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STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	40373.1.1(U-4910)	1	26

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

STRUCTURE
SUBSURFACE INVESTIGATION

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PROJ. REFERENCE NO. 40373.1.1 (U-4910) F.A. PROJ. STTP-1445(4)
COUNTY CABARRUS
PROJECT DESCRIPTION SR 1445 (DERITA ROAD) WIDENING
FROM NORTH OF SR 3894 (CONCORD MILLS BOULEVARD)
TO SR 1394 (POPLAR TENT ROAD)
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER

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.

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

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON 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.

ID: U-4910

PROJECT:

PERSONNEL
EVANS, T. E.

SOIL DRILLING

INVESTIGATED BY EVANS, T. E.

CHECKED BY HAMM, J. R.

SUBMITTED BY FALCON

DATE JULY 2014

DRAWN BY: EVANS, T. E.

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

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



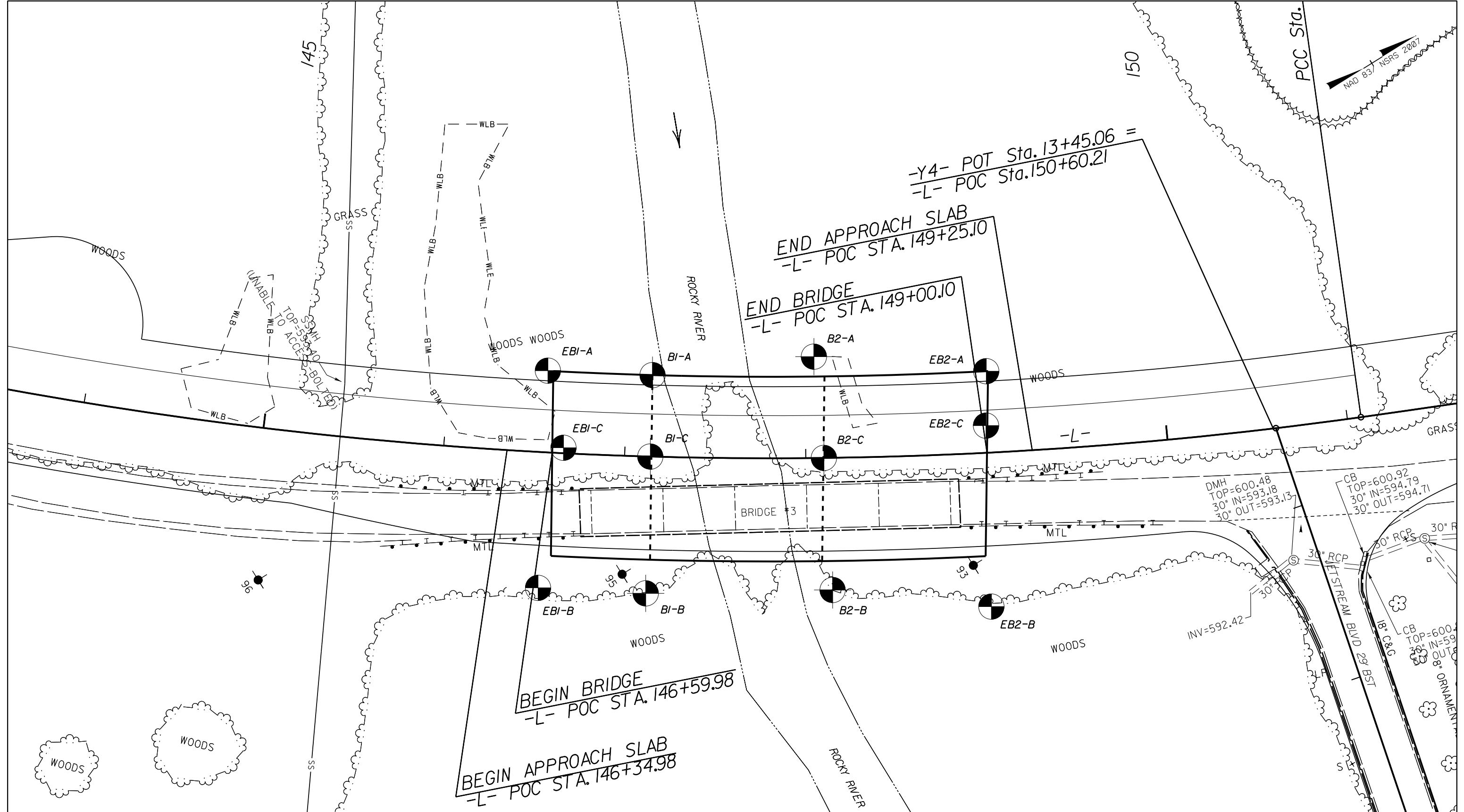
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO. 40373.1(U-4910)	SHEET NO. 2
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SUBSURFACE INVESTIGATION

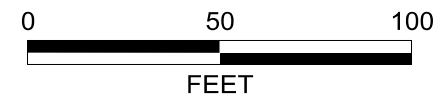
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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 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, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i>	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. ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR , SUBANGULAR , SUBROUNDED , OR ROUNDED .	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 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)	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 DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (IN OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
SOIL LEGEND AND AASHTO CLASSIFICATION	MINERALOGICAL COMPOSITION	WEATHERING	
GENERAL CLASS. GRANULAR MATERIALS (≤ 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	FRESH - ROCK FRESH, CRYSTALLINE BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SLI.) - ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN, CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY, ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SLI.) - ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH, OPEN JOINTS MAY CONTAIN CLAY, IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) - SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) - ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> 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. <i>IF TESTED, YIELDS SPT N VALUES > 100 BPF</i> 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. <i>IF TESTED, YIELDS SPT N VALUES < 100 BPF</i> 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.	
COMPRESSION SLIGHTLY COMPRESSIBLE MODERATELY COMPRESSIBLE HIGHLY COMPRESSIBLE	COMPRESSION LIQUID LIMIT LESS THAN 31 LIQUID LIMIT EQUAL TO 31-50 LIQUID LIMIT GREATER THAN 50	PERCENTAGE OF MATERIAL ORGANIC MATERIAL TRACE OF ORGANIC MATTER 2 - 3% LITTLE ORGANIC MATTER 3 - 5% MODERATELY ORGANIC 5 - 10% HIGHLY ORGANIC >10%	
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	MISCELLANEOUS SYMBOLS ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD	ROCK HARDNESS VERY HARD - CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD - CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD - CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD - CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT - CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT - CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.	
CONSISTENCY OR DENSENESS PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/F ²)	ABBREVIATIONS AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY MED. - MEDIUM MICA. - MICA MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY VST - VANE SHEAR TEST WEA. - WEATHERED γ - UNIT WEIGHT γ _d - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO		
TEXTURE OR GRAIN SIZE U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053			
SOIL MOISTURE - CORRELATION OF TERMS SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION			
PLASTICITY NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY			
COLOR DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.			
EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550X PORTABLE HOIST ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG.-CARBIDE INSERTS CASING w/ ADVANCER TRICONE *STEEL TEETH TRICONE *TUNG.-CARB. CORE BIT HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: -B -N Q2 -H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST	FRACTURE SPACING TERM VERY WIDE WIDE MODERATELY CLOSE CLOSE VERY CLOSE SPACING MORE THAN 10 FEET 3 TO 10 FEET 1 TO 3 FEET 0.16 TO 1 FEET LESS THAN 0.16 FEET	BEDDING TERM VERY THICKLY BEDDED THICKLY BEDDED THINLY BEDDED VERY THINLY BEDDED THICKLY LAMINATED THINLY LAMINATED THICKNESS > 4 FEET 1.5 - 4 FEET 0.16 - 1.5 FEET 0.03 - 0.16 FEET 0.008 - 0.03 FEET < 0.008 FEET	INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF THE MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE - RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED - GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED - GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED - SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.
			GROUND ELEVATIONS OBTAINED FROM TIN FILES ELEVATION: FT. NOTES: FIAD - *FILLED IMMEDIATELY AFTER DRILLING*



NOTES:

- PLANS ADOPTED FROM ELECTRONIC FILES RECEIVED FROM AECOM, IN SEPTEMBER 2013.
- APPROXIMATE BRIDGE SKEW = 90°

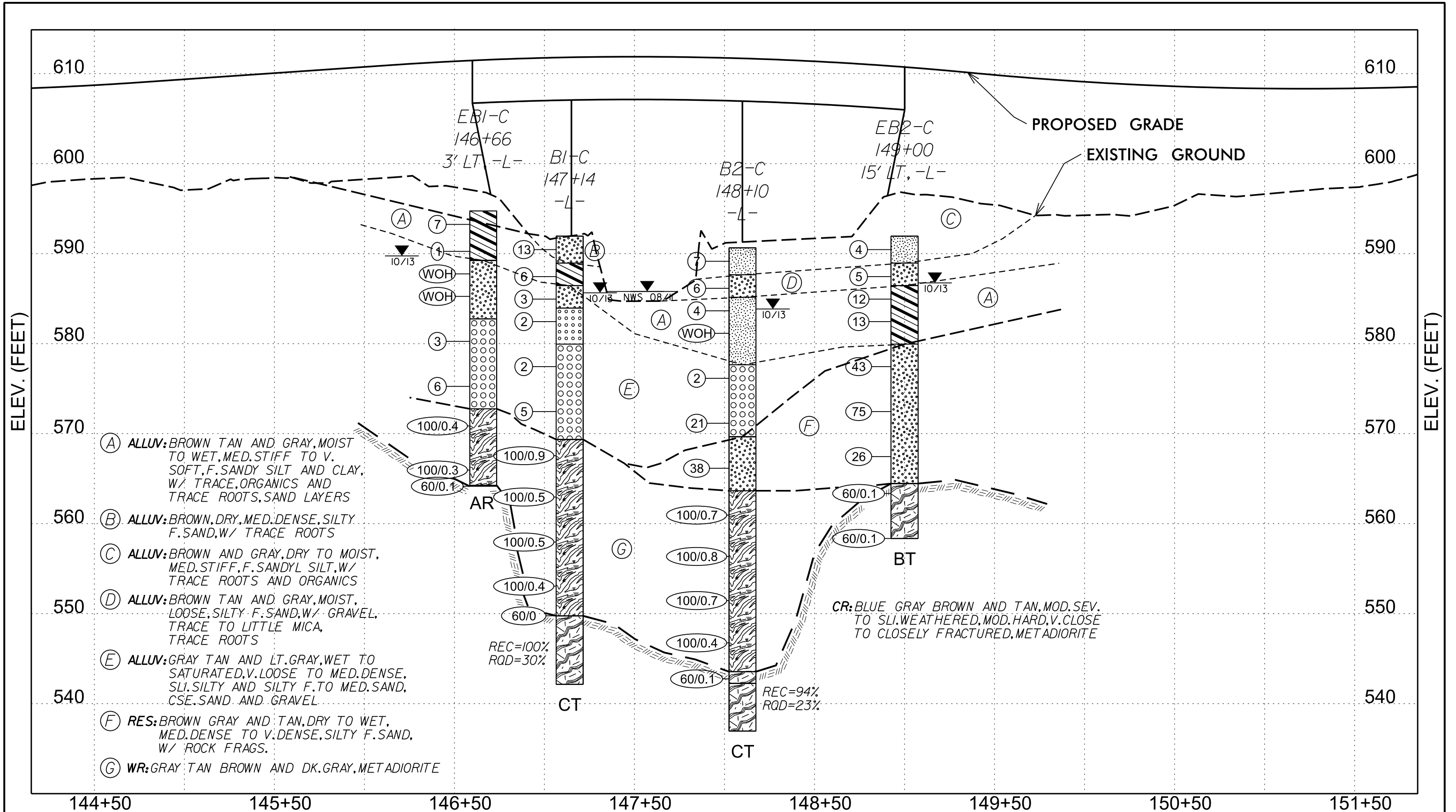


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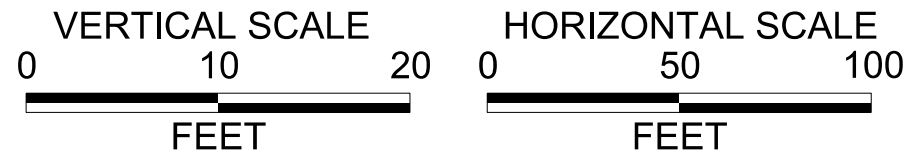
SITE PLAN

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS: 40373.1.1, TIP.: U-4910
FALCON PROJECT NO.: G13026.00



NOTES:

- GROUNDLINE PROFILE OF -L- TAKEN FROM BRIDGE SURVEY AND HYDRAULIC DESIGN REPORT, DATED SEPTEMBER 2013.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
- BRIDGE SKEW: 90 DEGREES



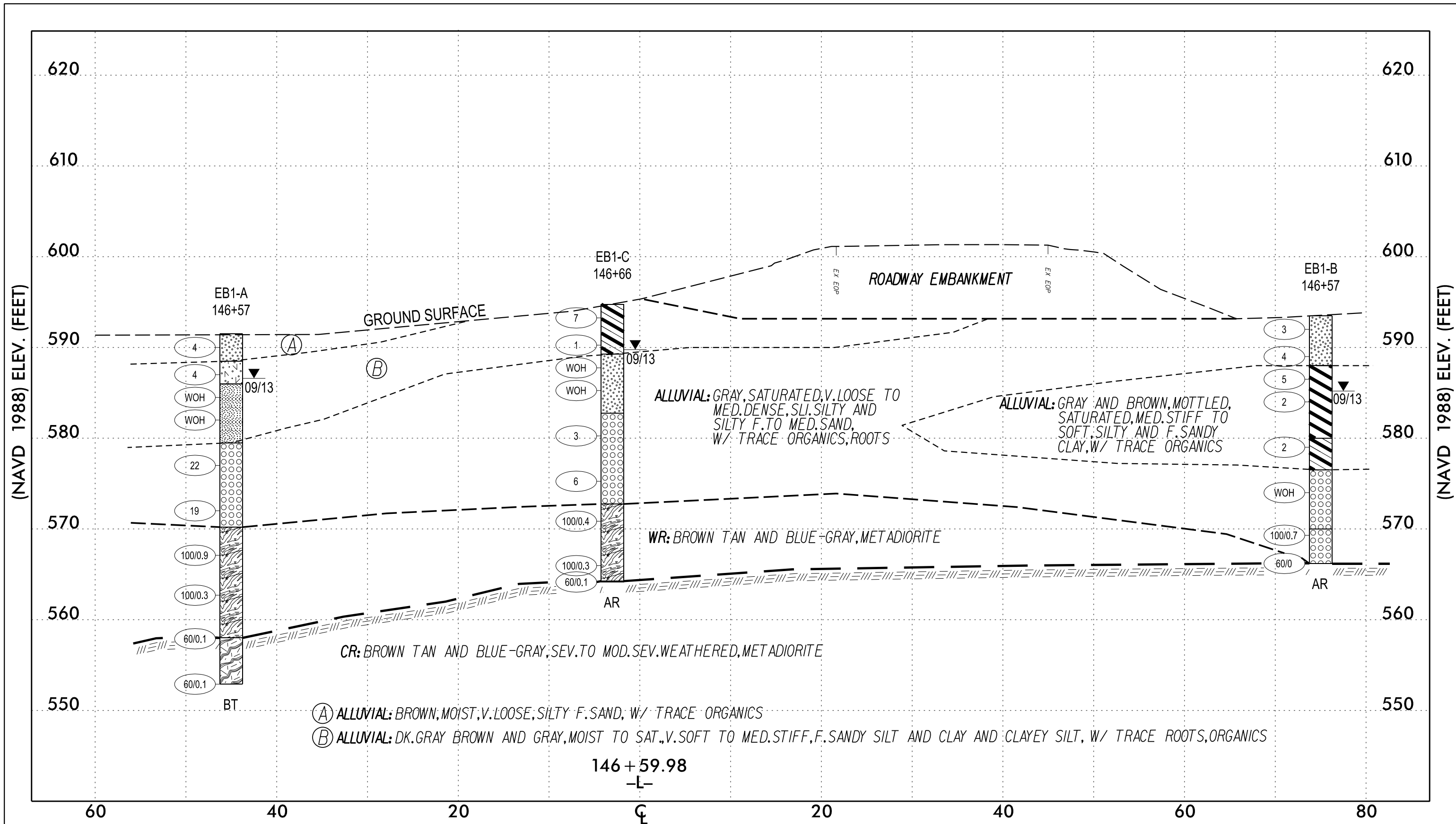
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SUBSURFACE PROFILE ALONG -L-

