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CORE PHOTOGRAPHS

### STATE OF NORTH CAROLINA

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

# **STRUCTURE** SUBSURFACE INVESTIGATION

| PROJ. REFERENCE NO. <u>38534.1.1 (B-4762)</u><br>COUNTY <b>HAYWOOD</b> | F.A. PROJ |
|--|-----------|
| PROJECT DESCRIPTION BRIDGE No. 72 ON OVER JONATHON CREEK               | SR-1407   |
| HTE DESCRIPTION  |           |
|  |           |

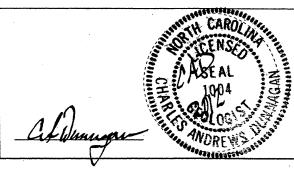
| STATE | STATE PROJECT REPERENCE NO. | SHEET<br>NO. | TOTAL |
|-------|-----------------------------|--------------|-------|
| N.C.  | 38534.1.1 (B-4762)          | 1            | 11    |

#### **CAUTION NOTICE**

CEMERAL SOIL AND ROCK STRATA DESCRIPTIONS AND NDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORNICS OR BETWEEN SAMPLED STRATA WITHIN THE BORROUGE. THE LABORATORY SAMPLE DATA AND THE M STU MPH-PLACE TEST DATA CAN BE RELIED ON ONLY TO THE DECREE OF RELIABLITY INMERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS MOCKATED IN THE SUSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION LIESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSCIERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING "TEMPERATIRES. PREPRIPTATION. AND WIND. AS WELL AS OTHER NON-CLIMATIC CONDITIONS INCLUDING "TEMPERATIRES. PERFEITATION. AND WIND. AS WELL AS OTHER NON-CLIMATIC FACTORS.

| M M HAGER                    |
|------------------------------|
| D O CHEEK                    |
| C J COFFEY                   |
| G K ROSE                     |
|                              |
|                              |
|                              |
|                              |
|                              |
| INVESTIGATED BY C A DUNNAGAN |
| CHECKED BY W D FRYE, Jr      |
| SUBMITTED BY W D FRYE, Jr    |
| DATEAPRIL 2012               |
|                              |

PERSONNEL



NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

DRAWN BY: C A DUNNAGAN

8534.

