| STATE | STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| N.C. | SF-770239 | 1 | 8 |

PROJECT: 17BP.6.R.76 REFERENCE: SF-770239

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

# STRUCTURE SUBSURFACE INVESTIGATION

COUNTY *ROBESON*

PROJECT DESCRIPTION *BRIDGE NO. 239 ON SR 1515 (UNION CHAPEL RD) OVER BURNT SWAMP*

## CONTENTS



PERSONNEL

*CAROLINA DRILLING*

*GOODNIGHT, D.J.*

INVESTIGATED BY *GOODNIGHT, D.J.*

DRAWN BY *CROCKETT, S.*

CHECKED BY *HAMM, J.R.*

SUBMITTED BY *FALCON ENG.*

DATE *MARCH 2018*

## CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

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

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

NOTES:

1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
2. 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 PROFESSIONAL SEAL 039779 ENGINEER JEREMY R. HAMM

DocuSigned by:

Jeremy R Hamm 3/14/2018

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SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED**

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

# SUBSURFACE INVESTIGATION

### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
### (PAGE 1 OF 2)

## SOIL DESCRIPTION

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,

*VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6*

## SOIL LEGEND AND AASHTO CLASSIFICATION

| GENERAL CLASS. | GRANULAR MATERIALS (≤ 35% PASSING #200) | | | | | | | SILT-CLAY MATERIALS (> 35% PASSING #200) | | | | ORGANIC MATERIALS | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GROUP CLASS. | A-1 | | A-3 | A-2 | | | | A-4 | A-5 | A-6 | A-7 | A-1, A-2<br>A-3 | A-4, A-5<br>A-6, A-7 | |
| | A-1-a | A-1-b | | A-2-4 | A-2-5 | A-2-6 | A-2-7 | | | | A-7-5,<br>A-7-6 | | | |
| SYMBOL | | | | | | | | | | | | | | |
| % PASSING<br>#10<br>#40<br>#200 | 50 MX<br>30 MX<br>15 MX | 50 MX<br>25 MX | 51 MN<br>10 MX | 35 MX | 35 MX | 35 MX | 35 MX | 36 MN | 36 MN | 36 MN | 36 MN | GRANULAR SOILS | SILT-CLAY SOILS | MUCK, PEAT |
| MATERIAL PASSING #40<br>LL<br>PI | —<br>6 MX | | —<br>NP | 40 MX<br>10 MX | 41 MN<br>10 MX | 40 MX<br>11 MN | 41 MN<br>11 MN | 40 MX<br>10 MX | 41 MN<br>10 MX | 40 MX<br>11 MN | 41 MN<br>11 MN | SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER | | HIGHLY ORGANIC SOILS |
| GROUP INDEX | 0 | | 0 | 0 | | 4 MX | | 8 MX | 12 MX | 16 MX | NO MX | | | |
| USUAL TYPES OF MAJOR MATERIALS | STONE FRAGS. GRAVEL, AND SAND | | FINE SAND | SILTY OR CLAYEY GRAVEL AND SAND | | | | SILTY SOILS | | CLAYEY SOILS | | | | |
| GEN. RATING AS SUBGRADE | EXCELLENT TO GOOD | | | | | | | FAIR TO POOR | | | | FAIR TO POOR | POOR | UNSUITABLE |

PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30

## CONSISTENCY OR DENSENESS

| PRIMARY SOIL TYPE | COMPACTNESS OR CONSISTENCY | RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) | RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$) |
|---|---|---|---|
| GENERALLY GRANULAR MATERIAL (NON-COHESIVE) | VERY LOOSE<br>LOOSE<br>MEDIUM DENSE<br>DENSE<br>VERY DENSE | < 4<br>4 TO 10<br>10 TO 30<br>30 TO 50<br>> 50 | N/A |
| GENERALLY SILT-CLAY MATERIAL (COHESIVE) | VERY SOFT<br>SOFT<br>MEDIUM STIFF<br>STIFF<br>VERY STIFF<br>HARD | < 2<br>2 TO 4<br>4 TO 8<br>8 TO 15<br>15 TO 30<br>> 30 | < 0.25<br>0.25 TO 0.5<br>0.5 TO 1.0<br>1 TO 2<br>2 TO 4<br>> 4 |