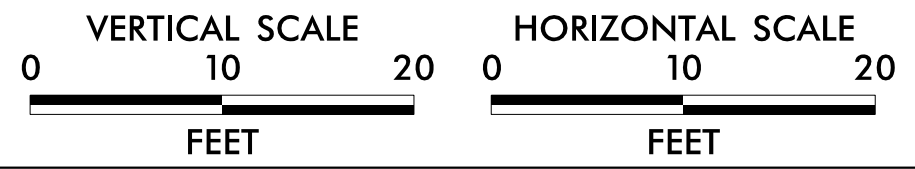
BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
 OVER ROCKY RIVER
 CABARRUS COUNTY, NORTH CAROLINA
 WBS.: 40373.1.1, TIP.: U-4910
 FALCON PROJECT NO.: G13026.00



- (A) ALLUVIAL: BROWN, MOIST, V. LOOSE, SILTY F. SAND, W/ TRACE ORGANICS
- (B) ALLUVIAL: DK. GRAY BROWN AND GRAY, MOIST TO SAT., V. SOFT TO MED. STIFF, F. SANDY SILT AND CLAY AND CLAYEY SILT, W/ TRACE ROOTS, ORGANICS

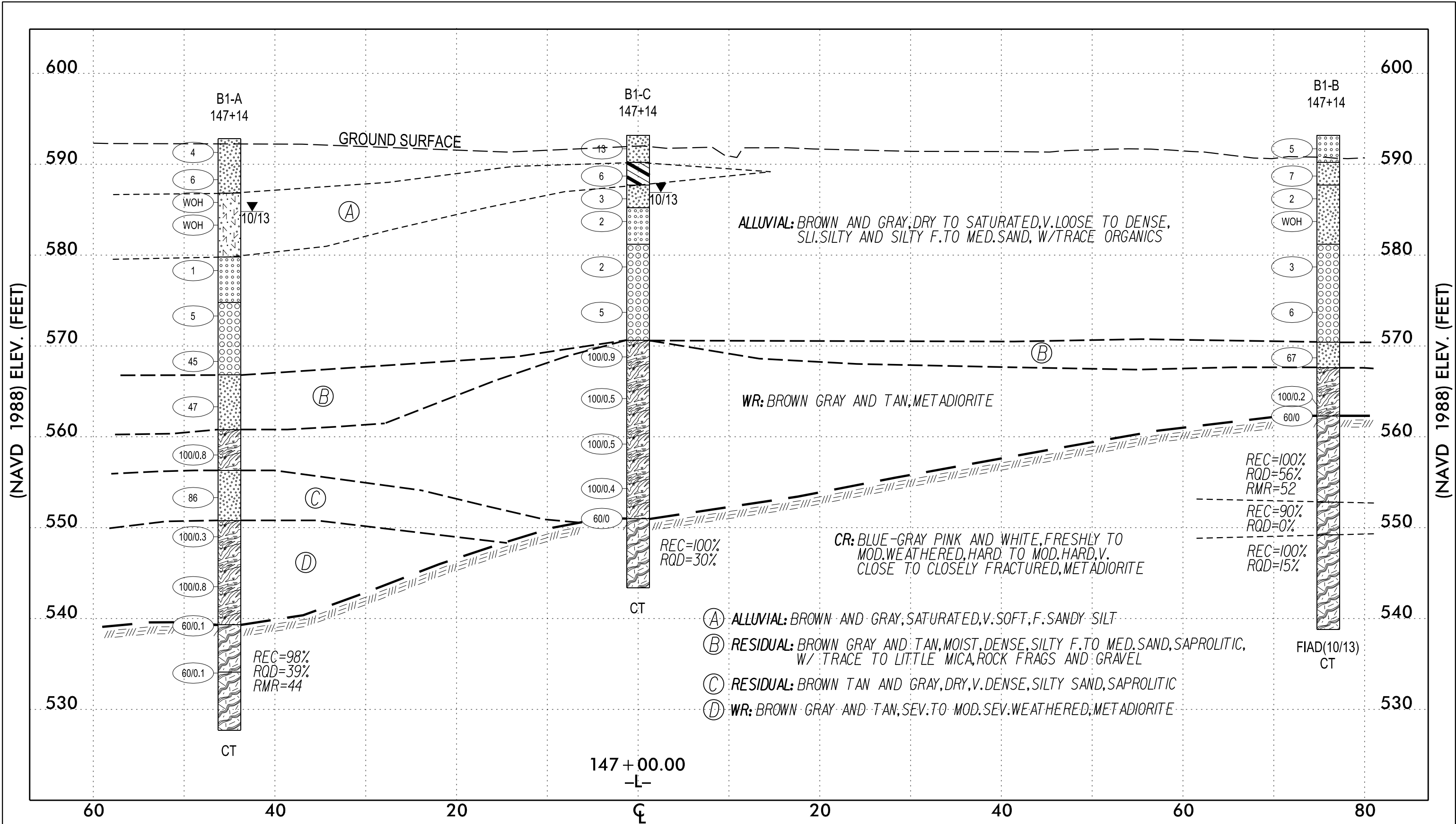
146 + 59.98
-L-

NOTES:
 • GROUNDLINE PROFILE OF -L- TAKEN FROM ELECTRONIC FILES RECEIVED FROM AECOM DATED SEPTEMBER 2013.
 • INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
 • APPROXIMATE BRIDGE SKEW: 90 DEGREES



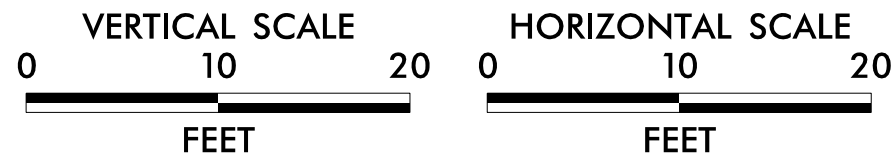
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SUBSURFACE CROSS SECTION - EB1
 BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
 OVER ROCKY RIVER
 CABARRUS COUNTY, NORTH CAROLINA
 WBS.: 40373.1.1, TIP.: U-4910
 FALCON PROJECT NO.: G13026.00



NOTES:

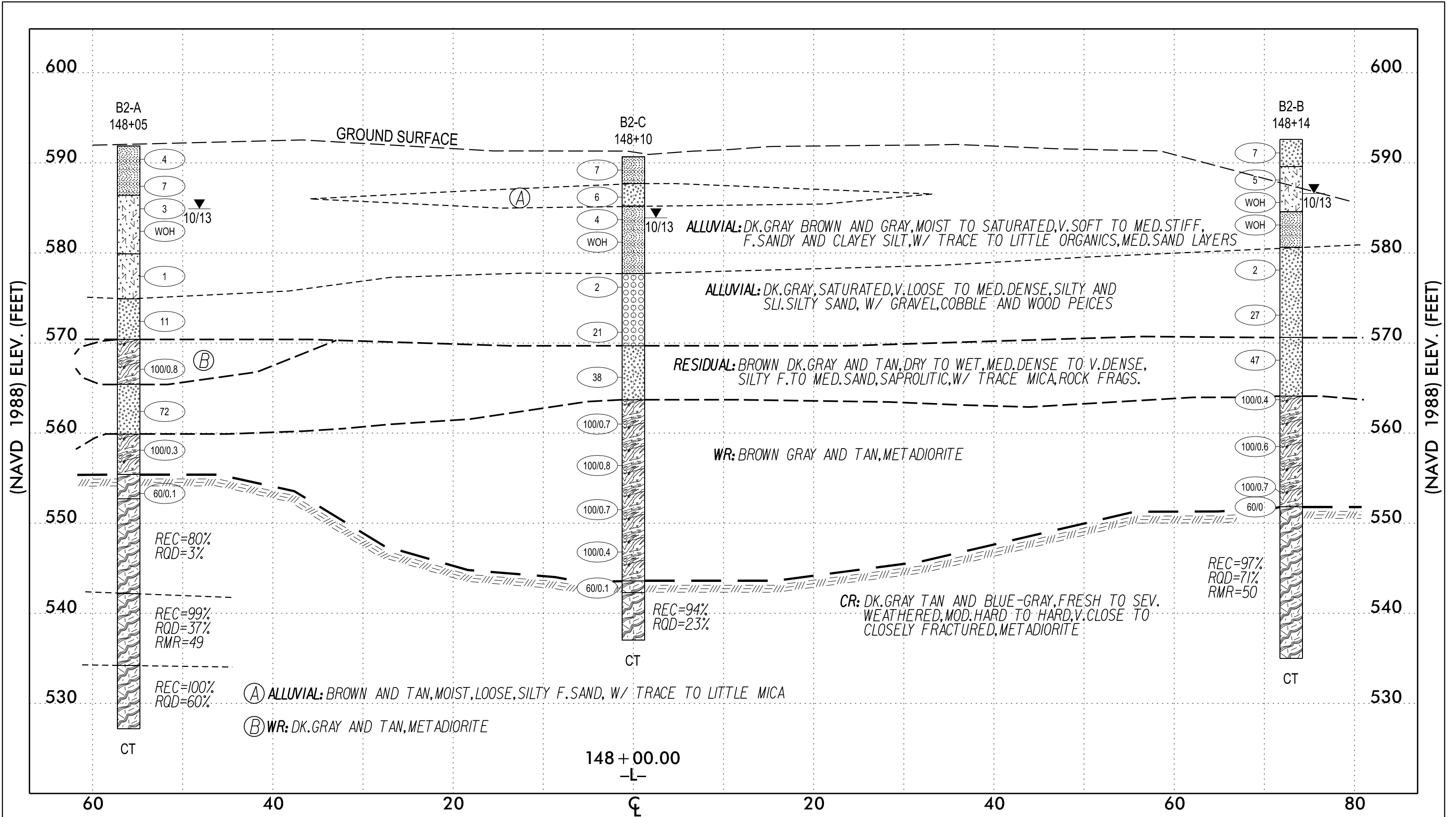
- GROUNDLINE PROFILE OF -L- TAKEN FROM ELECTRONIC FILES RECEIVED FROM AECOM DATED SEPTEMBER 2013.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
- APPROXIMATE BRIDGE SKEW: 90 DEGREES



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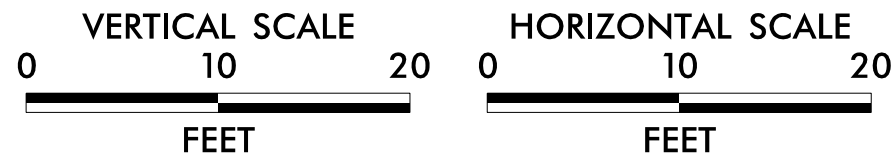
SUBSURFACE CROSS SECTION - B1

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1, TIP.: U-4910
FALCON PROJECT NO.: G13026.00



NOTES:

- GROUNDLINE PROFILE OF -L- TAKEN FROM ELECTRONIC FILES RECIEVED FROM AECOM DATED SEPTEMBER 2013.
- INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
- APPROXIMATE BRIDGE SKEW: 90 DEGREES



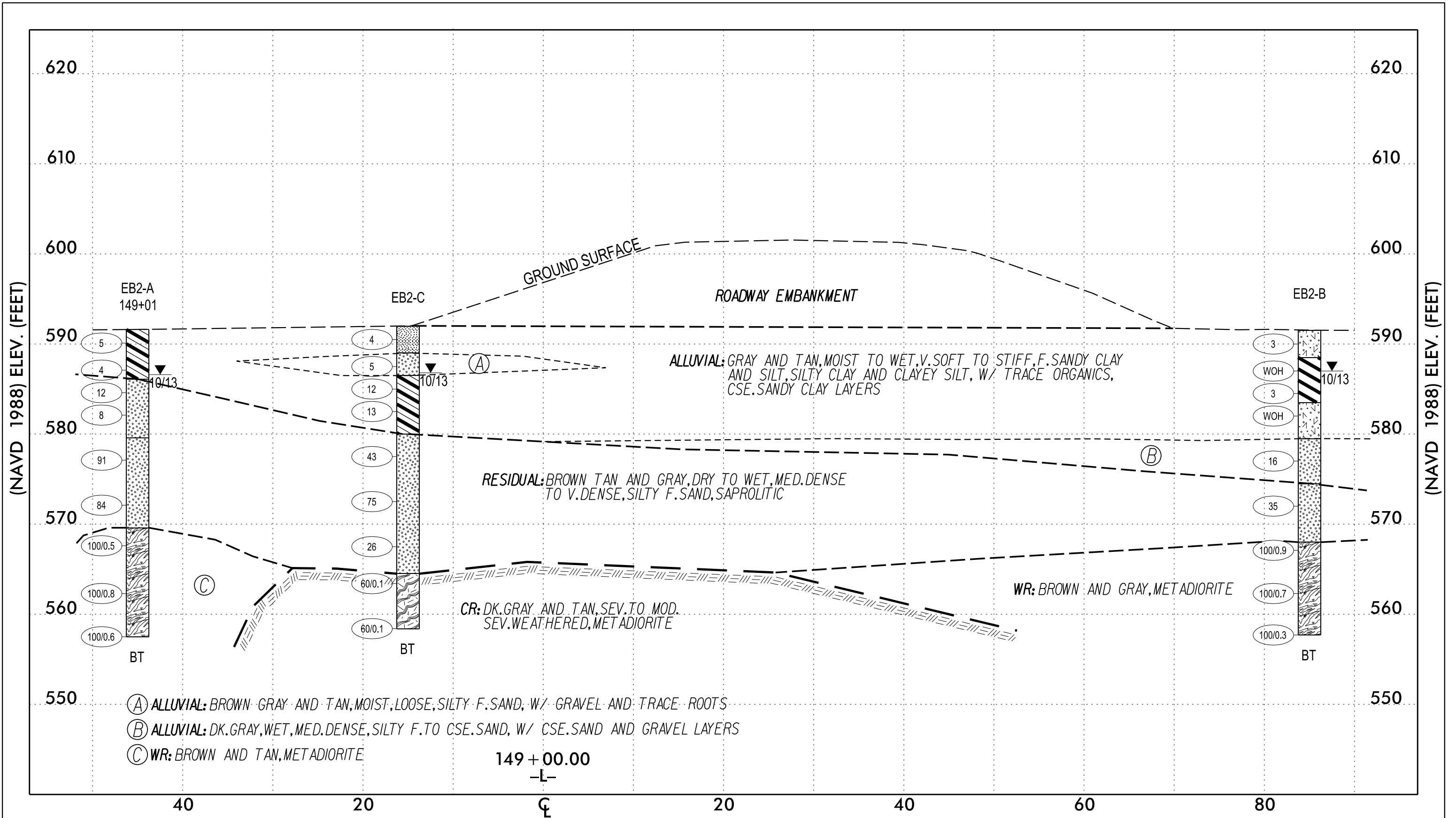
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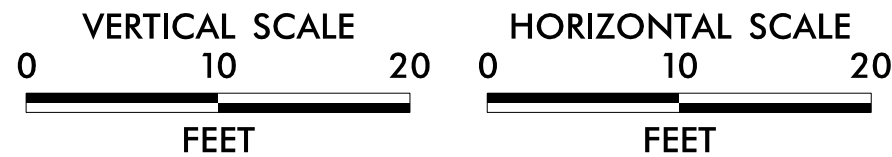
PHONE: 919.871.0800
FAX: 919.871.0803

