

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	40243.1.1 (B-4965)	1	14

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

STRUCTURE
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 40243.1.1 (B-4965) F.A. PROJ. BRZ-1165(6)
 COUNTY ROCKINGHAM
 PROJECT DESCRIPTION BRIDGE NO. 249 OVER LITTLE BEAVER
ISLAND CREEK ON SR 1165 (CARDINAL ROAD)

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CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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

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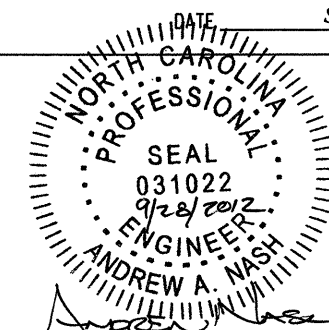
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SUBMITTED BY TERRACON CONSULTANTS

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PROJECT: 40243.1.1 ID: B-4965

DRAWN BY: ALEXANDER, M. J.

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

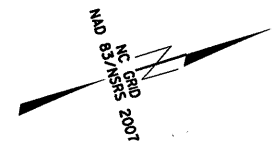
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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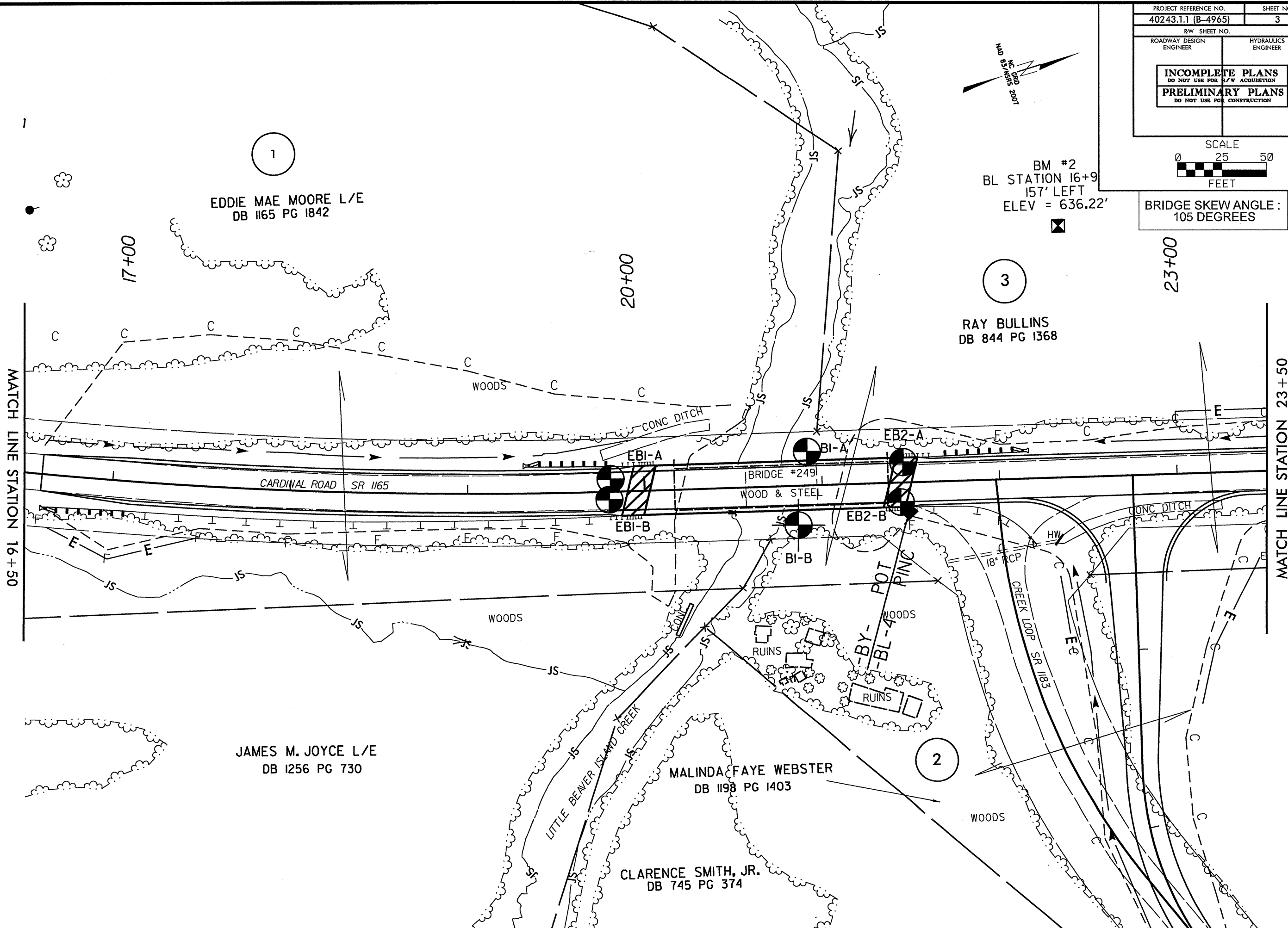
SOIL DESCRIPTION				GRADATION				ROCK DESCRIPTION				TERMS AND DEFINITIONS			
<p>SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLE: <i>VERY STIFF, GRAY SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>				<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED) GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES OF TWO OR MORE SIZES.</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>				<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 60 BLOWS, IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p> <p>WEATHERED ROCK (WR) NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p> <p>CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p> <p>NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.</p> <p>COASTAL PLAIN SEDIMENTARY ROCK (CP) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>				<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLOADED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (ROQ) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPI) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 60 BLOWS. STRATA CORE RECOVERY (SREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SROQ) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>			
SOIL LEGEND AND AASHTO CLASSIFICATION				MINERALOGICAL COMPOSITION				WEATHERING				INDURATION			
<p>GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS</p> <p>GROUP CLASS. A-1, A-1-b, A-2, A-2-4, A-2-5, A-2-6, A-2-7, A-4, A-5, A-6, A-7, A-1, A-2, A-3, A-4, A-5, A-6, A-7</p> <p>SYMBOL </p> <p>% PASSING: 10, 40, 200 (mm) </p> <p>LIQUID LIMIT PLASTIC INDEX </p> <p>GROUP INDEX </p> <p>USUAL TYPES OF MAJOR MATERIALS: STONE FRAGS, GRAVEL, AND SAND; FINE SAND; SILTY OR CLAYEY GRAVEL AND SAND; SILTY SOILS; CLAYEY SOILS</p> <p>GEN. RATING AS A SUBGRADE: EXCELLENT TO GOOD; FAIR TO POOR; POOR; UNSUITABLE</p> <p>PI OF A-7-5 SUBGROUP IS <= LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30</p>				<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p>COMPRESSIBILITY: SLIGHTLY COMPRESSIBLE; MODERATELY COMPRESSIBLE; HIGHLY COMPRESSIBLE</p> <p>PERCENTAGE OF MATERIAL: ORGANIC MATERIAL; GRANULAR SOILS; SILT-CLAY SOILS; OTHER MATERIAL</p> <p>GROUND WATER: WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING; STATIC WATER LEVEL AFTER 24 HOURS; PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA; SPRING OR SEEP</p>				<p>FRESH: ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (V SL.): ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.