CONTENTS

3825B

R

REFERENCE

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STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION **DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT**

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY Johnston

PROJECT DESCRIPTION NC 42 from SR 1902 (Glen Laurel Rd.) to SR 1003 (Buffalo Rd.)

SITE DESCRIPTION Bridge No. 75 on NC 42 over the Neuse River at -L- Sta. 64+20

34552 **PROJECT:**

| STATE STATE PROJECT REFERENCE NO. | SHEET NO. | TOTAL SHEETS |
|-----------------------------------|--------------|-----------------|
| N.C. R–3825B | 1 | 22 |

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 SOLI TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1991 707-680. THE SUBSIFICACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL SOL 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 UN-PLACED TEST DATA CAN BE RELIED ON ONLY TO THE DECREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOLL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOLL 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 VIBSURFACE 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 WARANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPNION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONSTRUCTION STO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OF FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FOM THE ACTUAL CONDENSATION.

- NOTES: I. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR CUARANTEED 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.

PERSONNEL

Lindsav Pugh

| Mid Atlantic Drilling |
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| |
| INVESTIGATED BY Stone |
| DRAWN BY <u>J.L. Stone</u> |
| CHECKED BY |
| SUBMITTED BY |
| DATE June 2017 |
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| Engineers and Scientists |
| Washington, North Carolina |
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| DocuSigned by: |
| Joseph 6 Stone 7/28/2017 |
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| DOCUMENT NOT CONSIDERED FINAL |
| UNLESS ALL SIGNATURES COMPLETED |

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

| | | | SOIL C | DESCR | IPTIO | N | | | | | | GR | ADATION | | | | | | ROCK DE | SCRIPTION |
|--------------------------------|--------------------------------------|---|--|----------------------------------|-------------------------------------|--------------------------------------|---|-----------------------------------|------------------------|--|----------------------|--------------------------------------|---|---------------------|---|---------------------------------------|----------------------------------|--|--|--|
| BE PENET ACCORDIN IS B | RATED WIT NG TO THE BASED ON T | D UNCONSOLIDA H A CONTINUOL STANDARD PE HE AASHTO SY R, TEXTURE, MOI! | JS FLIGHT PO NETRATION TE STEM. BASIC∣ | WER AUG EST (AAS) DESCRIPT | GER AND ' GHTO T 20 'TIONS GE | YIELD LESS 06,ASTM D NERALLY I | 5 THAN 100 1586). SOIL NCLUDE THE | BLOWS PE CLASSIFIC FOLLOWIN | R FOOT ATION IG: | <u>WELL GRADED</u> - INDICAT <u>UNIFORMLY GRADED</u> - IN <u>GAP-GRADED</u> - INDICATE | NDICATES ES A MIX | S THAT SOIL (TURE OF UNI | PARTICLES ARE AL | LL APPROXIN | MATELY THE SAME SIZE. | ROCK LINE SPT REFUSA BLOWS IN N | INDICATE AL IS PE NON-COAS | S THE LEVEL NETRATION B STAL PLAIN | _ AT WHICH NON-CO Y A SPLIT SPOON S | WOULD YIELD SPT REFUSAL IF TEST ASTAL PLAIN MATERIAL WOULD YIELD AMPLER EQUAL TO OR LESS THAN Ø. ANSITION BETWEEN SOIL AND ROCK |
| AS | S MINERALO | GICAL COMPOS | ITION, ANGULA | ARITY, STR | RUCTURE, | PLASTICIT | Y,ETC. FOR | EXAMPLE, | | THE ANGULARIT | | | SOIL GRAINS IS D | | BY THE TERMS: | | IALS AR | E TYPICALLY | DIVIDED AS FOLLO | |
| | | | ND AND | | | | | 5/1C+A-1-0 | | ANGULAR, SUBAN | | | | | | WEATHERED ROCK (WR) | | | NON-COASTAL PLA 100 BLOWS PER F | NIN MATERIAL THAT WOULD YIELD SP OOT IF TESTED. |
| GENERAL CLASS. | | Granular Mater (≤ 35% Passing • | 200) | (> | T-CLAY MA 35% Passin | NG \$200) | | ANIC MATERIA | ALS | | MES SUCH | H AS QUARTZ | CAL COMPOS | TALC, KAOLII | | CRYSTALLIN ROCK (CR) | E | | FINE TO COARSE WOULD YIELD SP1 GNEISS, GABBRO, S | GRAIN IGNEOUS AND METAMORPHIC RO REFUSAL IF TESTED. ROCK TYPE IN CHIST.ETC. |
| GROUP CLASS. 4 | A-1 A-1-a A-1-b | A-3 A-2-4 A- | A-2 -2-5 A-2-6 A-2 | _ | A-5 4 | A-6 A-7 A-7-5. A-7-6 | A-1, A-2 A-3 | A-4, A-5 A-6, A-7 | | | | | RESSIBILITY | | | NON-CRYSTA | LLINE | | FINE TO COARSE | GRAIN METAMORPHIC AND NON-COAST |
| SYMBOL | | | | 3 | | | | | | | | MPRESSIBLE COMPRESSIBL | F | LL < 31 LL = 31 | | COASTAL PL | | | ROCK TYPE INCLL | DES PHYLLITE, SLATE, SANDSTONE, ET EDIMENTS CEMENTED INTO ROCK. BUT |
| % PASSING | 0000000000 | | 2010 PM . PM PM . | | | | ···· | SILT- | ****** | | LY COMPR | RESSIBLE | | LL > 50 | | SEDIMENTAR (CP) | Y ROCK | | | CK TYPE INCLUDES LIMESTONE, SAND |
| | 50 MX 30 MX 50 MX | 51 MN | | | | | GRANULAR SOILS | CLAY | MUCK, PEAT | | P | | GE OF MATER | | | | | | | HERING |
| | 15 MX 25 MX | 10 MX 35 MX 35 | MX 35 MX 35 | MX 36 MN | 36 MN 36 | . MN 36 MN | | 50125 | | ORGANIC MATERIAL TRACE OF ORGANIC M | - | GRANULAR <u>SOILS</u> 2 - 3% | SILT - CLAY <u>SOILS</u> 3 - 5% | <u>OTH</u> TRACE | <u>ER MATERIAL</u> 1 - 10% | FRESH | | RESH, CRYSTA | | NTS MAY SHOW SLIGHT STAINING. ROCK |
| MATERIAL PASSING #40 LL | _ | | I MN 40 MX 41 M | | | | SOILS LITTLE | | | LITTLE ORGANIC MAT MODERATELY ORGANIC HIGHLY ORGANIC | TER | 2 - 3% 3 - 5% 5 - 10% > 10% | 5 - 12% 12 - 20% > 20% | LITTLE | E 10 - 20% 20 - 35% | VERY SLIGHT (V SLI.) | т воск о | GENERALLY FR | ESH, JOINTS STAINED | , SOME JOINTS MAY SHOW THIN CLAY C SHINE BRIGHTLY. ROCK RINGS UNDER F |
| PI GROUP INDEX | 6 MX Ø | NP 10 MX 10 | 1 MX 11 MN 11 M 4 MX | _ | | MN 11 MN MX NO MX | MODER | RATE | HIGHLY ORGANIC | | | | JND WATER | | SS% HIND HEOVE | | | CRYSTALLINE | | |
| USUAL TYPES S | STONE FRAGS. GRAVEL, AND | FINE SILT | Y OR CLAYEY | SIL | ILTY | CLAYEY | AMOUNT ORGAI MATT | NIC | SOILS | ▽ | | R LEVEL IN E | BORE HOLE IMMEDIA | | R DRILLING | SLIGHT (SLI.) | 1 INCH. | OPEN JOINTS | S MAY CONTAIN CLAY |) AND DISCOLORATION EXTENDS INTO RC . IN GRANITOID ROCKS SOME OCCASIONA RYSTALLINE ROCKS RING UNDER HAMMEI |
| MATERIALS | SAND | SAND GRAV | 'el and sand | | DILS | SOILS | | | | | | | VEL AFTER <u>24</u> | | | MODERATE (MOD.) | | | | ISCOLORATION AND WEATHERING EFFECT DULL AND DISCOLORED, SOME SHOW CL4 |
| gen, Rating As Subgrade | | EXCELLENT TO G | 000 | | FAIR TO F | OOR | Fair to Poor | POOR | UNSUITABLE | : - ──── | | NG OR SEEP | ATURATED ZONE, OF | : WAIER BE | ARING SIRATA | | DULL S | | | SHOWS SIGNIFICANT LOSS OF STRENGTH |
| | | PI OF A-7-5 SUB | GROUP IS ≤ LL | | | | > LL - 30 | | | | | | | | | MODERATELY | | | | OR STAINED. IN GRANITOID ROCKS, ALL |
| | | | | | NGE OF ST | | RANGE | E OF UNCO | NFINED | | | | NEOUS SYMBO | <u>JL3</u> | | SEVERE (MOD. SEV.) | AND C4 | AN BE EXCAVA | TED WITH A GEOLOG | KAOLINIZATION. ROCK SHOWS SEVERE L ST'S PICK. ROCK GIVES "CLUNK" SOUND |
| PRIMARY S | | COMPACT CONSIS | STENCY | PENET | IRATION R (N-VALU | | COMPR | ESSIVE SI (TONS/FT | TRENGTH | L ROADWAY EMB | | | OF ROCK STRU SPT | JCTURES | SLOPE INDICATOR | SEVERE (SEV.) | ALL R | ОСК ЕХСЕРТ С | | DR STAINED. ROCK FABRIC CLEAR AND E IN GRANITOID ROCKS ALL FELDSPARS |
| GENERAL GRANULA | | LOU | DSE | Í - | 4 TO 10 TO | 10 | | N/A | | SOIL SYMBOL | | | OPT DMT TEST BOP | | INSTALLATION | | | | OME FRAGMENTS OF TELD SPT N VALUES | STRONG ROCK USUALLY REMAIN. > 100 BPF |
| MATERIA (NON-COH | | VERY | NSE DENSE | | 30 TO > 50 | 50 1 | | < 0.25 | | ARTIFICIAL FI THAN ROADWA | AY EMBAN | |) AUGER BORING | ۵ ۵ | CONE PENETROMETER TEST SOUNDING ROD | VERY SEVERE (V SEV.) | ALL RO BUT M | DCK EXCEPT O ASS IS EFFEC | WARTZ DISCOLORED (TIVELY REDUCED TO | DR STAINED. ROCK FABRIC ELEMENTS AN SOIL STATUS, WITH ONLY FRAGMENTS O F ROCK WEATHERED TO A DEGREE THA |
| GENERAL SILT-CL4 MATERIA | AY | SO MEDIUM ST | FT STIFF | | 2 TO 4 TO 8 TO | 4 8 | | 0.25 TO 0 0.5 TO 1. 1 TO 2 | | | | MWC | | ELL – | TEST BORING WITH CORE | COMPLETE | VESTIG ROCK F | ES OF ORIGIN | AL ROCK FABRIC REN SOIL. ROCK FABRIC N | MAIN. <u>IF TESTED, WOULD YIELD SPT N</u> DT DISCERNIBLE, OR DISCERNIBLE ONLY NY BE PRESENT AS DIKES OR STRINGER: |
| (COHESI) | | VERY | STIFF | | 15 TO > 30 | 30 | | 2 TO 4 > 4 | | ALLUVIAL SOI | IL BOUND | | PIEZOMETER INSTALLATION | Ċ |)- SPT N-VALUE | | | AN EXAMPLE. | | |
| | | T | EXTURE | OR G | RAIN | SIZE | | | | <u> </u> | RE | ECOMMEN | DATION SYMB | JOLS | | VERY HARD | | | | HARDNESS ARP PICK. BREAKING OF HAND SPECIMEN |
| U.S. STD. SIE | | | 4 10 | 40 | | | 270 | | | | | CLASSIFIED EX SUITABLE WAS | | | ASSIFIED EXCAVATION - PTABLE.BUT NOT TO BE | | SEVERA | AL HARD BLOW | S OF THE GEOLOGIS | T'S PICK. |
| OPENING (MM BOULDEF | R CC | DBBLE G | 4.76 2.00 RAVEL | 0.4 COAR SAN | RSE | 25 0.075 FINE SAND | S | ILT | CLAY | SHALLOW UNDERCUT | | LASSIFIED E | | USED | IN THE TOP 3 FEET OF NKMENT OR BACKFILL | HARD | TO DET | TACH HAND SP | ECIMEN. | NLY WITH DIFFICULTY. HARD HAMMER B |
| (BLDR.) GRAIN MM | | COB.) 75 | (GR.) 2.0 | (CSE. | | (F SD. | | SL.) 0.005 | (CL.) | AR - AUGER REFUSAL | | | REVIATIONS MEDIUM | VST | - VANE SHEAR TEST | HARD | EXCAVA | | BLOW OF A GEOLOG | GOUGES OR GROOVES TO 0.25 INCHES D IST'S PICK. HAND SPECIMENS CAN BE D |
| SIZE IN. | | 3 SOIL MOIS | TURE - | CORRI | | | TERMS | | | BT - BORING TERMINATED - CL CLAY - CPT - CONE PENETRATION | | MOD | MICACEOUS MODERATELY ION PLASTIC | γ | N WEATHERED - UNIT WEIGHT - DRY UNIT WEIGHT | MEDIUM HARD | CAN BE | | IN SMALL CHIPS TO | S DEEP BY FIRM PRESSURE OF KNIFE (PEICES 1 INCH MAXIMUM SIZE BY HARD |
| | MOISTURE ERBERG LI | | FIELD MI DESCRI | | GL | IDE FOR F | TIELD MOIS | TURE DES | CRIPTION | CSE COARSE DMT - DILATOMETER TES DPT - DYNAMIC PENETRA | БТ | ORG PMT - | ORGANIC PRESSUREMETER TI SAPROLITIC | EST <u>S</u> | SAMPLE ABBREVIATIONS BULK | SOFT | CAN BE | E GROVED OR CHIPS TO SEV | GOUGED READILY BY | KNIFE OR PICK. CAN BE EXCAVATED IN E BY MODERATE BLOWS OF A PICK POIN |
| LL | |) LIMIT | - SATUR (SAT. | | | | DUID:VERY | | | e - VOID RATIO F - FINE - FOSS FOSSILIFEROUS | | SD S SL S | AND, SANDY ALT, SILTY SLIGHTLY | SS ST | - SPLIT SPOON - SHELBY TUBE - ROCK | VERY SOF T | CAN BE OR MOR | E CARVED WIT RE IN THICKN | H KNIFE. CAN BE EX | CAVATED READILY WITH POINT OF PICK. BY FINGER PRESSURE. CAN BE SCRATCH |
| PLASTIC RANGE < | | | - WET - | (W) | | | EQUIRES D | | | FRAC FRACTURED, FRAC FRAGS FRAGMENTS | TURES | TCR - | TRICONE REFUSAL | RT | - RECOMPACTED TRIAXIAL | | FINGER | NAIL. | | BEDDING |
| (PI) PL | | IC LIMIT | | | | | | | | HI HIGHLY | | V - VE | | | RATIO | TERM | | | SPACING | TERM |
| OM . SL . | | UM MOISTURE KAGE LIMIT | - MOIST | - (M) | SC | LID; AT OF | R NEAR OP1 | TIMUM MOI | STURE | DRILL UNITS: | ADVAN | NCING TOOLS: | ON SUBJECT | HAMMER | R TYPE: | VERY WI WIDE MODERAT | | 3 SE 1 | THAN 10 FEET TO 10 FEET TO 3 FEET | VERY THICKLY BEDDED THICKLY BEDDED 1 THINLY BEDDED 0. |
| | | | - DRY - | (D) | | | DITIONAL MUM MOIST | | | X CME-45C | | CLAY BITS 6. CONTINUOUS | S FLIGHT AUGER | | | CLOSE VERY CL | OSE | | 6 TO 1 FOOT THAN 0.16 FEET | VERY THINLY BEDDED 0.0 THICKLY LAMINATED 0.0 THINLY LAMINATED 4 |
| | 1 | | PLr | ASTIC | ITY | | | | | | | 8 HOLLOW AU | | в | П-н | | | | | RATION |
| | PLASTIC | | PLAST | | NDEX (PI) | | | Y STRENGI VERY LOW | гн | CME-550 | | HARD FACED | | X-N | <u>0 </u> | | | OCKS, INDURA | | NING OF MATERIAL BY CEMENTING, HE FINGER FREES NUMEROUS GRAINS; |
| SL1G | GHTLY PLAS | | | 0-5 6-15 | | | Ň | SLIGHT | | VANE SHEAR TEST | | | E INSERTS W/ ADVANCER | HAND T | OOLS: | FRIA | ЗLE | | | BY HAMMER DISINTEGRATES SAMPLE. |
| | ERATELY P HLY PLAST | | | 16-25 26 OR M | IORE | | | MEDIUM HIGH | | PORTABLE HOIST | | | W7 ADVANCER 15/16 • STEEL TEETH | | OST HOLE DIGGER AND AUGER | MODE | RATELY | INDURATED | | E SEPARATED FROM SAMPLE WITH S Y WHEN HIT WITH HAMMER. |
| | | | | COLOF | <u> </u> | | | | | X D-25 | | | ' TUNGCARB. | 🔲 s | OUNDING ROD | INDUF | RATED | | | DIFFICULT TO SEPARATE WITH STEEL BREAK WITH HAMMER. |
| | | INCLUDE COLO UCH AS LIGHT | | | | | | | | | | CORE BIT | | | ANE SHEAR TEST | EXTR | EMELY I | NDURATED | SHARP HAMME | R BLOWS REQUIRED TO BREAK SAMPLI |