## TEXTURE OR GRAIN SIZE

| U.S. STD. SIEVE SIZE | 4 | 10 | 40 | 60 | 200 | 270 |
|---|---|---|---|---|---|---|
| OPENING (MM) | 4.76 | 2.00 | 0.42 | 0.25 | 0.075 | 0.053 |

| BOULDER (BLDR.) | COBBLE (COB.) | GRAVEL (GR.) | COARSE SAND (CSE. SD.) | FINE SAND (F SD.) | SILT (SL.) | CLAY (CL.) |
|---|---|---|---|---|---|---|

| GRAIN SIZE | MM | 305 | 75 | 2.0 | 0.25 | 0.05 | 0.005 |
|---|---|---|---|---|---|---|---|
| | IN. | 12 | 3 | | | | |

## SOIL MOISTURE - CORRELATION OF TERMS

| SOIL MOISTURE SCALE (ATTERBERG LIMITS) | FIELD MOISTURE DESCRIPTION | GUIDE FOR FIELD MOISTURE DESCRIPTION |
|---|---|---|
| | - SATURATED - (SAT.) | USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE |
| LL — LIQUID LIMIT<br>PLASTIC RANGE (PI)<br>PL — PLASTIC LIMIT | - WET - (W) | SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE |
| OM — OPTIMUM MOISTURE<br>SL — SHRINKAGE LIMIT | - MOIST - (M) | SOLID; AT OR NEAR OPTIMUM MOISTURE |
| | - DRY - (D) | REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE |

## PLASTICITY

| | PLASTICITY INDEX (PI) | DRY STRENGTH |
|---|---|---|
| NON PLASTIC | 0-5 | VERY LOW |
| SLIGHTLY PLASTIC | 6-15 | SLIGHT |
| MODERATELY PLASTIC | 16-25 | MEDIUM |
| HIGHLY PLASTIC | 26 OR MORE | HIGH |

## COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

## GRADATION

WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.
UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE.
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.

## ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

## MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

## COMPRESSIBILITY

| | |
|---|---|
| SLIGHTLY COMPRESSIBLE | LL < 31 |
| MODERATELY COMPRESSIBLE | LL = 31 - 50 |
| HIGHLY COMPRESSIBLE | LL > 50 |

## PERCENTAGE OF MATERIAL

| ORGANIC MATERIAL | GRANULAR SOILS | SILT - CLAY SOILS |
|---|---|---|
| TRACE OF ORGANIC MATTER | 2 - 3% | 3 - 5% |
| LITTLE ORGANIC MATTER | 3 - 5% | 5 - 12% |
| MODERATELY ORGANIC | 5 - 10% | 12 - 20% |
| HIGHLY ORGANIC | > 10% | > 20% |

| OTHER MATERIAL | |
|---|---|
| TRACE | 1 - 10% |
| LITTLE | 10 - 20% |
| SOME | 20 - 35% |
| HIGHLY | 35% AND ABOVE |

## GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

## MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

## RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

## ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
$w$ - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
$\gamma$ - UNIT WEIGHT
$\gamma_d$ - DRY UNIT WEIGHT

SAMPLE ABBREVIATIONS

S - BULK
SS - SPLIT SPOON
ST - SHELBY TUBE
RS - ROCK
RT - RECOMPACTED TRIAXIAL
CBR - CALIFORNIA BEARING RATIO

## EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [X] CME-45C
- [ ] CME-55
- [ ] CME-550
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [ ] 8" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [X] 2 15/16" DRAG BIT

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B _____ [ ] -H _____
- [ ] -N _____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

| PROJECT REFERENCE NO. | SHEET NO. |
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| SF-770239 | 2A |

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

# SUBSURFACE INVESTIGATION

### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS
### (PAGE 2 OF 2)

## ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.
ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:

| | | |
|---|---|---|
| WEATHERED ROCK (WR) |  | NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED. |
| CRYSTALLINE ROCK (CR) |  | FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC. |
| NON-CRYSTALLINE ROCK (NCR) |  | FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC. |
| COASTAL PLAIN SEDIMENTARY ROCK (CP) |  | COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC. |

## WEATHERING

| | |
|---|---|
| FRESH | ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. |
| VERY SLIGHT (V SLI.) | ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. |
| SLIGHT (SLI.) | ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. |
| MODERATE (MOD.) | SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. |
| MODERATELY SEVERE (MOD. SEV.) | ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. *IF TESTED, WOULD YIELD SPT REFUSAL* |
| SEVERE (SEV.) | ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF* |
| VERY SEVERE (V SEV.) | ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF* |
| COMPLETE | ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE. |

## ROCK HARDNESS

| | |
|---|---|
| VERY HARD | CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. |
| HARD | CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. |
| MODERATELY HARD | CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. |
| MEDIUM HARD | CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. |
| SOFT | CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. |
| VERY SOFT | CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL. |

## FRACTURE SPACING

| TERM | SPACING |
|---|---|
| VERY WIDE | MORE THAN 10 FEET |
| WIDE | 3 TO 10 FEET |
| MODERATELY CLOSE | 1 TO 3 FEET |
| CLOSE | 0.16 TO 1 FOOT |
| VERY CLOSE | LESS THAN 0.16 FEET |

## BEDDING

| TERM | THICKNESS |
|---|---|
| VERY THICKLY BEDDED | 4 FEET |
| THICKLY BEDDED | 1.5 - 4 FEET |
| THINLY BEDDED | 0.16 - 1.5 FEET |
| VERY THINLY BEDDED | 0.03 - 0.16 FEET |
| THICKLY LAMINATED | 0.008 - 0.03 FEET |
| THINLY LAMINATED | < 0.008 FEET |

## INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.

| | |
|---|---|
| FRIABLE | RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. |
| MODERATELY INDURATED | GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. |
| INDURATED | GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. |
| EXTREMELY INDURATED | SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS. |

## TERMS AND DEFINITIONS

ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.