</p> <p>SLIGHT (SL.): ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH, OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.</p> <p>MODERATE (MOD.): SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS, IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY, ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.</p> <p>MODERATELY SEVERE (MOD. SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION, ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL.</p> <p>SEVERE (SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL, IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF.</p> <p>VERY SEVERE (V SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING, SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF.</p> <p>COMPLETE: ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS, QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS, SAPROLITE IS ALSO AN EXAMPLE.</p>				<p>ROCK HARDNESS: VERY HARD; HARD; MODERATELY HARD; MEDIUM HARD; SOFT; VERY SOFT</p> <p>FRACTURE SPACING: TERM; SPACING</p> <p>BEDDING: TERM; THICKNESS</p> <p>INDURATION: FRIABLE; MODERATELY INDURATED; INDURATED; EXTREMELY INDURATED</p>			
CONSISTENCY OR DENSITY				MISCELLANEOUS SYMBOLS				ROCK HARDNESS				INDURATION			
<p>PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</p> <p>GENERALLY GRANULAR MATERIAL (NON-COHESIVE): VERY LOOSE; LOOSE; MEDIUM DENSE; DENSE; VERY DENSE</p> <p>GENERALLY SILT-CLAY MATERIAL (COHESIVE): VERY SOFT; SOFT; MEDIUM STIFF; STIFF; VERY STIFF; HARD</p>				<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</p> <p>SOIL SYMBOL</p> <p>ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</p> <p>INFERRED SOIL BOUNDARY</p> <p>INFERRED ROCK LINE</p> <p>ALLUVIAL SOIL BOUNDARY</p> <p>DIP & DIP DIRECTION OF ROCK STRUCTURES</p> <p>SPT DMT TEST BORING</p> <p>AUGER BORING</p> <p>CORE BORING</p> <p>MONITORING WELL</p> <p>PIEZOMETER INSTALLATION</p> <p>SLOPE INDICATOR INSTALLATION</p> <p>CONE PENETROMETER TEST</p> <p>SOUNDING ROD</p>				<p>VERY HARD: CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.</p> <p>HARD: CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY, HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.</p> <p>MODERATELY HARD: CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.</p> <p>MEDIUM HARD: CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT, CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.</p> <p>SOFT: CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT, SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.</p> <p>VERY SOFT: CAN BE CARVED WITH KNIFE, CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY FINGER NAIL.</p>				<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.</p>			
TEXTURE OR GRAIN SIZE				ABBREVIATIONS				EQUIPMENT USED ON SUBJECT PROJECT				INDURATION			
<p>U.S. STD. SIEVE SIZE OPENING (MM): 4, 10, 40, 60, 200, 270</p> <p>BOULDER (BLDR.), COBBLE (COB.), GRAVEL (GR.), COARSE SAND (CSE, SD.), FINE SAND (F SD.), SILT (SL.), CLAY (CL.)