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

#### NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

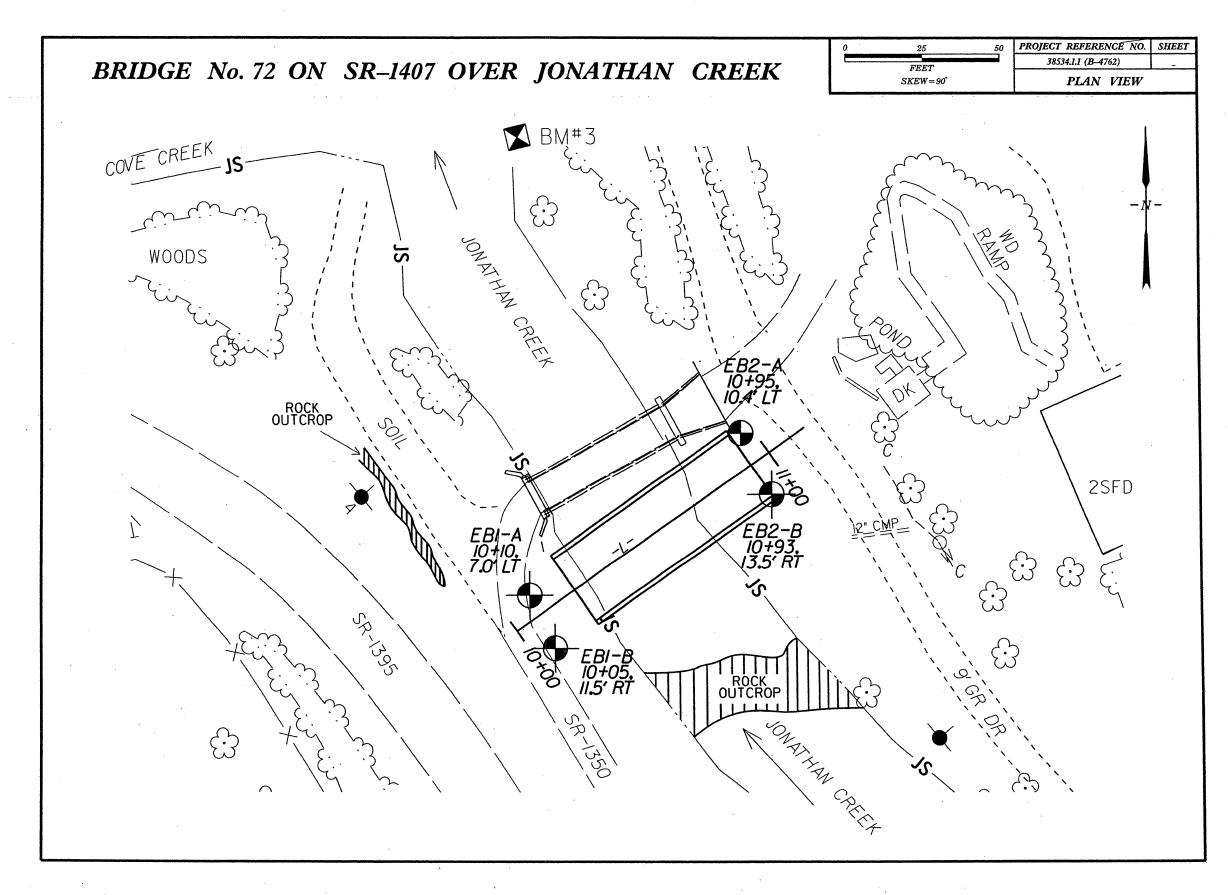
GEOTECHNICAL ENGINEERING UNIT

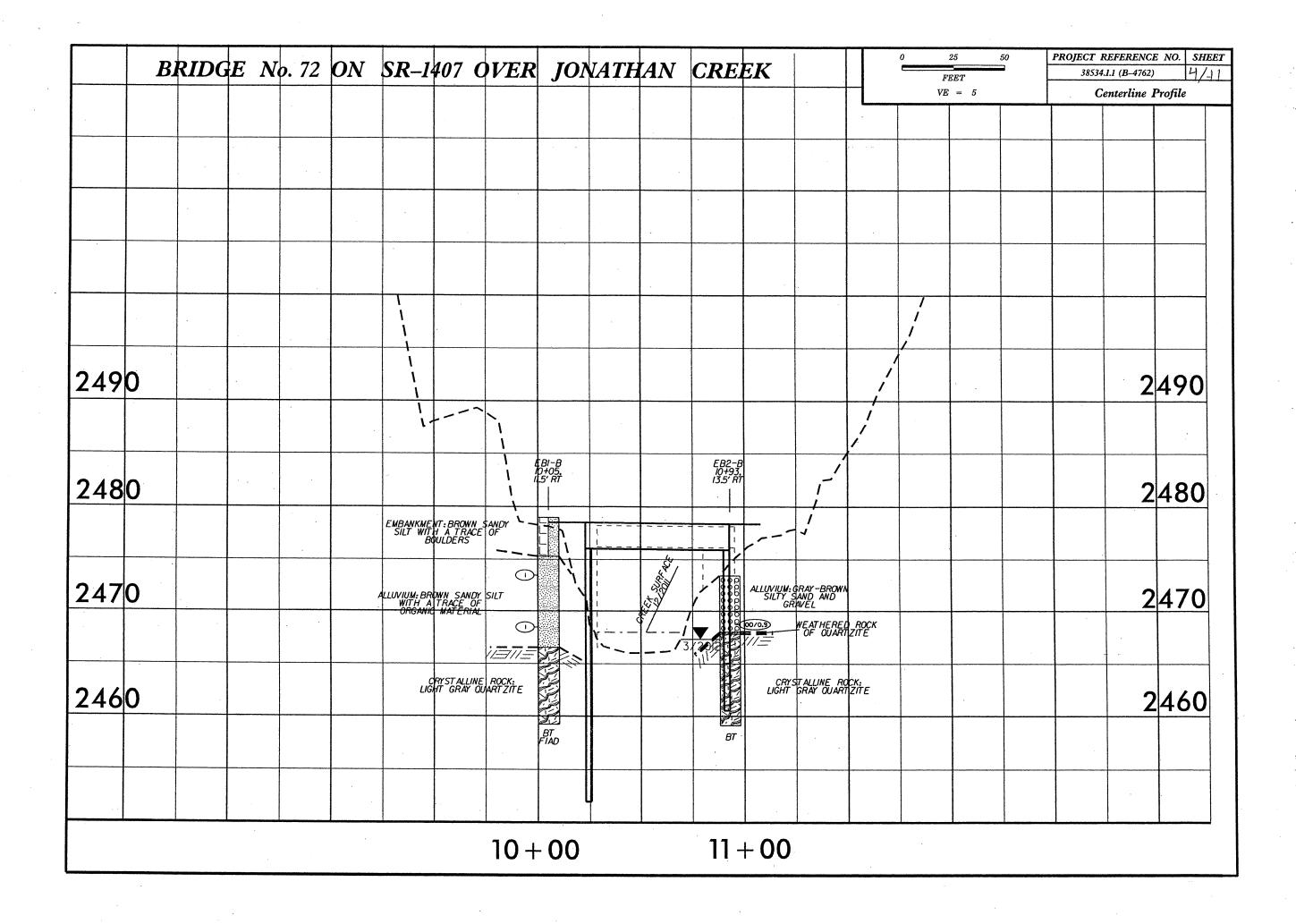
## SUBSURFACE INVESTIGATION

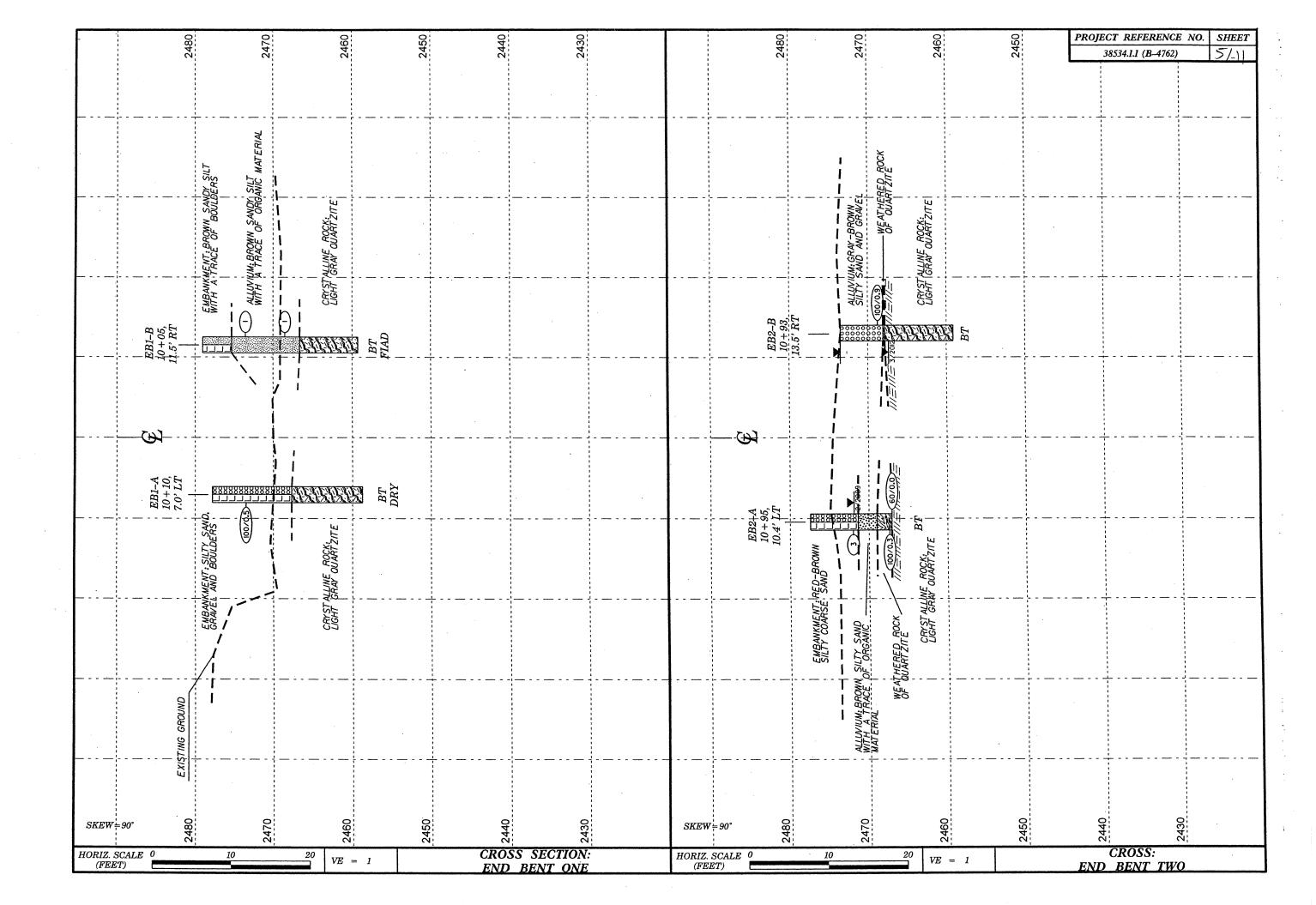
|  | SOIL AND ROCK LEGEND,  | , TERMS, SYMBOLS, AND ABBREVIATIONS   |  |
|--|--|---|--|
| SOIL DESCRIPTION   | GRADATION  | ROCK DESCRIPTION  | TERMS AND DEFINITIONS  |
| SOIL IS-CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN        | WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) | HOUR LINE INDICATES THE LEVEL AT WHICH MUN-CUASTAL PLAIN MATERIAL WOOLD TIELD SPT HEFUSAL.  | ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.   |
| 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO 1206, ASTM 0-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM, BASIC DESCRIPTIONS GENERALLY SHALL INCLINE. | GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.  ANGULARITY OF GRAINS  | IN NOW TO COLD PLAIN MATERIAL. THE TRANSITION RETUCEN SOLL AND ROLY IS DETEN REPRESENTED BY A TONE !  | ADJIFER - A WATER BEARING FORMATION OR STRATA.  ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND,   |
| CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE:        | THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR,  | ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:  | ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS,   |
| VERY STEF, GRAN, SLITY CLAN, MOST WITH INTERSECUED FINE SAND LIVERS, MICHLY PLASTIC, A-7-6   | SUBANGULAR, SUBROUNDED, OR ROUNDED.  | THE   | OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC  ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL                     |
| SOIL LEGEND AND AASHTO CLASSIFICATION  GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS SOUND AND ALVERTINES   | MINERAL OGICAL COMPOSITION  MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS  | CRYSTALLINE FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT  | AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.  |
| CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS   | WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.  | HUCK (CHI   | CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.  |
| GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5 CLASS. A-1-0 A-1-b A-2-4 A-2-5 A-2-6 A-2-7 A-4, A-5 A-6, A-7   | COMPRESSIBILITY  SLIGHTLY COMPRESSIBLE  LIQUID LIMIT LESS THAN 31  | SEDIMENTARY ROCK THAT WOULD YELD SPI REFUSAL IF TESTED, ROCK TYPE   | COLLUYIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE.  |
| SYMBOL COCCOCCOCCOCCOCCOCCOCCOCCOCCOCCOCCOCCOC   | MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50   | COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD   | CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL  |
| Z. PASSING SILT- MICK  | PERCENTAGE OF MATERIAL   | (CP) SHELL BEDS, ETC. WE ATHERING   | LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.  DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT  |
| " 40 38 MX 58 MX 51 MN SOILS CLAY PEAT   | ORGANIC MATERIAL GRANULAR SILT - CLAY SOILS SOILS OTHER MATERIAL   |   | ROCKS OR CUTS MASSIVE ROCK.  DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE   |
| 1 (PUI) 1 (PUI)  | TRACE OF ORGANIC MATTER  | HAMMER IF CRYSTALLINE.  | HORIZONTAL.  |
| PLASTIC INDEX 6 MX NP 18 MX 18 MX 18 MX 18 MX 18 MX 18 MX 11 MN 11 MN SOILS WITH LITTLE OR HIGHLY  | MODERATELY ORGANIC   | VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, (V SLIJ) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF | <u>OIP DIRECTION OIP AZIMUTHI</u> THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.  |
| GROUP INDEX 9 0 0 4 MX 8 MX 12 MX 16 MX No MX MODERATE AMOUNTS OF SOILS  | GROUND WATER   | SLIGHT ROCK GENERALLY FRESH, JUINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO   | FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.   |
| OF MAJOR GRAVEL, AND FINE SILTY OR CLAYEY SILTY CLAYEY ORGANIC MATERIALS SAND GRAVEL AND SAND SOILS SOILS MATTER   | ▼ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER ORILLING ▼ STATIC WATER LEVEL AFTER 24 HOURS  | (SL[.) ) INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME DCCASIONAL FELDSPAR [  | FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.  |
| GEN. RATING  | → PW PERCHED WATER SATURATED ZONE, OR WATER BEARING STRATA   |   | FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOGGED FROM PARENT MATERIAL.   |
| SUBGRADE POOR POOR POOR ONSUITABLE   | OTHE SPRING OR SEEP  | DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.   | FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY  |
| PI OF A-7-5 SUBGROUP IS ≤ LL - 30 :PI OF A-7-6 SUBGROUP IS > LL - 30  CONSISTENCY OR DENSENESS   | MISCELLANEOUS SYMBOLS  |   | THE STREAM.  FORMATION (FM.I - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN   |
| PRIMARY SOIL TYPE COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED   | ROADWAY EMBANKMENT (RE)  ROADWAY EMBANKMENT (RE)  WITH SOIL DESCRIPTION  ST CPT  DOT DWT TEST BORING  DESIGNATI  DESIGNATI   | INOR SEV ) AND CAN BE EXCAVATED WITH A GERLOGIST'S PICK, BOCK GIVES "CLINK" SOUND WHEN STRUCK   | THE FIELD.   |
| CONSISTENCY (N-VALUE) (TONS/FT? )  | WITH SOIL DESCRIPTION DESIGNATI  | TIONS  E SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED   | 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                        |
| GENERALLY VERY LOOSE C4 GRANULAR LOOSE 4 TO 10   | SOIL SYMBOL AUGER BORING SS - SPLIT SPOON  | (SEV.) IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME  | ITS LATERAL EXTENT.  |
| MATERIAL   MEDIUM DENSE 10 TO 30 N/A   | ARTIFICIAL FILL (AF) OTHER SAMPLE THAN ROADWAY EMBANKMENT CORE BORING  | IF TESTED, YIELDS SPT N VALUES > 188 BPF  VERY SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT  | LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.  MOTILED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTILING IN                                 |