PROJECT REFERENCE NO.



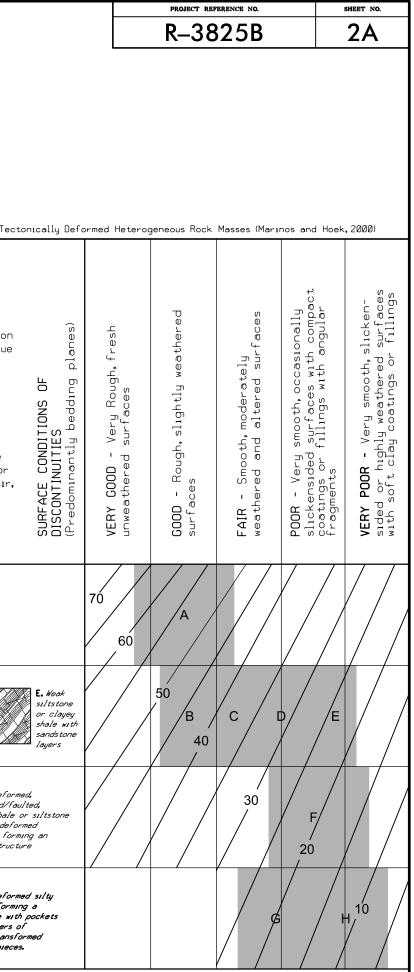
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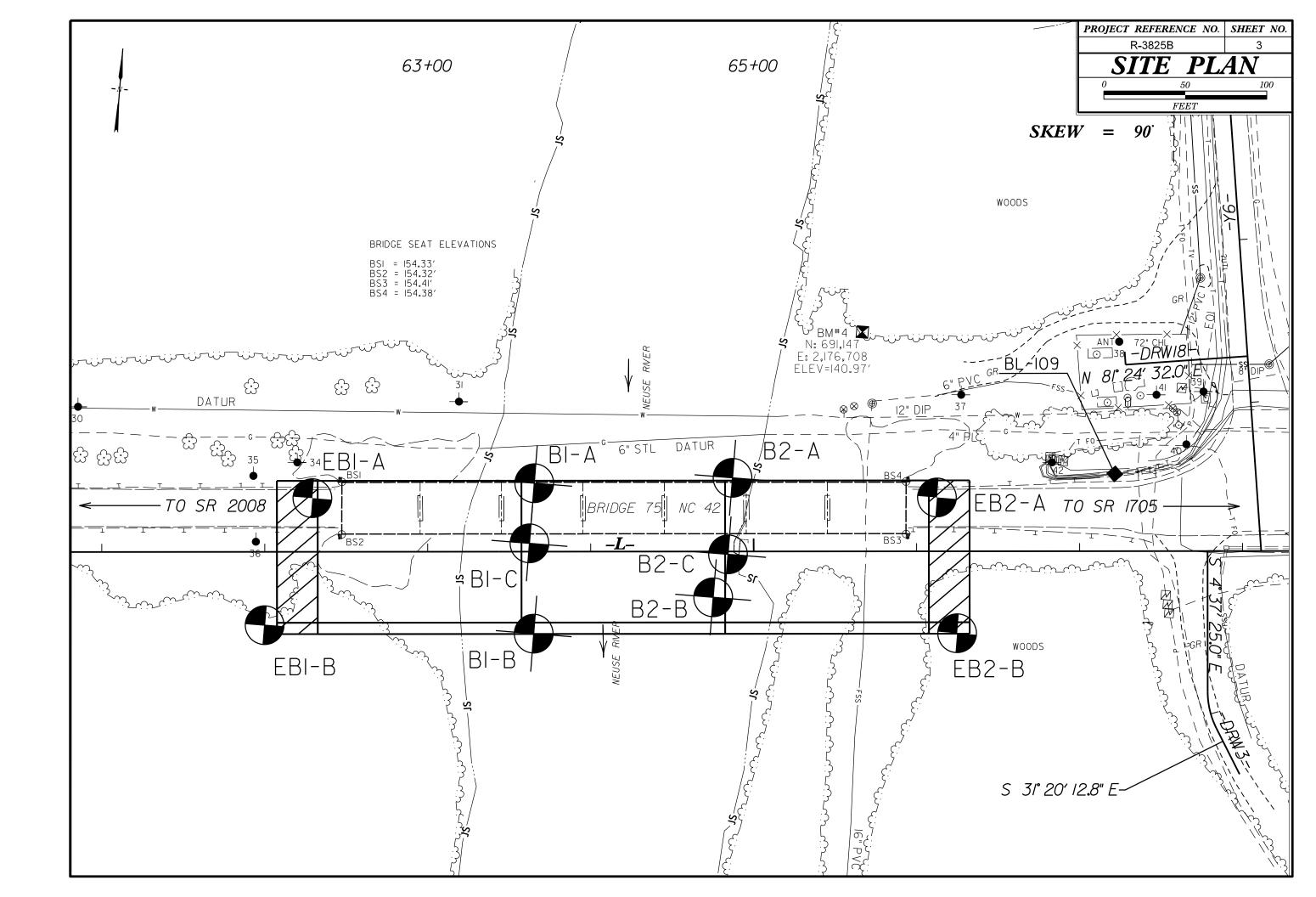
| | TERMS AND DEFINITIONS |
|-----------------------------------|--|
| D. AN INFERRED | ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. |
| SPT REFUSAL. FOOT PER 60 | AQUIFER - A WATER BEARING FORMATION OR STRATA. |
| IS OFTEN | ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. |
| | ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING |
| N VALUES > | 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 |
| CK THAT CLUDES GRANITE. | SURFACE. |
| L PLAIN | CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. |
| F TESTED. | COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. |
| MAY NOT YIELD | CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED |
| TONE, CEMENTED | 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. |
| RINGS UNDER | DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE |
| | HORIZONTAL. |
| ATINGS IF OPEN, AMMER BLOWS IF | DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. |
| CK UP TO . FELDSPAR | FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. |
| BLOWS. | FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. |
| . IN Y. ROCK HAS | FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. |
| AS COMPARED | FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. |
| ELDSPARS DULL | FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE |
| DSS OF STRENGTH | FIELD. |
| HEN STRUCK. | JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. |
| VIDENT BUT | LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. |
| RE KAOLINIZED | 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 |
| E DISCERNIBLE STRONG ROCK | USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE |
| ONLY MINOR | OF AN INTERVENING IMPERVIOUS STRATUM. |
| ALUES < 100 BPF | RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. |
| N SMALL AND SAPROLITE IS | ROCK DUALITY DESIGNATION (RDD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EDUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. |
| REQUIRES | SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. |
| OWS REQUIRED | <u>SILL</u> - 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. |
| EP CAN BE TACHED | <u>SLICKENSIDE</u> - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. |
| R PICK POINT. BLOWS OF THE | 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 I FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL |
| FRACHENTO | TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY |
| FRAGMENTS 1. SMALL, THIN | TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. |
| PIECES 1 INCH ED READILY BY | <u>STRATA ROCK QUALITY DESIGNATION (SROD)</u> - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OK GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. |
| | TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. |
| | BENCH MARK: BM # 4 |
| THICKNESS 4 FEET | END BENT ELEVATION DATA COLLECTED USING A SURVEY GRADE GPS |
| 5 - 4 FEET | ELEVATION: 141.0 FEET |
| 6 - 1.5 FEET 3 - 0.16 FEET | NOTES: |
| 8 - 0.03 FEET 0.008 FEET | |
| | |
| AT, PRESSURE, ETC. | |
| | |
| EEL PROBE; | |
| | |
| PROBE: | |
| ; | |
| | DATE: 8-15-14 |

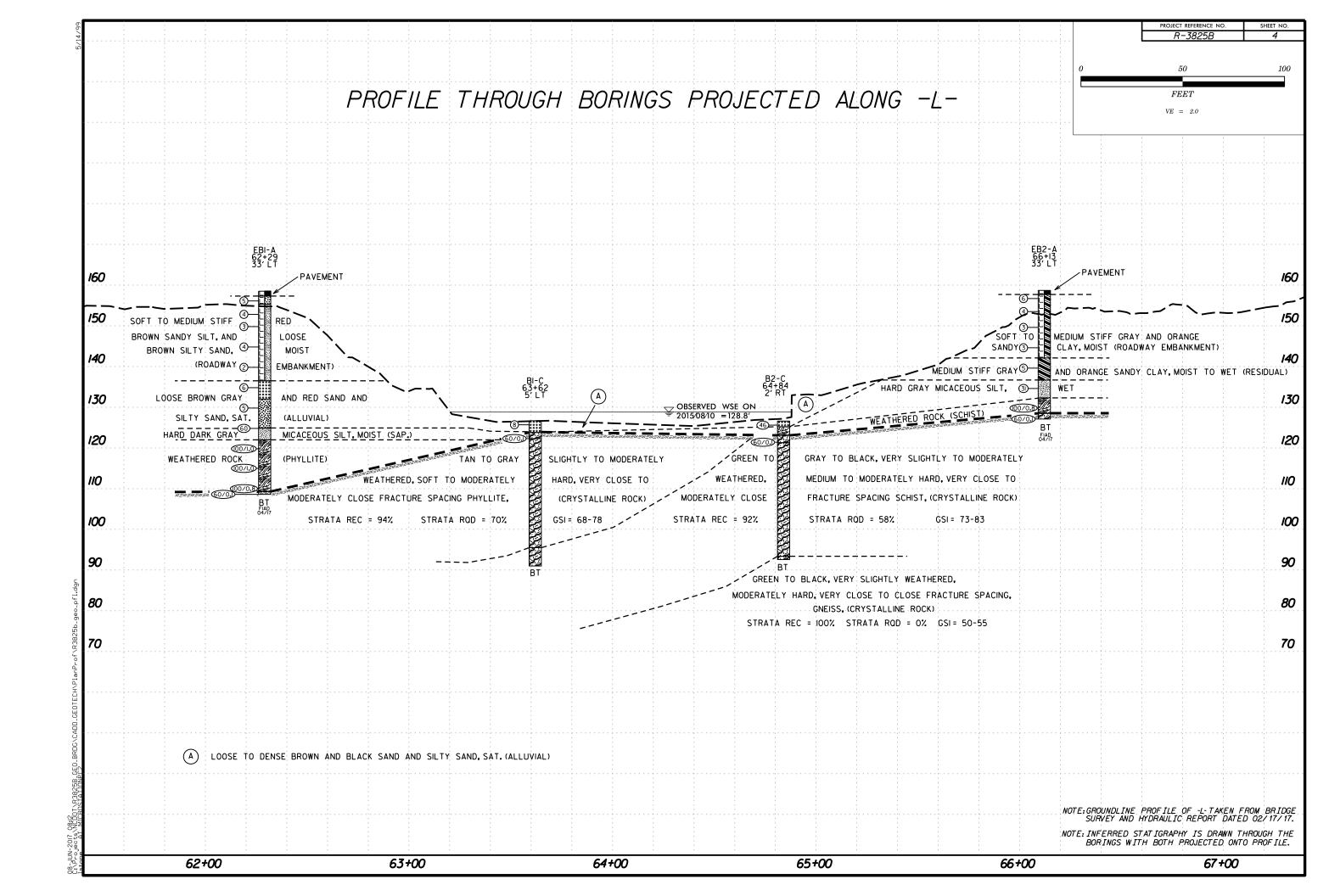
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT SUBSURFACE INVESTIGATION