</p> <p>GRAIN SIZE: MM 305, 75, 2.0, 0.25, 0.05, 0.005</p>				<p>AR - AUGER REFUSAL; BT - BORING TERMINATED; CL - CLAY; CPT - CONE PENETRATION TEST; CSE - COARSE; DMT - DILATOMETER TEST; DPT - DYNAMIC PENETRATION TEST; F - FINE; FOSS - FOSSILIFEROUS; FRAC. - FRACTURED, FRACTURES; FRAGS. - FRAGMENTS; HI - HIGHLY; MED. - MEDIUM; MICA - MICAEOUS; MOD. - MODERATELY; NP - NON PLASTIC; ORG. - ORGANIC; PMT - PRESSUREMETER TEST; SAP. - SAPROLITIC; SD. - SAND, SANDY; SL. - SILT, SILTY; SLL. - SLIGHTLY; TCR - TRICONE REFUSAL; W - MOISTURE CONTENT; V - VERY; VST - VANE SHEAR TEST; WEA. - WEATHERED; UNIT WEIGHT; DRY UNIT WEIGHT; SAMPLE ABBREVIATIONS: S - BULK; SS - SPLIT SPOON; ST - SHELBY TUBE; RS - ROCK; RT - RECOMPACTED TRIAXIAL; CBR - CALIFORNIA BEARING RATIO</p>				<p>DRILL UNITS: MOBILE B-; BK-51; CME-45C; CME-550; PORTABLE HOIST; D-50T (TER255)</p> <p>ADVANCING TOOLS: CLAY BITS; 6" CONTINUOUS FLIGHT AUGER; 6" HOLLOW AUGERS; HARD FACED FINGER BITS; TUNG-CARBIDE INSERTS; CASING w/ ADVANCER; TRICONE 2 1/16" * STEEL TEETH; TRICONE 2 1/16" * TUNG-CARB.; CORE BIT</p> <p>HAMMER TYPE: AUTOMATIC; MANUAL</p> <p>CORE SIZE: B; N-02; H</p> <p>HAND TOOLS: POST HOLE DIGGER; HAND AUGER; SOUNDING ROD; VANE SHEAR TEST</p>				<p>INDURATION: FRIABLE; MODERATELY INDURATED; INDURATED; EXTREMELY INDURATED</p>			
SOIL MOISTURE - CORRELATION OF TERMS				EQUIPMENT USED ON SUBJECT PROJECT				INDURATION				INDURATION			
<p>SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION</p> <p>LL - LIQUID LIMIT (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE</p> <p>PL - PLASTIC LIMIT SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE</p> <p>OM - OPTIMUM MOISTURE SHRINKAGE LIMIT SOLID; AT OR NEAR OPTIMUM MOISTURE</p> <p>SL - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE</p>				<p>DRILL UNITS: MOBILE B-; BK-51; CME-45C; CME-550; PORTABLE HOIST; D-50T (TER255)</p> <p>ADVANCING TOOLS: CLAY BITS; 6" CONTINUOUS FLIGHT AUGER; 6" HOLLOW AUGERS; HARD FACED FINGER BITS; TUNG-CARBIDE INSERTS; CASING w/ ADVANCER; TRICONE 2 1/16" * STEEL TEETH; TRICONE 2 1/16" * TUNG-CARB.; CORE BIT</p> <p>HAMMER TYPE: AUTOMATIC; MANUAL</p> <p>CORE SIZE: B; N-02; H</p> <p>HAND TOOLS: POST HOLE DIGGER; HAND AUGER; SOUNDING ROD; VANE SHEAR TEST</p>				<p>INDURATION: FRIABLE; MODERATELY INDURATED; INDURATED; EXTREMELY INDURATED</p>				<p>INDURATION: FRIABLE; MODERATELY INDURATED; INDURATED; EXTREMELY INDURATED</p>			
PLASTICITY				EQUIPMENT USED ON SUBJECT PROJECT				INDURATION				INDURATION			
<p>NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY</p> <p>PLASTICITY INDEX (PI) DRY STRENGTH: 0-5 VERY LOW; 6-15 SLIGHT; 16-25 MEDIUM; 26 OR MORE HIGH</p>				<p>DRILL UNITS: MOBILE B-; BK-51; CME-45C; CME-550; PORTABLE HOIST; D-50T (TER255)</p> <p>ADVANCING TOOLS: CLAY BITS; 6" CONTINUOUS FLIGHT AUGER; 6" HOLLOW AUGERS; HARD FACED FINGER BITS; TUNG-CARBIDE INSERTS; CASING w/ ADVANCER; TRICONE 2 1/16" * STEEL TEETH; TRICONE 2 1/16" * TUNG-CARB.; CORE BIT</p> <p>HAMMER TYPE: AUTOMATIC; MANUAL</p> <p>CORE SIZE: B; N-02; H</p> <p>HAND TOOLS: POST HOLE DIGGER; HAND AUGER; SOUNDING ROD; VANE SHEAR TEST</p>				<p>INDURATION: FRIABLE; MODERATELY INDURATED; INDURATED; EXTREMELY INDURATED</p>				<p>INDURATION: FRIABLE; MODERATELY INDURATED; INDURATED; EXTREMELY INDURATED</p>			
COLOR				EQUIPMENT USED ON SUBJECT PROJECT				INDURATION				INDURATION			
<p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>				<p>DRILL UNITS: MOBILE B-; BK-51; CME-45C; CME-550; PORTABLE HOIST; D-50T (TER255)</p> <p>ADVANCING TOOLS: CLAY BITS; 6" CONTINUOUS FLIGHT AUGER; 6" HOLLOW AUGERS; HARD FACED FINGER BITS; TUNG-CARBIDE INSERTS; CASING w/ ADVANCER; TRICONE 2 1/16" * STEEL TEETH; TRICONE 2 1/16" * TUNG-CARB.; CORE BIT</p> <p>HAMMER TYPE: AUTOMATIC; MANUAL</p> <p>CORE SIZE: B; N-02; H</p> <p>HAND TOOLS: POST HOLE DIGGER; HAND AUGER; SOUNDING ROD; VANE SHEAR TEST</p>				<p>INDURATION: FRIABLE; MODERATELY INDURATED; INDURATED; EXTREMELY INDURATED</p>				<p>INDURATION: FRIABLE; MODERATELY INDURATED; INDURATED; EXTREMELY INDURATED</p>			