AQUIFER - A WATER BEARING FORMATION OR STRATA.

ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.

ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.

COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.

CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK.

DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.

FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.

FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.

FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIG,NAL POSITION AND DISLODGED FROM PARENT MATERIAL.

FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.

FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD.

JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.

LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.

LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.

MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.

PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.

RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

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

SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.

SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.

SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE.

STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.

STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.

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

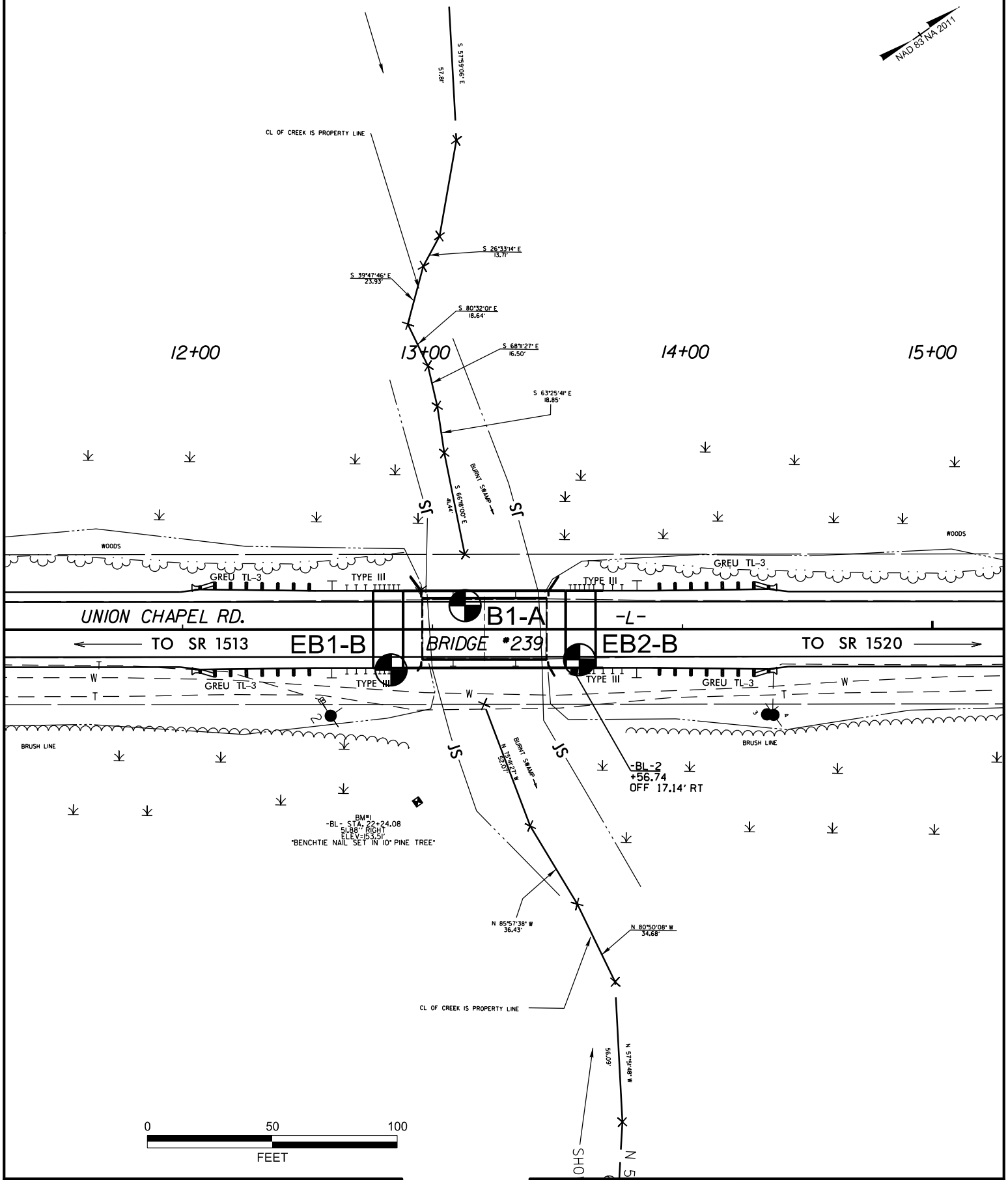
TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: BL-2 -L- STA. 13+57, 17' RT
N: 352565.5 E: 1961854.9
ELEVATION: 152.81 FEET