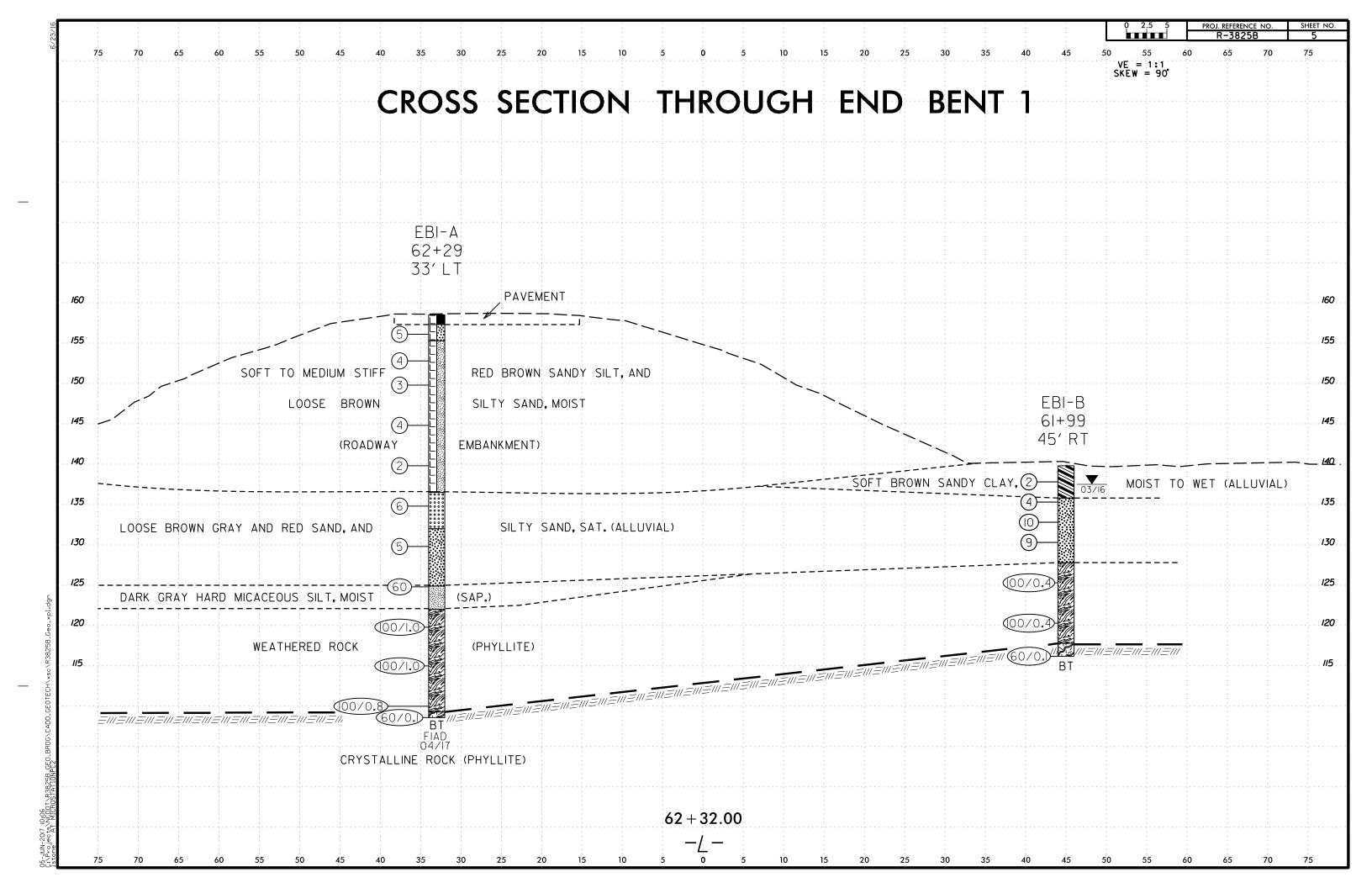
SUPPLEMENTAL LEGEND, GEOLOGICAL STRENGTH INDEX (GSI) TABLES FROM AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

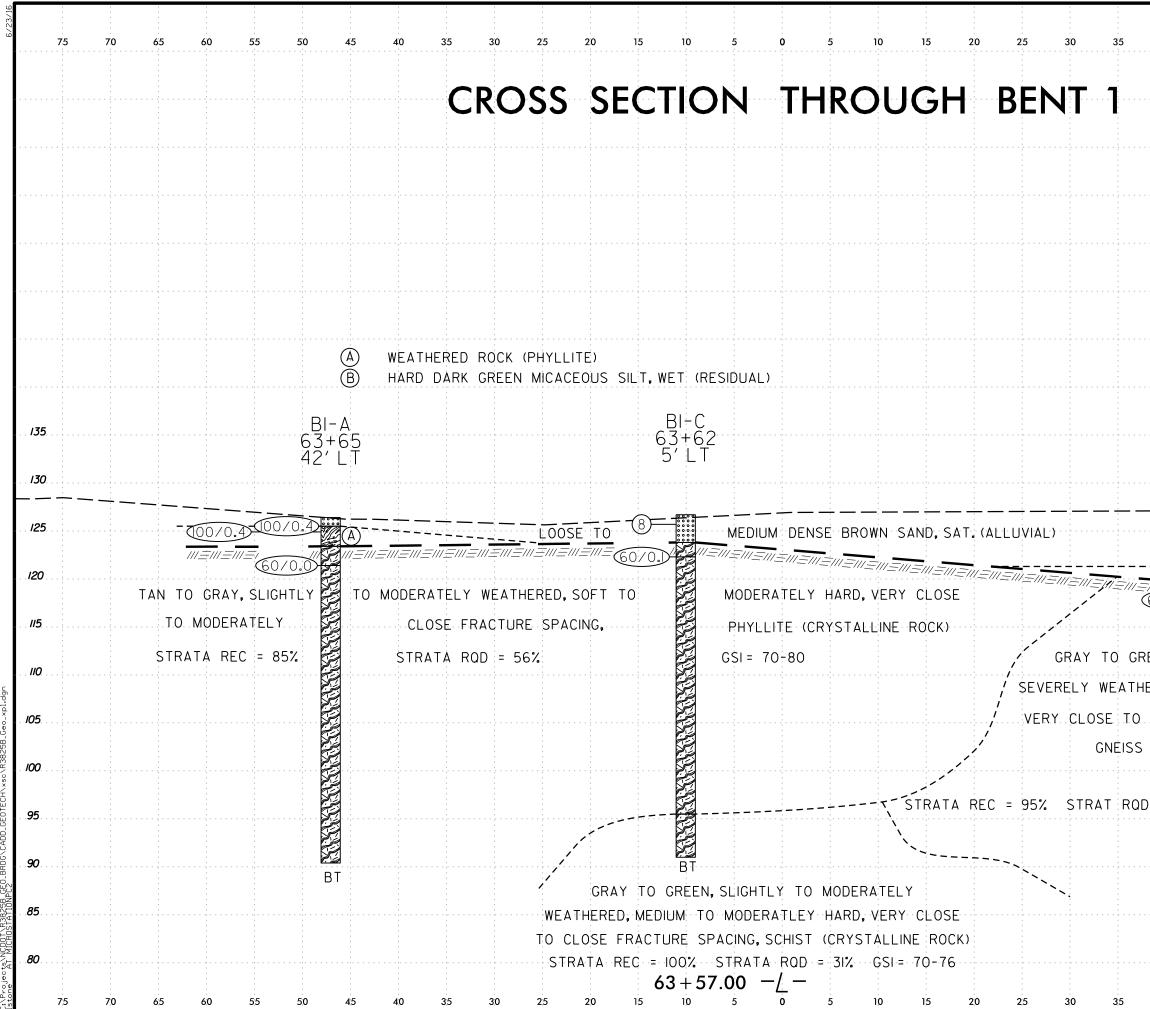
| AASHTO LRFD Figure 10.4.6.4–1 — Determination of GSI for Jointed F | Rock Mass (Marı | nos and Hoek,2 | 2000) | | | AASHTO LRFD Figure 10.4.6.4-2 — Determination of GSI for T |
|--|--------------------------------------|----------------------------------|---|--|--|--|
| GEOLOGICAL STRENGTH INDEX (GSI) FOR JOINTED ROCKS (Hoek and Marinos, 2000) From the lithology, structure and surface conditions of the discontinuities, estimate the average value of GSI. Do not try to be too precise. Quoting a range from 33 to 37 is more realistic than stating that GSI = 35. Note that the table does not apply to structurally controlled failures. Where weak planar structural planes are present in an unfavorable orientation with respect to the excavation face, these will dominate the rock mass behaviour. The shear strength of surfaces in rocks that are prone to deterioration as a result of changes in moisture content will be reduced if water is present. When working with rocks in the | 0D gh, fresh unweathered surfaces | slightly weathered, iron stained | ch, moderately weathered and ed surfaces | POOR Slickensided, highly weathered surfaces with compact coatings or fillings or angular fragments | VERY POOR Slickensided, highly weathered surfaces with soft clay coatings or fillings | GSI FOR HETEROGENEOUS ROCK MASSES SUCH AS FLYSCH (Marinos. P and Hoek E., 2000) From a description of the lithology, structure and surface conditions (particularly of the bedding planes), choose a box in the chart. Locate the position in the box that corresponds to the condition of the discontinuities and estimate the average value of GSI from the contours. Do not attempt to be too precise. Quoting a range from 33 to 37 is more realistic than giving GSI = 35. Note that the Hoek-Brown criterion does not apply to structurally controlled failures. Where unfavourably oriented continuous weak planar discontinuities are present, these will dominate the behaviour of the rock mass. The strength of some rock masses is reduced by the presence of groundwater and this can be allowed for by a slight shift to the right in the columns for fail poor and very poor conditions. Water pressure does |
| fair to very poor categories, a shift to the right may be made for wet conditions. Water pressure is dealt with by effective stress analysis. | | GOOD Rough, surface | FAIR Smoot alter | | ~ | not change the value of GSI and it is dealt with by using effective stress analysis. |
| STRUCTURE | DEC | CREASING SU | JRFACE QUA | ALITY 💳 | ⇒ | COMPOSITION AND STRUCTURE |
| INTACT OR MASSIVE - intact rock specimens or massive in situ rock with few widely spaced discontinuities | 90 | | | N/A | N/A | A. Thick bedded, very blocky sandstone The effect of pelitic coatings on the bedding planes is minimized by the confinement of the rock mass. In shallow tunnels or slopes these bedding planes may cause structurally controlled instability. |
| BLOCKY - well interlocked un- disturbed rock mass consisting of cubical blocks formed by three intersecting discontinuity sets | | 70 60 | | | | B. Sand- stone with thin inter- |
| VERY BLOCKY - interlocked, partially disturbed mass with multi-faceted angular blocks formed by 4 or more joint sets | | 5 | 0 | | | layers of siltstone amounts stone layers |
| BLOCKY/DISTURBED/SEAMY - folded with angular blocks formed by many intersecting discontinuity sets. Persistence of bedding planes or schistosity | | | 40 | 30 | | C, D, E, and G - may be more or less folded than illustrated but this does not change the strength. Tectonic deformation, faulting and loss of continuity moves these categories to F and H . |
| discontinuity sets. Persistence of bedding planes or schistosity DISINTEGRATED - poorly inter- locked, heavily broken rock mass with mixture of angular and rounded rock pieces | | | | 20 | | G. Undisturbed silty or clayey shale with or without a few very thin sandstone layers |
| LAMINATED/SHEARED - Lack of blockiness due to close spacing of weak schistosity or shear planes | N/A | N/A | | | 10 | Main Means deformation after tectonic disturbance |