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multiple

PROJECT REFERENCE NO. 40243.1.1 (B-4965)	SHEET NO. 3
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR L/W ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
SCALE 0 25 50 FEET	
BRIDGE SKEW ANGLE : 105 DEGREES	



BM #2
BL STATION 16+9
157' LEFT
ELEV = 636.22'



EDDIE MAE MOORE L/E
DB 1165 PG 1842

RAY BULLINS
DB 844 PG 1368

JAMES M. JOYCE L/E
DB 1256 PG 730

MALINDA FAYE WEBSTER
DB 1198 PG 1403

CLARENCE SMITH, JR.
DB 745 PG 374

MATCH LINE STATION 16+50

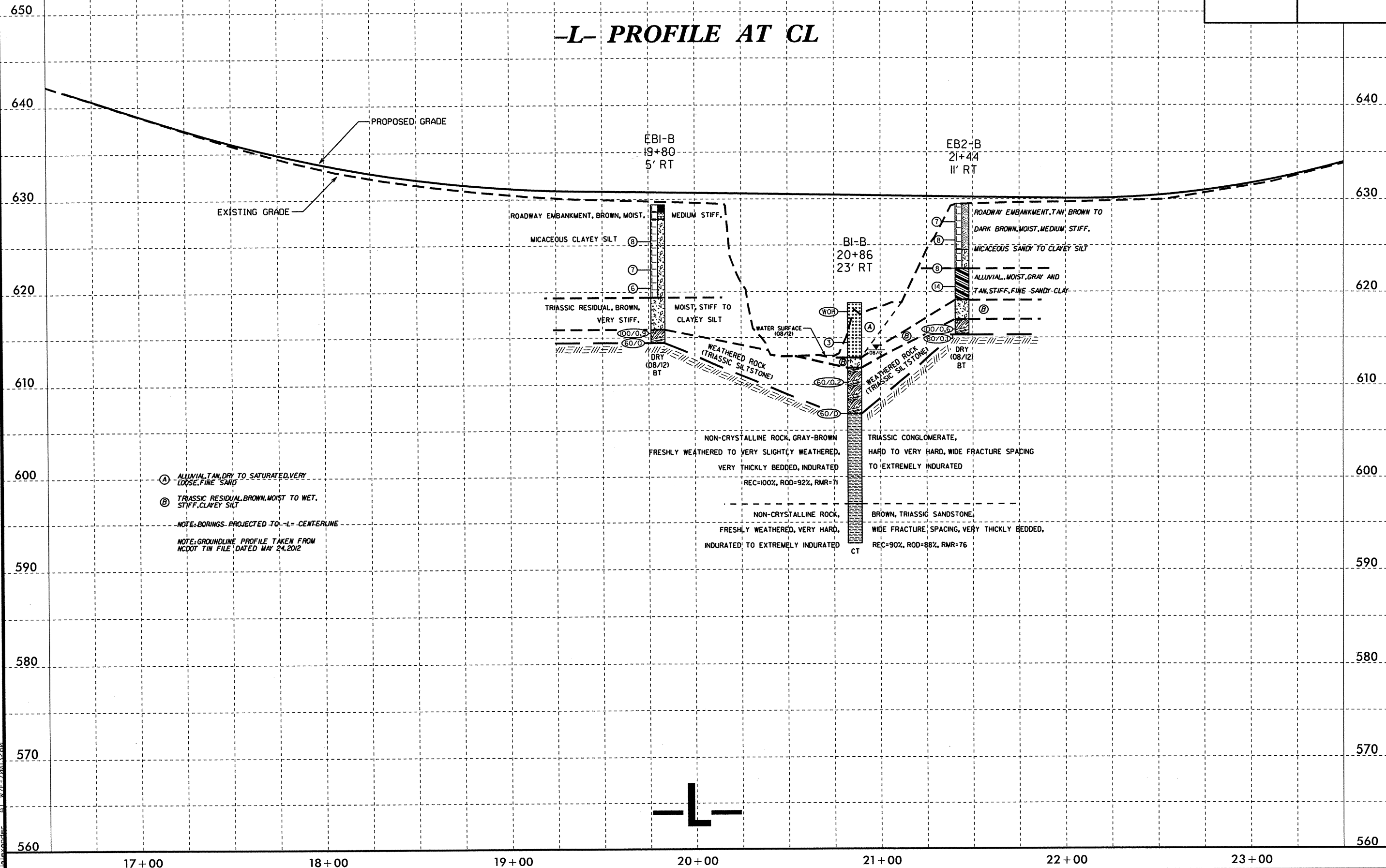
MATCH LINE STATION 23+50

5/14/99
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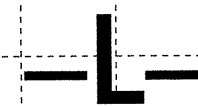
SCALE
 VERTICAL 10:1
 HORIZONTAL 50:1

PROJECT REFERENCE NO. 40243.1.1 (B-4965)	SHEET NO. 4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-L- PROFILE AT CL



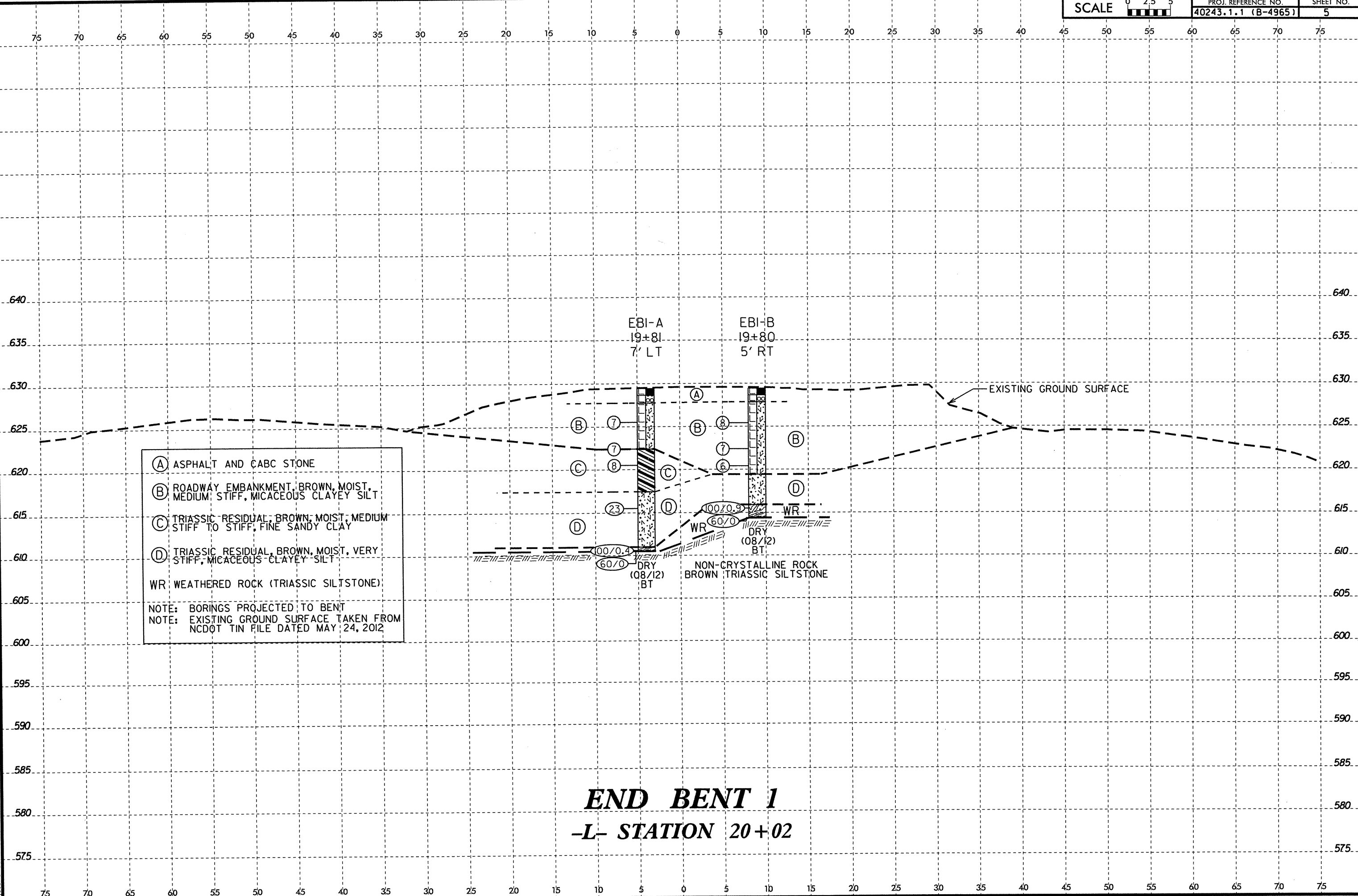
- (A) ALLUVIAL TAN DRY TO SATURATED VERY LOOSE FINE SAND
 - (B) TRIASSIC RESIDUAL BROWN MOIST TO WET STIFF CLAYEY SILT
- NOTE: BORINGS PROJECTED TO -L- CENTERLINE
- NOTE: GROUNDLINE PROFILE TAKEN FROM NCDOT TIN FILE DATED MAY 24, 2012