SUBSURFACE CROSS SECTION - B2

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1, TIP.: U-4910
FALCON PROJECT NO.: G13026.00



NOTES:
 • GROUNDLINE PROFILE OF -L- TAKEN FROM ELECTRONIC FILES RECEIVED FROM AECOM DATED SEPTEMBER 2013.
 • INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS WITH BOTH PROJECTED ONTO THE PROFILE.
 • APPROXIMATE BRIDGE SKEW: 90 DEGREES



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SUBSURFACE CROSS SECTION - EB2
 BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
 OVER ROCKY RIVER
 CABARRUS COUNTY, NORTH CAROLINA
 WBS.: 40373.1.1, TIP.: U-4910
 FALCON PROJECT NO.: G13026.00

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

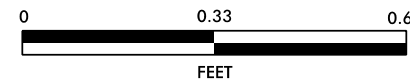
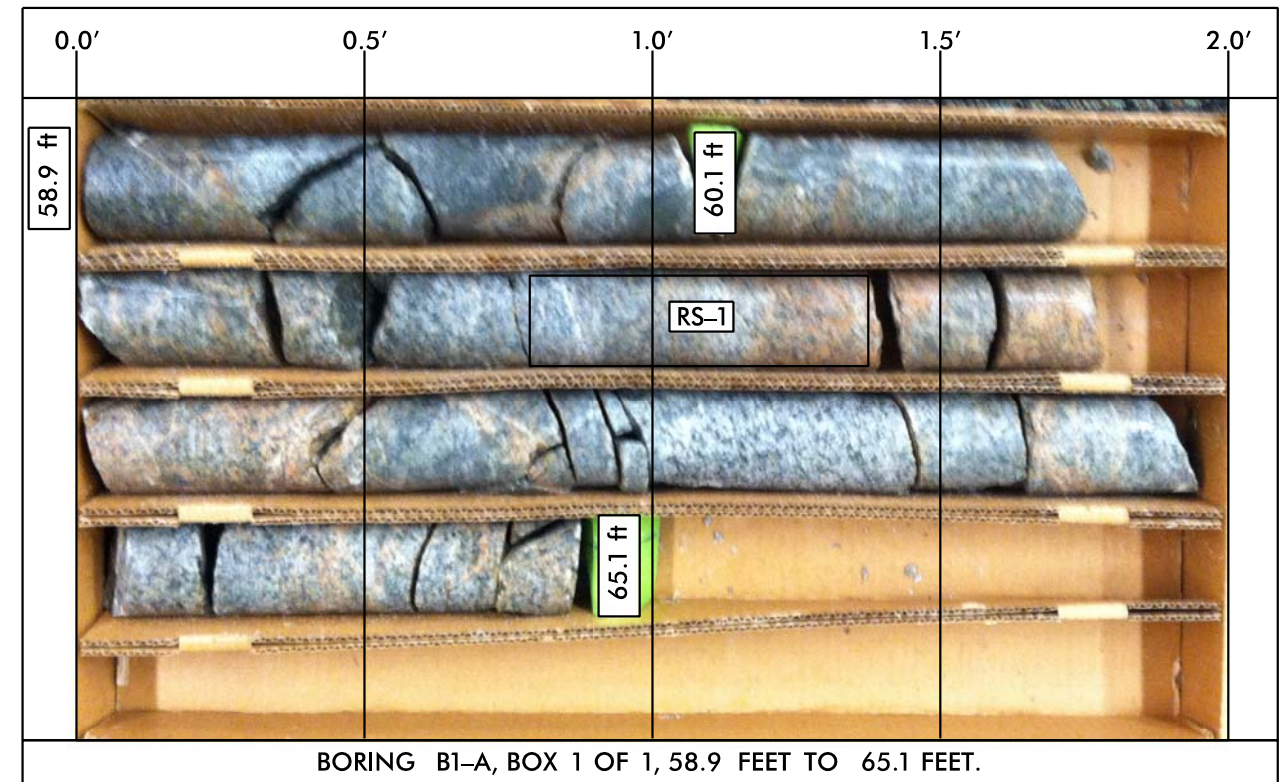
WBS 40373.1.1	TIP U-4910	COUNTY CABARRUS	GEOLOGIST EVANS, T. E.
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER			GROUND WTR (ft)
BORING NO. EB1-A	STATION 146+57	OFFSET 45 ft LT	ALIGNMENT -L-
COLLAR ELEV. 591.5 ft	TOTAL DEPTH 38.6 ft	NORTHING 598,701	EASTING 1,486,811
DRILL RIG/HAMMER EFF./DATE SOI8513 CME-550X 90% 08/21/2013		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER WHITE, J. D.	START DATE 09/30/13	COMP. DATE 09/30/13	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					
595															
590	591.0	0.5	1	2	2										
	588.0	3.5	2	2	2										
585	585.5	6.0	WOH	WOH	WOH										
	583.0	8.5	WOH	WOH	WOH										
580															
	578.0	13.5	4	10	12										
575															
	573.0	18.5	8	8	11										
570															
	568.0	23.5	32	68/0.4											
565															
	563.0	28.5	100/0.3												
560															
	558.0	33.5	60/0.1												
555															
	553.0	38.5	60/0.1												

WBS 40373.1.1	TIP U-4910	COUNTY CABARRUS	GEOLOGIST EVANS, T. E.
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER			GROUND WTR (ft)
BORING NO. EB1-B	STATION 146+57	OFFSET 75 ft RT	ALIGNMENT -L-
COLLAR ELEV. 593.5 ft	TOTAL DEPTH 27.3 ft	NORTHING 598,632	EASTING 1,486,910
DRILL RIG/HAMMER EFF./DATE SOI8513 CME-550X 90% 08/21/2013		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER WHITE, J. D.	START DATE 10/01/13	COMP. DATE 10/01/13	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					
595															
	593.0	0.5	1	1	2										
590															
	590.0	3.5	2	2	2										
	587.5	6.0	2	2	3										
585															
	585.0	8.5	WOH	WOH	2										
580															
	580.0	13.5	WOH	1	1										
575															
	575.0	18.5	WOH	WOH	WOH										
570															
	570.0	23.5	70	30/0.2											
	566.2	27.3	60/0												

NCDOT BORE DOUBLE U4910_GEO_GINT_BORING LOGS.GPJ NC_DOT_GDT 7/3/14



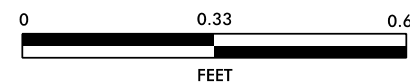
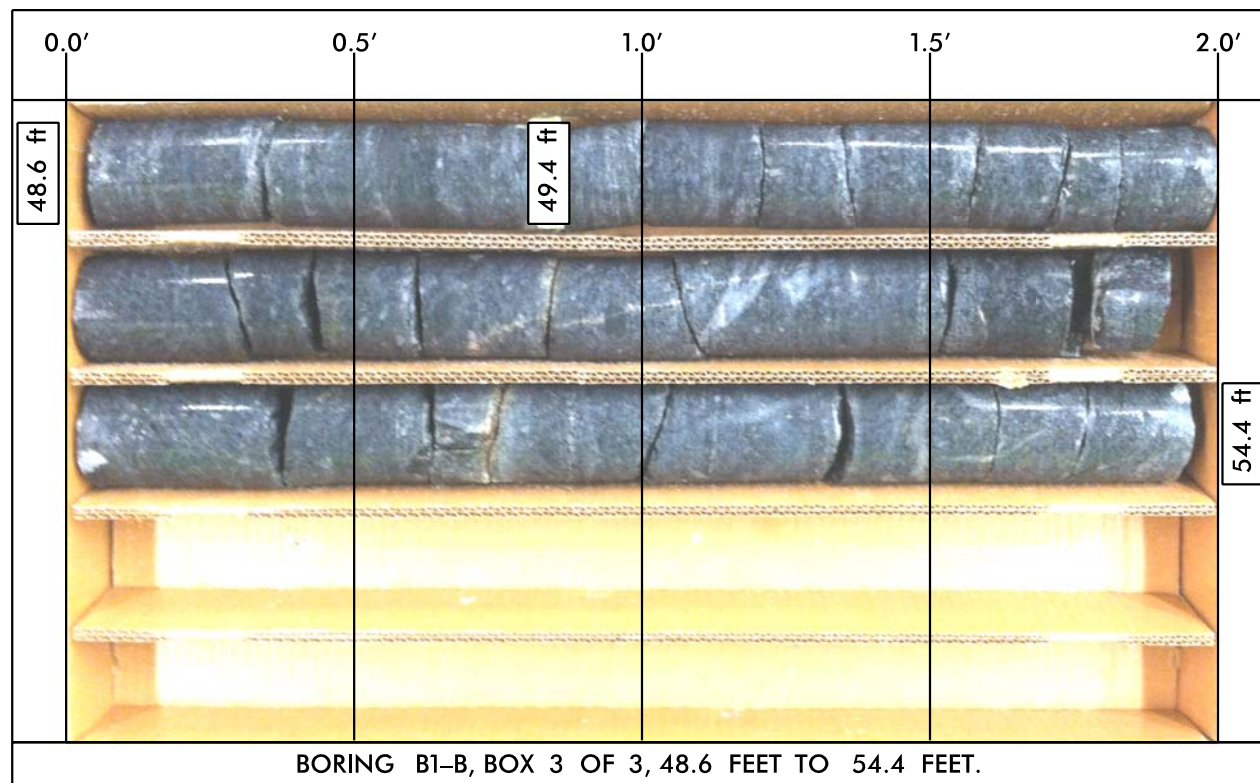
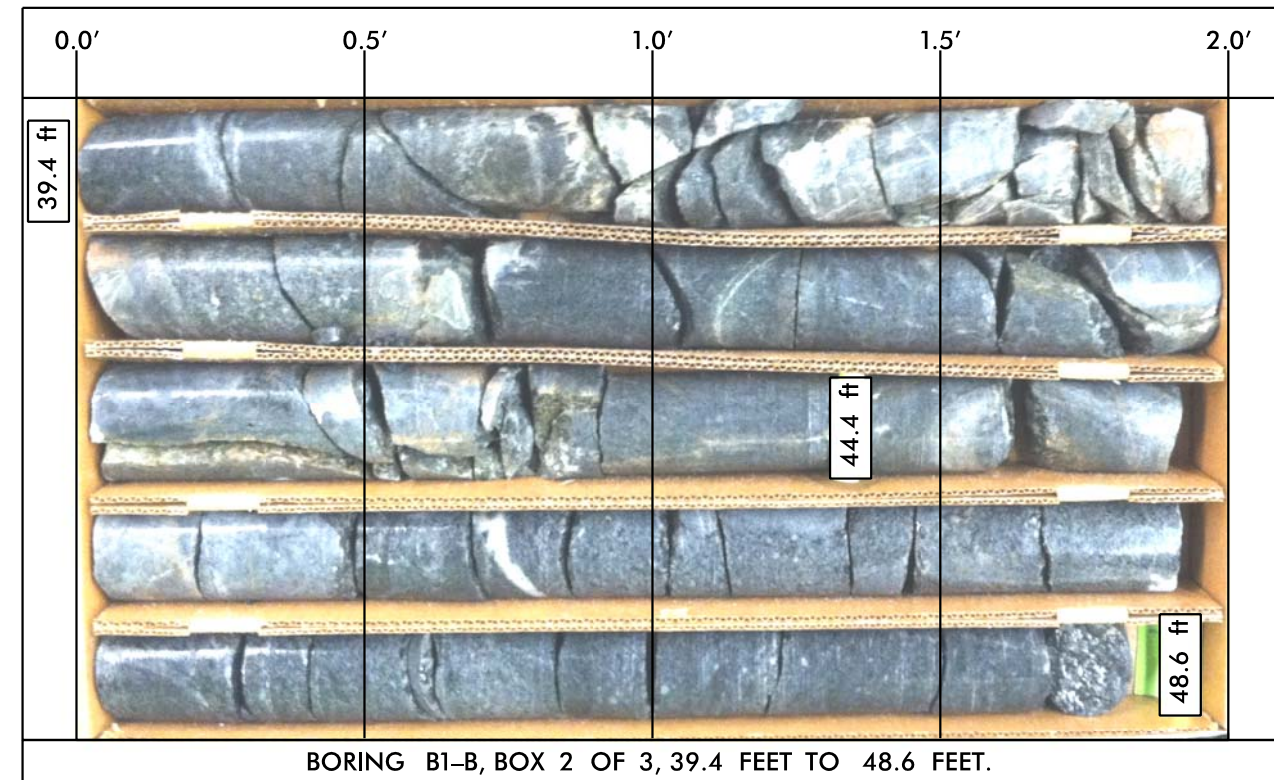
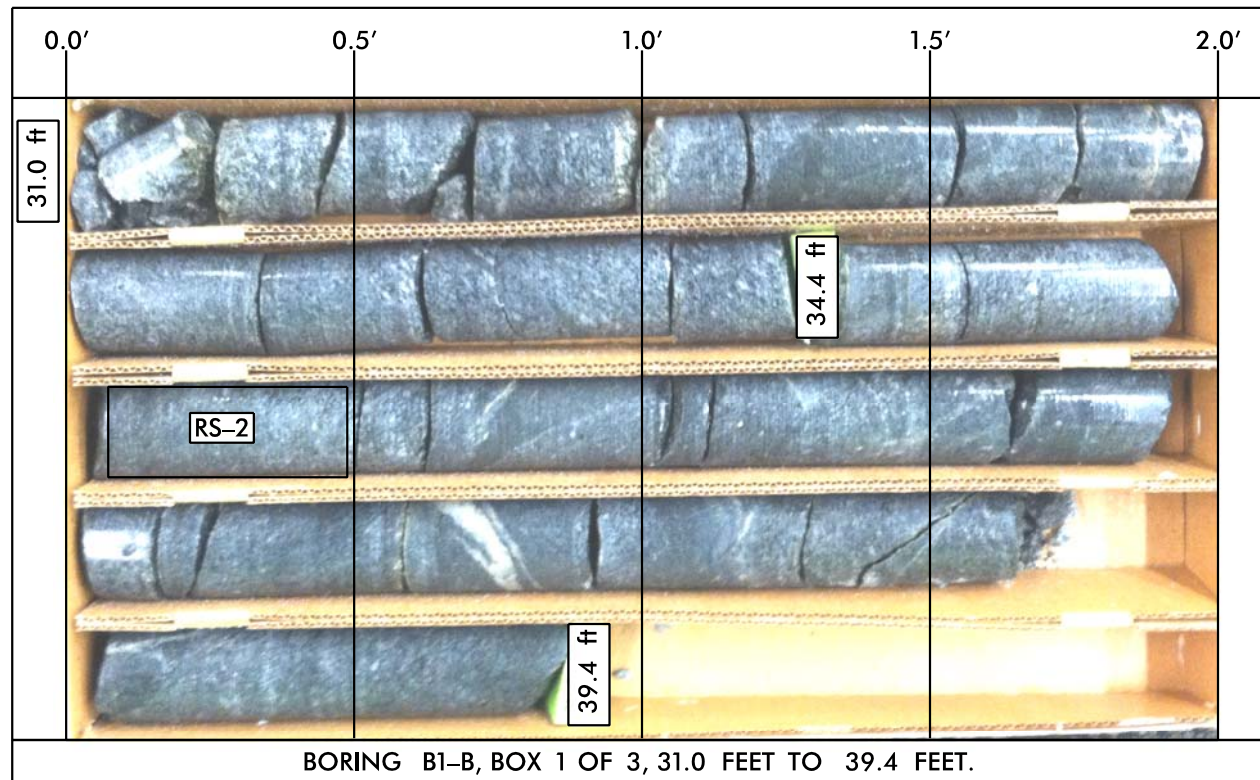
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ROCK CORE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1 , TIP.: U-4910
FALCON PROJECT NO.: G13026.00