NOTES:

FIAD - FILLED IMMEDIATELY AFTER DRILLING

DATE: 8-15-14



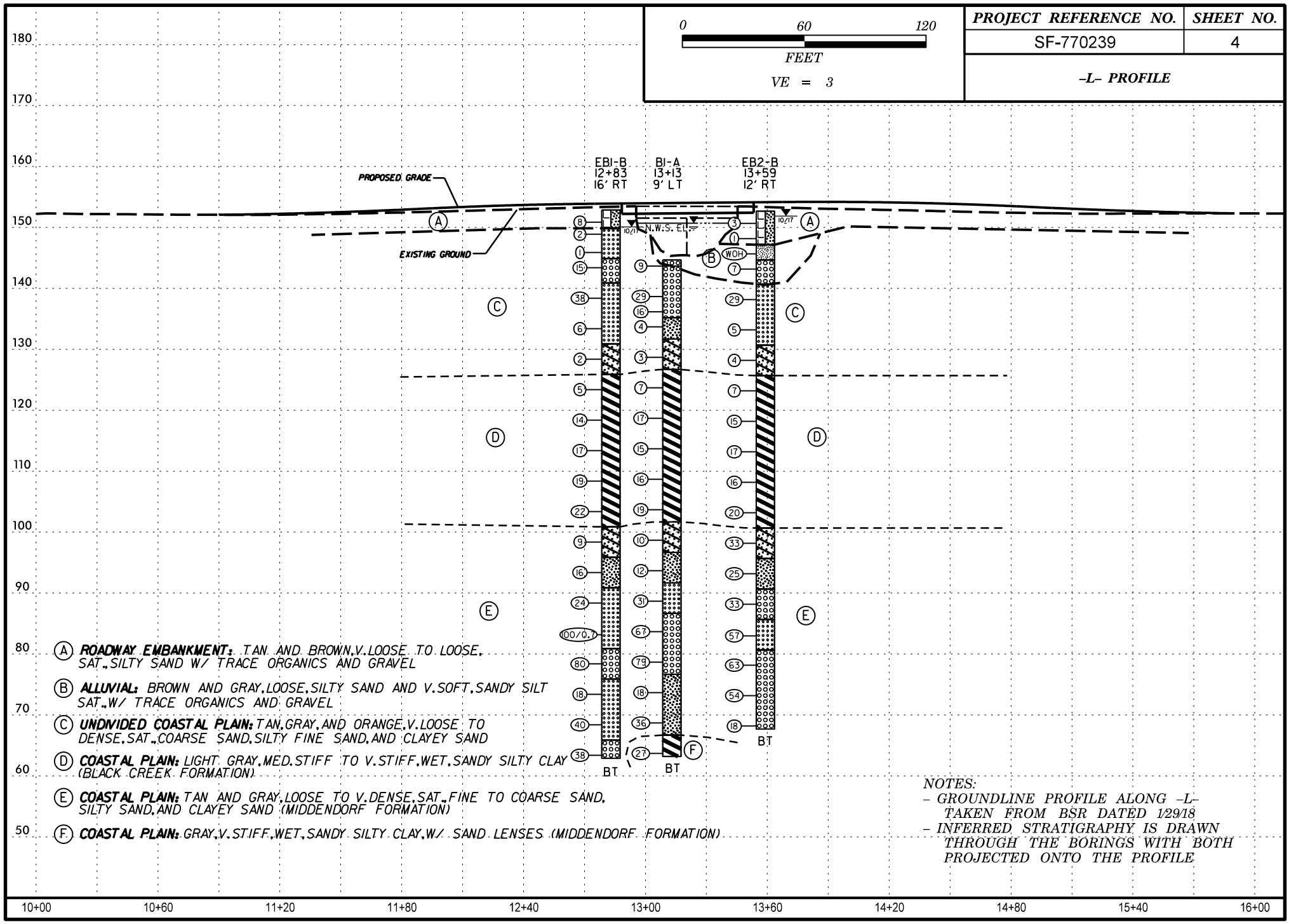

NOTES:

- PLANS ADOPTED FROM ELECTRONIC SURVEY FILES RECEIVED FROM ATKINS DATED SEPTEMBER 2017.
- BRIDGE SKEW: 90°

FALCON ENGINEERING
FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
CARY, NC 27513
PHONE: 919.871.0800