| VERY DENSE >50   | ST - SHELBY TUB  ST - SHELBY TUB  SAMPLE  SAMPLE   | (V SEV.) THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH DNLY FRAGMENTS OF STRONG ROCK REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK MEATHERED TO A DEGREE SUCH THAT ONLY MINOR               | SOILS USUALLY INDICATES POOR AERATION AND LACK OF COOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN                              |
| GENERALLY SOFT 2 TO 4 0.25 TO 0.50   | MONITORING WELL RS - ROCK SAMPL  INFERRED ROCK LINE  PIEZOMETER  | PLE VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 188 BPF   | INTERVENING IMPERVIOUS STRATUM.  |
| MATERIAL STIFF 8 TO 15 1 TO 2  | TTT- RECOMPACTE SAMPLE  ALLUVIAL SOIL BOUNDARY  ALLUVIAL SOIL BOUNDARY  ALLUVIAL SOIL BOUNDARY  ALLUVIAL SOIL BOUNDARY   | TED TRIAXIAL COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND  SCATTERED CONCENTRATIONS, DUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS  | RESIDUAL IRES. I SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.  ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF                         |
| HARD >30 >4  | 25/025 DIP & DIP DIRECTION OF SLOPE INDICATOR INSTALLATION CBR - CALIFORNIA  |   | ROCK SEGNENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.   |
| TEXTURE OR GRAIN SIZE  | RATIO SAMP  ROCK STRUCTURES  | VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES   | SAPROLITE (SAPA - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE  |
| U.S. STO. SIEVE SIZE 4 10 40 60 200 270  OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053  | SOUNDING ROD     REF—— SPT REFUSAL   | SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.   | PARENT ROCK.  SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND  |
| BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY  | ABBREVIATIONS  AR - AUGER REFUSAL HI HIGHLY W - MOISTURE CO  | HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.  | RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.   |
| (BLOR.) (COB.) (GR.) (CSE. SD.) (F SO.) (SL.) (CL.)  | BT - BORING TERMINATED MED MEDIUM V - VERY   | MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE  | SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR  |
| GRAIN MM 305 75 2.0 0.25 0.05 0.005<br>SIZE IN. 12 3   | CPT - CONE PENETRATION TEST MOD MODERATELY WEA WEATHERED   | BY MODERATE BLOWS.  | SLIP PLANE.  STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR BPF) OF  |
| SOIL MOISTURE - CORRELATION OF TERMS   | CSE COARSE NP - NON PLASTIC 7 - UNIT WEIGHT  DMT - DILATOMETER TEST ORG ORGANIC 7/6 - DRY UNIT WE  | WEIGHT HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE  | 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 |
| SOIL MOISTURE SCALE FIELD MOISTURE GUIDE FOR FIELD MOISTURE DESCRIPTION  | DPT - DYNAMIC PENETRATION TEST PMT - PRESSUREMETER TEST FIAD-FILLED IMM VOID RATIO SAP SAPROLITIC FIAD-FILLED IMM AFTER DRILL  | MEDIATELY  MEDIATELY  LLING  POINT OF A GEOLOGIST'S PICK.  CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS  | THAN 0.1 FOOT PER 60 BLOWS.  |
| - SATURATED - USUALLY LIQUID; VERY WET, USUALLY  | F - FINE SD SAND, SANDY WOH-WEIGHT OF I  | EDON CUIDE TO SCUEDAL INCLUES IN SIZE BY MODERATE DIQUE OF A DICK POINT SMALL THIN  | STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.   |
| LL LIQUID LIMIT (SAT.) FROM BELOW THE GROUND WATER TABLE   | FRAC FRACTURED, FRACTURES SLI SLIGHTLY FRAGS FRAGMENTS TCR - TRICONE REFUSAL   | VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY               | STRATA ROCK QUALITY DESIGNATION (SROD) - 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          |
| PLASTIC   SEMISOLID: REQUIRES DRYING TO  |  | FINGERNAIL.   | TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.  TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.  |
| PL PLASTIC LIMIT ATTAIN OPTIMUM MOISTURE   | EQUIPMENT USED ON SUBJECT PROJECT  | FRACTURE SPACING BEODING  IERM SPACING IERM THICKNESS   | BENCH MARK: BM=3 8-INCH SPIKE SET IN BASE OF IG-INCH   |
| OM OPTIMUM MOISTURE - MOIST - IMI SOLID: AT OR NEAR OPTIMUM MOISTURE   | DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:   | MANUAL VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED > 4 FEET   | MAPLE TREE, 107.4 FEET LEFT OF -BL- STA 14+13.86   |
| SL T SHRINKAGE LIMIT   | MOBILE 8 CLAY BITS   | MIDERATELY CLOSE 1 TO 3 FEFT THINLY BEDDED 0.16 - 1.5 FEET  | ELEVATION: 2471,74 FT.   |
| - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE   | 6 CONTINUOUS FLIGHT AUGER CORE SIZE:   | CLUSE 0.16 TO 1 FEET THICKLY LANIMATED 0.008 - 0.03 FEET  | NOTES:   |
| PLASTICITY   | O HOLLOW MUDERS  | THINLY LAMINATED C 0.008 FEET  INDURATION   | -  |
| PLASTICITY INDEX (PI) DRY STRENGTH   | TUNG -CARRIDE INSERTS  | FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.   |  |
| NONPLASTIC         0-5         YERY LOW           LOW PLASTICITY         6-15         SLIGHT   | X CME-558 X CASING X W/ ADVANCER HAND TOOLS:   | FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS: GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE.  |  |
| MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH   | PORTABLE HOIST TRICONE STEEL TEETH POST HOLE DIG   | IGGER MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE;  |  |
| COLOR .  | TRICONETUNGCARB. HAND AUGER  | BREAKS EASILY WHEN HIT WITH HAMMER.  INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE:   |  |
| DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY).  | CORE BIT SOUNDING ROD  | DIFFICULT TO BREAK WITH HAMMER.   |  |
| MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.   | L =   L =   THIL STEPA 1   | EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE: SAMPLE BREAKS ACROSS GRAINS.   |  |