17+00 18+00 19+00 20+00 21+00 22+00 23+00

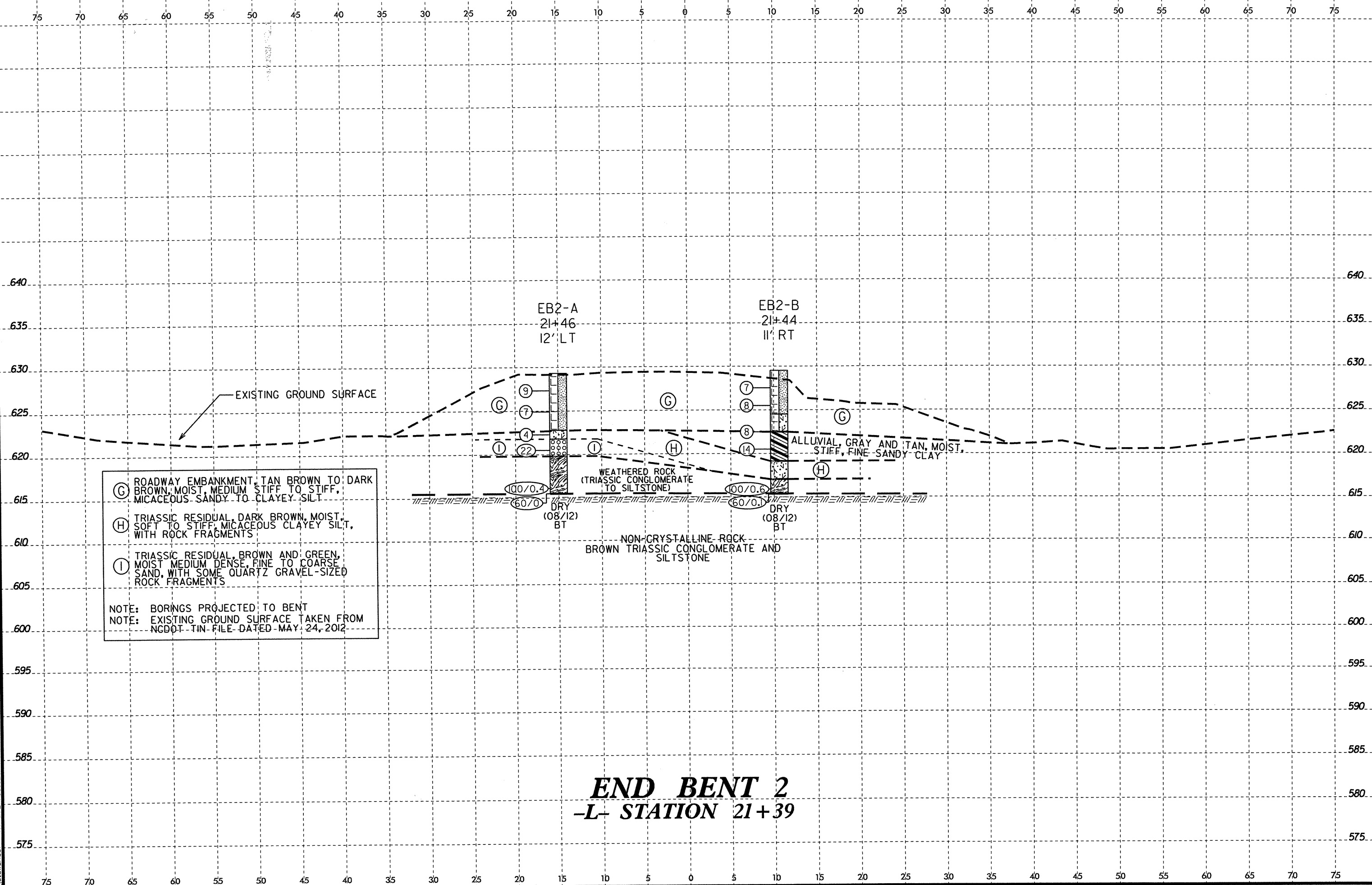
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END BENT 1
-L- STATION 20+02

8/23/09



(G) ROADWAY EMBANKMENT, TAN BROWN TO DARK BROWN, MOIST, MEDIUM STIFF TO STIFF, MICACEOUS SANDY TO CLAYEY SILT.
 (H) TRIASSIC RESIDUAL, DARK BROWN, MOIST, SOFT TO STIFF, MICACEOUS CLAYEY SILT, WITH ROCK FRAGMENTS.
 (I) TRIASSIC RESIDUAL, BROWN AND GREEN, MOIST MEDIUM DENSE, FINE TO COARSE SAND, WITH SOME QUARTZ GRAVEL-SIZED ROCK FRAGMENTS.