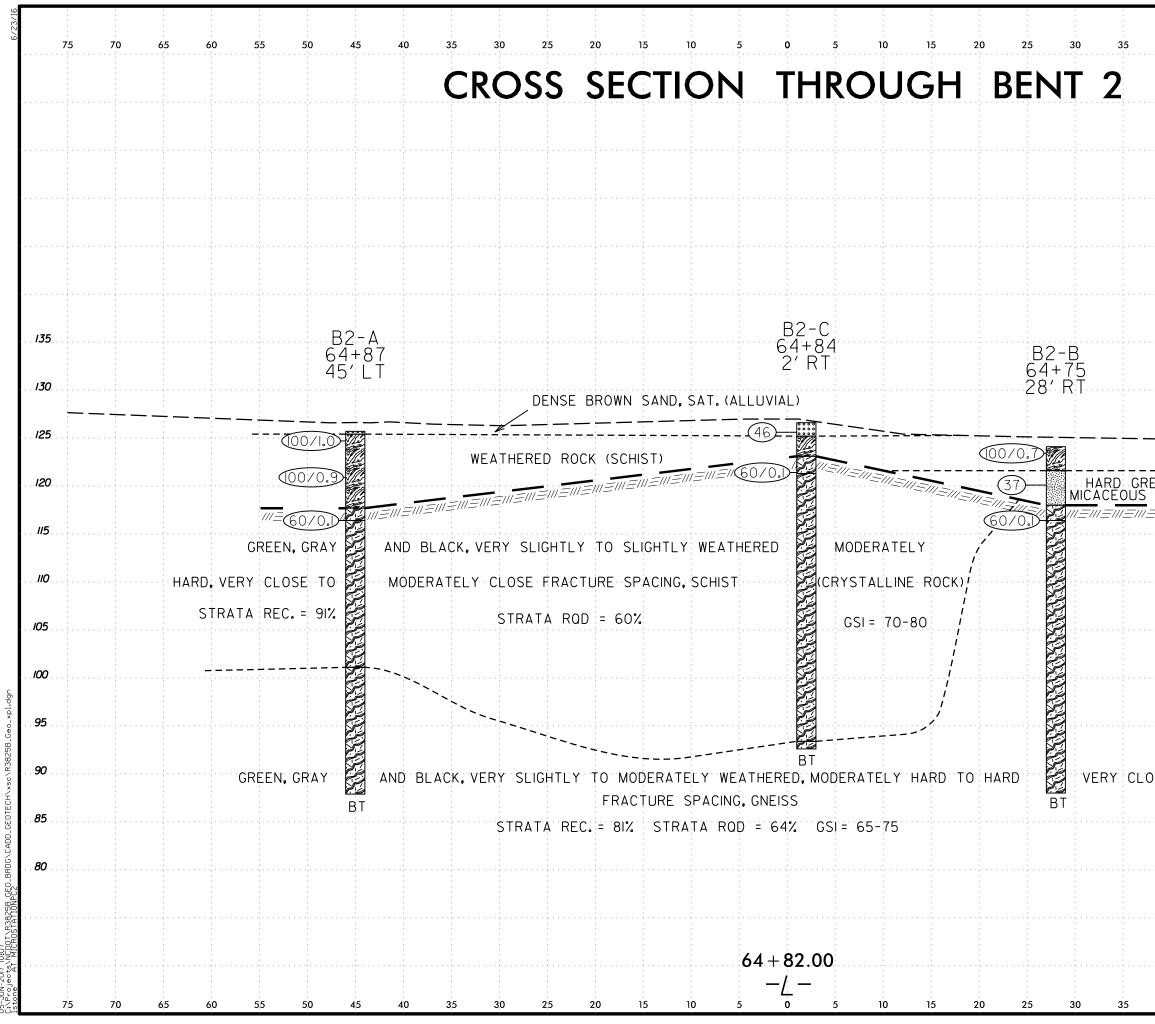




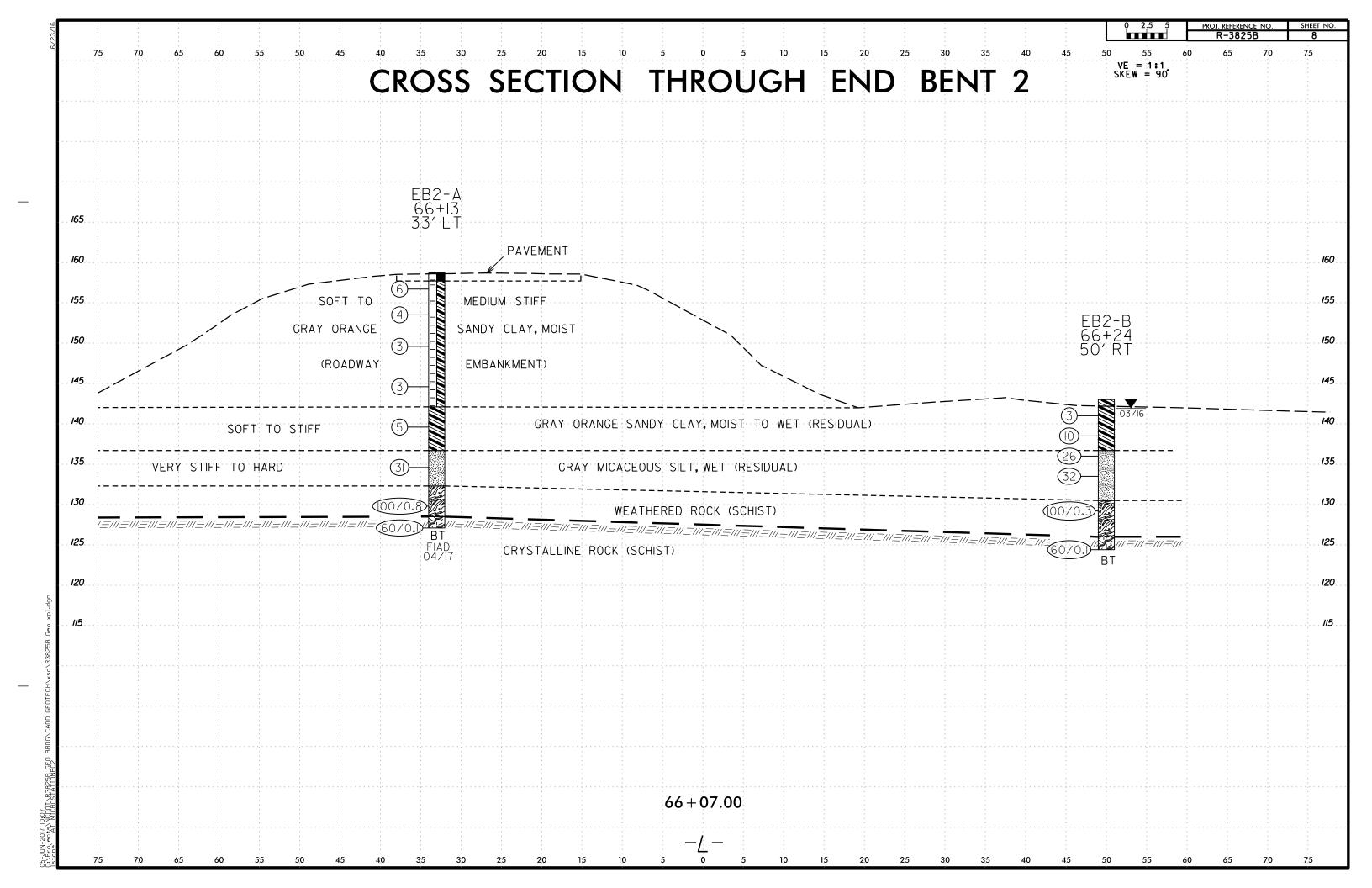




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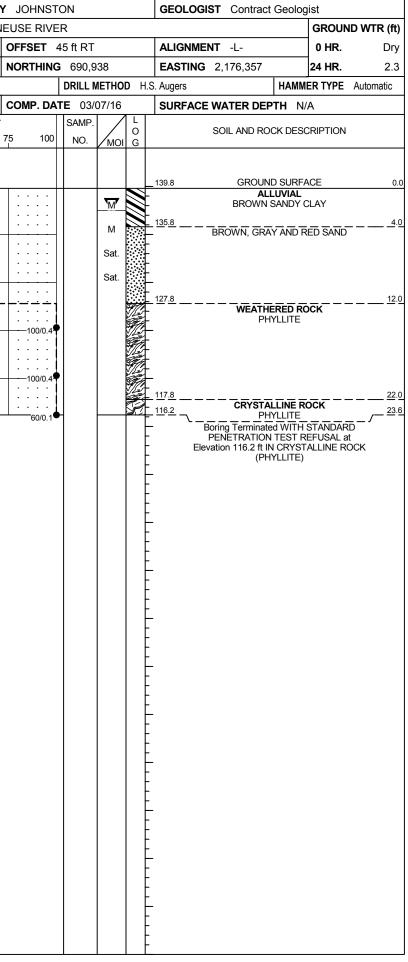


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| | | 2.1.FR3 | | | | | R-3825 | | | | | JOHNS | | | | (| GEOLO | GIST Lindsay Pugh | | | | | 52.1.FR | | | | P R-3825 | | COUNT | |
| | | | | IDGE I | | | | | | R TH | | USE RIV | | | | | | | _ | ND WTR (ft) | | | | | IDGE | | 5 ON -L- (N | - | ER THE I | |
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| COLL | AR ELI | EV. 15 | 58.5 ft | | T | OTAI | L DEP | TH 4 | 49.9 f | t | 1 | NORTHIN | IG 691, | 018 | | I | EASTIN | G 2,176,380 | 24 HR. | N/A | COL | LAR E | LEV. 1 | 39.8 ft | | Т | OTAL DEPT | H 23.6 f | ť | N |
| DRILL | RIG/HA | MMER E | FF./DA | TE M | D5464 | CME- | -45C 84 | % 08/0 | 09/2016 | 6 | | | DRILL | METH | IOD | Mud F | Rotary | HAM | MER TYPE | Automatic | DRIL | L RIG/H | AMMER | EFF./DA | TE B | RI2974 (| CME-45C 79% | 6 06/03/2015 | 5 | |
| DRIL | | 1. COO | GAN | | S | TAR | T DAT | E 04 | 4/22/1 | 7 | 0 | COMP. D | ATE 04 | /22/1 | 7 | 5 | SURFA | CE WATER DEPTH | N/A | | DRIL | | Contrac | t Drille | r | S | TART DATE | 03/07/1 | 6 | С |
| ELEV | DRIVE ELEV | | | ow co | | | | | | PER FC | | | SAMP | ?. ▼ ∕ | | 5 | | SOIL AND ROCK DE | SCRIPTION | 1 | ELEV | DRIVE | | · — | ow co | | | | PER FOO | |
| (ft) | (ft) | (ft) | 0.5ft | 0.5ft | 0.5ft | 0 | | 25 | į | 50 | 7 | 5 10 | NO. | /м | OI G | EI EI | LEV. (ft) | | | DEPTH (ft) | (ft) | (ft) | (ft) | 0.5ft | 0.5ft | 0.5ft | 0 2 | 25 | 50 | 75 |
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| 110 | 110.8 - | + 47.7 + | 50 | 50/0.3 | | | | • | · · · | · · | ••• | 100/0.8 | | | | 10 | 19.3 | | | 49.2 | | | ‡ | | | | | | | |
| | 108.7 | <u>+ 49.8</u> + | 60/0.1 | | | <u> ·</u> | | | | | | 60/0. | | | | - 10 | 18.6 | CRYSTALLINE PHYLLITE | ROCK | 49.9 | | | ‡ | | | | | | | |
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| | | ŧ | | | | | | | | | | | | | | F | | (PHYLLITE | | | | | Ŧ | | | | | | | |
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SHEET 9



GEOTECHNICAL BORING REPORT BUDEIUC

GEOTECHNICAL BORING REPORT

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| | COUNTY | Y JOHNST | ON | | GEOLOGIST Lindsay F | Pugh | |
| /E | R THE N | IEUSE RIVE | R | | | | GROUN |
| | | OFFSET 4 | 42 ft LT | | ALIGNMENT -L- | | 0 HR. |
|) ft | t | NORTHING | 691,038 | | EASTING 2,176,515 | | 24 HR. |
| | | | DRILL METHOD | NQ2 | 2 Casing W/SPT&Core | HAMM | ER TYPE |
| 14 | 7 | | | | | | 20 |