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ROCK CORE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1 , TIP.: U-4910
FALCON PROJECT NO.: G13026.00

WBS 40373.1.1	TIP U-4910	COUNTY CABARRUS	GEOLOGIST EVANS, T. E.
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER			GROUND WTR (ft)
BORING NO. B1-C	STATION 147+14	OFFSET CL	ALIGNMENT -L2-
COLLAR ELEV. 592.0 ft	TOTAL DEPTH 49.8 ft	NORTHING 598,722	EASTING 1,486,880
DRILL RIG/HAMMER EFF./DATE SOI8513 CME-550X 90% 08/21/2013		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER WHITE, J. D.	START DATE 10/04/13	COMP. DATE 10/04/13	SURFACE WATER DEPTH N/A

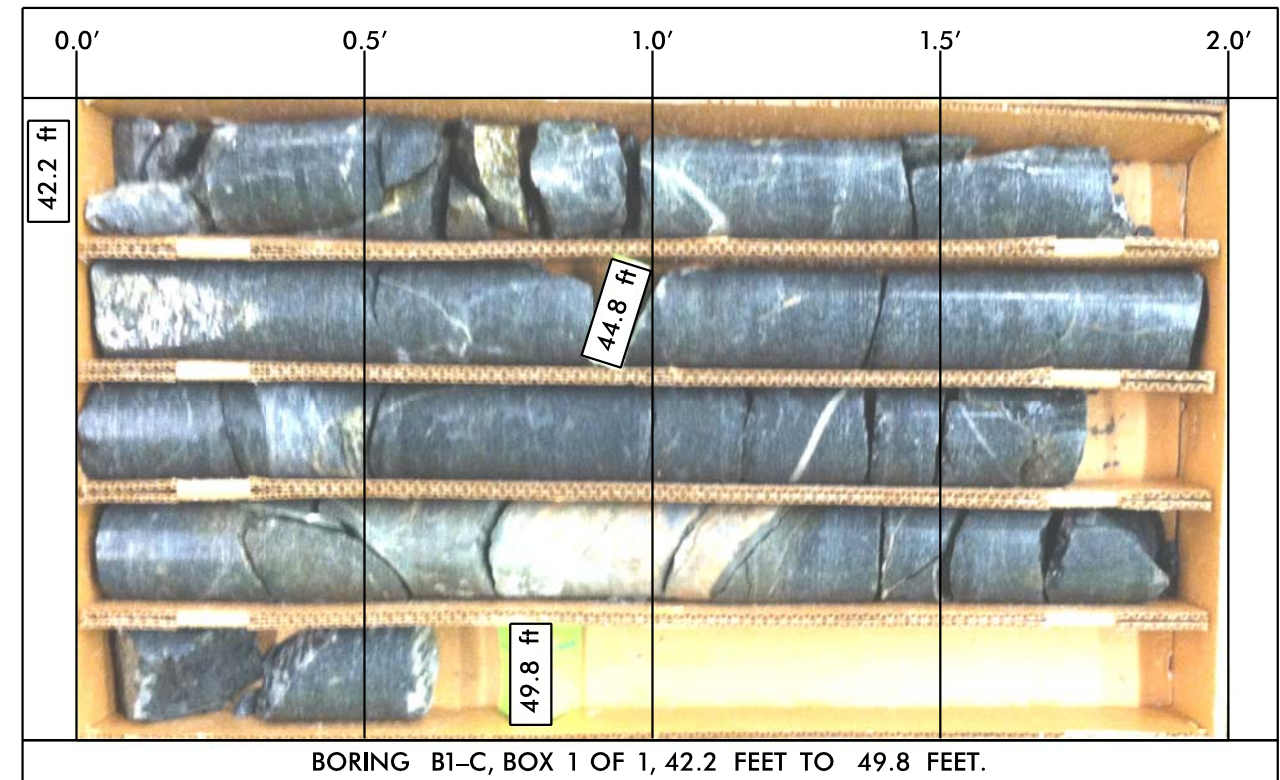
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
595																
592.0															GROUND SURFACE	0.0
590	591.5	0.5	2	5	8										ALLUVIAL BROWN, SILTY F. SAND (A-2-4) W/ TRACE ROOTS	3.0
588.5	588.5	3.5	3	3	3										GRAY AND BROWN, F. SANDY CLAY (A-6) W/ SAND LAYERS	5.5
585	586.0	6.0	WOH	2	1										GRAY, SILTY F. SAND (A-2-4)	8.0
580	583.5	8.5	WOH	1	1										GRAY, SLT. SILTY F. SAND (A-3)	12.0
575	578.5	13.5	WOH	WOH	2										GRAY, SLT. SILTY SAND (A-1-b)	22.6
570	573.5	18.5	2	3	2											
565	568.5	23.5	32	38	62/0.4										WEATHERED ROCK GRAY TAN AND BROWN, METADIORITE	42.2
560	563.5	28.5	100/0.5													
555	558.5	33.5	100/0.5													
550	553.5	38.5	100/0.4													
545	549.8	42.2	60/0												CRYSTALLINE ROCK BLUE-GRAY AND WHITE, MOD. TO SLI. WEATHERED, MOD. HARD, V. CLOSE TO CLOSELY WEATHERED, METADIORITE	49.8
																Boring Terminated at Elevation 542.2 ft in CR: METADIORITE

NC DOT BORE SINGLE U4910_GEO_GINT_BORING LOGS.GPJ NC_DOT.GDT 6/16/14

WBS 40373.1.1	TIP U-4910	COUNTY CABARRUS	GEOLOGIST EVANS, T. E.
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER			GROUND WTR (ft)
BORING NO. B1-C	STATION 147+14	OFFSET CL	ALIGNMENT -L2-
COLLAR ELEV. 592.0 ft	TOTAL DEPTH 49.8 ft	NORTHING 598,722	EASTING 1,486,880
DRILL RIG/HAMMER EFF./DATE SOI8513 CME-550X 90% 08/21/2013		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER WHITE, J. D.	START DATE 10/04/13	COMP. DATE 10/04/13	SURFACE WATER DEPTH N/A

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
549.8												
549.8	549.8	42.2	2.6	0:53/0.6	(2.6)	(0.9)		(7.6)	(2.3)		Begin Coring @ 42.2 ft	42.2
545	547.2	44.8	5.0	1:36/1.0	100%	35%		100%	30%		CRYSTALLINE ROCK BLUE-GRAY AND WHITE, MOD. TO SLI. WEATHERED, MOD. HARD, V. CLOSE TO CLOSELY WEATHERED, METADIORITE	49.8
	542.2	49.8		1:29/1.0	(5.0)	(1.4)					Boring Terminated at Elevation 542.2 ft in CR: METADIORITE	
				1:35/1.0	100%	28%						
				2:03/1.0								
				2:13/1.0								
				1:45/1.0								

NC DOT CORE SINGLE U4910_GEO_GINT_BORING LOGS.GPJ NC_DOT.GDT 6/16/14



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ROCK CORE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1 , TIP.: U-4910
FALCON PROJECT NO.: G13026.00

WBS 40373.1.1	TIP U-4910	COUNTY CABARRUS	GEOLOGIST EVANS, T. E.
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER			GROUND WTR (ft)
BORING NO. B2-A	STATION 148+05	OFFSET 56 ft LT	ALIGNMENT -L2-
COLLAR ELEV. 591.9 ft	TOTAL DEPTH 64.7 ft	NORTHING 598,828	EASTING 1,486,881
DRILL RIG/HAMMER EFF./DATE SOI8513 CME-550X 90% 08/21/2013		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER WHITE, J. D.	START DATE 10/03/13	COMP. DATE 10/03/13	SURFACE WATER DEPTH N/A

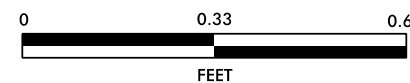
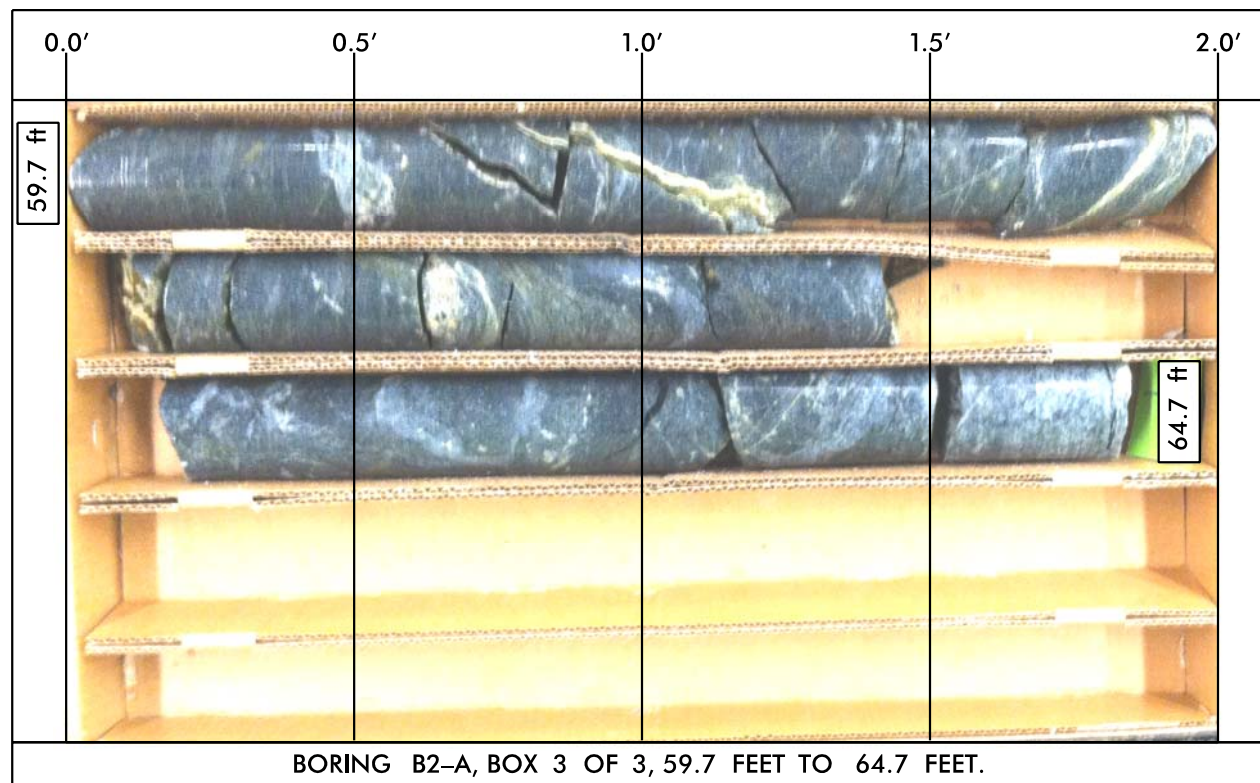
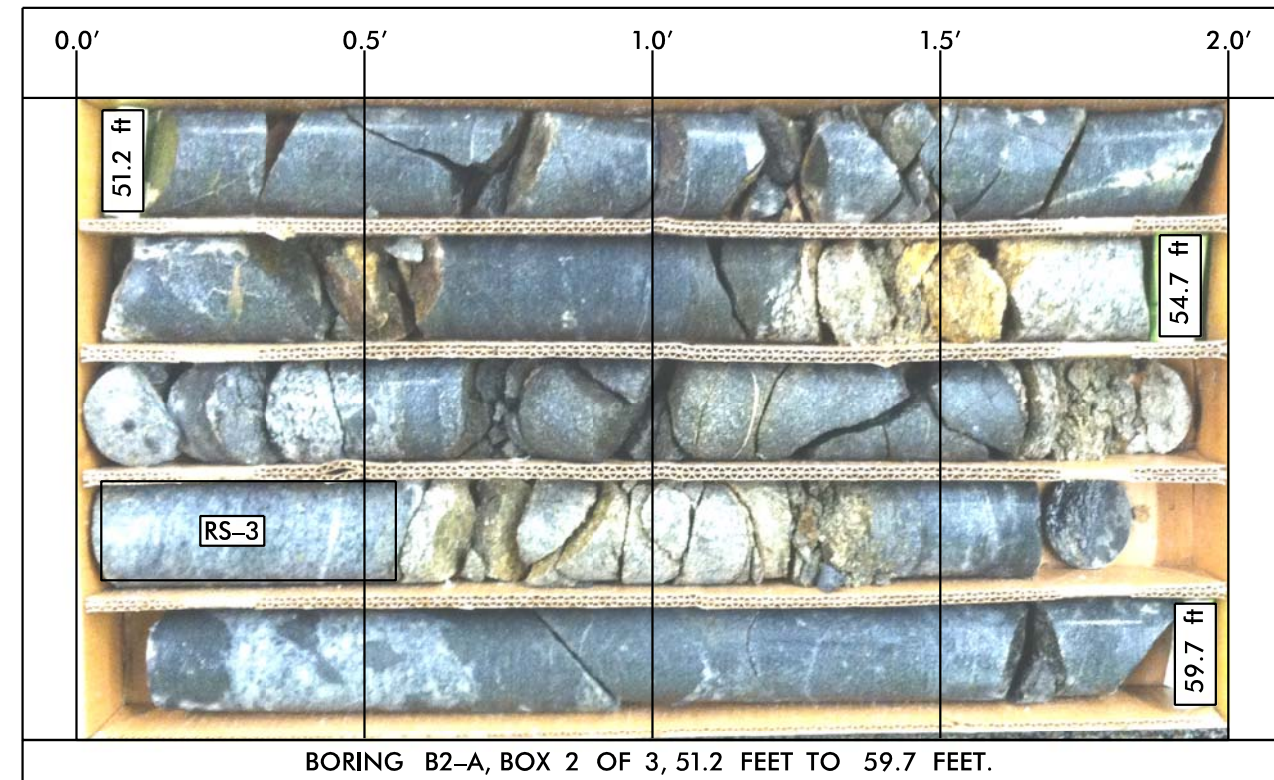
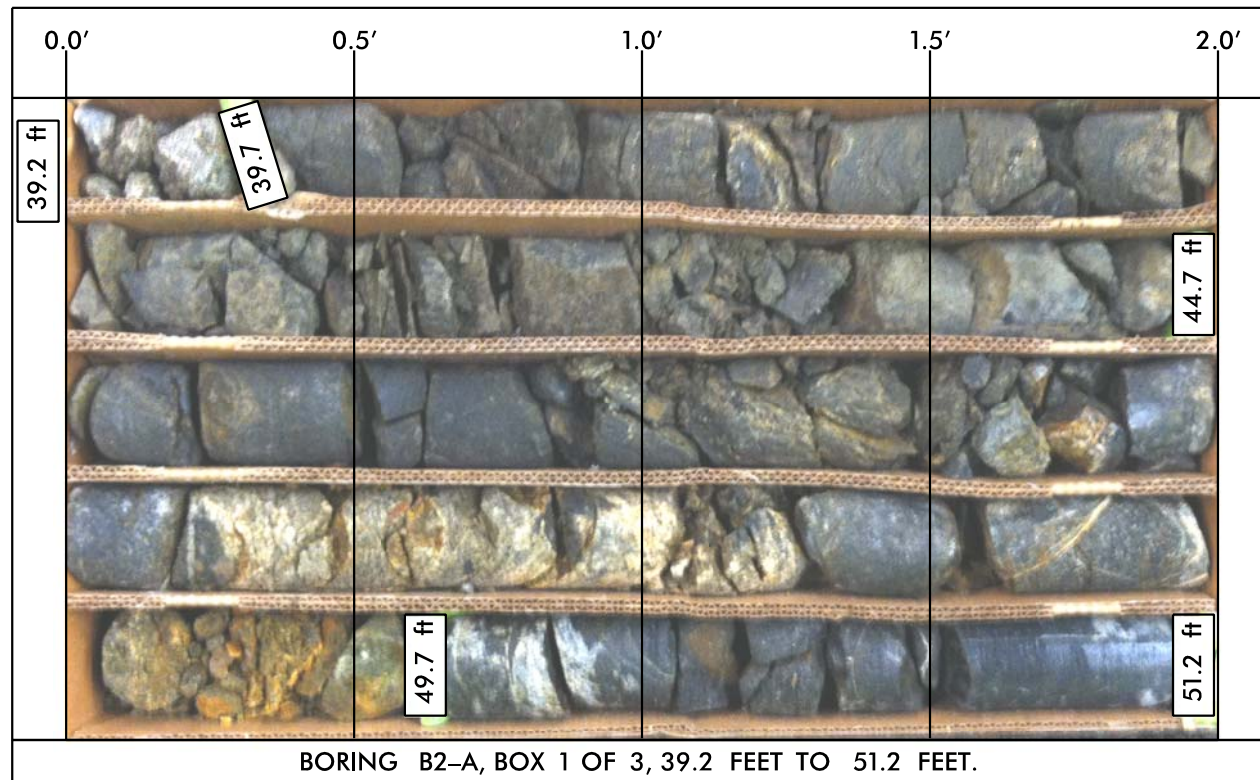
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
595																
	591.4	0.5	2	2	2									591.9	GROUND SURFACE	0.0
590	588.4	3.5	2	3	4										ALLUVIAL BROWN AND GRAY, F. SANDY SILT (A-4) W/ TRACE ROOTS, TRACE MICA	
585	585.9	6.0	1	1	2									586.4	GRAY, CLAYEY SILT (A-5) W/ TRACE ORGANICS	5.5
580	583.4	8.5	WOH	WOH	WOH									579.9	DK. GRAY, F. SANDY SILT (A-5) W/ LITTLE ORGANICS, W/ MED. SAND LAYERS	12.0
575	578.4	13.5	WOH	WOH	1									574.9	DK. GRAY, SILTY SAND (A-2-4)	17.0
570	573.4	18.5	5	4	7									570.4	WEATHERED ROCK BROWN AND GRAY, METADIORITE	21.5
565	568.4	23.5	41	51	49/0.3									565.4	RESIDUAL DK. GRAY AND TAN, SILTY F. SAND (A-2-4) SAPROLITIC, W/ TRACE MICA	26.5
560	563.4	28.5	40	40	32									559.9	WEATHERED ROCK DK. GRAY AND TAN, METADIORITE	32.0
555	558.4	33.5	100/0.3											555.4	CRYSTALLINE ROCK DK. GRAY AND TAN, SEV. TO MOD. SEV. WEATHERED, METADIORITE	36.5
550	552.7	39.2	60/0.1											552.7	CRYSTALLINE ROCK DK. GRAY AND TAN, MOD. SEV. WEATHERED, MOD. HARD, V. CLOSE TO CLOSELY FRACTURED, METADIORITE	39.2
545														542.2	DK. GRAY AND TAN, MOD. WEATHERED, MOD. HARD, V. CLOSE TO CLOSELY FRACTURED, METADIORITE	49.7
540														534.2	DK. GRAY AND TAN, MOD. WEATHERED, MOD. HARD, CLOSELY FRACTURED, METADIORITE	57.7
535														527.2	Boring Terminated at Elevation 527.2 ft in CR: METADIORITE	64.7

