °          | 3′                  | 66      | 34/0.1   |  |           |                    | 100/0.6     | <u>,</u>         |        | X <del>I</del> |                           |                        |              |           |       | <u> </u>      |            |           |           |               |           |         |          |         |       | ţ          |               |               |            |           |
| 0 -30<br>-30                             | ‡                |                     |         |          |  |           |                    |             | -{               |        | <b>%</b> [-    |                           |                        |              |           |       | <u> </u>      | 1          |           |           |               |           |         |          |         |       | -          |               |               |            |           |
| <u>3</u>                                 | 21 7             | 3.5                 | 1 75    | 25/0.1   |  |           |                    |             | $\Pi$            |        |                |                           |                        |              |           |       | <del>]</del>  |            |           |           |               |           |         |          |         |       | <u> </u>   |               |               |            |           |
| 鮗  | 1                | ١٠                  | .   , , |          |  |           | ::::               | 100/0,6     | ••               | 1      | M.             |                           |                        |              |           | H     | 1 I           |            |           | ŀ         |               |           |         |          |         |       | F          |               |               |            |           |



|      | 17BP.           |            | ייחם     |       |             | SF-390034 COUNTY GREENE GEOLOGIST Wrike, C. M. ON -L- (SR 1344) OVER MIDDLE SWAMP OVERFLOW   | GROUND WTR (ff)            |
|------|-----------------|------------|----------|-------|-------------|--|----------------------------|
|      |                 |            |          | DGE I | <del></del> | ·····  | 0 HR. N/A                  |
|      | NG NO.          |            |          |       |             |  |                            |
|      | AR ELE          |            |          |       |             | FAL DEPTH         70.0 ft         NORTHING         651,873         EASTING         2,432,757 | 24 HR. N/A                 |
| RILL | RIG/HAN         | MER E      | FF./DA1  | TE F8 | R3495       | ME-55 84% 12/14/2012 DRILL METHOD Mud Rotary HAI   | MMER TYPE Automatic        |
| RILL | ER C            | ontract    | Driller  |       | \$1         | ART DATE 07/30/13 COMP. DATE 07/30/13 SURFACE WATER DEPTH                                    | 3.5ft                      |
| LEV  | DRIVE  <br>ELEV | DEPTH      | BLO      | w col | JNT         | BLOWS PER FOOT SAMP. V L O SOIL AND ROCK D   | ESCRIPTION                 |
| (ft) | (ft)            | (ft)       | 0.5ft    | 0.5ft | 0.5ft       | 0 25 50 75 100 NO. MOI G ELEV.(ft)   | DEPTH (f                   |
|      |                 |            |          |       |             |  |                            |
| 35   |                 |            |          |       |             | WATER SURFACE  | <u> </u>                   |
|      | -               | -          |          |       |             |  |                            |
|      | 31.9            | - 00       | WOLL     | 1000  | WOH         | 31.9 GROUND SU   |                            |
| 30   | -               | _          | WOH      | WOH   | WOH         | T GRAY SAND WITH WOO   |                            |
|      | 28.4            | 3.5        | 1        | 3     | 3           | \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\  |                            |
|      | -               | -          | '        | "     |             | <b>№</b> 6   |                            |
| 25   | _               | -          |          |       |             | COASTAL F  | 5.AIN                      |
| -    | 23.4            | 8.5        | 2        | 4     | 5           | GRAY GREEN SILTY C   | LAY WITH SHELL             |
|      | -               |            |          |       |             | FRAGMENTS, WET   |                            |
| 20   |                 | L          |          |       |             | <del>  j      </del>       <b>S</b>  |                            |
| -    | 18.4            | 13.5       | 2        | 2     | 3           | <del>1</del>   |                            |
| 15   | -               |            |          |       |             |  |                            |
| 13   | 13.4            | 185        |          |       |             |  |                            |
| Ī    | 19.4            | - 10.5     | 2        | 2     | 4           | <b> </b>   •  •  • • • • • • • • • • • • • • •   |                            |
| 10   | -               | _          |          |       | ]           |  |                            |
|      | 8.4             | 23.5.      |          |       |             |  |                            |
|      | -               | ļ          | 2        | 3     | 3           | •6:         <b></b>   <b></b>  |                            |
| 5    | -               | Ĺ          |          |       | i           |  |                            |
| -    | 3.4             | 28.5       | 3        | 4     | 4           |  |                            |
|      | •               | -          | "        | "     | "           | • • • • • • • • • • • • • • • • • • •  |                            |
| 0    | _               | -          |          |       |             |  |                            |
| -    | -1.6            | 33.5       | 2        | - 5   | 5           |  |                            |