REVISED 02/23/0

PROJECT REFERENCE NO. 38534.I.I (B-4762)







| 1   |   | NCDOT GEOTECHNICAL ENGINEERING UNIT<br>BORELOG REPORT |
|-----|---|---|
| 2~) | W | BORELOG REPORT  |

SHEET

| WBS  | 38534         | 1.1.1          |        |        | TI     | IP B-4762    | c              | OUNT   | Y HAYWO  | OOD      |     |          | GEOLOGIST Hager, M. M.                      |                          |             |
|------|---------------|----------------|--------|--------|--------|--------------|----------------|--------|----------|----------|-----|----------|---|--------------------------|-------------|
| SITE | DESCF         | RIPTIO         | N Brid | dge No | . 72 o | n SR-1407    | over Jonatha   | n Cree | k.       |          |     | *****    | *   | GROUN                    | D WTR (f    |
| 30R  | NG NO         | . EB1          | -A     |        | S      | TATION 1     | 0+10           |        | OFFSET   | 7 ft LT  |     |          | ALIGNMENT -L-                               | 0 HR.                    | , N/A       |
| COLI | AR EL         | <b>EV</b> . 2, | 477.7  | ft     | TO     | OTAL DEP     | TH 19.0 ft     |        | NORTHIN  | G 699,9  | 902 |          | EASTING 808,033                             | 24 HR.                   | Dry         |
| RILL | RIG/HAI       | MMER E         | FF./DA | TE A   | FO0071 | CME-550X     | 72% 09/03/2009 | 9      |          |          |     | D NV     | <del></del>                                 | IMER TYPE                |             |
|      | LER - C       |                |        |        |        |              | E 03/23/12     | -      | COMP. D. |          |     |          | SURFACE WATER DEPTH                         |                          |             |
| LEV  | DRIVE<br>ELEV | DEPTH          | BLO    | ow co  | UNT    |              | BLOWS PER      | R F001 |          | SAMP     |     | 11       |   |                          | <del></del> |
| (ft) | (ft)          | (ft)           | 0.5ft  | 0.5ft  | 0.5ft  | 0 2          | 25 50          |        | 75 100   | NO.      | MO  | 0<br>I G | SOIL AND ROCK D                             | ESCRIPTION               | DEPTH (     |
| 1    |               |                |        |        |        |              |                |        |          | 1        |     | П        |   |                          |             |
| 480  |               | _              |        |        |        |              |                |        |          |          |     |          |   |                          |             |
| Ì    | 1             | _              |        |        |        |              |                |        |          |          |     | l E      | 2,477.7 GROUND SUI                          | REACE                    | 0           |
| 476  | .1            | -              |        |        |        |              |                |        |          |          | 1   | 13       | ROADWAY EMBA<br>Silty sand, gravel a        | NKMENT                   |             |
| 475  | -<br>2,473.4  | -<br>- 43      |        |        | ,      | <del> </del> |                |        |          | 1        |     |          | Sity Sanu, graver a                         | id boulders.             |             |
|      | 2,31,3-3      | <del></del> -  | 86     | 14/0.0 |        |              |                |        | 100/0.5  | <b>∳</b> |     |          |   |                          |             |
| 470  | 1             | -              |        |        |        |              | .              |        | : : : :  | 11       |     |          |   |                          |             |
|      | 1             |                |        |        |        |              |                |        |          |          | 1.  | F        | 2.467.6                                     |                          | 40          |
| ا ء  | ‡             | -              |        |        |        |              | .              |        |          | 11       | .   | 财        | 2,467.6 CRYSTALLINE                         |                          | 10          |
| 65   | 1             | -              |        |        |        | <b> </b>     |                |        | +        | 11       |     | 好        | Light gray qua                              | rızite.                  |             |
|      | 1             |                |        |        |        |              | .              |        |          |          |     | A        |   |                          |             |
| 60   | . ‡           |                |        |        |        |              |                |        | 1::::    | ]] .     |     | A        |   |                          |             |
| -    |               | <del></del>    | -      |        |        | 1            | l              | · · ·  | <u> </u> | Ц        |     | P.       | 2,458.7                                     | ention 2 450 7           | 19          |
|      | 1             |                |        |        | -      |              |                |        |          |          |     | F        | Boring Terminated at Ele-<br>light gray qua | rauon 2,458.7<br>rtzite. | II IN       |
|      | 1             | <del>.</del>   |        |        |        |              |                |        |          |          |     | F        |   |                          |             |
|      | I             |                |        |        | ·      |              |                |        |          | 1.       |     | F        |   |                          |             |
|      | Ŧ             |                |        |        |        |              |                |        |          |          |     | 1        |   |                          |             |
|      | Ŧ             |                |        |        | 1      |              |                |        |          |          |     |          |   |                          |             |
|      | Ŧ             |                |        |        |        |              | •              |        |          |          |     |          | ·<br>·                                      |                          |             |
|      | 7             |                |        |        |        | •            |                |        |          |          |     |          |   |                          |             |
|      | ‡             |                |        |        |        |              |                |        |          |          |     |          |   |                          |             |
|      | ‡             |                |        |        | -      |              |                |        |          |          | ٠.  |          | •   |                          |             |
| Ì    | ‡             |                |        |        |        |              |                |        |          |          | •   | <b> </b> |   |                          |             |
|      | ‡             |                | .      | į      |        |              |                |        |          |          |     | t        |   |                          |             |
|      | ‡             |                | - 1    | I      |        |              |                |        |          | 1 .      |     | E        | •   |                          |             |
| -    | ‡             |                |        |        |        |              |                |        |          |          |     | <u> </u> |   |                          |             |
|      | .‡            | .              | İ      | [      |        |              |                | *      |          |          |     | E        |   |                          |             |
|      | ‡             |                |        | l      |        |              |                |        |          |          | ·   | <u> </u> |   |                          |             |
|      | ‡             | I              |        | İ      |        |              |                |        |          |          | Ì   | <u> </u> |   |                          |             |
|      | ‡             |                | -      | .      | l      |              |                | •      |          |          |     | lE       |   |                          |             |
|      | ‡             | .              |        | 1      | Ì      |              |                |        |          |          |     | E        | • •   |                          |             |
|      | ‡             |                |        |        |        |              |                |        |          |          |     | F        |   |                          |             |
|      | ‡             |                |        | .      |        |              |                |        |          |          |     | F        | •   |                          |             |
|      | ‡             | .              | ļ      | 1      |        |              |                |        |          |          |     | F        |   | •                        |             |
|      | ‡             |                |        |        | İ      |              |                |        |          |          |     | F        | •   |                          |             |
|      | ‡             | 1              |        |        |        |              |                |        |          |          |     | F        | •   |                          |             |
|      | Í             |                |        |        |        |              |                |        |          |          |     | F        |   |                          |             |
|      | $\pm$         |                |        | Ì      |        |              |                |        | •        |          | •   | F        |   |                          |             |
|      | Ŧ             |                | l      |        |        |              |                |        |          |          |     |          |   |                          |             |
|      | Ŧ             | l              |        |        |        |              |                |        |          |          |     |          |   |                          |             |
|      | Ŧ             | - 1            | ŀ      | 1      |        |              |                |        |          |          |     | -        |   |                          |             |
|      | ‡             | 1              |        | •      |        |              |                | ٠.     |          |          |     |          |   |                          |             |
| 1    | +             | - 1            | - 1    | - 1    |        |              |                |        |          | ı        | i   | ı l      | •   |                          |             |



SHEET

WBS 38534.1.1 TIP B-4762 COUNTY HAYWOOD GEOLOGIST Hager, M. M. SITE DESCRIPTION Bridge No. 72 on SR-1407 over Jonathan Creek. GROUND WTR (ft) OFFSET 7ft LT BORING NO. EB1-A STATION 10+10 ALIGNMENT -L-0 HR. COLLAR ELEV. 2,477.7 ft TOTAL DEPTH 19.0 ft **NORTHING** 699,902 **EASTING** 808,033 24 HR. DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009 DRILL METHOD NW Casing W/SPT & Core HAMMER TYPE Automatic DRILLER Coffey, Jr., C. **START DATE 03/23/12** COMP. DATE 03/23/12 SURFACE WATER DEPTH N/A CORE SIZE NXWL TOTAL RUN 8.9 ft RUN DEPTH RUN (ft) (ft) RUN REC. RQD (ft) (ft) % % STRATA L REC. RQD O (ft) (ft) G SAMP. NO. ELEV DESCRIPTION AND REMARKS (Min/ft) ELEV. (ft) Begin Coring @ 10.1 ft

CRYSTALLINE ROCK

Light gray quartzite with thin schistose zones and a trace of pyrite. Very slightly weathered to fresh; hard to very hard. 0.9/0.9 1.6/0.0 1.9/0.0 2.3/0.0 1.9/0.0 1.7/0.0 1.6/0.0 (2.9) (2.8) 74% 72% 2465 2,463.7 14.0 a) Joints @ 10°. b) Joints @ 40°. (4.8) (4.8) 96% 96% 2460 2,458.7 19.0 1.5/0.0 Boring Terminated at Elevation 2,458.7 ft in light gray quartzite.