| | B | BORE LOG | | | C | CORE LOG | |
|---|--------------------------------|---------------------------------------|--|---|---|---|--|
| WBS 34552.1.FR3 | TIP R-3825B COUNT | TY JOHNSTON | GEOLOGIST Lindsay Pugh | WBS 34552.1.FR3 | TIP R-3825B COUNT | TY JOHNSTON | GEOLOGIST Lindsay Pugh |
| SITE DESCRIPTION BRIDGE | NO. 75 ON -L- (NC 42) OVER THE | NEUSE RIVER | GROUND WTR (ft) | SITE DESCRIPTION BRIDGE NO | D. 75 ON -L- (NC 42) OVER THE | NEUSE RIVER | GROUND WTR (ft) |
| BORING NO. B1-A | STATION 63+65 | OFFSET 42 ft LT | ALIGNMENT -L- 0 HR. N/A | BORING NO. B1-A | STATION 63+65 | OFFSET 42 ft LT | ALIGNMENT -L- 0 HR. N/A |
| COLLAR ELEV. 126.4 ft | TOTAL DEPTH 36.0 ft | NORTHING 691,038 | EASTING 2,176,515 24 HR. N/A | COLLAR ELEV. 126.4 ft | TOTAL DEPTH 36.0 ft | NORTHING 691,038 | EASTING 2,176,515 24 HR. N/A |
| DRILL RIG/HAMMER EFF./DATE MI | ID0314 D-25 86% 08/04/2016 | DRILL METHO | DD NQ2 Casing W/SPT&Core HAMMER TYPE Automatic | DRILL RIG/HAMMER EFF./DATE MIDO | 0314 D-25 86% 08/04/2016 | | NQ2 Casing W/SPT&Core HAMMER TYPE Automatic |
| DRILLER B. Fowler | START DATE 05/01/17 | COMP. DATE 05/02/17 | SURFACE WATER DEPTH 5.9ft | DRILLER B. Fowler | START DATE 05/01/17 | COMP. DATE 05/02/17 | SURFACE WATER DEPTH 5.9ft |
| ELEV (ft) DRIVE ELEV (ft) DEPTH (ft) BLOW COL | | 75 400 | 0 SOIL AND ROCK DESCRIPTION | CORE SIZE NQ2 | TOTAL RUN 31.0 ft | | |
| (ft) (ft) (ft) 0.5ft 0.5ft | 0.5ft 0 25 50 | 75 100 NO. MO | I G ELEV. (ft) DEPTH (ft) WATER SURFACE (05/01/17) | | RUN STRATA REC. RQD SAMP. REC. RQD (ft) (ft) NO. (ft) (ft) (ft) | | DESCRIPTION AND REMARKS |
| | | | | | % % % | ===::(:;) | |
| 130 | | | | 121.4 120 121.4 5.0 2.4 N=60/0.0 | 0 (2.3) (2.2) (23.9) (13.8 | 3) 121.4 TAN TO GRAY, S | Begin Coring @ 5.0 ft LIGHTLY TO MODERATLEY WEATHERED, MEDIUM 5 |
| 126.4 0.0 | | | - 126.4 RIVER BED 0.0 | | 96% 92% (3.7) (3.1) | TO MODERAT | TELY HARD, VERY CLOSE TO CLOSE FRACTURE SPACING, PHYLLITE, WITH A |
| 125.4 0.0 125.3 1.1 3 100/0.4 | 4 | Sat. | 125.5 ALLUVIAL 0.9 BROWN SAND | | 0 74% 62% | VOID A | AT 11.4 +/-, AND A CLAY SEAM AT 25.0 +/- GSI = 72-82 |
| | | . 100/0.4 | WEATHERED ROCK /- 3.0 | \pm \pm \pm 1 1/20/10 | | | |
| 121.4 + 5.0 | | · · · · · · · · · · · · · · · · · · · | | 4.7 3:10/1.0 |) (4.7) (1.8)) 100% 38% | | |
| | | · · · · · · · · · · · · · · · · · · · | PHYLLITE TAN TO GRAY, SLIGHTLY TO J | $ _{110} + _{4:44/1.0}$ | | | |
| | | | MODERATLEY WEATHERED, MEDIUM TO MODERATELY HARD, VERY CLOSE | | , 0 (3.3) (1.4) 0 85% 36% | 67 | |
| 115 | | | TO CLOSE FRACTURE SPACING, PHYLLITE, WITH A | | 0 85% 36% | | |
| | | · · · · · · · · · · · · · · · · · · · | 1214 | 105 105.4 21.0 10:54/0.9 5.0 4:14/1.0 | 9) (2.9) (0.9)) 58% 18% | 3) 121.4 TAN TO GRAY, S TO MODERAT VOID A VOID A 90.4 Boring Terminated a | |
| | | | REC. =77%, RQD = 45% GSI = 72-82 | | | | |
| | | · · · · · · · · · · · · · · · · · · · | | $ _{100} 100.4 + 26.0 _{4.43/1.0}$ | | | |
| | | | | 5.0 4:18/1.0 5:27/1.0 5:55/1.0 | 0 (4.2) (3.1) 84% 62% RS-1 | | |
| 105 | | | | 5:26/1.0 | | | |
| | | | | |) (2.8) (1.3)) 56% 26% | | |
| | | | | | | | |
| | | · · · · · · RS-1 | | 90.4 + 36.0 2:50/1.0 | | 90.4 Boring Terminated : | 36.1 at Elevation 90.4 ft IN CRYSTALLINE ROCK (PHYLLITE) |
| | | | | | | - | |
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| | | | 90.4 36.0 | | | | |
| | | | Boring Terminated at Elevation 90.4 ft IN CRYSTALLINE ROCK (PHYLLITE) | | | | |
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GEOTECHNICAL BORING REPORT PODEIOC

GEOTECHNICAL BORING REPORT

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|----------------------|-----------------|-----------------|------------------|----------|-------------------------------------|---------------|--------|--------------|---------------------|---|-----------------|--------------|--------------|-----------------------------------|---------|----------------------------------|---------------------|-------------|----------|--------------------|------------------|-----------------|-------------|-----------|----------------|------------------------------|-------------------|---------------|
| WBS 34552.1.FR3 | | TIP R-3825 | В | COUNT | NTY JOHNSTON GEOLOGIST Lindsay Pugh | | | | | | | | 34552 | .1.FR3 | | | TIP R- | 3825B | | COUN | TY JOHN | NSTON | | | GEOLOGI | ST Lindsay | [,] Pugh | |
| SITE DESCRIPTION | BRIDGE NO. | 75 ON -L- (N | C 42) OV | ER THE N | NEUSE RIVE | R | | | | GR | OUND WTR (ft) | SITE | DESCR | IPTION | BRID | DGE NO |). 75 ON - | L- (NC 42 |) OVE | R THE | NEUSE R | RIVER | | | | | GR | OUND WTR (ft |
| BORING NO. B1-C | | STATION 6 | 3+62 | | OFFSET | 5 ft LT | | ALIG | NMENT -L- | 0 H | ir. N/A | BOR | ING NO. | B1-C | | | STATIO | N 63+62 | 2 | | OFFSE | T 5 ft I | LT | | ALIGNMEN | NT -L- | 0 H | R. N/A |
| COLLAR ELEV. 126 | .7 ft | TOTAL DEPT | TH 35.7 1 | ft | NORTHING | G 691, | 001 | EAST | ING 2,176,51 | 5 24 H | ir. N/A | COLL | LAR ELE | EV. 126 | 6.7 ft | | TOTAL | DEPTH | 35.7 ft | | NORTH | IING 6 | 91,001 | | EASTING | 2,176,515 | 24 H | R. N/A |
| DRILL RIG/HAMMER EFF | ./DATE MID03 | 14 D-25 86% 08/ | /04/2016 | | | DRILL | METHOD | NQ2 Casing | g W/SPT&Core | HAMMER TY | PE Automatic | DRILL | . RIG/HAI | MMER EF | F./DATI | E MID0 | 314 D-25 80 | 5% 08/04/20 | 16 | | | DR | RILL METHO | OD NQ2 | 2 Casing W/SF | PT&Core | HAMMER TY | PE Automatic |
| DRILLER B. Fowler | | START DATE | E 04/20/ | 17 | COMP. DA | TE 04 | /21/17 | SURF | ACE WATER D | DEPTH 2.2ft | | DRIL | LER B | . Fowler | | | START | DATE 04 | 4/20/1 | 7 | COMP. | DATE | 04/21/17 | 7 | SURFACE | WATER DE | PTH 2.2ft | |
| | BLOW COUNT | | | PER FOOT | | SAMP | | | SOIL AND | ROCK DESCRIPT | ION | COR | E SIZE | NQ2 | | | | RUN 31. | | | | | | | | | | |
| (ft) (ft) (ft) (| 0.5ft 0.5ft 0.5 | Sft 0 2 | 25 | 50 | 75 100 | NO. | MOI G | ELEV. (f | t) | | DEPTH (fi | ELEV (ft) | RUN ELEV | DEPTH | | DRILL RATE | RUN REC. R | D SAMP | P. RE | | | | | DE | ESCRIPTION | I AND REMARI | KS | |
| | | | | | | | | | | | | | (ft) | (ft) | (ft) | (Min/ft) | (ft) (% | ft) NO. | (ft % | t) (ft) % | G _{ELE} | EV. (ft) | | | | | | DEPTH (1 |
| 130 | | | | | | | | F | WATER S | SURFACE (04/20/1 | 17) | 122.3 | 122.3 - | 4.4 | 5.0 | 3:13/1.0 | (4.6) (3 | .6) | (25 | 5.3) (18.3 | 7) | 2.3 TA | N TO GRA | Y, SLIGH | ITLY TO MOD | ring @ 4.4 ft DERATELY SE | EVERELY WEA | THERED, 4 |
| 126.7 - 0.0 | | | | | | | | 126.7 | | RIVER BED | 0. | 120 | - | - | | 5:00/1.0 | (4.6) (3 92% 72 | 2% | 94 | % `70% | | SC | OFT TO MO | DERATE | LY HARD, VE | ERY CLOSE T PACING, PHY | O MODERATEL | YCLOSÉ |
| | VOH 1 7 | ·•8 · · | | | | | Sat. | | BE | ALLUVIAL ROWN SAND | | | - 117.3 - | - 9.4 | | 3:11/1.0 4:50/1.0 | | | | | | | | | | l = 68-78 | | |
| | | • ـ ـ ـ ـ | | | ╞┝╧╧╧┥ | | | 123.8 | | TALLINE ROCK | 2.9 | 115 | - 115.5 | - 11.2 | 1.8 | 2:36/1.0 4:50/0.8 | (1.6) (1 | .1) I% | | | | | | | | | | |
| | 0/0.1 | | | | • • 60/0.1 | | | <u>122.3</u> | ٦ | PHYLLITE BRAY, SLIGHTLY | | | - | F | 4.0 | 3:32/1.0 4:40/1.0 | (4.6) (4 | .3) | | i.3) (18. % 70% | | | | | | | | |
| | | | | | | | | | MODERATELY S | SEVERELY WEA | THERED, | | 110.9 | 15.8 | | 4:19/1.0 5:17/1.0 5:30/0.6 | | | | | | | | | | | | |
| | | | | | | | | | CLOSE TO I | DERATELY HARD MODERATELY CL SPACING, PHYL | OSE | 110 | | | 5.4 | 3:55/1.4 | (3.0) (3 | .1) | | | | | | | | | | |
| 115 | | | | | | | | Ł | REC. = 94% | RQD = 70% GSI = | LITE = 68-78 | | - | - | | 3:45/1.0 4:03/1.0 | | 70 | | | | | | | | | | |
| | | | · · · · | | | | | | | | | 105 | 105.5 - | 21.2 | | 3:51/1.0 5:17/1.0 | | - | | | | | | | | | | |
| | | | | | | | | | | | | | - | | | 4:39/1.0 | (5.0) (5 100% 10 | .0) 0% | | | | | | | | | | |
| | | | <u> </u> | <u> </u> | | | | | | | | | 100 5 | 26.2 | | 4:36/1.0 5:43/1.0 7:00/1.0 | | | | | | | | | | | | |
| | | | | | | | | | | | | 100 | 100.5 - | - 20.2 | 5.0 | 3:39/1.0 | (4.5) (1 90% 32 | .6) | | | | | | | | | | |
| 105 | | | · · · · | | | | | | | | | | - | | | 4:10/1.0 | 1 1 | 2% | | | | | | | | | | |
| | | | | | | | | | | | | 95 | 95.5 - | 31.2 | 4.5 | 6:57/1.0 8:25/1.0 | | 4 | | <u> </u> | 95. | | | | | | | 31. |
| | | | | | | | | | | | | | - | E I | 4.5 | 4:34/1.0 | (4.5) (1 100% 3 | .4) I% | 100 | .5) (1.4 0% 31% | | Gr | TO MODE | ERATEL | Y HARD, CLO | OSE TO VERY | WEATHERED, | TURE |
| | | | | <u> </u> | | | | | | | | | 91.0 | 35.7 | | 4:20/1.0 5:13/1.0 4:16/0.5 | 1 1 | | | | 91. | | | | | CHIST GSI = 7 | | 35. |
| | | | | | | | | | | | | | - | | | 4.10/0.5 | 1 | | | | | B | oring Termi | inated at | Elevation 91.0 | 0 ft IN CRYST | ALLINE ROCK (| SCHIST) |
| 95 – | | | | | | | | 95.5 | GRAY TO GR | EEN, MODERATE | 31.2 ELY TO | | - | | | | | | | | | | | | | | | |
| | | | | | | | | | SLIGHTLY WE | EATHERED, MEDI HARD, CLOSE T | IUM TO | | - | E I | | | | | | | | | | | | | | |
| | | · · · · | | | | | | 91.0 | CLOSE FRACT | TURE SPACING, S RQD = 31% GSI = | SCHIST 35.3 | | - | | | | | | | | _ | | | | | | | |
| | | | | | | | | F | Boring Termina | ated at Elevation 9 | 1.0 ft IN | | - | | | | | | | | | | | | | | | |
| | | | | | | | | Ę | CRYSTAL | LINE ROCK (SCHI | 151) | | _ | | | | | | | | | | | | | | | |
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| 88258 | | | | | | | | Ę. | | | | | - | | | | | | | | | | | | | | | |
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GEOTECHNICAL BORING REPORT

| | C | ORE L | .0G | | | | | |
|----|----------|------------|--------------|----|---------------------|---------------|---------|-------|
| | COUNT | Y JOHNST | ON | | GEOLOGIST Lindsay F | Pugh | | |
| 'E | ER THE N | IEUSE RIVE | R | | | | GROUN | D WT |
| | | OFFSET | 50 ft RT | | ALIGNMENT -L- | | 0 HR. | |
| f | t | NORTHING | 690,946 | | EASTING 2,176,522 | | 24 HR. | |
| | | | DRILL METHOD | NQ | 2 Casing W/SPT&Core | HAMM | ER TYPE | Auton |
| 1 | 7 | COMP. DA | TE 05/04/17 | | SURFACE WATER DEP | TH 8.8 | Bft | |