NCDOT BORE SINGLE U4910_GEO_GINT_BORING LOGS.GPJ NC_DOT.GDT 6/16/14

WBS 40373.1.1	TIP U-4910	COUNTY CABARRUS	GEOLOGIST EVANS, T. E.
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER			GROUND WTR (ft)
BORING NO. B2-A	STATION 148+05	OFFSET 56 ft LT	ALIGNMENT -L2-
COLLAR ELEV. 591.9 ft	TOTAL DEPTH 64.7 ft	NORTHING 598,828	EASTING 1,486,881
DRILL RIG/HAMMER EFF./DATE SOI8513 CME-550X 90% 08/21/2013		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER WHITE, J. D.	START DATE 10/03/13	COMP. DATE 10/03/13	SURFACE WATER DEPTH N/A

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %			
552.7	552.7	39.2	0.5	1:20/0.5	(0.3)	(0.0)		(8.4)	(0.3)		Begin Coring @ 39.2 ft	39.2
550	547.2	44.7	5.0	1:38/1.0 1:40/1.0 1:27/1.0 1:46/1.0 1:38/1.0	(60%) (3.5)	(0.0) (0.0)		80%	3%		DK. GRAY AND TAN, MOD. SEV. WEATHERED, MOD. HARD, V. CLOSE TO CLOSELY FRACTURED, METADIORITE	
545	542.2	49.7	5.0	1:30/1.0 1:32/1.0 1:33/1.0 1:48/1.0 2:21/1.0	(4.6) (0.3)	6%		(7.8)	(1.3)		DK. GRAY AND TAN, MOD. WEATHERED, MOD. HARD, V. CLOSE TO CLOSELY FRACTURED, METADIORITE	49.7
540	537.2	54.7	5.0	1:02/1.0 0:59/1.0 1:03/1.0 1:14/1.0 1:22/1.0	(4.8) (0.8)	16%		98%	16%		R1=10, R2=8, R3=8, R4=20, R5=4 TYPE=E, CLASS=III RMR=49	57.7
535	532.2	59.7	5.0	1:30/1.0 1:11/1.0 1:21/1.0 1:22/1.0 1:50/1.0	(5.0) (1.9)	38%	RS-3	(7.0)	(4.2)		DK. GRAY AND TAN, MOD. WEATHERED, MOD. HARD, CLOSELY FRACTURED, METADIORITE	57.7
530	527.2	64.7	5.0	1:21/1.0 1:20/1.0 1:21/1.0 1:22/1.0 1:29/1.0	(5.0) (2.8)	56%		100%	60%		Boring Terminated at Elevation 527.2 ft in CR: METADIORITE	64.7

NCDOT CORE SINGLE U4910_GEO_GINT_BORING LOGS.GPJ NC_DOT.GDT 6/16/14



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ROCK CORE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1 , TIP.: U-4910
FALCON PROJECT NO.: G13026.00

WBS 40373.1.1	TIP U-4910	COUNTY CABARRUS	GEOLOGIST EVANS, T. E.
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER			GROUND WTR (ft)
BORING NO. B2-B	STATION 148+14	OFFSET 73 ft RT	ALIGNMENT -L2-
COLLAR ELEV. 592.6 ft	TOTAL DEPTH 57.6 ft	NORTHING 598,769	EASTING 1,486,996
DRILL RIG/HAMMER EFF./DATE SOI8513 CME-550X 90% 08/21/2013		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER WHITE, J. D.	START DATE 10/02/13	COMP. DATE 10/03/13	SURFACE WATER DEPTH N/A

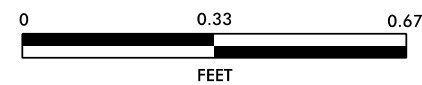
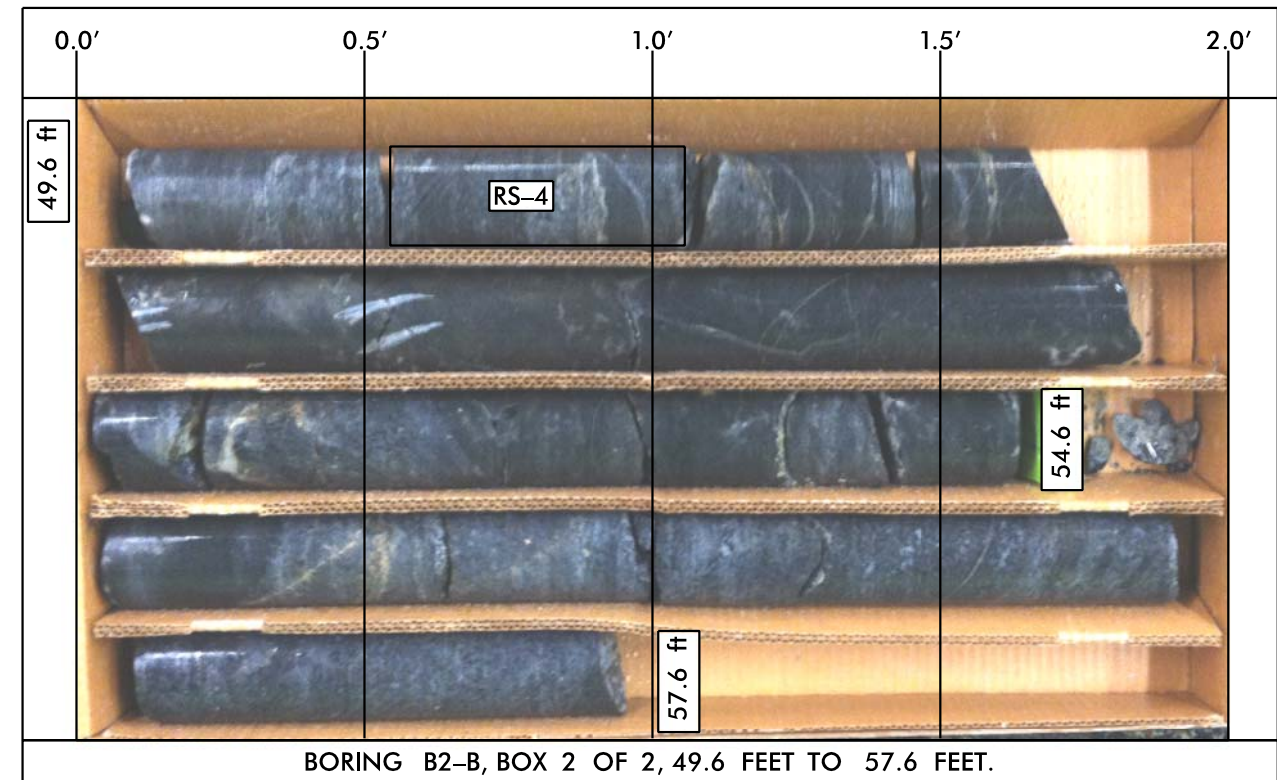
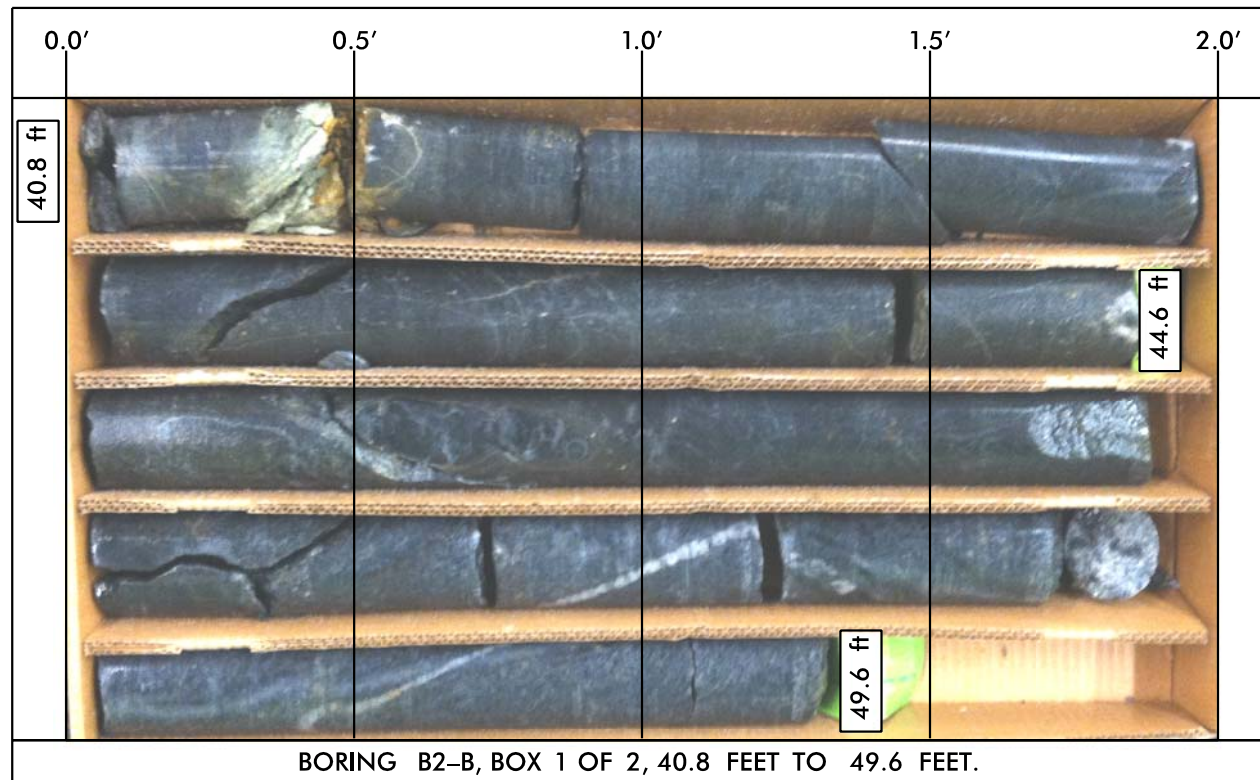
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
595																
	592.6	0.5												592.6	GROUND SURFACE	0.0
590	589.1	3.5	4	5	2									589.6	ALLUVIAL BROWN, SILTY F. SAND (A-2-4) W/ GRAVEL, TRACE ROOTS, TRACE MICA BROWN AND GRAY, CLAYEY SILT (A-5) W/ TRACE ORGANICS	3.0
585	584.1	8.5	WOH	WOH	WOH									584.6	GRAY AND BROWN, F. SANDY SILT (A-4) W/ TRACE ORGANICS	8.0
580	579.1	13.5	2	1	1									580.6	DK. GRAY AND GRAY, SILTY F. SAND (A-2-4) INTERLAYERED W/ THIN CSE. SAND LAYERS	12.0
575	574.1	18.5	2	7	20										GRAVEL AND WOOD PIECES @ 18.5 - 20.0 FT	
570	569.1	23.5	18	24	23									570.6	RESIDUAL BROWN AND GRAY, SILTY SAND (A-2-4) SAPROLITIC	22.0
565	564.1	28.5	100/0.4											564.1	WEATHERED ROCK BROWN AND GRAY, METADIORITE	28.5
560	559.1	33.5	62	38/0.1												
555	554.1	38.5	70	30/0.2												
550	551.8	40.8	60/0											551.8	CRYSTALLINE ROCK DK. GRAY, V. SLI. WEATHERED TO FRESHLY WEATHERED, V. HARD, CLOSELY FRACTURED, METADIORITE	40.8
545																
540																
535														535.0	Boring Terminated at Elevation 535.0 ft in CR: METADIORITE	57.6