SHEET

| NBS   | 38534         | 1.1.1         |              |           | Т        | ΙP  | B-4762              | COUNT    | Y HAYWO     | OD       |            |         | GEOLOGIST Hager, M. M.            |                |             |
|-------|---------------|---------------|--------------|-----------|----------|-----|---------------------|----------|-------------|----------|------------|---------|-----------------------------------|----------------|-------------|
| SITE  | DESCR         | RIPTIO        | N Bric       | ige No    | o. 72 o  | n : | SR-1407 over Jonat  | han Cree | k.          |          |            |         |                                   | GROU           | IND WTR (f  |
| 3OR   | NG NO         | . EB1         | -B           |           | s        | TA  | ATION 10+05         |          | OFFSET      | 12 ft RT |            |         | ALIGNMENT -L-                     | 0 HR.          | FIAE        |
| COL   | LAR EL        | <b>EV.</b> 2, | 479.0        | ft        | Т        | 01  | TAL DEPTH 19.7 ft   |          | NORTHIN     | G 699,8  | 885        |         | EASTING 808,041                   | 24 HR.         | FIAD        |
| ORILL | RIG/HAI       | MMER E        | FF./DA       | TE A      | FO0071   | 1 C | ME-550X 72% 09/03/2 | 009      | <del></del> | DRILL    | METHO      | D N     | W Casing W/SPT & Core HA          | MMER TYPE      | Automatic   |
| ORIL  | LER C         | heek, l       | D. O.        |           | s        | TA  | ART DATE 03/22/1    | 2        | COMP. DA    | TE 03/   | 22/12      |         | SURFACE WATER DEPTH               | N/A            | <del></del> |
| LEV   | DRIVE<br>ELEV | DEPTH         | BLC          | ow cc     | TAUC     | П   | BLOWS               | PER FOO  | Γ           | SAMP.    | <b>V</b> / | L       | 100 AND DOOK                      | FOODIDTIO      |             |
| (ft)  | (ft)          | (ft)          | 0.5ft        | 0.5ft     | 0.5ft    | Ш   | 0 25                | 50<br>1  | 75 100      | NO.      | MOI        | O.<br>G | SOIL AND ROCK [<br>ELEV. (ft)     | ESCRIPTIC      | DEPTH (     |
|       |               |               |              |           |          |     |                     |          | -           |          |            |         | •                                 | •              |             |
| 480   |               |               |              |           |          |     |                     |          |             |          |            |         | ·                                 |                | ٠           |
|       | -             | <u> </u>      |              |           | ļ        | H   |                     | 1        | <del></del> | <b> </b> | ļ          | 1 888   | 2,479.0 GROUND St                 |                | C           |
|       | 1             | -             |              |           |          |     |                     |          |             |          |            |         | ROADWAY EMB Brown sandy silt with |                | ders.       |
| 475   | 2,474.5       | 4.5           |              |           |          |     |                     |          |             |          |            | L       | 2,475.3                           |                | 3           |
|       | 1             | -             | WOH          | 1         | WOH      |     | 1                   |          |             |          | w          |         | ALLUVI<br>Brown sandy silt with   | a trace of org | ganic       |
|       |               | _             |              |           | 1        |     |                     |          |             |          |            |         | materia                           | l.             |             |
| 70    | 2,469.5       | 9.5           | WOU          | WOH       | <u> </u> |     |                     |          | +           |          |            |         | <u> </u>                          |                |             |
| .     | 1             |               | WOH          | WOH       | 1        |     | 1                   |          |             |          |            |         | •                                 |                |             |
| 65    | 1             | -             |              |           |          | П   |                     | +=:-:-   | +           |          |            |         | - 2,466.6<br>- CRYSTALLIN         | E ROCK         | 12          |
|       | 1             | -             |              |           |          | П   |                     |          | <b> </b>    |          |            |         | Light gray qu                     |                |             |
|       | 1             |               |              |           |          | 11  |                     |          | 1           |          |            |         | :                                 |                |             |
| 60    | 1             | -             |              |           | 1        | Ш   |                     |          |             |          |            |         | -                                 |                |             |
| İ     |               |               | <del> </del> | <b></b> - | ┼──      | Н   | LI                  |          | I           | 4        | <b></b> -  | S#2     | 2,459.3  Boring Terminated at El  | evation 2,45   | 9.3 ft in   |
| 1     | +             | _             |              |           |          |     |                     |          |             |          |            |         | light gray qu                     | artzite.       |             |
| -     | 4             |               |              |           |          |     |                     |          |             |          |            |         | •<br><del>-</del>                 |                |             |
|       | 1             | -             |              |           |          |     |                     |          |             |          |            |         | <u>.</u>                          |                |             |
|       | · 1           | -             |              |           |          | l   |                     |          |             |          |            |         | -                                 |                |             |
|       | 4             |               |              |           |          |     |                     |          |             |          |            |         | <del>-</del><br><del></del>       |                |             |
|       | 1             | -             |              |           |          | l   |                     |          |             |          |            |         | -<br>-                            |                |             |
|       | 1             | _             |              |           |          |     |                     |          |             | 1        |            |         | -<br>-                            |                |             |
|       | 1             | _             |              |           |          | l   |                     |          |             |          |            |         | _                                 |                |             |
|       | +             | •             |              |           |          |     |                     |          |             |          |            |         | -                                 |                |             |
|       | ‡             | -             |              |           |          |     |                     |          |             |          |            |         | <u>.</u>                          |                |             |
|       | 1             | -             |              |           |          |     |                     |          |             |          |            |         | <u>_</u> '                        |                |             |
|       | +             | •             |              |           | l        |     |                     |          |             |          |            |         | -<br>-                            |                |             |
|       | Ŧ             |               |              |           |          |     | 4                   |          |             |          | İ          |         | <del>-</del>                      |                |             |
|       | 7             | -             |              |           |          |     |                     |          |             |          |            |         | <u>.</u>                          |                |             |
|       | ‡             | -             |              |           |          |     |                     |          |             | 1        |            |         |                                   |                |             |
|       | 1             | -             |              |           |          |     |                     |          |             | 1        |            |         | -                                 |                |             |
| Ì     | 7             | -             |              |           |          |     |                     |          |             |          |            |         | <del></del>                       |                |             |
|       | 1             | •             |              |           |          |     |                     |          |             |          |            |         |                                   |                |             |
| İ     | <u> </u>      | -             |              |           |          | ľ   |                     |          |             |          |            |         | •                                 |                |             |
|       | +             | •             |              |           |          |     |                     |          |             |          |            |         | -                                 |                |             |
|       | Ŧ             | -             |              |           | }        |     |                     |          |             | ı        |            |         |                                   |                |             |
|       |               | -             |              |           |          | 1   |                     |          |             |          |            | İ       |                                   |                |             |
|       | 1             | -             |              |           |          |     |                     |          |             | 1        |            |         | -                                 |                |             |
|       | . 7           | -             |              |           |          |     |                     |          |             |          |            |         |                                   |                |             |
|       | ‡             | -             |              |           |          |     |                     |          |             |          | l          | '       | -                                 |                |             |
|       | 1             | •<br>•        |              |           |          |     |                     |          | •           |          |            |         |                                   |                |             |
| -     | +             |               |              |           |          |     | •                   |          |             |          |            |         |                                   |                |             |
|       | +             | •             |              |           |          |     |                     |          |             |          | 1          |         | <del>-</del>                      |                |             |
|       | ‡             | .             |              |           |          | -   |                     |          |             |          |            |         |                                   |                |             |
|       | 1             |               |              |           |          |     |                     |          |             |          |            |         |                                   |                |             |
| 1     | . ‡           | -             |              |           | '        |     |                     |          |             |          |            |         |                                   | •              |             |
| - [   | ‡             |               |              |           |          | 1   |                     |          |             |          |            |         | _                                 |                |             |
|       |               |               |              | 1         | 1        | 1   |                     |          |             |          | 4          |         |                                   |                |             |