| | | | | | | | | B | DRE | LOG | ì | | | | | | | | | | | | | | | | CO | RE | LOG | | | | |
|----------|-------------------------|----------|--------|---------|--------------|----------------|-------|-----------|----------|-----------------------------|-------|------------|------------------|--|------------|------------|---------------|---------------|---------------|----------------------|---|--|-------------------|-----------|----------------|-----------------|---|----------|-------------------|--------------|--|----------------|-----------|
| WBS 3 | 34552.1.FR | 3 | | TIP | R-3825 | 5B | С | OUNTY | JOHNS | STON GEOLOGIST Lindsay Pugh | | | | | | | | S 345 | 52.1.F | R3 | | | TIP | R-38 | 325B | | COUNTY | JOHN | STON | G | GEOLOGIST Lindsay Pu | gh | |
| SITE DE | SCRIPTIO | N BRID | DGE NO | 0. 75 (| ON -L- (N | IC 42) O | VER | THE NE | USE RIV | /ER | | | | | GROUNE | WTR (ft) | SIT | E DESC | CRIPT | ION | BRID | GE NC | D. 75 C | DN -L- | (NC 42) | OVEF | THE NEU | ISE RI | VER | | | GROUN | D WTR (|
| BORING | g no. B1-E | В | | ST | ATION 6 | 63+64 | | | OFFSET | 50 ft F | RT | | A | LIGNMENT -L- | 0 HR. | N/A | BO | ring n | ю . в | 1-B | | | STA | TION | 63+64 | | 0 | FFSET | 50 ft RT | Δ | LIGNMENT -L- | 0 HR. | N/ |
| COLLA | R ELEV. 1 | 25.9 ft | | то | TAL DEP | TH 37.9 | 9 ft | | NORTHI | IG 690 |),946 | | E/ | ASTING 2,176,522 | 24 HR. | N/A | CO | LLAR E | ELEV. | 125. | .9 ft | | тот | | EPTH 3 | 37.9 ft | N | ORTHI | NG 690,946 | E | EASTING 2,176,522 | 24 HR. | N/ |
| DRILL RI | G/HAMMER B | EFF./DAT | E MID | 0314 D- | 25 86% 08 | 8/04/2016 | | | | DRIL | L MET | HOD | NQ2 Ca | asing W/SPT&Core HAMI | MER TYPE | Automatic | DRI | LL RIG/H | HAMME | REFF | ./DATE | E MIDO | 0314 D-2 | 25 86% | 08/04/201 | 16 | • | | DRILL METHOD | NQ2 C | Casing W/SPT&Core | IAMMER TYPE | Automatic |
| | R B. Fowle | | | ST | ART DAT | E 05/03 | 3/17 | | COMP. D | ATE 0 | 5/04/ | 17 | SI | JRFACE WATER DEPTH 8 | 3.8ft | | DRI | LLER | B. Fo | wler | | | STA | RT D | ATE 05 | 5/03/17 | C | OMP. I | DATE 05/04/17 | s | SURFACE WATER DEPT | H 8.8ft | |
| | | H BLO | W COUN | | | | | R FOOT | | | P. 🔻 | | | SOIL AND ROCK DES | SCRIPTION | | CO | RE SIZ | E NG | 02 | | | тот | 'AL RI | JN 29.8 | | | | | | | | |
| (ft) | (ft) (ft) | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 7 | 75 10 | 0 NO | . /n | AOI G | ELE | | | DEPTH (ft) | ELE | | | PTH F | | DRILL RATE | REC. (ft) % | RUN | SAMP | . ST REC | RATA L . RQD O . (ft) G | | | DES | SCRIPTION AND REMARKS | | |
| | | | | | | | | | | | | | | | | | (ft) | (ft) | | π) | (ft) | (Min/ft) | (ft) % | (ft) % | NO. | | | | | | | | DEPTH |
| 135 | | | | | | | | | | | | Z . | _ . | WATER SURFACE | (05/03/17) | | 117.8 | | <u>8 - 8</u> | .1 | 1.4 7 | 7:02/1.0 |) (1 1) | (0.4) | 1 | (28 4 |) (19 2) | 117. | 8 GRAY TO GR | E REEN VI | Begin Coring @ 8.1 ft ERY SLIGHTLY TO MODER/ | TI FY SEVEREI | Y |
| | Ŧ | | | | | | | | | | | | E | | | | 115 | | 4 9 | | 4 - 4 | 4:44/0.4 | 1 79% | 29% | | 95% | 64% | Ł | WEATHERED, M | MODER | ATLEY HARD TO HARD, VE ACTURE SPACING, GNEISS | RY CLOSE TO V | VIDE |
| 130 | Ŧ | | | | | | | | | | | | E | | | | | | ŧ | | | 2:45/1.0 7:19/1.0 7:18/1.0 7:52/1.0 | 91% | 33% | , | | | | | | GSI = 78-88 | | |
| | ł | | | | | | | | | | | | F | | | | 140 | | <u>9 14</u> | | | 8:18/0.5 | | (3.2) |) | | | | | | | | |
| 1 | 25.9 0.0 | | | | | | | | | | | | _ 125 | | | 0.0 | 110 | | + | | 1.5 | 0.40/ I.U | , , | 64% | | | | | | | | | |
| 125 | + | 10 | 2 | 3 | - 6 5 | | | | | | S | at. | | ALLUVIAL BROWN SAM | | 106. | <u>9 19</u> | | | 5:02/1.0 7:22/1.0 | | | _ | | | | | | | | | | |
| 1; | 22.6 <mark>- 3.3</mark> | 10 | 12 | 10 | | | · · · | | | | | 0.0 | - - 121 | 3 | 4.6 | 105 | _ | ‡ | | 4 | 5:32/1.0 4:21/1.0 |) 98% | 35% | | | | | | | | | | |
| 120 | ‡ | | | | | | • | · · · · | <u> </u> | | | | E 119 | ESIDUAL | | | 102 | 1 + 23 | 3.8 | 0.00 | 9:50/1.0 9:51/1.0 23:57/0.8 | | | | | | | | | | | | |
| _1 | 17.9 - 8.0 | 60/0.1 | | | | | | · · · · · | 60/0 | | | | 117 | .8 CRYSTALLINE I | <u></u> | 100 | | + | | 5.1 1 | 2 <u>3:57/0.8</u> 1:56/1.0 9:20/1.0 | 0 (5.1) 100% | (4.4) | 2 | |) (19.2) 64% | | | | | | | |
| 115 | ŧ | 60/0.1 | | | · · · · · | | | · · · · · | | 1 | | | 1 | GRAY TO GREEN, MODER | ERE | 100 | | Ŧ | | 1 | 1:17/1.0 6:34/1.0 | 0 | | ' | | | | | | | | | |
| 110 | Ŧ | | | | | | | | | 1 | | | } | TO VERY SLIGHTLY W MODERATLEY HARD TO | Y | | 97.0 | <u> 28</u> | | 1 | 5:04/1.1 0:46/1.0 | 1 | (4.2) | <u>,</u> | | | | | | | | | |
| | Ŧ | | | | · · · · | | . . | · · · · · | | | | | 4 | CLOSE TO WIDE FRACT GNEISS | | | 95 | _ | Ŧ | | I F | 6:48/1.0 7:10/1.0 |) 100% | 6 100% | RS-2 | _ | | | | | | | |
| 110 | Ŧ | | | | · · · · | | | · · · · · | | | | | <u>_</u> | REC. = 95% RQD = 64% | 8 | | 92.8 | <u>3 33</u> | | 48 5 | 7:36/1.0 5:23/0.2 | (43) | (3.8) | | | | Ŧ | | | | | | |
| | Ŧ | | | | · · · · · | | . . | · · · · · | | | | | | | | | 90 | | Ŧ | | 1 | 2.51/1.0 7·49/1 0 | 90% | 79% | | | | E | | | | | |
| 105 | Ī | | | | | | | | | | | | £ | | | | | 88.0 | <u>) 37</u> | 7.9 | 1 | 9:31/1.0 2.58/1.0 4:37/0.8 | | | | | | 88.0 | I | | | | |
| | Ŧ | | | | | | | | | | | | £ | | | | | | ŧ | | | | | | | | | L | Boring Terminat | ted at Ele | evation 88.0 ft IN CRYSTALL | NE ROCK (GNE | ISS) |
| | ÷ | | | | | | . . | | | | | | | | | | | | + | | | | | | | | | F | | | | | |
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| | | SORE LOG | | | | | | | ORE LUG | | |
|---|----------------------------|---------------------------------------|--|--------------------|----------------------|---|--|--|------------------------------|--|-----------------------|
| WBS 34552.1.FR3 | | TY JOHNSTON | GEOLOGIST Lindsay Pugh | | WBS 34552.1 | | TIP R-3825B | | FY JOHNSTON | GEOLOGIST Lindsay Pugh | |
| SITE DESCRIPTION BRIDGE NO | 1 | | - | ROUND WTR (ft) | | | O. 75 ON -L- (NC 42) O | ER THE | 1 | | GROUND WTR (ft) |
| BORING NO. B2-A | STATION 64+87 | OFFSET 45 ft LT | | HR. N/A | BORING NO. | | STATION 64+87 | | OFFSET 45 ft LT | ALIGNMENT -L- | 0 HR. N/A |
| COLLAR ELEV. 125.7 ft | TOTAL DEPTH 37.8 ft | NORTHING 691,051 | EASTING 2,176,636 24 H | HR. N/A | COLLAR ELEV | | TOTAL DEPTH 37.8 | ft | NORTHING 691,051 | EASTING 2,176,636 | 24 HR. N/A |
| DRILL RIG/HAMMER EFF./DATE MIDO | 0314 D-25 86% 08/04/2016 | DRILL METHOD N | Q2 Casing W/SPT&Core HAMMER T | TYPE Automatic | DRILL RIG/HAMM | ER EFF./DATE MI | 00314 D-25 86% 08/04/2016 | | | D NQ2 Casing W/SPT&Core HAM | MER TYPE Automatic |
| DRILLER Contract Driller | START DATE 05/02/17 | COMP. DATE 05/03/17 | SURFACE WATER DEPTH 7.8ft | | DRILLER Cor | | START DATE 05/02 | /17 | COMP. DATE 05/03/17 | SURFACE WATER DEPTH 7 | 7.8ft |
| ELEV DRIVE DEPTH BLOW COUN | | | SOIL AND ROCK DESCRIPT | TION | CORE SIZE N | | TOTAL RUN 28.5 ft | 070474 | | | |
| (ft) (ft) (ft) 0.5ft 0.5ft 0 | 0 25 50 | 75 100 NO. G | ELEV. (ft) WATER SURFACE (05/02/ | 2/17) DEPTH (ft) | (ff) ELEV | EPTH RUN DRILI (ft) (ft) (Min/f | REC. RQD SAMP. (ft) (ft) NO. | STRATA REC. RQD (ft) (ft) % % | | DESCRIPTION AND REMARKS | |
| | | | | | (it) (ft) | (IL) (IL) (Min/f | (ft) (ft) NO. | % % | G ELEV. (ft) | | DEPTH (ft |
| 130 | | | - | | 116.4 115 116.4 - | 9.3 12 4.54/1 | 0 (12) (07) | 14 1) (8 5) | GRAY VERY | Begin Coring @ 9.3 ft SLIGHTLY TO SLIGHTLY WEATHERED, | MODERATELY 9 |
| | | | | | 115 115.2 | 9.3 1.2 4:54/1 0.5 4.6 5:02/0 5:36/1 5:33/1 9:16/1 9:16/1 | $\frac{2}{0}$ $\frac{100\%}{58\%}$ | 92% 56% | 116.4 GRAY, VERY HARD, VE | RY CLOSE TO CLOSE FRACTURE SPACI GSI = 65 - 75 | NG, SCHIST |
| 125 125.7 0.0 2 98/0.5 | | Sat. \$777 | - 125: <u>7</u> RIVER BED - ALLUVIAL | 8.9 | | 5:33/1 9:16/1 | 0 91% 54% | | | | |
| | | | BROWN SAND | | 110 110.6 - | | $\begin{array}{c} 0 \\ 6 \\ 0 \end{array}$ (4.3) (2.2) | | | | |
| 121.8 3.9 | | | WEATHERED ROCK SCHIST | | | 5.1 6:49/1 6:04/1 4:49/1 | 0 84% 43% | | | | |
| | | 100/0.9 | _ | | 105 105.5 - 1 | 4:55/1 3:38/1 | 0 | | | | |
| | | | . 117.7 CRYSTALLINE ROCK | 8.0 | | 4.4 5:31/1 7:38/1 | 0 100% 70% | | | | |
| <u>116.5 + 9.2</u> 115 <u>60/0.1</u> | | | - <u>116.4</u> CRYSTALLINE ROCK - SCHIST - GRAY, VERY SLIGHTLY TO SL | <u> </u> | | 8:44/1 | 0 | | 101.1 | | 24.6 |
| | | | WEATHERED, MODERATELY | Y HARD, | 100 | | 4 (4.6) (4.6) 0 96% 96% RS-3 | 12.1) (11.5) 92% 87% |) GRAY, VERY | SLIGHTLY TO SLIGHTLY WEATHERED, | MODERATELY |
| | | | VERY CLOSE TO CLOSE FRA SPACING, SCHIST | | ‡ | 12:05/1 12:57/1 5:58/0 | 0 (4.6) (4.6) RS-3 .0 96% 96% RS-3 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 .0 | | | D, MODERATELY CLOSE TO WIDE FRAC GNEISS GSI = 79 TO 90 | |
| | | | REC. = 92% RQD = 56% GSI | l = 65-75 | 96.3 + 2 | <u>9.4</u> 14:11/1 4.8 16:43/0 | .0 .7 (3.9) (3.3) | | | 661 - 79 10 90 | |
| | | | | | | 5:01/1 | 0 81% 69% | | | | |
| 105 | | | — | | 91.5 - | 4.2 4.2 4.2 4.2 4.2 4.2 4.2 4.2 4.2 5:01/1 10:29/1 8:22/1 9:18/1 10:32/0 | Ŏ <u>8</u> | | | | |
| | | | | | 90 | 3.0 6:15/1 | 0 (3.6) (3.6) | | | | |
| | | | 101.1 | 24.6 | 87.9 | 7.8 11:45/1 14:37/0 | .0 . <u>6</u> | | 87.9 Boring Termin | ated at Elevation 87.9 ft IN CRYSTALLINE F | 37.8 ROCK (GNEISS) |
| | | RS-3 | GRAY, VERY SLIGHTLY TO SL WEATHERED, MODERATELY H | HARD TO | | | | | | | |
| | | | HARD, MODERATELY CLOSE T FRACTURE SPACING, GN | IEISS | | | | | | | |
| 95 7 | | | REC. = 92% RQD = 87% GSI | I = 79-90 | I I Ŧ | | | | | | |
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| 90 | | · · · · · · · · · · · · · · · · · · · | - | | I I I | | | | - | | |
| | | | Boring Terminated at Elevation 8 | 37.8 87.9 ft IN | IIII | | | | | | |
| | | | . CŘYSTALLINE ROCK (GNE | EISS) | | | | | | | |
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GEOTECHNICAL BORING REPORT CORE LOG