| _    |                 | ‡          |          |       |             |  |                            |
| -5   | -               | 38.5       | ļ        |       |             |  |                            |
| f    | -6.6            | 38.5       | 2        | 3     | 5           |  |                            |
| -10  | -               | Į.         |          |       |             |  |                            |
|      | -<br>11.6       | 43.5       |          |       |             |  |                            |
|      |                 | ļ          | 2        | 2     | 3           | •6;;   : : : :   : : : :         <b>3</b>  |                            |
| -15  |                 | ţ          |          |       |             |  |                            |
|      | -16.6           | 48.5       | 46       | E1    | 49/0.4      |  | <u> </u>                   |
|      |                 | Ŧ          | 15       | 51    | 49/0.4      | 100/0.9         DARK GRAY SAND,  | SAT. (PEEDEE               |
| -20  | -               | ‡          |          |       |             | FORMATI  | ON)                        |
| ļ    | -21.6           | 53.5       | 28       | 60    | 40/0.3      |  |                            |
|      |                 | ‡          |          |       |             | 100/0.8  |                            |
| -25  | _               | <u> </u>   |          |       |             | <del>    </del>  |                            |
|      | -26.6           | 58.5       | 27       | 64    | 36/0.2      |  |                            |
| -30  |                 | Ŧ          |          |       | 1           | 100/0.7  |                            |
| -30  | -<br>-31.6      | +<br>63.5_ |          |       | 1           |  |                            |
|      | -01. <b>0</b>   | 10.5       | 32       | 30    | 25          | 55   |                            |
| -35  |                 | †          |          |       | 1           |  |                            |
|      | -36.6           | 68.5       | <u> </u> |       |             |  |                            |
|      |                 | <b>†</b>   | 14       | 25    | 43          | -38.1 Boring Terminated at E   | 70<br>levation -38.1 ft IN |
|      | _               | ‡          |          |       |             | VERY DENS  | E SAND                     |
| !    |                 | †          | [        |       |             |  |                            |
|      | 1               | Г          | 1        | 1     | 1           | 1   L  |                            |

| BOREL                         | .OG REPORT  |   |                                |  |                                 | 7447                |  |
|-------------------------------|---|---|--------------------------------|--|---------------------------------|---------------------|--|
| WBS 17BP.2.R.51               | TIP SF-390034 COUNTY GRE  | EENE GEOLOGIST Wrike, C. M.                 |                                |  | <u> </u>                        | TY GREENE           | GEOLOGIST Wrike, C. M.                                 |
| SITE DESCRIPTION BRIDGE       | IO. 34 ON -L- (SR 1344) OVER MIDDLE SV  | WAMP OVERFLOW                               | GROUND WTR (ft)                | SITE DESCRIPTION BRIDGE NO.  | ). 34 ON -L- (SR 1344) OVER MII |                     | GROUND WTR (ft)  |
| BORING NO. EB2-B              | STATION 15+31 OFFSI   | ET 17 ft RT ALIGNMENT -L-                   | 0 HR. N/A                      | BORING NO. EB2-B   | STATION 15+31                   | OFFSET 17 ft RT     | ALIGNMENT -L- 0 HR. N/A                                |
| COLLAR ELEV. 41.8 ft          | TOTAL DEPTH 79.8 ft NORT  | HING 651,905 EASTING 2,432,782              | <b>24 HR</b> . 6.4             |  | TOTAL DEPTH 79.8 ft             | NORTHING 651,905    | EASTING 2,432,782 24 HR. 6.4                           |
| DRILL RIG/HAMMER EFF/DATE F&  | R3495 CME-55 84% 12/14/2012   | DRILL METHOD Mud Rotary HAI                 | MMER TYPE Automatic            | DRILL RIG/HAMMER EFF./DATE F&R3  |                                 | DRILL METHOD M      |  |
| DRILLER Contract Driller      | START DATE 07/31/13 COMP  | P. DATE 07/31/13 SURFACE WATER DEPTH        | N/A                            |  | START DATE 07/31/13             | COMP. DATE 07/31/13 | SURFACE WATER DEPTH N/A                                |
| ELEV DRIVE DEPTH BLOW COL     |   | SAMP. C SOIL AND ROCK D                     |                                | ELEV DRIVE ELEV (ft) DEPTH BLOW COUNT (ft) 0.5ft |                                 | /  0                | SOIL AND ROCK DESCRIPTION                              |
| (ft) (ft) (ft) 0.5ft 0.5ft    | 0.5ft 0 25 50 75  | 100 NO. MOI G ELEV. (ft)                    | DEPTH (ft)                     | (ft) (ft) 0.5ft 0.5ft 0.   | .511 0 20 00                    | 75 100 NO. MOI G    |  |
|                               |   |   |                                |  | Match Line                      |                     |  |
| 45                            |   |   |                                | -35 -36.7 78.5 -37.00 74.1   |                                 |                     | <u></u>  |
| 41.8 + 0.0                    |   | 41.8 GROUND SU                              |                                | 17 29 71/  | /0.3                            | 100/0.8             | -38.0 79.8  Boring Terminated at Elevation -38.0 ft IN |
| 40 1 2                        | 1 •3 · · · · · · · · · · · · · ·  | ROADWAY EMB. TAN ORANGE SAND,               |                                |  |                                 |                     | VERY DENSE SAND  |
| 38.3 - 3.5 WOH WOH            |   | 11    |                                |  |                                 |                     | -<br>-   |