NC DOT BORE SINGLE U4910_GEO_GINT_BORING LOGS.GPJ NC_DOT.GDT 6/16/14

WBS 40373.1.1	TIP U-4910	COUNTY CABARRUS	GEOLOGIST EVANS, T. E.
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER			GROUND WTR (ft)
BORING NO. B2-B	STATION 148+14	OFFSET 73 ft RT	ALIGNMENT -L2-
COLLAR ELEV. 592.6 ft	TOTAL DEPTH 57.6 ft	NORTHING 598,769	EASTING 1,486,996
DRILL RIG/HAMMER EFF./DATE SOI8513 CME-550X 90% 08/21/2013		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER WHITE, J. D.	START DATE 10/02/13	COMP. DATE 10/03/13	SURFACE WATER DEPTH N/A

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)	
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %				
551.8													
	551.8	40.8	3.8	1:19/0.8 1:55/1.0 1:25/1.0 1:21/1.0	(3.8) 100%	(2.8) 74%		(16.3) 97%	(12.0) 71%		Begin Coring @ 40.8 ft CRYSTALLINE ROCK DK. GRAY, V. SLI. WEATHERED TO FRESHLY WEATHERED, V. HARD, CLOSELY FRACTURED, METADIORITE	40.8	
550	548.0	44.6	5.0	1:01/1.0 1:16/1.0 1:21/1.0 1:43/1.0 2:22/1.0	(4.9) 98%	(3.6) 72%					R1=5, R2=15, R3=6, R4=20, R5=4 TYPE=E, CLASS=III RMR=50		
545	543.0	49.6	5.0	1:30/1.0 1:52/1.0 1:35/1.0 1:26/1.0 1:45/1.0	(5.0) 100%	(3.2) 64%	RS-4						
540	538.0	54.6	3.0	1:25/1.0 1:28/1.0 1:36/1.0	(2.6) 87%	(2.4) 80%							
535	535.0	57.6										535.0	
												Boring Terminated at Elevation 535.0 ft in CR: METADIORITE	57.6

NC DOT CORE SINGLE U4910_GEO_GINT_BORING LOGS.GPJ NC_DOT.GDT 6/16/14



FALCON
ENGINEERING

FALCON ENGINEERING, INC.
1210 TRINITY ROAD, SUITE 110
RALEIGH, NC 27607

PHONE: 919.871.0800
FAX: 919.871.0803

ROCK CORE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCK RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1 , TIP.: U-4910
FALCON PROJECT NO.: G13026.00

WBS 40373.1.1	TIP U-4910	COUNTY CABARRUS	GEOLOGIST EVANS, T. E.
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER			GROUND WTR (ft)
BORING NO. B2-C	STATION 148+10	OFFSET CL	ALIGNMENT -L2-
COLLAR ELEV. 590.7 ft	TOTAL DEPTH 53.7 ft	NORTHING 598,803	EASTING 1,486,932
DRILL RIG/HAMMER EFF./DATE SOI8513 CME-550X 90% 08/21/2013		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER WHITE, J. D.	START DATE 10/03/13	COMP. DATE 10/04/13	SURFACE WATER DEPTH N/A

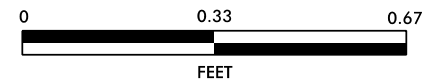
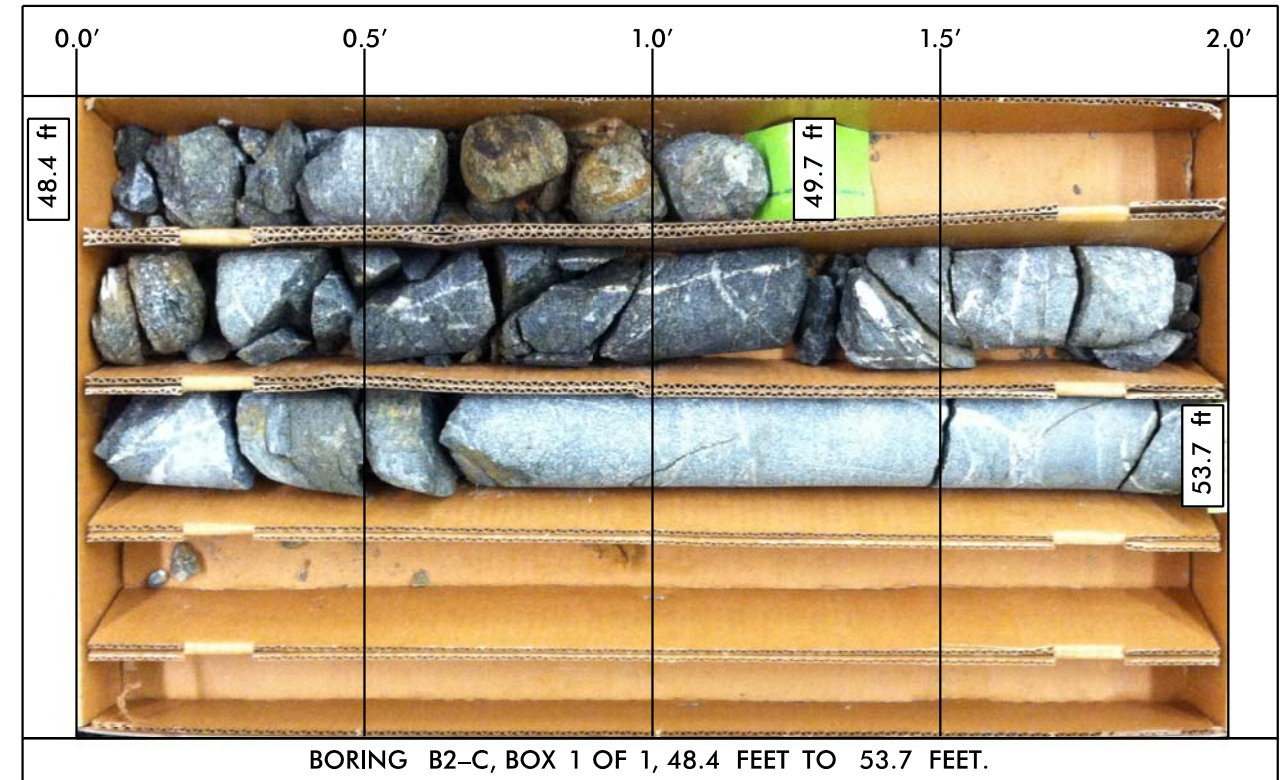
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
595															
590	590.2	0.5	3	4	3								590.7	GROUND SURFACE	0.0
585	587.2	3.5	4	3	3								587.7	ALLUVIAL BROWN, F. SANDY SILT (A-4) W/ TRACE ROOTS	3.0
580	584.7	6.0	1	2	2								585.2	BROWN AND TAN, SILTY F. SAND (A-2-4) W/ TRACE TO LITTLE MICA	5.5
575	582.2	8.5	WOH	WOH	WOH								577.7	BROWN AND GRAY, F. SANDY SILT (A-4)	13.0
570	577.2	13.5	WOH	1	1								572.2	GRAY TAN AND LT. GRAY, SLI. SILTY SAND (A-1-b) W/ THIN CSE. SAND LAYERS	21.0
565	572.2	18.5	4	11	10								569.7	COBBLE / GRAVEL LAYER 19.8 - 21 FT	27.0
560	567.2	23.5	14	19	19								563.7	RESIDUAL BROWN AND TAN, SILTY F. SAND (A-2-4) W/ ROCK FRAGS	47.1
555	562.2	28.5	22	36	64/0.2								543.6	WEATHERED ROCK BROWN GRAY AND TAN, METADIORITE	48.4
550	557.2	33.5	44	56/0.3									542.3	CRYSTALLINE ROCK BLUE-GRAY, SEV. TO MED. SEV. WEATHERED, METADIORITE	53.7
545	552.2	38.5	71	29/0.2									542.3	DK. GRAY, MOD. SEV. WEATHERED, MOD. HARD, V. CLOSE TO CLOSELY FRACTURED, METADIORITE	
540	547.2	43.5	100/0.4										537.0	Boring Terminated at Elevation 537.0 ft in CR: METADIORITE	

NCDOT BORE SINGLE U4910_GEO_GINT_BORING LOGS.GPJ NC_DOT.GDT 6/16/14

WBS 40373.1.1	TIP U-4910	COUNTY CABARRUS	GEOLOGIST EVANS, T. E.
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER			GROUND WTR (ft)
BORING NO. B2-C	STATION 148+10	OFFSET CL	ALIGNMENT -L2-
COLLAR ELEV. 590.7 ft	TOTAL DEPTH 53.7 ft	NORTHING 598,803	EASTING 1,486,932
DRILL RIG/HAMMER EFF./DATE SOI8513 CME-550X 90% 08/21/2013		DRILL METHOD SPT Core Boring	HAMMER TYPE Automatic
DRILLER WHITE, J. D.	START DATE 10/03/13	COMP. DATE 10/04/13	SURFACE WATER DEPTH N/A

ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (ft) %	RQD (ft) %		REC. (ft) %	RQD (ft) %			
542.3	542.3	48.4	1.3	0:30/0.3	(1.0)	(0.0)		(5.0)	(1.2)		Begin Coring @ 48.4 ft	48.4
540	541.0	49.7	4.0	2:00/1.0	77%	0%		94%	23%		DK. GRAY, MOD. SEV. WEATHERED, MOD. HARD, V. CLOSE TO CLOSELY FRACTURED, METADIORITE	48.4
				1:06/1.0	(4.0)	(1.2)						
				1:00/1.0	100%	30%						
				0:53/1.0								
				1:13/1.0								
	537.0	53.7									Boring Terminated at Elevation 537.0 ft in CR: METADIORITE	53.7

NCDOT CORE SINGLE U4910_GEO_GINT_BORING LOGS.GPJ NC_DOT.GDT 6/16/14



FALCON ENGINEERING, INC.
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RALEIGH, NC 27607
PHONE: 919.871.0800
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ROCK CORE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
OVER ROCKY RIVER
CABARRUS COUNTY, NORTH CAROLINA
WBS.: 40373.1.1 , TIP.: U-4910
FALCON PROJECT NO.: G13026.00

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 40373.1.1		TIP U-4910		COUNTY CABARRUS		GEOLOGIST EVANS, T. E.										
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER							GROUND WTR (ft)									
BORING NO. EB2-A		STATION 149+01		OFFSET 45 ft LT		ALIGNMENT -L-										
COLLAR ELEV. 591.6 ft		TOTAL DEPTH 34.1 ft		NORTHING 598,904		EASTING 1,486,938										
DRILL RIG/HAMMER EFF./DATE SOI8513 CME-550X 90% 08/21/2013			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER WHITE, J. D.		START DATE 10/01/13		COMP. DATE 10/01/13		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						
595																
590	591.1	0.5	3	2	3								M	GROUND SURFACE 0.0		
	588.1	3.5	2	2	2								M	ALLUVIAL GRAY AND TAN, F. SANDY CLAY (A-6) W/ TRACE ORGANICS		
585	585.6	6.0	3	6	6								M	RESIDUAL BROWN GRAY AND TAN, SILTY MED. TO CSE. SAND (A-2-4)	5.5	
	583.1	8.5	3	3	5								W			
580	578.1	13.5	20	35	56								M	BROWN TAN AND GRAY, SILTY F. SAND (A-2-4) SAPROLITIC	12.0	
575	573.1	18.5	29	28	56								D			
570	568.1	23.5	100/0.5											WEATHERED ROCK BROWN AND TAN, METADIORITE	22.0	
565	563.1	28.5	47	53/0.3												
560	558.1	33.5	82	18/0.1												
															Boring Terminated at Elevation 557.5 ft in WR: METADIORITE	34.1

WBS 40373.1.1		TIP U-4910		COUNTY CABARRUS		GEOLOGIST EVANS, T. E.										
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER							GROUND WTR (ft)									
BORING NO. EB2-B		STATION 149+00		OFFSET 85 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 591.5 ft		TOTAL DEPTH 33.8 ft		NORTHING 598,840		EASTING 1,487,051										
DRILL RIG/HAMMER EFF./DATE SOI8513 CME-550X 90% 08/21/2013			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER WHITE, J. D.		START DATE 10/02/13		COMP. DATE 10/02/13		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						
595																
590	591.0	0.5	2	2	1								W	GROUND SURFACE 0.0		
	588.0	3.5	WOH	WOH	WOH								SS-38	ALLUVIAL BROWN AND GRAY, CLAYEY SILT (A-5) W/ TRACE ORGANICS	3.0	
585	585.5	6.0	WOH	1	2								SS-39	GRAY, SILTY CLAY (A-7) W/ TRACE ORGANICS	8.0	
	583.0	8.5	WOH	WOH	WOH								W	GRAY, CLAYEY SILT (A-5)	8.0	
580	578.0	13.5	5	7	9								W	DK. GRAY, SILTY F. TO CSE. SAND (A-2-4) W/ CSE. SAND AND GRAVEL LAYERS	12.0	
575	573.0	18.5	12	14	21								M	RESIDUAL BROWN AND TAN, SILTY F. SAND (A-2-4)	17.0	
570	568.0	23.5	40	60/0.4										WEATHERED ROCK BROWN AND GRAY, METADIORITE	23.5	
565	563.0	28.5	65	35/0.2												
560	558.0	33.5	100/0.3													
															Boring Terminated at Elevation 557.7 ft in WR: METADIORITE	33.8

NCDOT BORE DOUBLE U4910_GEO_GINT_BORING LOGS.GPJ NC_DOT_GDT 7/3/14



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 40373.1.1	TIP U-4910	COUNTY CABARRUS	GEOLOGIST EVANS, T. E.	
SITE DESCRIPTION BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER				GROUND WTR (ft)
BORING NO. EB2-C	STATION 149+00	OFFSET 15 ft LT	ALIGNMENT -L-	0 HR. 11.2
COLLAR ELEV. 592.0 ft	TOTAL DEPTH 33.6 ft	NORTHING 598,888	EASTING 1,486,964	24 HR. 5.2
DRILL RIG/HAMMER EFF./DATE SOI8513 CME-550X 90% 08/21/2013		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic	
DRILLER WHITE, J. D.	START DATE 10/01/13	COMP. DATE 10/01/13	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						
595																
	591.5	0.5	2	1	3									592.0	GROUND SURFACE	0.0
590	588.5	3.5	2	3	2									589.0	ALLUVIAL BROWN AND GRAY, F. SANDY SILT (A-4) W/ TRACE ROOTS AND ORGANICS	3.0
	586.0	6.0	4	6	6									586.5	BROWN GRAY AND TAN, SILTY F. SAND (A-2-4) W/ GRAVEL AND TRACE ROOTS	5.5
585	583.5	8.5	3	7	6										GRAY AND TAN, F. SANDY CLAY (A-6) W/ CSE. SANDY CLAY LAYERS	
580	578.5	13.5	10	17	26									580.0	RESIDUAL BROWN GRAY AND TAN, SILTY F. SAND (A-2-4) SAPROLITIC	12.0
575	573.5	18.5	25	38	37											
570	568.5	23.5	19	15	11											
565	563.5	28.5	60/0.1											564.5	CRYSTALLINE ROCK DK. GRAY AND TAN, SEV. TO MOD. SEV. WEATHERED, METADIORITE	27.5
560	558.5	33.5	60/0.1											558.4	Boring Terminated with Standard Penetration Test Refusal at Elevation 558.4 ft in CR: METADIORITE	33.6