| | E | BORE LOG | | | 1 1 | CORE LOG | 1 | |
|--------------------------------|--------------------------------|---------------------------------------|--|---|--|--|--|---------------------|
| WBS 34552.1.FR3 | TIP R-3825B COUN | TY JOHNSTON | GEOLOGIST Lindsay Pugh | WBS 34552.1.FR3 | TIP R-3825B COU | JNTY JOHNSTON | GEOLOGIST Lindsay Pugh | |
| SITE DESCRIPTION BRIDGE N | NO. 75 ON -L- (NC 42) OVER THE | NEUSE RIVER | GROUND WTR (ft) | SITE DESCRIPTION BRIDGE NO | 0. 75 ON -L- (NC 42) OVER TH | E NEUSE RIVER | | GROUND WTR (ft) |
| BORING NO. B2-C | STATION 64+84 | OFFSET 2 ft RT | ALIGNMENT -L- 0 HR. N/A | BORING NO. B2-C | STATION 64+84 | OFFSET 2 ft RT | ALIGNMENT -L- | 0 HR. N/A |
| COLLAR ELEV. 126.6 ft | TOTAL DEPTH 34.0 ft | NORTHING 691,004 | EASTING 2,176,637 24 HR. N/A | COLLAR ELEV. 126.6 ft | TOTAL DEPTH 34.0 ft | NORTHING 691,004 | EASTING 2,176,637 | 24 HR. N/A |
| DRILL RIG/HAMMER EFF./DATE MIL | D0314 D-25 86% 08/04/2016 | DRILL METHOD N | Q2 Casing W/SPT&Core HAMMER TYPE Automatic | DRILL RIG/HAMMER EFF./DATE MID0 |)314 D-25 86% 08/04/2016 | DRILL METHOD | NQ2 Casing W/SPT&Core HAN | IMER TYPE Automatic |
| DRILLER B. Fowler | START DATE 04/18/17 | COMP. DATE 04/19/17 | SURFACE WATER DEPTH 2.5ft | DRILLER B. Fowler | START DATE 04/18/17 | COMP. DATE 04/19/17 | SURFACE WATER DEPTH | 2.5ft |
| | | | 1 | CORE SIZE NQ2 | TOTAL RUN 28.7 ft | | | |
| (ft) ELEV (ft) 0.5ft 0.5ft | | 75 100 NO. MOI G | SOIL AND ROCK DESCRIPTION ELEV. (ft) DEPTH (ft) | ELEV RUN DEPTH RUN DRILL | RUN STRAT | | | |
| | | | | (ft) (ft) (ft) (ft) (ft) (ft) (Min/ft) | RUN REC. ROD (ft) (ft) NO. (ft) % (ft) % | A L QDD O (ft) G ELEV. (ft) | DESCRIPTION AND REMARKS | DEPTH (ft) |
| 130 | | | | 121.3 | | | Begin Coring @ 5.3 ft | |
| | | | WATER SURFACE (04/18/17) | 120 121.3 + 5.3 5.0 4:44/1.0 | (4.2) (4.0) (24.2) (1 84% 80% 91% 6 | 6.5) 121.3 GREEN TO C | GRAY TO BLACK VERY SLIGHTLY TO ODERATELY HARD, MODERATELY O | O SLIGHTLY 5.3 |
| | | | - 126.6 RIVER BED 0.0 | 1 4:35/1.0 | | 22/0 VEATHERED, W | LOSE FRACTURE SPACING, SCHIST | r |
| 125 3 8 | 38 | <u>· · · · ·</u> Sat. | - 125.2 ALLUVIAL 1.4 | 116.3 10.3 4:02/1.0 3:54/1.0 | | | GSI = 75-85 | |
| | | | 123.1 WEATHERED ROCK 3.5 | 115 5.0 8:03/1.0 7:21/1.0 7:21/1.0 | (5.0) (4.4) 100% 88% | | | |
| 121.5 + 5.1 | | · · · · · · · · · · · · · · · · · · · | | 5:34/1.0 6:56/1.0 | | | | |
| | | | | | (3.5) (1.1) 100% 31% | | | |
| | | | - SLIGHTLY TO SLIGHTLY WEATHERED, - MODERATELY HARD, VERY CLOSE TO | 1 1070 T 100 1 7:52/1.0 | 100% 31% | | | |
| 115 | | | - MODERATELY CLOSE FRACTURE | 107.0 + 10.0 | (3.8) (3.3) 100% 87% | | | |
| | | | | 105 104.0 22.6 3.8 5.31/1.0 6.20/1.0 6.23/1.0 6.23/1.0 6.23/1.0 6.23/1.0 | | | | |
| | | | - | | (3.6) (1.9) 73% 39% | | | |
| | | | - | 100 00 4 07 5 07 5 07 5 07 5 07 5 07 5 07 | | | | |
| | | | - | 99.1 27.5 3:38/0.9 | (4.1) (2.8) | 6.5) 2% 4121.3 GREEN TO C WEATHERED, M C 000 94.6 94.6 0.0) 92.6 GREEN TO BLA HARD, VERY | | |
| 105 | | | - | 3:48/1.0 | 91% 62% | | | |
| | | | - | 95 94.6 32.0 4:13/1.0 3:24/1.0 4:13/1.0 | | 94.6 | | 32.0 |
| | | | | 92.6 - 34.0 2.0 3:12/1.0 | (1.0) (0.0) 50% 0% (1.0) (1.0) (0 50% 0% (1.0) (1.0) (0 50% (1.0) (1.0) (0 50% (1.0) (1. | 0.0) GREEN TO BLA 0% 92.6 HARD VERY | CK VERY SLIGHTLY WEATHERED, CLOSE TO CLOSE FRACTURE SPAC | MODERATELY |
| 100 - | | | - | | | | GSI = 50-55 | / |
| | | | | | | Boring Terminated | I at Elevation 92.6 ft IN CRYSTALLINE | RUCK (GNEISS) |
| | | | | | | | | |
| 95 | | | - 94.6 32.0 - GREEN TO BLACK VERY SLIGHTLY | | | | | |
| | | | - 92.6 WEATHERED, MODERATELY HARD, 34.0 | | | | | |
| | | | - VERY CLOSE TO CLOSE FRACTURE - SPACING, GNEISS | | | | | |
| | | | REC. = 50% RQD = 0% GSI = 50-55 Boring Terminated at Elevation 92.6 ft IN | | | | | |
| | | | Boring Terminated at Elevation 92.6 ft IN CRYSTALLINE ROCK (GNEISS) | | | | | |
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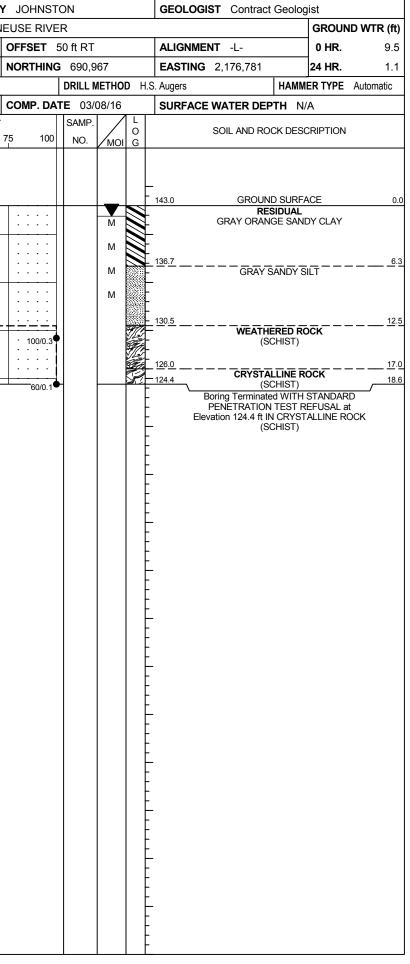
GEOTECHNICAL BORING REPORT CORE LOG