SITE PLAN

BRIDGE NO. 239 ON SR 1515 (UNION CHAPEL RD.)
OVER BURNT SWAMP
ROBESON COUNTY, NORTH CAROLINA
WBS NO.: 17BP.6.R.76 | TIP NO.: SF-770239
FALCON PROJECT NO.: G17043.02


0
60
120
FEET
VE = 3
PROJECT REFERENCE NO.
SF-770239
SHEET NO.
4
–L– PROFILE
EB1-B
12+83
16' RT
B1-A
13+13
9' LT
EB2-B
13+59
12' RT
PROPOSED GRADE
EXISTING GROUND
N.W.S. EL.
10/17
WOH
BT
180
170
160
150
140
130
120
110
100
90
80
70
60
50
10+00
10+60
11+20
11+80
12+40
13+00
13+60
14+20
14+80
15+40
16+00
A ROADWAY EMBANKMENT: TAN AND BROWN, V. LOOSE TO LOOSE, SAT., SILTY SAND W/ TRACE ORGANICS AND GRAVEL
B ALLUVIAL: BROWN AND GRAY, LOOSE, SILTY SAND AND V. SOFT, SANDY SILT SAT., W/ TRACE ORGANICS AND GRAVEL
C UNDIVIDED COASTAL PLAIN: TAN, GRAY, AND ORANGE, V. LOOSE TO DENSE, SAT., COARSE SAND, SILTY FINE SAND, AND CLAYEY SAND
D COASTAL PLAIN: LIGHT GRAY, MED. STIFF TO V. STIFF, WET, SANDY SILTY CLAY (BLACK CREEK FORMATION)
E COASTAL PLAIN: TAN AND GRAY, LOOSE TO V. DENSE, SAT., FINE TO COARSE SAND, SILTY SAND, AND CLAYEY SAND (MIDDENDORF FORMATION)
F COASTAL PLAIN: GRAY, V. STIFF, WET, SANDY SILTY CLAY, W/ SAND LENSES (MIDDENDORF FORMATION)
NOTES:
– GROUNDLINE PROFILE ALONG –L– TAKEN FROM BSR DATED 1/29/18
– INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE

# GEOTECHNICAL BORING REPORT
# BORE LOG

| | | | | |
|---|---|---|---|---|
| **WBS** 17BP.6.R.76 | **TIP** SF-770239 | **COUNTY** ROBESON | **GEOLOGIST** Contract Geologist | |
| **SITE DESCRIPTION** BRIDGE NO. 239 ON SR 1515 (UNION CHAPEL RD) OVER BURNT SWAMP | | | | **GROUND WTR (ft)** |
| **BORING NO.** EB1-B | **STATION** 12+83 | **OFFSET** 16 ft RT | **ALIGNMENT** -L- | **0 HR.** N/A |
| **COLLAR ELEV.** 152.9 ft | **TOTAL DEPTH** 90.0 ft | **NORTHING** 352,506 | **EASTING** 1,961,812 | **24 HR.** 2.8 |
| **DRILL RIG/HAMMER EFF./DATE** BRI0674 CME-45C 91% 02/22/2017 | | **DRILL METHOD** Mud Rotary | | **HAMMER TYPE** Automatic |
| **DRILLER** Contract Driller | **START DATE** 10/02/17 | **COMP. DATE** 10/02/17 | **SURFACE WATER DEPTH** N/A | |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT 0.5ft | 0.5ft | 0.5ft | BLOWS PER FOOT 0 25 50 75 100 | SAMP. NO. | MOI | LOG | SOIL AND ROCK DESCRIPTION ELEV. (ft) | DEPTH (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 155 | | | | | | | | | | 152.9 GROUND SURFACE | 0.0 |
| | 151.9 | 1.0 | 3 | 3 | 5 | 8 | | | | **ROADWAY EMBANKMENT** | |
| 150 | 149.9 | 3.0 | 1 | 1 | 1 | 2 | | Sat. | | 149.9 TAN AND BROWN, SLIGHTLY SILTY SAND (A-2-4) WITH TRACE ASPHALT FRAGMENTS | 3.0 |
| | 146.9 | 6.0 | 1 | 0 | 1 | 1 | | Sat. | | **UNDIVIDED COASTAL PLAIN** | |
| 145 | 144.4 | 8.5 | 2 | 6 | 9 | 15 | | Sat. | | 144.9 TAN TO DARK BROWN, MEDIUM SAND (A-3) WITH TRACE GRAVEL | 8.0 |
| 140 | 139.4 | 13.5 | 15 | 17 | 21 | 38 | | W | | 140.9 TAN AND GRAY, MEDIUM TO COARSE SAND (A-1-b) | 12.0 |
| 135 | 134.4 | 18.5 | 3 | 3 | 3 | 6 | | Sat. | | TAN AND LIGHT GRAY, MEDIUM SAND (A-3) | |
| 130 | 129.4 | 23.5 | 2 | 1 | 1 | 2 | | Sat. | | 130.9 ORANGE AND TAN, CLAYEY COARSE TO FINE SAND (A-2-6) | 22.0 |
| 125 | 124.4 | 28.5 | 2 | 2 | 3 | 5 | | W | | 125.9 **COASTAL PLAIN** | 27.0 |
| 120 | 119.4 | 33.5 | 4 | 6 | 8 | 14 | | W | | LIGHT GRAY, SANDY SILTY CLAY (A-7) (BLACK CREEK FORMATION) | |
| 115 | 114.4 | 38.5 | 4 | 7 | 10 | 17 | | W | | | |
| 110 | 109.4 | 43.5 | 5 | 8 | 11 | 19 | | W | | | |
| 105 | 104.4 | 48.5 | 7 | 10 | 12 | 22 | | W | | | |
| 100 | 99.4 | 53.5 | 3 | 5 | 4 | 9 | | Sat. | | 100.9 LIGHT GRAY, CLAYEY SAND (A-2-6) (MIDDENDORF FORMATION) | 52.0 |
| 95 | 94.4 | 58.5 | 5 | 7 | 9 | 16 | | Sat. | | 95.9 LIGHT GRAY, SILTY SAND (A-2-4) (MIDDENDORF FORMATION) | 57.0 |
| 90 | 89.4 | 63.5 | 11 | 11 | 13 | 24 | | Sat. | | 90.9 TAN AND GRAY, SLIGHTLY SILTY SAND (A-3) (MIDDENDORF FORMATION) | 62.0 |
| 85 | 84.4 | 68.5 | 30 | 69 | 31/0.2 | 100/0.7 | | Sat. | | | |
| 80 | 79.4 | 73.5 | 32 | 41 | 39 | 80 | | W | | 80.9 TAN AND GRAY, SLIGHTLY SILTY FINE TO COARSE SAND (A-1-b) (MIDDENDORF FORMATION) | 72.0 |
| 75 | 74.4 | 78.5 | 6 | 8 | 10 | 18 | | Sat. | | 75.9 LIGHT GRAY, SLIGHTLY SILTY SAND (A-3) WITH INTERMITTENT CLAY LENSES AND LIGNITE FRAGMENTS (MIDDENDORF FORMATION) | 77.0 |
| 70 | 69.4 | 83.5 | 16 | 17 | 23 | 40 | | Sat. | | | |
| 65 | 64.4 | 88.5 | 17 | 16 | 22 | 38 | | Sat. | | 65.9 GRAY, SLIGHTLY SILTY FINE TO COARSE SAND (A-1-b) (MIDDENDORF FORMATION) | 87.0 |
| | | | | | | | | | | 62.9 Boring Terminated at Elevation 62.9 ft IN COASTAL PLAIN: SAND (A-1-b) | 90.0 |