NOTE: BORINGS PROJECTED TO BENT
 NOTE: EXISTING GROUND SURFACE TAKEN FROM NCDOT TIN FILE DATED MAY 24, 2012

END BENT 2
-L- STATION 21+39

02-OCT-2012 11:39
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NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 40243.1.1	TIP B-4965	COUNTY ROCKINGHAM	GEOLOGIST Nash, A. A.
SITE DESCRIPTION Bridge #249 over Little Beaver Island Creek on SR 1165 (Cardinal Road)			GROUND WTR (ft)
BORING NO. EB1-A	STATION 19+81	OFFSET 7 ft LT	ALIGNMENT -L-
COLLAR ELEV. 629.4 ft	TOTAL DEPTH 18.9 ft	NORTHING 966,613	EASTING 1,700,816
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Duggins, W. T.	START DATE 08/07/12	COMP. DATE 08/07/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
630													GROUND SURFACE 0.0	
													0.8' Asphalt 0.8	
													0.9' CABC Stone 1.7	
625	626.5	2.9	4	3	4							M	ROADWAY EMBANKMENT BROWN CLAYEY SILT WITH TRACE FINE SAND AND MICA	
	623.4	6.0	4	3	4							M		
620	621.5	7.9	4	4	4							M	TRIASSIC RESIDUAL BROWN FINE SANDY CLAY	7.0
	616.5	12.9	5	10	13							M	BROWN CLAYEY MICACEOUS SILT	12.0
615	611.5	17.9												
	610.5	18.9	10	100/0.4									WEATHERED ROCK (BROWN TRIASSIC SILTSTONE)	18.4
													Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 610.5 ft ON NON-CRYSTALLINE ROCK: BROWN TRIASSIC SILTSTONE	18.9

WBS 40243.1.1	TIP B-4965	COUNTY ROCKINGHAM	GEOLOGIST Nash, A. A.
SITE DESCRIPTION Bridge #249 over Little Beaver Island Creek on SR 1165 (Cardinal Road)			GROUND WTR (ft)
BORING NO. EB1-B	STATION 19+80	OFFSET 5 ft RT	ALIGNMENT -L-
COLLAR ELEV. 629.4 ft	TOTAL DEPTH 15.0 ft	NORTHING 966,609	EASTING 1,700,827
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Duggins, W. T.	START DATE 08/07/12	COMP. DATE 08/07/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
630													GROUND SURFACE 0.0	
													0.8' Asphalt 0.8	
													0.8' CABC Stone 1.6	
625	626.4	3.0	5	4	4							M	ROADWAY EMBANKMENT BROWN CLAYEY SILT WITH TRACE FINE SAND AND MICA	
	623.4	6.0										M		
620	621.4	8.0	3	3	3							M	TRIASSIC RESIDUAL BROWN CLAYEY SILT	10.0
	616.4	13.0	43	34	66/0.4									
615	614.4	15.0											WEATHERED ROCK (BROWN TRIASSIC SILTSTONE)	15.0
													Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 614.4 ft ON NON-CRYSTALLINE ROCK: BROWN TRIASSIC SILTSTONE	

NCDOT BORE DOUBLE B4965_GEO_BRDG_BORINGS.GPJ NC_DOT.GDT 10/2/12

WBS 40243.1.1		TIP B-4965		COUNTY ROCKINGHAM		GEOLOGIST Nash, A. A.								
SITE DESCRIPTION Bridge #249 over Little Beaver Island Creek on SR 1165 (Cardinal Road)							GROUND WTR (ft)							
BORING NO. B1-A		STATION 20+92		OFFSET 19 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 619.2 ft		TOTAL DEPTH 20.7 ft		NORTHING 966,723		EASTING 1,700,833								
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011				DRILL METHOD Wash Boring		HAMMER TYPE Automatic								
DRILLER Duggins, W. T.		START DATE 08/06/12		COMP. DATE 08/06/12		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	L O G	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
620	619.2	0.0												619.2 GROUND SURFACE 0.0
			WOH	WOH	3	3							D	ALLUVIAL TAN FINE SAND WITH TRACE SILT
615	616.4	2.8	1	0	1	1								
														613.2 TRIASSIC RESIDUAL 6.0
													Sat.	610.9 BROWN TAN SILTY FINE SAND WITH TRACE CLAY 8.3
610	611.4	7.8	19	35	65/0.4									WEATHERED ROCK (BROWN TRIASSIC SANDSTONE)
														606.4 NON-CRYSTALLINE ROCK 12.8
605	606.4	12.8			60/0.1									BROWN TRIASSIC SANDSTONE
600	601.4	17.8			60/0.1									
	598.5	20.7			60/0									598.5 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 598.5 ft IN NON-CRYSTALLINE ROCK: BROWN TRIASSIC SILTSTONE 20.7