GEOTECHNICAL BORING REPORT CORE LOG

| | | | | | <u> </u> | ORE | LOG | | | _ | | | | | | | | | | | | | | | | KE L | | | | | | |
|--------------|-------------------------------|-------------|---------------|------------------|----------|------------------------|----------------------------|---------|------------|--------------|------------|-------------------------|------------------|------------|-------|---------------|----------------|---------|--|---|--------------|---------------|-----------|--------------------------|-------------|--------------|-----------|----------|----------------|-------------------------------------|----------------|----------------|
| WBS 3 | 34552.1.FR3 | T | IP R-3825E | 3 | COUNT | Y JOHN | GEOLOGIST Lindsay Pugh | | | | | | | | WBS | 3 3455 | 52.1.FR | 3 | | TIP | R-382 | 25B | C | OUNT | Y J(| OHNSTO | N | | GEOLOC | GIST Lindsay P | | |
| SITE DE | ESCRIPTION BRID | GE NO. 75 | 5 ON -L- (NC | C 42) OVE | | NEUSE R | | | | | | | GROUND | WTR (ft) | SITE | DESC | RIPTIO | N BRI | DGE NO | 0. 75 0 |)N -L- (| NC 42) | OVER | THE N | NEUS | E RIVE | ۲ | | | | GR | OUND WTR (f |
| BORING | g NO. B2-B | S | TATION 64 | 4+75 | | OFFSE | 7 28 ft R | Т | | ALIGN | IMENT -L- | | 0 HR. | N/A | BOR | ING NO |). B2-E | 3 | | STA | TION | 64+75 | | | OFF | SET 2 | 8 ft RT | | ALIGNM | ENT -L- | 0 H | IR. N/. |
| COLLAF | R ELEV. 124.1 ft | Т | OTAL DEPT | H 36.1 ft | t | NORTH | I NG 690 | ,977 | | EASTI | NG 2,176, | ,630 | 24 HR. | N/A | COL | LAR EI | _EV. 1 | 24.1 ft | | тот | AL DE | PTH 3 | 6.1 ft | | NO | RTHING | 690,977 | 7 | EASTING | G 2,176,630 | 24 H | IR. N/ |
| DRILL RI | IG/HAMMER EFF./DATE | E MID0314 | D-25 86% 08/0 | 04/2016 | | | DRILL | METH | OD N | Q2 Casing | W/SPT&Core | HAM | MER TYPE A | utomatic | DRILI | L RIG/H | AMMER I | FF./DA | re mid | 0314 D-2 | 25 86% 0 |)8/04/201 | 6 | | | | DRILL MET | THOD N | IQ2 Casing W/ | SPT&Core | HAMMER T | PE Automatic |
| DRILLE | R B. Fowler | S | TART DATE | 04/19/1 | 7 | COMP. | DATE 04 | 1/20/17 | 7 | SURF | ACE WATE | R DEPTH 5 | 5.4ft | | DRIL | LER | B. Fowle | er | | STA | RT DA | TE 04/ | /19/17 | | COI | MP. DAT | E 04/20/ | /17 | SURFAC | E WATER DEPT | H 5.4ft | |
| ELEV DF | | V COUNT | | BLOWS F | PER FOOT | Г | SAMF | P. ▼∕ | | | SOIL AN | ND ROCK DES | SCRIPTION | | COR | | NQ2 | | | | | N 28.4 | | | | | | | | | | |
| (ft) (| (ft) (ft) 0.5ft (| 0.5ft 0.5ft | 0 2 | 5 5 | 50 | 75 1 | 00 NO. | мс | | ELEV. (ft) | | | | DEPTH (ft) | | RUN ELEV | DEPTH | | DRILL RATE | REC. | RQD (ft) | SAMP. | · REC. | RATA RQD (ft) % | L | | | | DESCRIPTIC | N AND REMARKS | | |
| | | | | | | | | | | | | | | | (ft) | (ft) | (ft) | (ft) | (Min/ft) |) (ft) | (ft) % | NO. | (ft) % | (ft) % | Ö G | ELEV. (ft |) | | | | | DEPTH |
| 130 | | | | | | | | | <u>'</u> _ | <u> </u> | WATE | ER SURFACE (| (04/19/17) | | 116.4 | | + 7.7 | 4.6 | 11:05/1. | 0 (2.5) | (12) | | (21.3) | (15.5) | | 116.4 | GREEN | | | oring @ 7.7 ft VERY SLIGHTLY | | ATELY |
| | ‡ | | | | | | | | | - | | | | | 115 | | + | 7.0 | 8:31/1.0 17:57/1. | 54% | 26% | | 75% | | | 116.4 | WEAT | THERED, | MODERATEL | LY HARD, VERY C WITH A 1.4' SANE | LOSE TO CL | OSE |
| 125 | ‡ | | | | | | | | | - | | | | | | 111.8 | 12.3 | | 19:31/0. 2:55/0.8 \6:42/0.6 | 2 | | | | | R | - | TRACTO | | 10.9' AND A | QUARTZ VEIN AT SI = 65-75 | | |
| 125 | 24.1 0.0 49 5 | 1/0 2 | | | | | · 🖌 🗕 🚽 | _ | | 124.1 | 10 | RIVER BED | | 0.0 | 110 | _ | ‡ | 4.9 | <u>6:42/0.6</u> 4:19/1.0 | $\frac{6}{2}$ (4.5) $\frac{92\%}{2}$ | (3.3) 67% | | | | R | | | | G | 51 = 05-75 | | |
| 11 | | | | <u></u> . | <u> </u> | · · 100/ | 0.7 | | | <u>121.6</u> | | SCHIST | | 2.5 | | | ± | | 4:19/1.0 5:25/1.0 5:39/1.0 5:40/1.0 6:09/1.0 6:25/1.0 | | | | | | R | - | | | | | | |
| 120 | - 38 | 25 12 | | • • • • • • | · · · | | · | w | | - | GREEN | SAPROLITI GRAY MICAC | E EOUS SILT | | 105 | 106.9 | 17.2 | 5.1 | 6:09/1.0 |)) (4.7) | (3.5) | | | | R | | | | | | | |
| | ‡ | | | : : <u> · ·</u> | + | · · · · · | | | | 118.0 | | | | 6.1 | 105 | _ | ‡ | | 5:53/1.0 5:39/1.0 |) 92%) | 69% | | | | R | - | | | | | | |
| 115 | <u>16.5 + 7.6</u> + 60/0.1 | | | · · · · · | · · · · | · · · 60/ | L | | | - 116.4 - | GREEN T | TO GRAY TO E | BLACK VERY | 7.7 | | 101.8 | 22.3 | | 7:29/1.0 5:37/1.1 | 1 | | | | | R | - | | | | | | |
| | † | | | | | | | | | | WEATHER | RED, MODERA | ATELY HARD, | | 100 | 4 | ‡ | | 4:37/1.0 5:08/1.0 |) 92% | (3.8) 78% | | | | | | | | | | | |
| | ‡ | | | | | · · · · · · · · | . | | | - | SPACING, | GNEISS WITH | H A 1.4' SAND | | | 06.0 | + 27.2 | | 5:04/1.0 5:23/1.0 | 0 | | | | | B | - | | | | | | |
| 110 | | | | | | · · · · · | | | | - | QU | | T 31.9' | | 95 | 30.3 | + 27.2 | 5.0 | 6:26/0.9 |) (2.7) | (2.3) | | | | | | | | | | | |
| | Ŧ | | | | | · · · · · · · · · · | · | | | - | REC. = 75 | % RQD = 55% | ତ ତଥା = ୧୨୦-12 | | 35 | 1 | ‡ | | 5:35/1.0 | 0 | 46% | | | | R | - | | | | | | |
| 105 | Ŧ | | | | | | | | | - | | | | | | 91.9 | 32.2 | 3.9 | 4:01/1.0 | | (1.4) | | | | R. | - | | | | | | |
| | Ŧ | | | | | | | | | - | | | | | 90 | _ | ‡ | 3.9 | 4:40/1.0 |) 62% | (1.4) 36% | | | | P. | | | | | | | |
| | Ŧ | | | | | · · · · · | · | | | - | | | | | | 88.0 | 36.1 | | 11:05/0. 2:23/0.5 5:35/0.9 | 5 | | RS-4 | | | | 88.0 | Boring Te | rminated | at Elevation 8 | 8.0 ft IN CRYSTALI | INE BOCK | |
| 100 | | | | · · · · | · · · · | · · · · · | | | | - | | | | | | | ŧ | | | | | | | | | - | Doning re | | | | | UNEI00) |
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| | | | | | | | | | بجمت | 88.0 | | | ation 88.0 ft IN | 36.1 | | | Ŧ | | | | | | | | | - | | | | | | |
| | ± | | | | | | | | | - | CRYST | ALLINE ROCK | (GNEISS) | | | | Ŧ | | | | | | | | | - | | | | | | |
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|-------|---------------|---------------|----------|--------|--------|--|----------------|------------------------|-------------|----------------|--------|------|--------------|--|---------------------------|---------|---------------|---------------|-----------|-------|----------|---------------------------------------|--|
| | 34552 | | | | | P R-3825 | | | TY JOHNS | | | | GEOL | OGIST Lindsay Pugh | 1 | _ | 3 4552 | | | | | P R-3825B | COUNTY |
| | | | | IDGE | | - | | ER THE | NEUSE RIV | | | | | | GROUND WTR (ft | | | | | DGE N | | ON -L- (NC 42) OV | ER THE NE |
| BOR | ING NO | . EB2- | A | | S | TATION 6 | 6+13 | | OFFSET | 33 ft LT | - | | ALIGN | MENT -L- | OHR. FIAD | BOF | RING NO. | EB2 | -В | | ST | ATION 66+24 | |
| COL | LAR ELI | EV. 15 | 58.7 ft | | Т | OTAL DEP | TH 31.6 | ft | NORTHI | NG 691, | 049 | | EASTI | NG 2,176,762 | 24 HR. N/A | COL | LAR ELE | EV. 14 | 43.0 ft | | ТС | DTAL DEPTH 18.6 | ft I |
| DRILL | RIG/HA | MMER E | FF./DA | TE M | ID5464 | CME-45C 84 | % 08/09/20 | 16 | | DRILL | METHO | DD M | ud Rotary | НАММ | IER TYPE Automatic | DRIL | L RIG/HAI | MMER E | FF./DA | TE BF | RI2974 C | CME-45C 79% 06/03/201 | 15 |
| DRIL | LER M | 1. COO | GAN | | S | TART DAT | E 04/22 | ′17 | COMP. D | ATE 04 | /22/17 | 7 | SURF | CE WATER DEPTH N | /A | DRI | LER C | ontract | t Driller | - | ST | ART DATE 03/08/ | /16 |
| ELEV | DRIVE ELEV | DEPTH | BLC | ow co | UNT | | BLOWS | PER FOC | т | SAMP | . 🔨 | | | SOIL AND ROCK DES | CRIPTION | ELEV | DRIVE | DEPTH | · | W COL | | BLOWS | S PER FOOT |
| (ft) | (ft) | (ft) | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 I | 75 10 | 0 NO. | Имо | ы G | ELEV. (ft) | | DEPTH (| t) (ft) | (ft) | (ft) | 0.5ft | 0.5ft | 0.5ft | 0 25 | 50 7 |
| | | | | | | | | | | | | | | | | | | | | | | | |
| 160 | | L | | | | | | | | | | | _ | | | 145 | | L | | | | | |
| i. | 157.7 · | | | | | | 1 | | | | | | 158.7 | GROUND SURF/ PAVEMENT | | | - | | | | | | |
| | | T 1.0 | 3 | 3 | 3 | ↓ • • • • • • • • • • • • • • • • • • • | | . | | | м | | | ROADWAY EMBAN | KMENT | 11 | 142.0 | 1.0 | 1 | 1 | 2 | | |
| 155 | 154.5 - | 4.2 | | | | | | | | | | | - | GRAY AND ORANGE SA | ANDY CLAY | 140 | 139.5 - | 3.5 | | | | | |
| l | - | ŧ | 2 | 2 | 2 | • 4 | | · · · · · · · · | · · · · · · | | м | | | | | | 137.0 | 6.0 | 3 | 5 | 5 | • • 10 · · · · · | • • • • • • |
| 150 | 150.6 · | 8.1 | | | | | | · · · · · | · · · · · · | | | | • | | | 135 | - | F | 7 | 12 | 14 | | • • • • • |
| | - | ŧ | 1 | 1 | 2 | • <u>3</u> | | | | | м | | - | | | | 134.5 | 8.5 | 4 | 7 | 25 | · · · · · · · · · · · · · · · · · · · | |
| | | ŧ | | | | :::: | · · · · | · · · · · | · · · · · · | | | | - | | | | - | ł | | | | | · · · · · · |
| 145 | 145.6 | + 13.1 - | 1 | 2 | 1 | | | | | | w | L | _ | | | 130 | - 129.5 - | - 13.5 | | | | · · · · · · · · · · · · · · · · · | <u>. </u> |
| | - | ŧ | | | | $\left \begin{array}{cccc} \P^{3} & \cdot & \cdot \\ 1 & \cdot & \cdot & \cdot \end{array} \right $ | | | | | | | | | | | - | - 10.0 | 100/0.3 | | | | |
| 1 | 140.6 · | | | | | :::: | | | | | | | 142.1 | RESIDUAL | <u>16</u> | | - | Ł | | | | | |
| 140 | - 140.0 | | 1 | 2 | 3 | 1• 5 | + | | | | w | | _ | GRAY AND ORANGE SA | ANDY CLAY | 125 | 124.5 | 18.5 | 60/0.1 | | | | · · · · · · |
| 1 | | Ŧ | | | | | | | | | | | . 136.7 | | 22 | | - | F | 00/0.1 | | | | |
| 135 | 135.6 · | 23.1 | <u> </u> | | | •••• | †j:: | | | | | | . 130.7 | GRAY MICACEOU | S SILT | | - | F | | | | | |
| | - | ŧ | 5 | 9 | 22 | | 9 31 | | | | M | | - | | | | | ŧ | | | | | |
| | | ŧ | | | | | 1÷÷ | · - · · · · | ÷ – ÷ ÷ ÷ ÷ | - 1 | | 977 | 132.3 | WEATHERED RO | <u>оск</u> 26 | 4 | - | ÷ | | | | | |
| 130 | 130.6 | <u>+ 28.1</u> | 36 | 64/0.3 | 1 | | | | | 11 | | | _ | SCHIST | | | | F. | | | | | |
| | | 1 | | | | | | | | | | | <u>128.5</u> | | | | - | ł | | | | | |
| 1 | 127.2 | 31.5 | 60/0.1 | | | | | | | 1 | | | 127.1 | SCHIST | / | 6 | - | L | | | | | |
| 1 | - | Ł | | | | | | | | | | | _ | Boring Terminated WITH PENETRATION TEST R | REFUSAL at | | - | | | | | | |
| l | | Ŧ | | | | | | | | | | | - | Elevation 127.1 ft IN CRYST (SCHIST) | ALLINE ROCK | | - | F | | | | | |
| | | Ŧ | | | | | | | | | | F | - | (| | | - | F | | | | | |
| i | - | Ŧ | | | | | | | | | | | - | | | | - | F | | | | | |
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| | - | ŧ | | | | | | | | | | | - | | | | | F | | | | | |
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SHEET 16



| | | R | ROCK TES | ST RES | SULTS | 5 |
|--------|--------|---------|---------------|----------|-------------|-----------------|
| SAMPLE | OFFSET | STATION | DEPTH | ROCK | UNIT WT. | UNIAXIAL COMPRE |
| NO. | OFFSEI | STATION | INTERVAL | TYPE | (lb/ft^3) | STRENGTH, (ps |
| RS-1 | 42' LT | 63 + 65 | 27.3' - 27.9' | PHYLLITE | 165.1 | 1,570 |
| RS-2 | 50' RT | 63 + 64 | 30.5' - 32.5' | GNEISS | 179.3 | 4,630 |
| RS-3 | 45' LT | 64+87 | 25.3' - 27.2' | GNEISS | 174.2 | 7,700 |
| RS-4 | 28' RT | 64+75 | 35.4' - 36.1' | GNEISS | 171.4 | 14,580 |

| PROJECT REFERENCE NO. | SHEET NO. |
|-----------------------|-----------|
| R-3825B | 17 |
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CORE PHOTOGRAPHS B1-A BOXES 1,2 AND 3: 5.0 TO 36.0 FEET 00 1F and and and and and and and 5.0 7.4 12.4 D. 15.8 17.1 17.1 27.3 26.0 D 27.3 FEET

CORE PHOTOGRAPHS

B1-C

BOXES 1,2 ,3 and 4: 4.4 TO 35.7 FEET

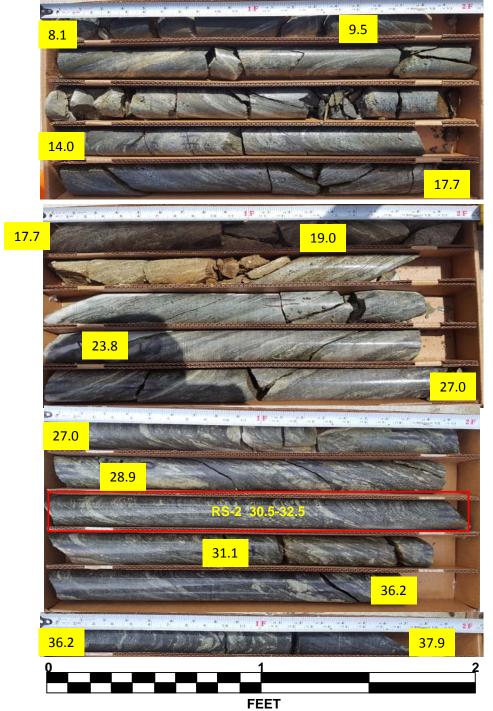


SHEET 18 34552.1.FR3 (R-3825B)

CORE PHOTOGRAPHS

B1-B

BOXES 1,2,3 AND 4: 8.1 TO 37.9 FEET



SHEET 19 34552.1.FR3 (R-3825B)

CORE PHOTOGRAPHS

B2-A BOXES 1,2, and 3: 9.3 TO 37.8 FEET



SHEET 20 34552.1.FR3 (R-3825B) CORE PHOTOGRAPHS

B2-C



FEET

FEET

BOXES 1,2, and 3: 5.3 TO 34.0 FEET

CORE PHOTOGRAPHS

B2-B



SHEET 21 34552.1.FR3 (R-3825B)

SITE PHOTOGRAPH Bridge No. 75 on NC 42 over the Neuse River



Looking west toward End Bent 1

| PROJECT REFERENCE NO. | SHEET NO. | |
|-----------------------|-----------|--|
| R-3825B | 22 | |
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