NCDOT BORE DOUBLE U4910_GEO_GINT_BORING LOGS.GPJ NC_DOT_GDT 7/3/14

AASHTO SOIL CLASSIFICATION AND GRADATION SHEET

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER

WBS: 403732.1; TIP: U-4910

CABARRUS COUNTY, NORTH CAROLINA
FALCON ENGINEERING, INC. PROJECT NO: G13026.00

BORING			SAMPLE	TOTAL SAMPLE			Atterberg Limit Test Results			Natural Moisture Content
AASHTO Classification			PERCENT PASSING							
STATION	OFFSET (FEET)	DEPTH (FEET)	#10	#40	#200	LL	PL	PI	%	
EB1-B		SS-36		100	98	89	54	26	28	32.4
A-7-6										
146+57	75' RT	6-7.5								
EB1-C		SS-37		100	92	67	36	20	16	29.3
A-6										
146+66	3' LT	3.5-5								
EB2-B		SS-38		100	98	94	64	33	31	52.0
A-7-5										
149+00	85' RT	3.5-5								
EB2-B		SS-39		100	95	80	43	24	19	28.8
A-7-6										
149+00	85' RT	6-7.5								

SIGNATURE:  123-01-0509





Notes: LL = Liquid limit
PL = Plastic limit
PI = Plasticity index = LL - PL

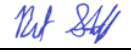
SUMMARY OF ROCK CORE TEST RESULTS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD) OVER ROCKY RIVER

WBS NO.: 40373.1.1, TIP NO.: U-4910

CABARRUS COUNTY, NORTH CAROLINA
FALCON ENGINEERING, INC. PROJECT NO: G13026.00

Sample No.	Boring	Station	Offset	Depth (ft)	Rock Type	Geologic Map Unit	Run RQD	Length (ft)	Diameter (ft)	Unit Weight (PCF)	Unconfined Compressive Strength (PSI)	Young's Modulus (PSI)	Rock Mass Rating (RMR)	Failure
RS-1	B1-A	147+14	45' LT	61.8-62.1	METAMORPHOSED QUARTZ DIORITE	PzZq	48%	0.34	0.17	162.9	6,518	858,893	43	
RS-2	B1-B	147+14	76' RT	35.0-35.3	METAMORPHOSED QUARTZ DIORITE	PzZq	70%	0.36	0.17	176.9	11,978	2,458,265	43	
RS-3	B2-A	148+05	56' LT	56.7-57.0	METAMORPHOSED QUARTZ DIORITE	PzZq	38%	0.35	0.17	171.1	19,314	3,566,373	49	
RS-4	B2-B	148+14	73' RT	50.0-50.3	METAMORPHOSED QUARTZ DIORITE	PzZq	64%	0.35	0.17	177.5	6,955	1,461,947	50	

SIGNATURE:  NCDOT No.: 123-01-0509

Notes: LL = Liquid limit
PL = Plastic limit
PI = Plasticity index = LL - PL



PHOTOGRAPH TAKEN FROM NEAR INTERIOR BENT 1 LOOKING UPSTATION AT EXISTING BRIDGE AND CHANNEL.



PHOTOGRAPH TAKEN FROM LOCATION UPSTATION OF EXISTING BRIDGE LOOKING DOWNSTATION TOWARD BRIDGE.



PHOTOGRAPH TAKEN FROM NEAR BORING EB1-C LOOKING TOWARD EXISTING STRUCTURE



PHOTOGRAPH TAKEN FROM NEAR INTERIOR BENT 2 LOOKING DOWNSTATION TOWARD CHANNEL



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SITE PHOTOGRAPHS

BRIDGE NO. 3 ON SR 1445 (DERITA ROAD)
 OVER ROCKY RIVER
 CABARRUS COUNTY, NORTH CAROLINA
 WBS.: 40373.1.1 , TIP.: U-4910
 FALCON PROJECT NO.: G13026.00

REFERENCE: U-4910

PROJECT: 40373

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4910	1	9

CONTENTS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND
3	SITE PLAN AND WALL ENVELOPES
4-8	BORING LOGS
9	SOIL TEST RESULTS

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CABARRUS
PROJECT DESCRIPTION SR 1445 DERITA ROAD
WIDENING FROM NORTH OF SR 2894 TO SR 1394

SITE DESCRIPTION _____
WALL -W1- 172 + 15.00, 52.5' RT, TO 179 + 50.00 64.5' RT
WALL -W2- 185 + 75.66, 76.5' LT, TO 186 + 39.31, 76.5' LT

CAUTION NOTICE

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

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

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

- NOTES:
- THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 - BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

GOODNIGHT, D. J.

TRIGON EXP.

INVESTIGATED BY GOODNIGHT, D. J.

DRAWN BY HUNSBERGER, W. S.

CHECKED BY HAMM, J. R.

SUBMITTED BY FALCON ENG.

DATE JULY 2017



Jeremy R. Hamm

7/18/16

SIGNATURE

DATE

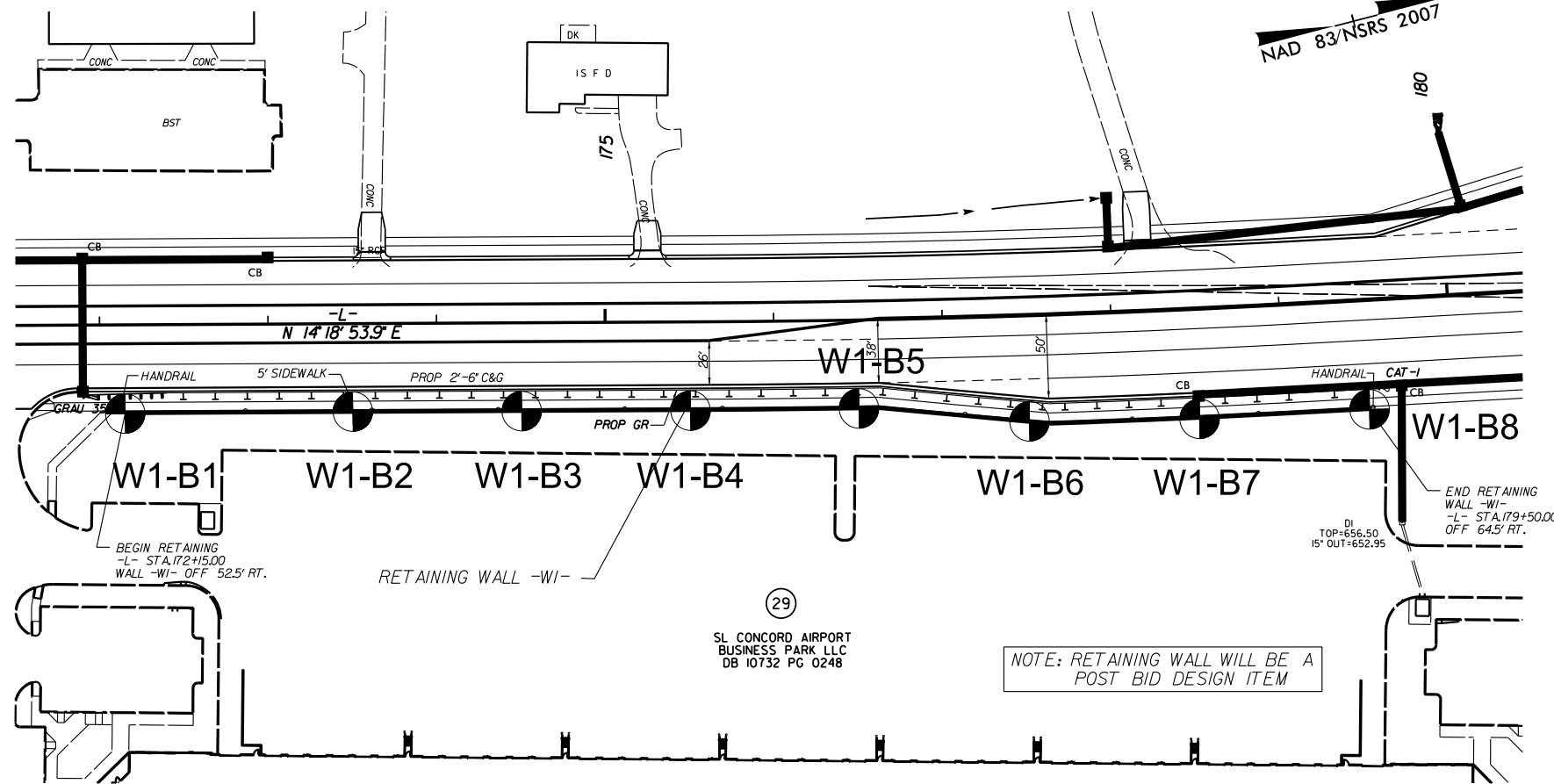
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT**

SUBSURFACE INVESTIGATION

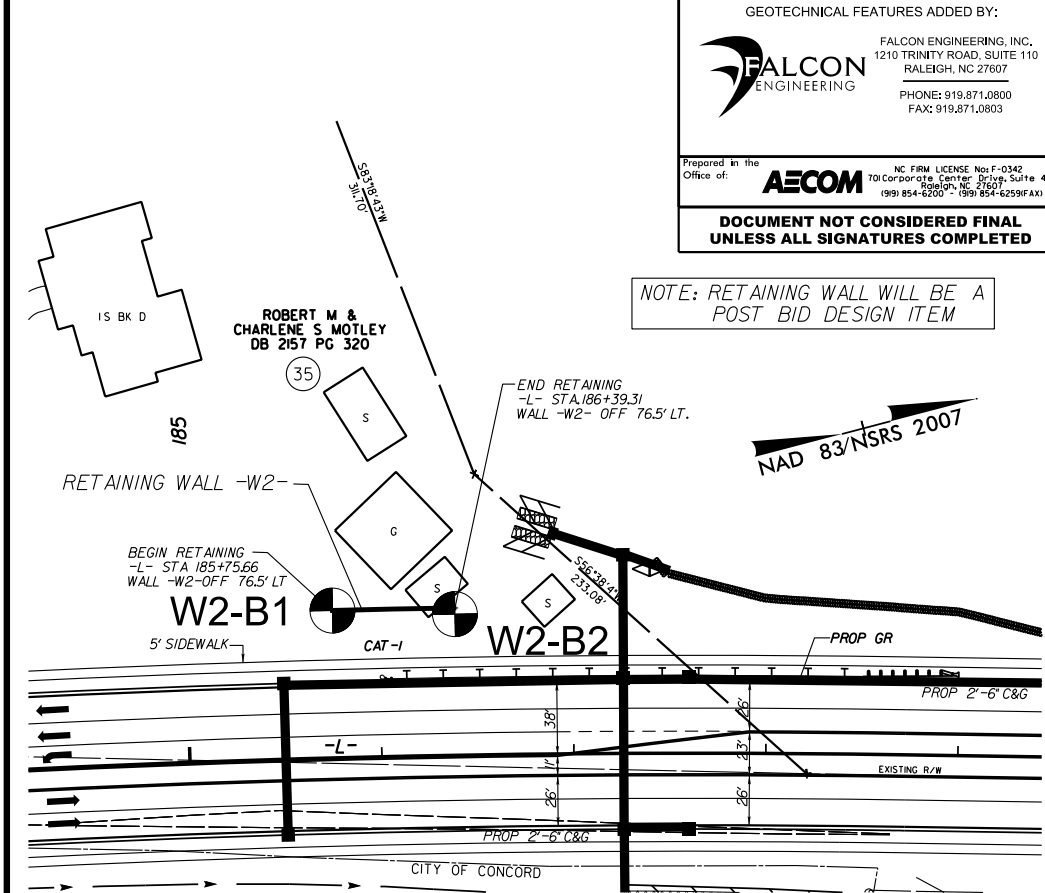
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS									
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST 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. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</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, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENISE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (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 TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>									
SOIL LEGEND AND AASHTO CLASSIFICATION										ANGULARITY OF GRAINS										WEATHERED ROCK (WR)										CRYSTALLINE ROCK (CR)									
<p>GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS</p>										<p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p>										<p>NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.</p>										<p>FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.</p>									
MINERALOGICAL COMPOSITION										COMPRESSION										NON-CRYSTALLINE ROCK (NCR)										COASTAL PLAIN SEDIMENTARY ROCK (CP)									
<p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p>SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</p>										<p>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 SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.</p>									
PERCENTAGE OF MATERIAL										GROUND WATER										WEATHERING										FRESH									
<p>ORGANIC MATERIAL GRANULAR SOILS SILT - CLAY SOILS OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE</p>										<p>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>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. 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. 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. 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. 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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> 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. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i> ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i> ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. FABRIC MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>										<p>ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. 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. 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. 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. 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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> 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. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i> ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i> ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. FABRIC MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</p>									
CONSISTENCY OR DENSENESS										MISCELLANEOUS SYMBOLS										MODERATE (MOD.)										MODERATELY SEVERE (MOD. SEV.)									
<p>PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT²)</p>										<p>ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY</p>										<p>DIP & DIP DIRECTION OF ROCK STRUCTURES SPT TEST BORE AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION</p>										<p>SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD TEST BORING WITH CORE SPT N-VALUE</p>									
TEXTURE OR GRAIN SIZE										RECOMMENDATION SYMBOLS										SEVERE (SEV.)										VERY SEVERE (V. SEV.)									
<p>U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270 4.76 2.00 0.42 0.25 0.075 0.053</p>										<p>UNDERCUT EXCAVATION UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK</p>										<p>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. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i> 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. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i> ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i> ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. FABRIC MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.</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. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROUDED 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. SOFT CAN BE GROUDED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</p>									
SOIL MOISTURE - CORRELATION OF TERMS										ABBREVIATIONS										VERY HARD										HARD									
<p>SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION</p>										<p>AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DMT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY</p>										<p>MED. - MEDIUM MICA - MICACEOUS MOD. - MODERATELY NP - NON PLASTIC ORG. - ORGANIC PMT - PRESSUREMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLI. - SLIGHTLY TCR - TRICONE REFUSAL w - MOISTURE CONTENT V - VERY</p>										<p>VST - VANE SHEAR TEST WEA. - WEATHERED W - UNIT WEIGHT W_d - DRY UNIT WEIGHT SAMPLE ABBREVIATIONS S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO</p>									
PLASTICITY										EQUIPMENT USED ON SUBJECT PROJECT										MODERATELY HARD										MEDIUM HARD									
<p>NON PLASTIC 0-5 VERY LOW SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM HIGHLY PLASTIC 26 OR MORE HIGH</p>										<p>DRILL UNITS: CME-45C, CME-55, CME-550, VANE SHEAR TEST, PORTABLE HOIST, Mobile B-57</p>										<p>ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE *STEEL TEETH, TRICONE *TUNG-CARB., CORE BIT</p>										<p>HAMMER TYPE: AUTOMATIC, MANUAL CORE SIZE: B, H, N HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST</p>									
COLOR										FRACATURE SPACING										MODERATELY SEVERE (MOD. SEV.)										SEVERE (SEV.)									
<p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>										<p>TERM SPACING VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FOOT VERY CLOSE LESS THAN 0.16 FEET</p>										<p>TERM THICKNESS VERY THICKLY BEDDED 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET</p>										<p>FRACATURE SPACING: VERY WIDE, WIDE, MODERATELY CLOSE, CLOSE, VERY CLOSE BEDDING: VERY THICKLY BEDDED, THICKLY BEDDED, THINLY BEDDED, VERY THINLY BEDDED, THICKLY LAMINATED, THINLY LAMINATED</p>									
PLASTICITY										INDURATION										VERY HARD										HARD									
<p>PLASTICITY INDEX (PI) DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH</p>										<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</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. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROUDED 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. SOFT CAN BE GROUDED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</p>										<p>FRACATURE SPACING: VERY WIDE, WIDE, MODERATELY CLOSE, CLOSE, VERY CLOSE BEDDING: VERY THICKLY BEDDED, THICKLY BEDDED, THINLY BEDDED, VERY THINLY BEDDED, THICKLY LAMINATED, THINLY LAMINATED</p>									
FRACATURE SPACING										INDURATION										VERY HARD										HARD									
<p>FRACATURE SPACING: VERY WIDE, WIDE, MODERATELY CLOSE, CLOSE, VERY CLOSE BEDDING: VERY THICKLY BEDDED, THICKLY BEDDED, THINLY BEDDED, VERY THINLY BEDDED, THICKLY LAMINATED, THINLY LAMINATED</p>										<p>FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE RUBBING WITH FINGER FREES NUMEROUS GRAINS; GENTLE BLOW BY HAMMER DISINTEGRATES SAMPLE. MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER. INDURATED GRAINS ARE DIFFICULT TO SEPARATE WITH STEEL PROBE; DIFFICULT TO BREAK WITH HAMMER. EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.</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. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROUDED 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. SOFT CAN BE GROUDED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.</p>										<p>FRACATURE SPACING: VERY WIDE, WIDE, MODERATELY CLOSE, CLOSE, VERY CLOSE BEDDING: VERY THICKLY BEDDED, THICKLY BEDDED, THINLY BEDDED, VERY THINLY BEDDED, THICKLY LAMINATED, THINLY LAMINATED</p>									
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PLASTICITY										INDURATION																													