7/1

| Z            | Y <b>Ų</b>          | D (  | COF         | RE B   | OR                            | ING                           | RE           | PO.                      | RT                      | ,           |          |                 | •  |              |              | 7/11        |
|--------------|---------------------|--|-------------|--|-------------------------------|-------------------------------|--------------|--------------------------|-------------------------|-------------|----------|-----------------|--|--------------|--------------|-------------|
| WBS          | 38534               |  |             |  |                               | B-476                         |              |                          |                         |             | AYWO     | OD              | GEOLOGIST Hager  | M. M.        |              |             |
| SITE         | DESCR               | IPTION                                       | l Bridg     | ge No. 7   | 2 on S                        | R-1407                        | over Jo      | natha                    | n Cree                  | ek.         |          |                 |  |              | GROUN        | ID WTR (ft) |
| BORI         | NG NO               | . EB1-                                       | В.          |  | STAT                          | LION                          | 10+05        |                          |                         | OF          | FSET     | 12 ft RT        | ALIGNMENT -L-  |              | 0 HR.        | FIAD        |
| COLL         | AR EL               | EV. 2,4                                      | 79.0 f      | t  | TOT                           | AL DE                         | PTH 19.      | 7 ft                     |                         | NC          | RTHIN    | G 699,885       | EASTING 808,041  |              | 24 HR.       | FIAD        |
| DRILL        | RIG/HAI             | MMER E                                       | F./DAT      | E AFO0   | 071 CN                        | E-550X                        | 72% 09/      | 03/2009                  | }                       |             |          | DRILL METHOD NW | / Casing W/SPT & Core  | HAMN         | ER TYPE      | Automatic   |
| DRIL         | LER C               | heek, C                                      | ). O.       |  | ŞTAI                          | RT DA                         | TE 03/2      | 2/12                     |                         | CC          | MP. DA   | ATE 03/22/12    | SURFACE WATER  | EPTH N       | /A           |             |
| COR          | E SIZE              | NXWL   |             |  |                               |                               | N 6.9 ft     |                          |                         |             |          | ٠,٢             |  |              |              |             |
| ELEV<br>(ft) | RUN<br>ELEV<br>(ft) | DEPTH<br>(ft)                                | RUN<br>(ft) | DRILL<br>RATE<br>(Min/ft)                                      | REC.<br>(ft)<br>%             | JN<br>RQD<br>(ft)<br>%        | SAMP.<br>NO. | STR<br>REC.<br>(ft)<br>% | ATA<br>RQD<br>(ft)<br>% | L<br>O<br>G | ELEV.    |                 | DESCRIPTION AND REM  | ARKS         |              | DEPTH (ft)  |
| 466.17       |                     |  |             |  |                               |                               |              |                          |                         |             |          |                 | Begin Coring @ 12.8  |              |              |             |
| 2465         | 2,466.2<br>2,464.3  | 12.8<br>14.7                                 | 5.0         | 1.5/0.0<br>1.8/0.9<br>1.7/0.0<br>1.9/0.0<br>1.9/0.0<br>1.4/0.0 | (1.6)<br>84%<br>(5.0)<br>100% | (1.6)<br>84%<br>(5.0)<br>100% |              |                          |                         |             |          |                 | CRYSTALLINE ROC<br>partzite with a trace of pyrit<br>a) Joint @ 50°.<br>rting along foliation @ 60°. | e. Fresh; v  |              |             |
| 2400         | 2,459.3             | 19.7   |             | 1.2/0.0  |                               |                               |              | <b></b>                  |                         | 1           | 2,459.3  | Boring Termina  | ated at Elevation 2,459.3 ft   | in light ara | v quadzite   | 19.7        |
|              | 3                   |  |             |  |                               |                               |              |                          |                         |             | -        | boning remine   | aled at Elevation 2,400.0 ii   | in ngrit gre | y quantzite. |             |
|              | -                   | -  |             |  |                               |                               |              |                          |                         |             | <u> </u> |                 |  | •            |              |             |
|              | -                   | -  |             | •  |                               |                               |              |                          |                         |             | -        |                 |  |              |              |             |
|              |                     |  |             |  |                               |                               |              |                          |                         |             | -        |                 |  |              |              |             |
|              | -                   | -  | ·           |  |                               |                               |              |                          |                         |             | F        |                 |  |              |              | l           |
|              | -                   | Ŧ  |             |  |                               |                               |              |                          |                         |             | F        |                 |  |              |              |             |
|              | -                   | F  |             |  | ľ                             |                               |              |                          |                         |             | E        |                 |  |              |              |             |
|              |                     | Ŧ  |             |  | ŀ                             |                               |              |                          |                         |             | E .      |                 |  |              |              | 1           |
|              |                     | Ī  |             |  |                               |                               |              |                          |                         |             | E        |                 |  |              |              | ŀ           |
|              |                     | ŧ  |             |  | 1                             |                               |              |                          |                         |             | E        |                 | •  |              |              |             |
|              |                     | ŧ  |             |  |                               |                               |              |                          |                         |             | E        |                 |  |              |              |             |
|              | -                   | ł  |             |  |                               |                               |              |                          |                         |             | F        |                 |  |              |              |             |
|              |                     | Ì  |             |  |                               |                               |              |                          |                         |             | <u> </u> |                 |  |              |              |             |
|              | _                   | ļ  |             |  |                               |                               |              |                          |                         |             | E        |                 |  |              |              |             |
|              |                     | ţ  |             |  |                               |                               |              |                          |                         |             | E        |                 |  |              |              |             |
|              |                     | ŧ  |             |  | 1                             |                               |              | 1                        |                         |             | E        |                 |  |              |              |             |
|              | -                   | ŧ  |             |  |                               |                               |              |                          |                         |             | -        |                 |  |              |              |             |
|              |                     | ‡  |             |  |                               |                               |              |                          |                         |             | -        |                 |  |              |              | ļ           |
| R            |                     | <u> </u>                                     |             |  |                               |                               |              |                          |                         |             | L        |                 |  |              |              |             |
|              |                     | ‡  |             |  |                               |                               |              |                          |                         |             | t        | •               |  |              |              |             |
|              |                     | İ  |             |  |                               |                               |              |                          |                         |             | t        |                 |  |              |              |             |
|              | -                   | ‡  |             |  |                               |                               |              |                          |                         |             | -        |                 |  |              |              |             |
|              |                     | ‡  |             | l  |                               |                               |              |                          |                         |             | t        |                 |  |              |              |             |
|              | l .                 | Ţ  |             |  |                               |                               |              |                          |                         |             | Ł        |                 |  |              | •            |             |
|              |                     | ‡  |             |  |                               |                               |              |                          |                         |             | Ł        |                 |  |              |              |             |
|              |                     | ‡ ·  |             |  |                               |                               |              |                          |                         | ŀ           | E        |                 |  |              |              |             |
|              |                     | <u>†</u>                                     |             |  |                               |                               |              |                          |                         |             | F        |                 |  |              |              |             |
|              |                     | t  | ŀ           |  |                               |                               |              |                          |                         | l           | t        |                 |  |              |              |             |
|              |                     | ‡  |             |  |                               |                               |              |                          |                         |             | E        |                 |  |              | •            |             |
|              |                     | İ  |             |  |                               | 1                             |              |                          |                         |             | Ł        | :               |  |              |              |             |
|              |                     | <u> </u>                                     |             | l  |                               |                               |              |                          |                         |             | <u> </u> |                 |  |              |              |             |
|              | .                   | ‡  |             |  |                               |                               |              |                          |                         |             | <u> </u> |                 | •  |              |              |             |
|              |                     | İ  |             |  |                               |                               |              |                          |                         |             | -        | •               | •  |              |              |             |
|              | · .                 | ‡  | 1           |  |                               |                               |              |                          |                         |             | L        | •               |  |              |              |             |
|              |                     | ‡  |             | 1  |                               | 1                             |              |                          |                         |             | ţ        |                 |  |              |              |             |
| L            | ľ                   | <u>†                                    </u> | 1           | <u></u>  |                               |                               | 1            | <u> </u>                 | 1                       | $\perp$     | 上        |                 |  |              |              |             |

# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

|             | 38534                 |               |         |        |             | IP B-      |       |           |                | COUN    |           | HAYV          | VOC | סס           |                   |        | GEO              | LOGIST Hager, I                           |  |                 |          |
|-------------|-----------------------|---------------|---------|--------|-------------|------------|-------|-----------|----------------|---------|-----------|---------------|-----|--------------|-------------------|--------|------------------|---|--|-----------------|----------|
|             | DESCR                 |               |         | lge No |             |            |       |           | onath          | nan Cre |           |               |     |              |                   |        | 1                |   |  | GROUND \        | -        |
|             | ING NO                |               |         |        |             | TATIC      |       |           |                |         |           |               |     | 0 ft LT      |                   |        |                  | NMENT -L-                                 |  | 0 HR.           | N/A      |
|             | LAR EL                |               |         |        |             |            |       | TH 10     |                |         | N         | ORTH          |     | 699,9        |                   |        |                  | ING 808,102                               |  | 24 HR.          | 5.5      |
|             | . RIG/HA              |               | FF./DA  | TE A   |             |            |       |           |                |         |           |               |     |              |                   | D N    | W Casing         |   |  | RTYPE Au        | tomatic  |
| DRIL        | LER N                 |               |         |        |             | TART       | DATE  | E 02/1    |                |         |           | OMP.          | DA  | TE 02/       | 7/09              |        | SURF             | ACE WATER DE                              | EPTH N/A                                 | <del>\</del>    |          |
| LEV<br>(ft) | DRIVE<br>ELEV<br>(ft) | DEPTH<br>(ft) | 0.5ft   | 0.5ft  | <del></del> | 0          | 2     | BLO<br>25 | WS P           | ER FOO  | 75<br>75  | <u> </u>      | 100 | SAMP.<br>NO. | MOI               | 0<br>0 | ELEV. (fi        | SOIL AND R                                | OCK DESC                                 |                 | DEPTH (f |
| 480         |                       | <u> </u><br>  | ,       |        |             |            |       | 1         |                |         | -1        |               | -   |              |                   | L}o    |                  | GROUI<br>ROADWAY                          | ND SURFA                                 |                 | 0.       |
| 475         | 2,473.0               | 4.4           | WOLL    |        |             |            | · · · |           |                |         |           | · · ·         | -   |              | _                 |        | <del>-</del><br> | Red-brown                                 |  |                 |          |
|             | ٠.                    | ‡             | WOH     | 2      | 1           | <b>4</b> 3 |       |           | : :            |         | :         |               | :   |              | _ <del>_</del> W_ |        | 2,471.4          |   | LUVIAL                                   |                 | 6.0      |
| 470         | -                     | ţ             |         |        |             | i_         |       | <u> </u>  | $= \downarrow$ |         | $\exists$ |               |     |              |                   |        | 2,469.0          | Brown silty sand                          | with a trace                             | ce of organic   | 8.4      |
|             | 3.467.4<br>3.467.1    | 188           | 100/0.3 |        |             | <u> </u>   |       | <u> </u>  | • •            |         | ·L        |               |     |              |                   |        | 2,467.1          |   | naterial.<br>IERED RO                    | OCK             |          |
|             | -                     |               | 60/0.0  |        |             |            |       |           | ٠              |         |           | 100/6<br>60/0 | 0.3 | ,            |                   |        | -<br>            | Weathered<br>Boring Terminated<br>light g | rock of qu<br>at Elevation<br>ay quartzi | on 2,467.1 ft c | )<br>on  |
|             |                       | ‡             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | -                |   | by G K Ro                                |                 |          |
|             | -                     | ‡             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | _                |   |  |                 |          |
|             |                       | ‡             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | <b>-</b>         |   |  |                 |          |
|             |                       | ‡             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | _                |   |  |                 |          |
|             | -                     | ‡             |         |        |             | · .        |       |           |                |         |           |               |     |              |                   |        | <b>-</b><br>-    |   |  |                 |          |
|             |                       | ‡             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | -                |   |  |                 |          |
|             | _                     | t             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | _                |   |  |                 |          |
|             |                       | ł             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        |                  |   |  |                 |          |
|             |                       | Ŧ             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        |                  |   |  |                 |          |
|             | -                     | Ŧ             | ,       | t      |             |            |       |           |                |         |           |               |     |              |                   |        | -                |   |  |                 |          |
|             |                       | ‡             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | -                |   |  |                 |          |
|             |                       | ‡             |         | ľ      |             |            |       |           |                |         |           |               |     |              |                   |        |                  |   |  |                 |          |
|             | -                     | ‡             |         |        | •           |            |       |           |                |         |           |               |     |              |                   |        | -                |   |  |                 |          |
| •           |                       | ‡             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        |                  |   |  |                 |          |
|             |                       | ţ             |         |        |             |            |       |           |                |         |           |               |     |              | 蜂                 |        | _                |   |  |                 |          |
|             |                       | t             |         |        |             |            |       |           |                |         |           |               |     |              | *                 |        | -                |   |  |                 |          |
|             |                       | +             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | F                | ٠   |  |                 |          |
|             | -                     | Ŧ             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | _                |   |  |                 |          |
|             |                       | Ŧ             |         |        | 1           | 1          |       |           |                |         |           |               |     |              |                   |        | F                |   |  |                 |          |
|             |                       | Ŧ             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | -                |   |  |                 |          |
|             | -                     | ‡             |         | 1      |             |            |       |           |                |         |           |               |     |              |                   |        | -                |   |  |                 |          |
|             |                       | ‡             |         |        |             | ŀ          |       |           |                |         |           |               |     | 1            |                   |        | <u> </u>         |   |  |                 |          |
|             | _                     | <u> </u>      |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | L                |   |  |                 |          |
|             |                       | t             |         | }      | 1           |            |       |           |                |         |           |               |     | İ            |                   |        | ŀ                |   |  |                 |          |
|             |                       | ł             |         |        |             |            |       |           |                |         |           |               |     | ŀ            |                   |        | F                |   |  |                 |          |
|             | _                     | Ŧ             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | <u> </u>         |   |  |                 |          |
|             |                       | Ŧ             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | -                |   |  |                 |          |
|             |                       | ‡             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | -                |   |  |                 |          |
|             | -                     | ‡             |         |        |             |            |       |           |                |         |           |               |     |              |                   |        | -                |   |  | •               |          |
|             |                       | ‡             |         |        |             |            |       |           |                |         |           |               |     | 1            |                   |        | <u> </u>         |   |  |                 |          |
|             | -                     | ‡             |         |        | 1           |            | ,     |           |                |         |           |               |     | 1            |                   |        | _                | * 2                                       |  |                 |          |
|             |                       | t             |         |        |             |            |       |           |                |         |           |               |     | 1            |                   |        | E                |   |  |                 |          |
|             |                       | +             |         |        | ŀ           |            |       |           |                |         |           |               |     |              |                   | 1      |                  |   |  |                 |          |