|                               |   |   |                                | ‡  |                                 |                     |  |
| 35 33.3 8.5                   |   | <del></del>                                 |                                |  |                                 |                     | <u>.</u>   |
| - 33.3 + 8.3 WOH WOH          | <b>                                    </b>   | 1.1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1     |                                |  |                                 |                     | -<br>-   |
| 30 ‡                          |   |   | <u>a</u> . — — — — <u>12.0</u> |  |                                 |                     | _<br>-   |
| 28.3                          | 7   | GRAY SAND                                   | ), SAT.                        |  |                                 |                     | -<br>-   |
| 25                            |   | <u> </u>                                    |                                |  |                                 |                     | <u>-</u>   |
| 23.3 18.5 4 5                 |   |   |                                |  |                                 |                     | -<br>-   |
|                               | 8   13.   11. | i I – I – Istori                            |                                |  |                                 |                     | -<br>-   |
| 20 7 20 5                     |   | 19.8 COASTAL                                | PLAIN 22.0                     |  |                                 |                     | <br>-  |
| 18.3 7 23.5 2 3               | 4   47 : :   : : : :   : : : :   : : :  | FRAGMENTS, WET                              | (YORKTOWN                      |  |                                 |                     | -  |
| 15                            |   | FORMATI                                     | ON)                            |  |                                 |                     |  |
| 13.3 7 28.5 2 3               | 4   | ∷    🕦                                      |                                |  |                                 |                     | -<br>-   |
| 10 1 1                        |   | ∷    👺                                      |                                |  |                                 |                     | -<br><del>-</del>                                      |
| 83 + 335                      |   |   |                                |  |                                 |                     | -<br>-   |
| 2 4                           | 4   . •8  | ∷    🗗                                      |                                |  |                                 |                     | -<br>-   |
| 5 1                           |   | <del> </del>     <b>8</b>                   |                                |  |                                 |                     |  |
| 3.3 7.38.5 3 4                | 4   |   |                                |  |                                 |                     | -  |
|                               |   |   |                                |  |                                 |                     | -<br><br>-   |
| -1.7 + 43.5 3 4               | 7   | ∷   |                                |  |                                 |                     |  |
| -5                            |   | ∷     <b>⊠</b>                              |                                |  |                                 |                     | -<br>-   |
| -6.7 48.5                     |   | <del></del>                                 |                                |  |                                 |                     | -  |
|                               | 5   | ∃     <b>§</b> {                            |                                |  |                                 |                     | -  |
| -10                           |   |   |                                |  |                                 |                     | <del>-</del><br>*                                      |
| -11.7 7 53.5 2 2              | 4   | ::     <b> ≥</b>                            |                                |  |                                 |                     |  |
|                               |   |   |                                |  |                                 |                     | <u>-</u>   |
| 5 -15 -16.7 - 58.5 34 100/0.8 | :::: :::: :::: ::::   | -16.7                                       | PI AIN 58.5                    |  |                                 |                     |  |
| 의 T 1 1                       | 1   | COASTAL<br>00/0.5 DARK GRAY SAND,<br>FORMAT | SAT. (PEEDEE                   |  |                                 |                     |  |
| <u>a</u> +                    |   |   | 10117                          |  |                                 |                     |  |
| -21.7 T 63.5 35 62            |   | 00/0.7                                      |                                |  |                                 |                     | _  |
| <u>R</u> -25                  |   |   |                                |  |                                 |                     | <u>-</u><br>-  |
| 26.7 + 68.5   45   100/0.8    |   |   |                                |  |                                 |                     | <u></u>  |
| 30 +                          | :::: :::: :::: :::: :::   | 00/0.57                                     |                                |  |                                 |                     | <del>-</del>   |
| ố   -317 + 73.5               |   |   |                                |  |                                 |                     | <b>-</b><br>-  |
| 25 37                         | 38  |   |                                |  |                                 |                     | <b>}</b><br>-  |