WBS 40243.1.1		TIP B-4965		COUNTY ROCKINGHAM		GEOLOGIST Nash, A. A.								
SITE DESCRIPTION Bridge #249 over Little Beaver Island Creek on SR 1165 (Cardinal Road)							GROUND WTR (ft)							
BORING NO. B1-B		STATION 20+86		OFFSET 23 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 618.8 ft		TOTAL DEPTH 26.0 ft		NORTHING 966,707		EASTING 1,700,871								
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011			DRILL METHOD Core Boring			HAMMER TYPE Automatic								
DRILLER Duggins, W. T.		START DATE 08/06/12		COMP. DATE 08/06/12		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT				SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75					100
620	618.8	0.0	WOH	WOH	WOH							618.8	GROUND SURFACE	0.0
615	615.4	3.4	WOH	1	2							612.8	ALLUVIAL TAN FINE SAND WITH TRACE SILT	6.0
610	610.4	8.4										611.8	TRIASSIC RESIDUAL BROWN CLAYEY SILT WEATHERED ROCK (BROWN TRIASSIC SILTSTONE)	7.0
605	606.8	12.0										606.8	NON-CRYSTALLINE ROCK GRAY-BROWN TRIASSIC CONGLOMERATE	12.0
600												597.0	NON-CRYSTALLINE ROCK BROWN TRIASSIC SANDSTONE	21.8
595												592.8	NON-CRYSTALLINE ROCK BROWN TRIASSIC SANDSTONE	26.0
Boring Terminated at Elevation 592.8 ft IN NON-CRYSTALLINE ROCK: BROWN TRIASSIC SANDSTONE														

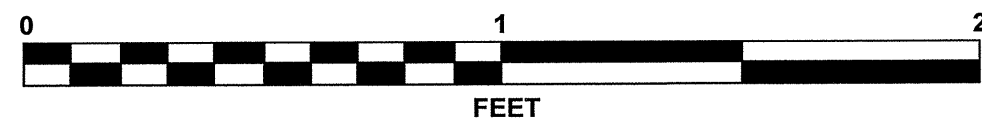
NCDOT BORE SINGLE B4965_GEO_BRDG_BORINGS.GPJ NC_DOT_GDT 9/28/12

WBS 40243.1.1		TIP B-4965		COUNTY ROCKINGHAM		GEOLOGIST Nash, A. A.						
SITE DESCRIPTION Bridge #249 over Little Beaver Island Creek on SR 1165 (Cardinal Road)							GROUND WTR (ft)					
BORING NO. B1-B		STATION 20+86		OFFSET 23 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 618.8 ft		TOTAL DEPTH 26.0 ft		NORTHING 966,707		EASTING 1,700,871						
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011			DRILL METHOD Core Boring			HAMMER TYPE Automatic						
DRILLER Duggins, W. T.		START DATE 08/06/12		COMP. DATE 08/06/12		SURFACE WATER DEPTH N/A						
CORE SIZE NQ2			TOTAL RUN 14.0 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	ROD (%)		REC. (%)	ROD (%)			
606.8	606.8	12.0	4.0	N=60/0 4:31/1.0 4:11/1.0 3:49/1.0 2:35/1.0	(4.0)	(4.0)		(9.8)	(9.0)		Begin Coring @ 12.0 ft	12.0
605	602.8	16.0	5.0	4:11/1.0 4:27/1.0 4:05/1.0 4:06/1.0 4:31/1.0	(5.0)	(5.0)	RS-1	100%	100%		NON-CRYSTALLINE ROCK GRAY-BROWN TRIASSIC CONGLOMERATE, FRESHLY WEATHERED TO VERY SLIGHTLY WEATHERED, HARD TO VERY HARD, WIDE FRACTURE SPACING, VERY THICKLY BEDDED, INDURATED TO EXTREMELY INDURATED	
600	597.8	21.0	5.0	4:00/1.0 2:57/1.0 3:02/1.0 2:43/1.0 2:57/1.0	(4.8)	(3.7)	RS-2	96%	74%		3 - JOINTS AT < 30 DEGREES BETWEEN 21.1 TO 21.5 FT 1 - VERTICAL JOINT BETWEEN 21.5 TO 21.8 FT R1=7, R2=20, R3=25, R4=12, R5=7, RMR=71	21.8
595	592.8	26.0									NON-CRYSTALLINE ROCK BROWN TRIASSIC SANDSTONE, FRESHLY WEATHERED, VERY HARD, WIDE FRACTURE SPACING, VERY THICKLY BEDDED, INDURATED TO EXTREMELY INDURATED	26.0
R1=7, R2=17, R3=25, R4=2, R5=7, RMR=76 Boring Terminated at Elevation 592.8 ft IN NON-CRYSTALLINE ROCK: BROWN TRIASSIC SANDSTONE												

CORE PHOTOGRAPHS

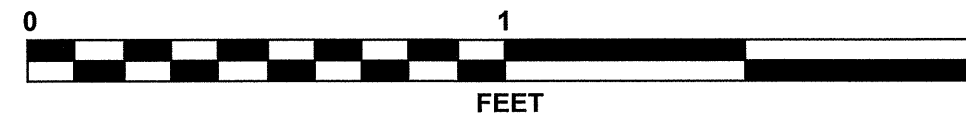
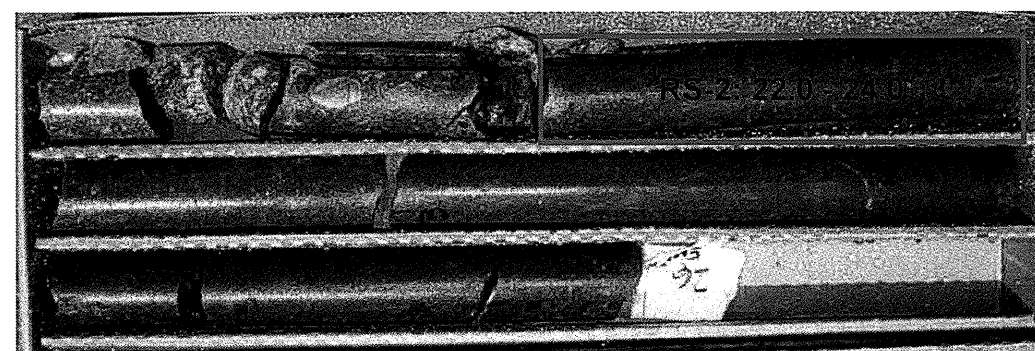
B1-B