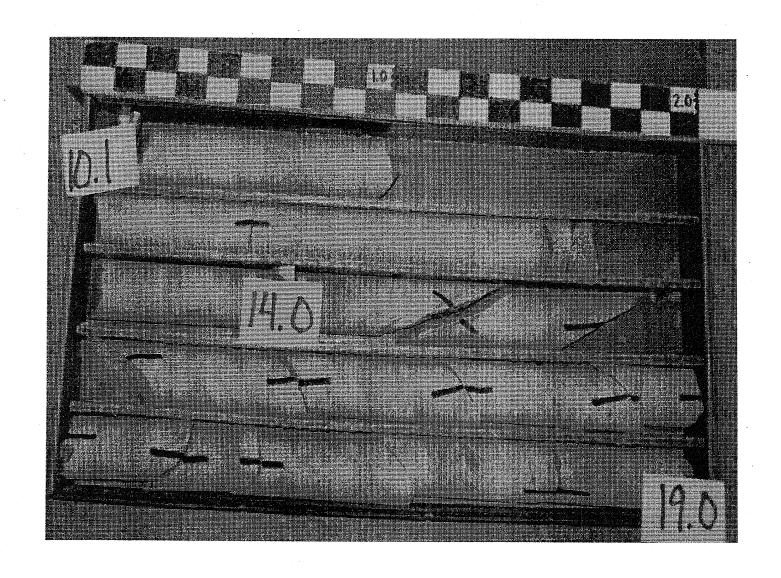
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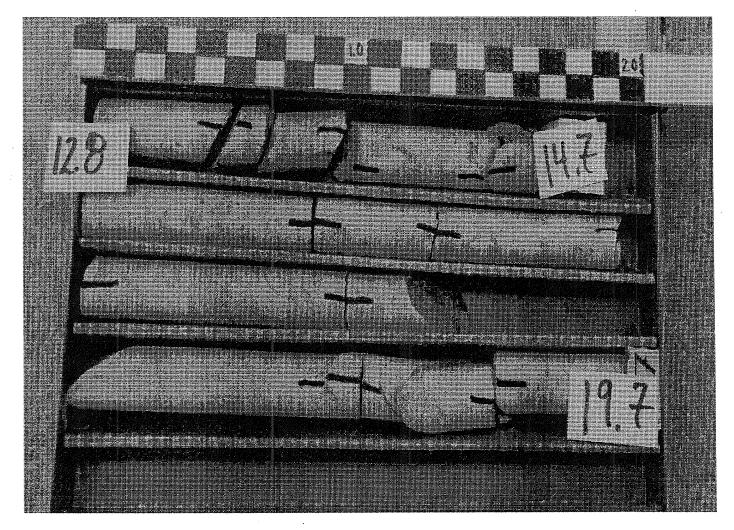
|      | 3853          |          |  |              |         |         | P B-4762            | 1         | TY HAYWO   | OOD            |            |          | GEOLOGIST Hager, I                             | Л. M.               |                                       |   |
|------|---------------|----------|--|--------------|---------|---------|---------------------|-----------|--|----------------|------------|----------|--|---------------------|---------------------------------------|---|
| SITE | DESC          | RIPTIC   | N Bri  | dge N        | o. 72 c | on      | SR-1407 over Jona   | than Cred | ek.  |                |            |          | •  |                     | GROUN                                 | ID WTR (f                               |
| BOF  | RING NO       | D. EB2   | 2-B  |              | S       | ST.     | ATION 10+93         |           | OFFSET   | 14 ft RT       |            |          | ALIGNMENT -L-                                  |                     | 0 HR.                                 | N/A                                     |
| COL  | LAR EL        | _EV. 2   | ,473.5   | ft           | T       | го      | TAL DEPTH 14.31     | t         | NORTHIN  | <b>G</b> 699,9 | 935        |          | EASTING 808,111                                |                     | 24 HR.                                | 6.1                                     |
| DRIL | L RIG/HA      | MMER     | EFF./D/  | ATE A        | FO007   | 10      | CME-550X 72% 09/03/ | 2009      |  | DRILL          | METHO      | D N      | W Casing W/SPT & Core                          | HAM                 | MER TYPE                              | <del></del>                             |
| DRII | LER C         | Coffey,  | Jr., C.  |              | s       | ST.     | ART DATE 03/22/1    | 2         | COMP. D  |                |            |          | SURFACE WATER DE                               |                     |                                       | , |
| ELEV | DRIVE<br>ELEV | DEPT     | H BL   | owco         | DUNT    | T       | BLOWS               | PER FOO   | · <del>1</del>                                   | SAMP           | <b>V</b> / | 11       |  |                     |                                       |   |
| (ft) | (ft)          | (ft)     | 0.5ft  | 0.5ft        | 0.5ft   |         | 0 25                | 50        | 75 100   | NO.            | MOI        | 0<br>G   | SOIL AND RO                                    | OCK DE              | SCRIPTION                             | DEPTH (                                 |
|      |               |          |  |              |         |         |                     |           |  |                |            |          |  |                     | · · · · · · · · · · · · · · · · · · · |   |
| 2475 |               | 1        | -  |              |         |         |                     |           |  |                |            |          |  |                     |                                       | •                                       |
|      |               | <u> </u> |  | <u> </u>     |         | $\perp$ |                     |           |  |                |            |          | -<br>- 2,473.5 GROUN                           | D SURI              | ACE                                   | .0                                      |
|      |               | 1        |  |              |         |         |                     |           |  |                |            | 000      | Gray-brown s                                   | LUVIAL<br>Ity saind |                                       |   |
| 2470 | - 400 0       | Ŧ        | 1.   |              |         |         |                     | 1         |  |                |            | 000      | →  | ,                   | and graves                            |   |
|      | 2,468.8       | 4.7      | 8  | 100/0.       | 4       |         |                     | : : : :   | 40000  |                |            | 000      | 2,468.1  |                     |                                       | 5                                       |
| 2465 |               | ‡        |  |              |         |         |                     | : : : :   | 100/0.9  |                |            |          | 2,467.97 WEATH<br>Weathered                    |                     |                                       | 5                                       |
| 400  | -             | ‡        |  | İ            |         |         |                     |           | <del>                                     </del> |                |            |          | - CRYSTA<br>Light gr                           | LLINE I             | ROCK                                  |   |
|      | -             | ‡        |  |              |         |         |                     |           |  |                |            |          | Light gi                                       | ay quan             | ZILG.                                 |   |
| 460  | -             | ţ        | 1  |              |         |         |                     |           |  |                |            |          |  |                     |                                       |   |
|      |               |          | <del>                                     </del> | <del> </del> | 1       | ۲       |                     | L         |  | 4              |            |          | 2,459.2<br>Boring Terminated                   | at Eleva            | tion 2 459 2                          | 14<br>Off in                            |
|      |               | E        |  |              |         |         |                     |           |  |                |            |          | light gr                                       | ay quart            | zite.                                 |   |
|      | _             | Ė        |  |              |         |         |                     |           |  |                |            |          | -<br>-   |                     |                                       |   |
|      | -             | -        |  |              |         |         |                     |           |  |                |            |          |  |                     |                                       |   |
|      |               |          |  |              |         | l       |                     |           |  |                |            |          |  |                     |                                       |   |
|      |               |          |  |              |         |         |                     |           |  |                |            |          | <b>-</b>                                       |                     |                                       |   |
|      | 1             |          |  |              |         |         |                     |           |  |                |            |          |  |                     |                                       |   |
|      |               |          |  |              |         |         |                     |           |  |                |            | l        | <u>.                                      </u> |                     |                                       |   |
|      | 1             | -        |  |              |         |         |                     |           |  |                |            | F        | <u> </u>                                       |                     |                                       |   |
|      | 1             |          |  |              |         |         |                     |           |  |                |            | <b> </b> |  |                     |                                       |   |
|      | 1             | _        |  |              |         |         |                     |           |  |                |            |          | -  |                     |                                       |   |
|      | 1             | -        |  |              |         |         |                     | •         |  |                |            |          |  |                     |                                       |   |
|      | 7             | -        |  |              |         |         |                     |           |  |                |            |          |  |                     |                                       |   |
|      | 7             | -        |  |              |         |         |                     |           |  |                |            |          | • .  |                     |                                       |   |
|      | ‡             | -        |  |              |         | ŀ       |                     |           |  |                |            |          |  |                     |                                       |   |
|      | 1             | -        |  |              |         |         |                     |           |  |                |            | Ŀ        | _  |                     |                                       |   |
|      | ‡             |          |  |              |         |         |                     |           |  |                |            | Ŀ        | •  |                     |                                       |   |
|      | ‡             | -        |  |              |         |         |                     |           |  |                |            |          |  |                     |                                       |   |
|      | +             |          |  |              |         |         |                     |           |  |                |            | F        | <u>-</u> .                                     |                     |                                       |   |
|      | 1             |          |  |              |         | Ì       |                     |           |  |                |            |          |  |                     |                                       |   |
| -    | +             | •        |  |              |         |         |                     |           |  |                |            |          |  |                     |                                       |   |
| 1    | Ŧ             |          |  |              |         |         |                     |           |  |                |            |          | -  |                     |                                       |   |
|      | Į.            |          |  |              |         |         |                     |           |  |                |            |          |  |                     |                                       |   |
|      | #             | •        |  |              |         |         |                     |           |  |                | -          | l        | _  |                     |                                       |   |
|      | ‡             |          |  |              |         |         |                     |           |  |                |            | F        |  |                     |                                       |   |
|      | ‡             |          |  |              |         |         |                     |           |  |                |            | F        |  |                     |                                       |   |
|      | +             |          |  |              |         |         |                     |           |  |                |            |          | -  |                     |                                       |   |
|      | Ŧ             |          |  |              |         |         |                     |           |  |                |            |          |  |                     |                                       |   |
|      | , ‡           |          |  |              | 1       |         |                     |           |  |                |            | <u> </u> |  |                     |                                       |   |
|      | †             | .        | .  | l            |         |         |                     |           |  |                |            | F        | <del>-</del>                                   |                     |                                       |   |
|      | <u></u>       | Į        |  | į            | 1       |         |                     |           |  |                |            | F        |  |                     |                                       |   |
| -    | Ī             |          |  |              | Ī       |         |                     |           |  |                |            |          |  |                     |                                       |   |
|      | Ŧ             |          |  | ŀ            | .       |         |                     |           |  |                |            |          | _  |                     |                                       |   |
|      | ‡             | 1        | 1  | l            | l       |         |                     |           |  |                |            | E        | • .  |                     |                                       |   |
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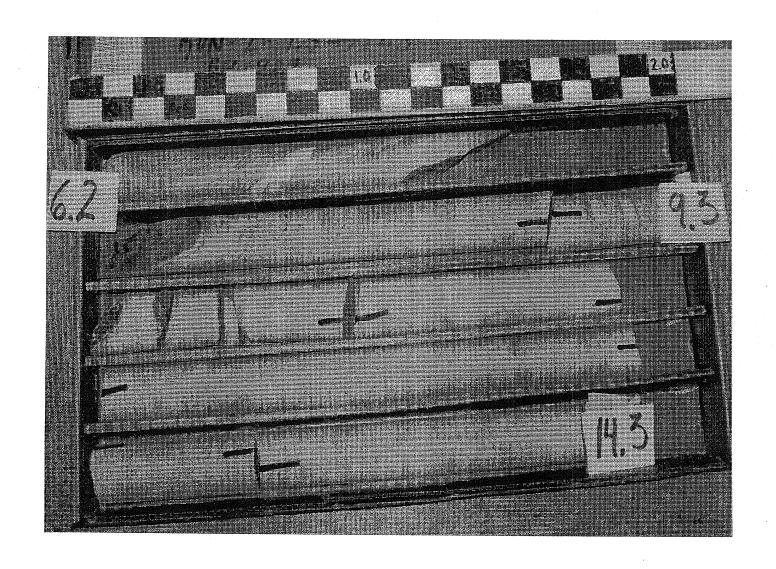
CORE BORING REPORT WBS 38534.1.1 TIP B-4762 COUNTY HAYWOOD GEOLOGIST Hager, M. M. SITE DESCRIPTION Bridge No. 72 on SR-1407 over Jonathan Creek. GROUND WTR (ft) BORING NO. EB2-B STATION 10+93 OFFSET 14 ft RT ALIGNMENT -L-0 HR. COLLAR ELEV. 2,473.5 ft TOTAL DEPTH 14.3 ft **NORTHING** 699,935 **EASTING** 808,111 24 HR. 6.1 DRILL RIG/HAMMER EFF./DATE AFO0071 CME-550X 72% 09/03/2009 DRILL METHOD NW Casing W/SPT & Core HAMMER TYPE Automatic DRILLER Coffey, Jr., C. **START DATE** 03/22/12 COMP. DATE 03/22/12 SURFACE WATER DEPTH N/A CORE SIZE NXWL TOTAL RUN 8.0 ft DRILL RATE (Min/ft) RUN DEPTH RUN RUN REC. RQD (ft) (ft) % % | STRATA | L | REC. | RQD | O | (ft) | (ft) | G | ELEV. (ft) | ELEV SAMP. DESCRIPTION AND REMARKS (ft) (ft) NO. (ft) Begin Coring @ 6.2 ft CRYSTALLINE ROCK 2.5/0.0 (3.0) (3.0) 1.5/0.0 97% 97% 2.6/1.1 2465 Light gray quartzite qith schistose interlayers. Very slightly weathered to 2,464.2 9.3 fresh; very hard. 1.4/0.0 (4.9) 2.0/0.0 100% 2.6/0.0 2.8/0.0 a) Joint @ 70°. (continued) 2460 2,459.3 14.2 3.9/0.0 Boring Terminated at Elevation 2,459.2 ft in light gray quartzite.





38534.1.1 (B-4762)
Haywood Co.
Bridge No. 72 on SR-1407
Over Jonathon Creek
EB1-A
Box 1 of 1

38534.1.1 (B-4762)
Haywood Co.
Bridge No. 72 on SR-1407
Over Jonathon Creek
EB1-B
Box 1 of 1



38534.1.1 (B-4762)
Haywood Co.
Bridge No. 72 on SR-1407
Over Jonathon Creek
EB2-B
Box 1 of 1