NCDOT BORE SINGLE G17043.02_GEO_BRDG0239.GPJ NC_DOT.GDT 3/14/18

# GEOTECHNICAL BORING REPORT
# BORE LOG

| | | | |
|---|---|---|---|
| **WBS** 17BP.6.R.76 | **TIP** SF-770239 | **COUNTY** ROBESON | **GEOLOGIST** Contract Geologist |
| **SITE DESCRIPTION** BRIDGE NO. 239 ON SR 1515 (UNION CHAPEL RD) OVER BURNT SWAMP | | | **GROUND WTR (ft)** |
| **BORING NO.** B1-A | **STATION** 13+13 | **OFFSET** 9 ft LT | **ALIGNMENT** -L- | **0 HR.** N/A |
| **COLLAR ELEV.** 144.7 ft | **TOTAL DEPTH** 81.5 ft | **NORTHING** 352,545 | **EASTING** 1,961,808 | **24 HR.** N/A |
| **DRILL RIG/HAMMER EFF./DATE** BRI0674 CME-45C 91% 02/22/2017 | | **DRILL METHOD** Mud Rotary | **HAMMER TYPE** Automatic | |
| **DRILLER** Contract Driller | **START DATE** 10/03/17 | **COMP. DATE** 10/03/17 | **SURFACE WATER DEPTH** 5.6ft | |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT 0.5ft | 0.5ft | 0.5ft | BLOWS PER FOOT 0 25 50 75 100 | SAMP. NO. | MOI | LOG | SOIL AND ROCK DESCRIPTION ELEV. (ft) / DEPTH (ft) |
|---|---|---|---|---|---|---|---|---|---|---|
| 150 | | | | | | | | | | WATER SURFACE (10/03/17) |
| 145 | 144.7 | 0.0 | | | | | | | | 144.7 GROUND SURFACE 0.0 |
| | | | 2 | 1 | 8 | 9 | | Sat. | | 143.7 **ALLUVIAL** 1.0<br>GRAY, SLIGHTLY SILTY COARSE TO FINE SAND (A-1-b) WITH TRACE FRAGMENTS |
| 140 | 139.7 | 5.0 | 7 | 12 | 17 | 29 | | Sat. | | **UNDIVIDED COASTAL PLAIN**<br>LIGHT TAN-GRAY, FINE TO COARSE SAND (A-1-a) |
| | 137.2 | 7.5 | 8 | 9 | 7 | 16 | | Sat. | | 135.2 9.5 |
| 135 | 134.7 | 10.0 | 2 | 1 | 3 | 4 | | Sat. | | LIGHT GRAY, SILTY FINE SAND (A-2-4) |
| 130 | 129.7 | 15.0 | | | | | | | | 131.7 13.0 |
| | | | 2 | 1 | 2 | 3 | | Sat. | | ORANGE-TAN, CLAYEY COARSE TO FINE SAND (A-2-6) |
| 125 | 124.7 | 20.0 | | | | | | | | 126.7 18.0 |
| | | | 2 | 3 | 4 | 7 | | W | | **COASTAL PLAIN**<br>LIGHT GRAY, SANDY SILTY CLAY (A-7) (BLACK CREEK FORMATION) |
| 120 | 119.7 | 25.0 | 4 | 7 | 10 | 17 | | W | | |
| 115 | 114.7 | 30.0 | | | | | | | | |
| | | | 5 | 6 | 9 | 15 | | W | | |
| 110 | 109.7 | 35.0 | | | | | | | | |
| | | | 5 | 7 | 9 | 16 | | W | | |
| 105 | 104.7 | 40.0 | | | | | | | | |
| | | | 5 | 7 | 12 | 19 | | W | | |
| 100 | 99.7 | 45.0 | | | | | | | | 101.7 43.0 |
| | | | 7 | 5 | 5 | 10 | | Sat. | | LIGHT GRAY, CLAYEY SAND (A-2-6) (MIDDENDORF FORMATION) |
| 95 | 94.7 | 50.0 | | | | | | | | 96.7 48.0 |
| | | | 7 | 6 | 6 | 12 | | Sat. | | LIGHT GRAY, SILTY SAND (A-2-4) (MIDDENDORF FORMATION) |
| 90 | 89.7 | 55.0 | | | | | | | | 91.7 53.0 |
| | | | 10 | 15 | 16 | 31 | | Sat. | | LIGHT GRAY, MEDIUM SAND (A-3) (MIDDENDORF FORMATION) |
| 85 | 84.7 | 60.0 | | | | | | | | 86.7 58.0 |
| | | | 26 | 29 | 38 | 67 | | Sat. | | GRAY, SLIGHTLY CLAYEY FINE TO COARSE SAND (A-1-b) (MIDDENDORF FORMATION) |
| 80 | 79.7 | 65.0 | | | | | | | | |
| | | | 7 | 19 | 60 | 79 | | W | | |
| 75 | 74.7 | 70.0 | | | | | | | | 76.7 68.0 |
| | | | 7 | 8 | 10 | 18 | | Sat. | | LIGHT GRAY, SILTY SAND (A-2-4) WITH TRACE LIGNITE FRAGEMENTS, INTTERMITTENT CLAY LAYERS AND LIGNITIZED/PYRITIZED WOOD FRAGMENTS (MIDDENDORF FORMATION) |
| 70 | 69.7 | 75.0 | | | | | | | | |
| | | | 14 | 15 | 21 | 36 | | Sat. | | |
| 65 | 64.7 | 80.0 | | | | | | | | 66.7 78.0<br>GRAY, SANDY SILTY CLAY (A-7) WITH SAND LENSES AND TRACE PYRITIZED PLANT FRAGMENTS (MIDDENDORF FORMATION) |
| | | | 10 | 11 | 16 | 27 | | W | | 63.2 81.5<br>Boring Terminated at Elevation 63.2 ft IN COASTAL PLAIN: CLAY (A-7) |