BOX 1: 12.0 - 21.0 FEET



B1-B

BOX 2: 21.0 - 26.0 FEET



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 40243.1.1	TIP B-4965	COUNTY ROCKINGHAM	GEOLOGIST Nash, A. A.
SITE DESCRIPTION Bridge #249 over Little Beaver Island Creek on SR 1165 (Cardinal Road)			GROUND WTR (ft)
BORING NO. EB2-A	STATION 21+46	OFFSET 12 ft LT	ALIGNMENT -L-
			0 HR. Dry
COLLAR ELEV. 629.3 ft	TOTAL DEPTH 13.8 ft	NORTHING 966,773	EASTING 1,700,854
			24 HR. Dry
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Duggins, W. T.	START DATE 08/06/12	COMP. DATE 08/06/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
630														629.3	GROUND SURFACE	0.0
	628.3	1.0	4	4	5										ROADWAY EMBANKMENT BROWN SILT WITH TRACE FINE SAND, GRAVEL AND MICA	
625	625.9	3.4	4	3	4											
	623.3	6.0	5	2	2											
620	621.5	7.8	5	10	12										TRIASSIC RESIDUAL DARK BROWN CLAYEY SILT WITH TRACE MICA AND ROCK FRAGMENTS	6.5
	616.5	12.8													BROWN AND GREEN CLAYEY FINE TO COARSE SAND WITH SOME QUARTZ GRAVEL-SIZED ROCK FRAGMENTS	9.5
	615.5	13.8	100/0.4												WEATHERED ROCK (BROWN TRIASSIC CONGLOMERATE)	13.8
			60/0												Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 615.5 ft ON NON-CRYSTALLINE ROCK: BROWN TRIASSIC CONGLOMERATE	

WBS 40243.1.1	TIP B-4965	COUNTY ROCKINGHAM	GEOLOGIST Nash, A. A.
SITE DESCRIPTION Bridge #249 over Little Beaver Island Creek on SR 1165 (Cardinal Road)			GROUND WTR (ft)
BORING NO. EB2-B	STATION 21+44	OFFSET 11 ft RT	ALIGNMENT -L-
			0 HR. Dry
COLLAR ELEV. 629.5 ft	TOTAL DEPTH 14.2 ft	NORTHING 966,766	EASTING 1,700,875
			24 HR. Dry
DRILL RIG/HAMMER EFF./DATE TER255 DIEDRICH D-50 77% 07/15/2011		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Duggins, W. T.	START DATE 08/06/12	COMP. DATE 08/06/12	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
630														629.5	GROUND SURFACE	0.0
	628.5	1.0	4	4	3										ROADWAY EMBANKMENT TAN BROWN MICACEOUS SILT WITH TRACE FINE SAND AND GRAVEL	
625	626.5	3.0	4	4	4											
	623.5	6.0	3	3	5										DARK BROWN CLAYEY MICACEOUS SILT	5.0
	621.5	8.0	4	5	9										ALLUVIAL GRAY AND TAN FINE SANDY CLAY WITH FINE SAND LAYERS	7.0
620	616.5	13.0													TRIASSIC RESIDUAL BROWN CLAYEY SILT WITH TRACE MICA	10.4
	615.4	14.1	92	8/0.1											WEATHERED ROCK (BROWN TRIASSIC SILTSTONE)	12.5
			60/0.1												NON-CRYSTALLINE ROCK BROWN TRIASSIC SILTSTONE	14.1
															Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 615.3 ft IN NON-CRYSTALLINE ROCK: BROWN TRIASSIC SILTSTONE	14.2

NCDOT BORE DOUBLE B4885_GEO_BRDG_BORINGS.GPJ NC_DOT.GDT 10/2/12

**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAY
MATERIALS & TESTS UNIT
PHYSICAL TESTING LABORATORY**

SHEET 13 OF 14

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

PROJECT NO.: 40243.1.1
F.A. NO.: BRZ-1165(6)
COUNTY: ROCKINGHAM
BRIDGE NO. 249 OVER LITTLE BEAVER ISLAND CREEK ON SR 1165 (CARDINAL ROAD)

Sample #	Boring #	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (in)	Diameter (in)	Unit Weight (PCF)	Unconfined Compressive Strength (KSI)	Young's Modulus (MPSI)	Splitting Tensile Strength (PSI)	Remarks
RS-1	B1-B	13.5 - 14.4	TRIASSIC CONGLOMERATE	TrDS	100	3.78	1.99	166.8	13.3	8.39	n/a	
RS-2	B1-B	22.0 - 24.0	TRIASSIC SANDSTONE	TrDS	74	3.81	1.98	173.8	12.7	8.39	n/a	

T. I. P. No. B-4965

REPORT ON SAMPLES OF ROCK COMPRESSION

Project 40243.1.1 **County** Rockingham **Owner** Andrew Nash
Date: Sampled 4/4/2012 **Received** 4/4/2012 **Reported** 9/26/12
Sampled from _____ **By** _____
Submitted by Andrew Nash **Standard Specifications** 2006
Tested By Dan Miller **Date Tested** 9/26/2012

TEST RESULTS

Proj. Sample No.		RS-1	RS-2			
Lab. Sample No.		P381989	P381989			
Diameter	in	1.986	1.98			
Specimen Height	in	3.780	3.81			
Area	in ²	3.098	3.079			
H/D Ratio		1.90	1.92			
Weight	lbf	1.13	1.18			
Unit Weight	lbf/ft ³	166.8	173.8			
Ultimate	lbf	41500	39500.0			
Ultimate	ksi	13.397	12.829			
Ultimate Corrected	ksi	13.33	12.76			
Sec Mod @ 40%	Mpsi	8.39	8.39			
Station		20+86	20+86			
Offset		23' RT	23' RT			
Alignment						
Depth (ft)		13.50	22.00			
	to	14.40	24.00			

cc:

V. O. Cordle
Physical Testing Engineer

SITE PHOTOGRAPHS



PHOTO TAKEN FROM EXISTING BRIDGE DECK FACING UP STREAM



PHOTO TAKEN FROM EXISTING BRIDGE DECK FACING DOWN STREAM



PHOTO TAKEN FROM UP STATION OF BRIDGE FACING DOWN STATION



PHOTO TAKEN FROM DOWN STATION OF BRIDGE FACING UP STATION