# GEOTECHNICAL BORING REPORT
# BORE LOG

| | | | |
|---|---|---|---|
| **WBS** 17BP.6.R.76 | **TIP** SF-770239 | **COUNTY** ROBESON | **GEOLOGIST** Contract Geologist |
| **SITE DESCRIPTION** BRIDGE NO. 239 ON SR 1515 (UNION CHAPEL RD) OVER BURNT SWAMP | | | **GROUND WTR (ft)** |
| **BORING NO.** EB2-B | **STATION** 13+59 | **OFFSET** 12 ft RT | **ALIGNMENT** -L- | **0 HR.** 2.9 |
| **COLLAR ELEV.** 152.7 ft | **TOTAL DEPTH** 85.0 ft | **NORTHING** 352,570 | **EASTING** 1,961,852 | **24 HR.** 0.8 |
| **DRILL RIG/HAMMER EFF./DATE** BRI0674 CME-45C 91% 02/22/2017 | | **DRILL METHOD** Mud Rotary | **HAMMER TYPE** Automatic | |
| **DRILLER** Contract Driller | **START DATE** 10/03/17 | **COMP. DATE** 10/04/17 | **SURFACE WATER DEPTH** N/A | |

| ELEV (ft) | DRIVE ELEV (ft) | DEPTH (ft) | BLOW COUNT 0.5ft | 0.5ft | 0.5ft | BLOWS PER FOOT 0 25 50 75 100 | SAMP. NO. | MOI | LOG | SOIL AND ROCK DESCRIPTION ELEV. (ft) | DEPTH (ft) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 155 | | | | | | | | | | | |
| | | | | | | | | | | 152.7 GROUND SURFACE | 0.0 |
| | 151.7 | 1.0 | 3 | 2 | 1 | 3 | | Sat. | | **ROADWAY EMBANKMENT** BROWN, SILTY SAND (A-2-4) WITH TRACE ORGANICS AND GRAVEL | |
| 150 | 149.2 | 3.5 | 1 | 0 | 1 | 1 | | Sat. | | 147.2 | 5.5 |
| | 146.7 | 6.0 | WOH | WOH | WOH | 0 | | Sat. | | **ALLUVIAL** 144.7 BROWN, SANDY SILT (A-4) WITH TRACE GRAVEL AND ORGANICS | 8.0 |
| 145 | 144.2 | 8.5 | WOH | 2 | 5 | 7 | | Sat. | | TAN, FINE TO COARSE SAND (A-1-b) 140.7 WITH TRACE ORGANICS | 12.0 |
| 140 | 139.2 | 13.5 | 14 | 14 | 15 | 29 | | Sat. | | **UNDIVIDED COASTAL PLAIN** TAN, SLIGHTLY SILTY FINE SAND (A-3) | |
| 135 | 134.2 | 18.5 | 3 | 2 | 3 | 5 | | Sat. | | | |
| 130 | 129.2 | 23.5 | WOH | 2 | 2 | 4 | | Sat. | | 130.7 ORANGE AND TAN, CLAYEY COARSE TO FINE SAND (A-2-6) | 22.0 |
| 125 | 124.2 | 28.5 | 1 | 3 | 4 | 7 | | W | | 125.7 **COASTAL PLAIN** LIGHT GRAY, SANDY SILTY CLAY (A-7) (BLACK CREEK FORMATION) | 27.0 |
| 120 | 119.2 | 33.5 | 3 | 7 | 8 | 15 | | W | | | |
| 115 | 114.2 | 38.5 | 4 | 7 | 10 | 17 | | W | | | |
| 110 | 109.2 | 43.5 | 5 | 7 | 9 | 16 | | W | | | |
| 105 | 104.2 | 48.5 | 6 | 9 | 11 | 20 | | W | | | |
| 100 | 99.2 | 53.5 | 13 | 15 | 18 | 33 | | W | | 100.7 GRAY, CLAYEY SAND (A-2-6) (MIDDENDORF FORMATION) | 52.0 |
| 95 | 94.2 | 58.5 | 8 | 10 | 15 | 25 | | Sat. | | 95.7 LIGHT GRAY, SILTY SAND (A-2-4) (MIDDENDORF FORMATION) | 57.0 |
| 90 | 89.2 | 63.5 | 11 | 13 | 20 | 33 | | Sat. | | 90.7 LIGHT GRAY, SLIGHTLY SILTY MEDIUM TO COARSE SAND (A-1-b) (MIDDENDORF FORMATION) | 62.0 |
| 85 | 84.2 | 68.5 | 25 | 30 | 27 | 57 | | Sat. | | 85.7 TAN AND GRAY, SAND (A-3) (MIDDENDORF FORMATION) | 67.0 |
| 80 | 79.2 | 73.5 | 34 | 34 | 29 | 63 | | Sat. | | 80.7 GRAY, MEDIUM TO COARSE SAND (A-1-b) WITH INTERMITTENT CLAY LAYERS (MIDDENDORF FORMATION) | 72.0 |
| 75 | 74.2 | 78.5 | 21 | 27 | 27 | 54 | | Sat. | | | |
| 70 | 69.2 | 83.5 | 9 | 9 | 9 | 18 | | Sat. | | 67.7 | 85.0 |
| | | | | | | | | | | Boring Terminated at Elevation 67.7 ft IN COASTAL PLAIN: SAND (A-1-b) | |