RETAINING WALL DETAIL -W1-

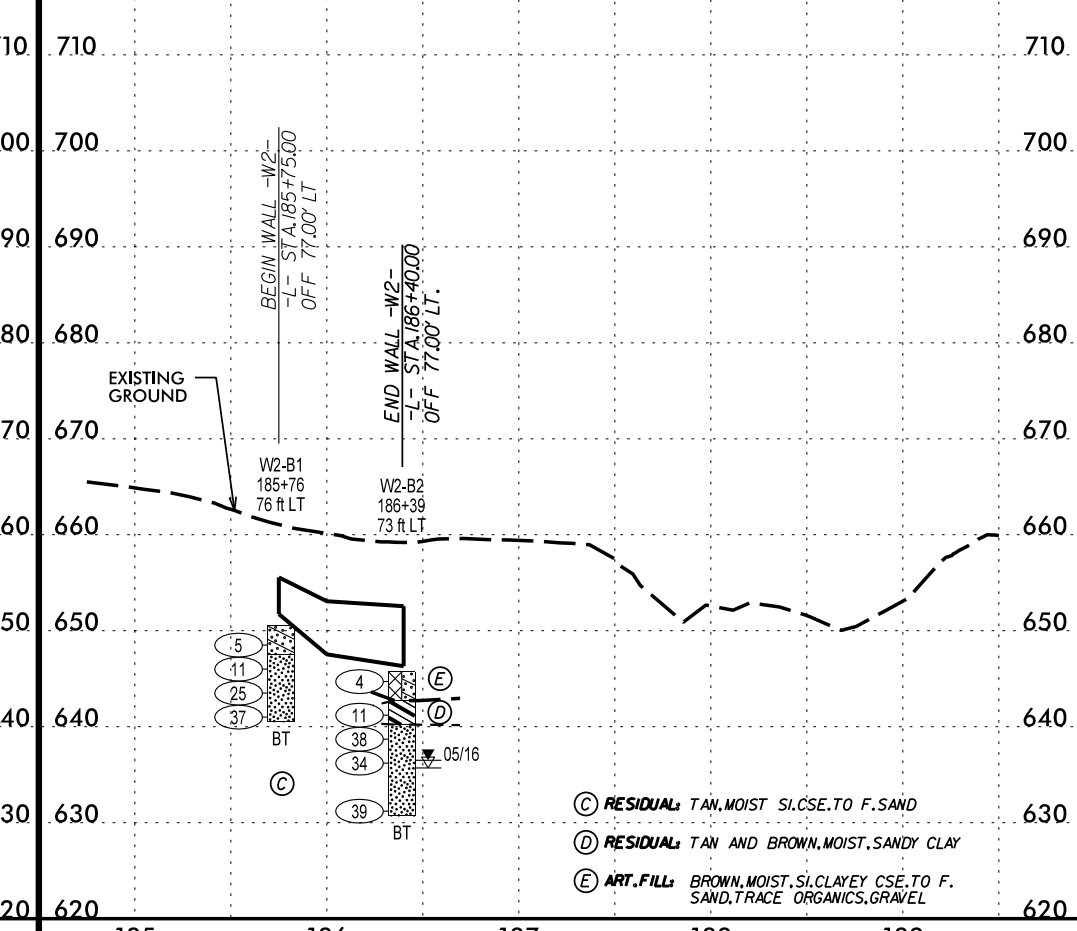
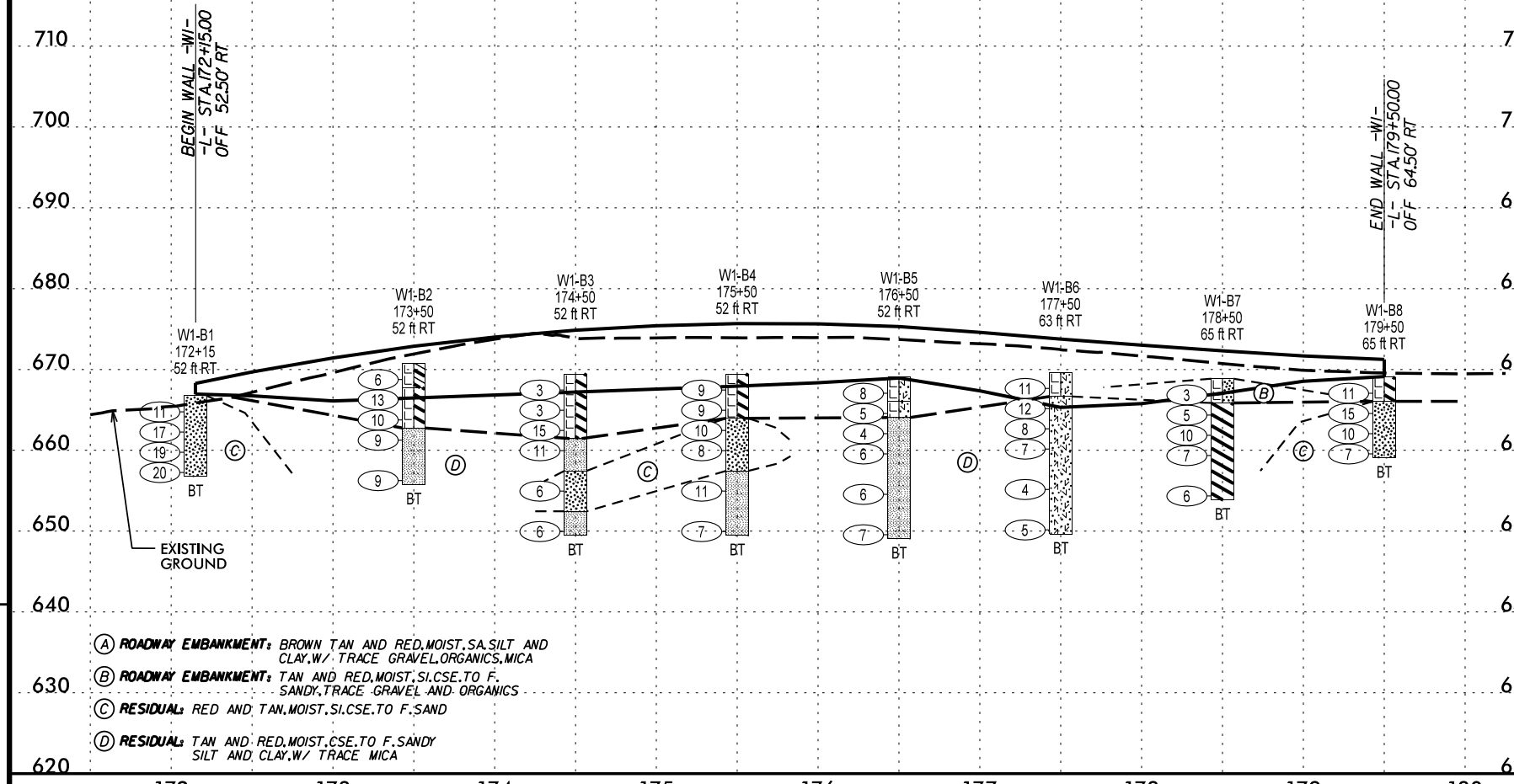


RETAINING WALL DETAIL -W2-



PROJECT REFERENCE NO.	SHEET NO.
U-4910B	3
GEOTECHNICAL FEATURES ADDED BY:	
FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 RALEIGH, NC 27607 PHONE: 919.871.0800 FAX: 919.871.0803	
Prepared in the Office of:	NC FIRM LICENSE No F-0342 701 Corporate Center Drive, Suite 415 Raleigh, NC 27607 (919) 854-6200 • (919) 854-6259(FAX)
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

REVISIONS:



- (A) ROADWAY EMBANKMENT: BROWN TAN AND RED, MOIST, SILT AND CLAY, W/ TRACE GRAVEL, ORGANICS, MICA
- (B) ROADWAY EMBANKMENT: TAN AND RED, MOIST, SILT, CLAY, SANDY, TRACE GRAVEL AND ORGANICS
- (C) RESIDUAL: RED AND TAN, MOIST, SILT, CLAY, SANDY
- (D) RESIDUAL: TAN AND RED, MOIST, SILT, CLAY, SANDY

- (C) RESIDUAL: TAN, MOIST, SILT, CLAY, SANDY
- (D) RESIDUAL: TAN AND BROWN, MOIST, SANDY CLAY
- (E) ART. FILL: BROWN, MOIST, SILT, CLAY, SANDY, SAND, TRACE ORGANICS, GRAVEL

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 40373.1.1		TIP U-4910		COUNTY CABARRUS		GEOLOGIST Goodnight, D. J.									
SITE DESCRIPTION SR 1445 DERITA ROAD WIDENING FROM NORTH OF SR 2894 TO SR 1394							GROUND WTR (ft)								
BORING NO. W1-B3		STATION 174+50		OFFSET 52 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 669.4 ft		TOTAL DEPTH 20.0 ft		NORTHING 601,293		EASTING 1,487,797									
DRILL RIG/HAMMER EFF./DATE MOBILE B-57, TRI 88016			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic									
DRILLER Estep, J. E.		START DATE 05/17/16		COMP. DATE 05/17/16		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					
670														669.4	0.0
	668.4	1.0	2	1	2								M	ROADWAY EMBANKMENT MOD. PLASTIC, BROWN, SILTY CLAY (A-7-5) W/ TRACE ORGANICS	
	665.9	3.5	2	1	2								M		
	663.4	6.0	5	6	9								SS-2 25%		
	660.9	8.5	3	5	6								M	RESIDUAL NON-PLASTIC, TAN AND RED, CSE. TO F. SANDY SILT (A-4)	8.0
	655.9	13.5	2	3	3								M	NON-PLASTIC, TAN, SILTY CSE. TO F. SAND (A-2-4)	12.0
	650.9	18.5	1	2	4								M	NON-PLASTIC, TAN AND RED, CSE. TO F. SANDY SILT (A-4)	17.0
													M	Boring Terminated at Elevation 649.4 ft IN RESIDUAL: SANDY SILT	20.0

WBS 40373.1.1		TIP U-4910		COUNTY CABARRUS		GEOLOGIST Goodnight, D. J.									
SITE DESCRIPTION SR 1445 DERITA ROAD WIDENING FROM NORTH OF SR 2894 TO SR 1394							GROUND WTR (ft)								
BORING NO. W1-B4		STATION 175+50		OFFSET 52 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 669.3 ft		TOTAL DEPTH 20.0 ft		NORTHING 601,390		EASTING 1,487,822									
DRILL RIG/HAMMER EFF./DATE MOBILE B-57, TRI 88016			DRILL METHOD H.S. Augers			HAMMER TYPE Automatic									
DRILLER Estep, J. E.		START DATE 05/17/16		COMP. DATE 05/17/16		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					
670														669.3	0.0
	668.3	1.0	2	4	5								M	ROADWAY EMBANKMENT MOD. PLASTIC, TAN AND RED, SILTY CLAY (A-7-5) W/ TRACE ORGANICS	
	665.8	3.5	3	4	5								SS-3 25%		
	663.3	6.0	3	4	6								M	RESIDUAL NON-PLASTIC, RED AND TAN, SILTY F. SAND (A-2-4)	5.5
	660.8	8.5	3	3	5								M		
	655.8	13.5	2	4	7								M	NON-PLASTIC, TAN, CSE. TO F. SANDY SILT (A-4)	12.0
	650.8	18.5	2	3	4								M	Boring Terminated at Elevation 649.3 ft IN RESIDUAL: SANDY SILT	20.0

NCDOT BORE DOUBLE_U4910_GINT_BORING LOGS.GPJ NC_DOT.GDT 7/19/16

Falcon Engineering, Inc.			1210 Trinity Road, Suite 110, Raleigh, NC 27607								
LABORATORY TEST RESULTS											
SR 1445 Derita Road Widening from north of SR 2894 Concord Mills Boulevard to Sr 1394 Poplar Tent Road											
City of Concord Cabarrus County, NC											
WBS: 40373.1.1 TIP No.: U-4910											
Falcon Engineering Project No.: G16014.00											
SAMPLE		DEPTH	AASHTO CLASS	ATTERBERG LIMITS			% PASSING (SIEVES)			% MOISTURE	% ORGANICS
NO.	BORING			LL	PL	PI	#10	#40	#200		
SS-1	W1_B2	6.0-7.5	A-7-5	57	39	18	100	85	58	31.2	-
SS-2	W1_B3	6.0-7.5	A-7-5	65	40	25	99	83	63	25.4	-
SS-3	W1_B4	3.5-5.0	A-7-5	57	41	16	100	79	55	25.2	-
SS-4	W1_B5	3.5-5.0	A-5	49	43	6	100	81	51	24.7	-
SS-5	W1_B6	8.5-10.0	A-5	52	51	1	100	96	71	31.2	-
SS-6	W1_B7	3.5-5.0	A-7-5	52	32	20	100	90	72	27.3	-
SS-7	W2_B2	3.5-5.0	A-6	38	21	17	97	78	51	22.8	-

Notes: LL Liquid Limit
 PL Plastic Limit
 PI Plasticity Index = LL - PL

REFERENCE: U-4910

PROJECT: 40373

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4910	1	11

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN AND WALL ENVELOPES
4-10	BORING LOGS
11	SOIL TEST RESULTS

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CABARRUS
PROJECT DESCRIPTION SR 1445 DERITA ROAD
WIDENING FROM NORTH OF SR 2894 TO SR 1394

SITE DESCRIPTION
WALL -W1- 172 + 15.00, 67.58' RT, TO 179 + 50.00 89.54' RT
WALL -W2- 185 + 75.66, 76.5' LT, TO 186 + 39.31, 76.5' LT

CAUTION NOTICE

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

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

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

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

GOODNIGHT, D. J.
TRIGON EXP.
HOGLEN, J. R.

INVESTIGATED BY DJG/JRH
DRAWN BY HUNSBERGER, W. S.
CHECKED BY HAMM, J. R.
SUBMITTED BY FALCON ENG.
DATE NOVEMBER 2016



Jeremy R. Hamm 11/21/16
SIGNATURE DATE

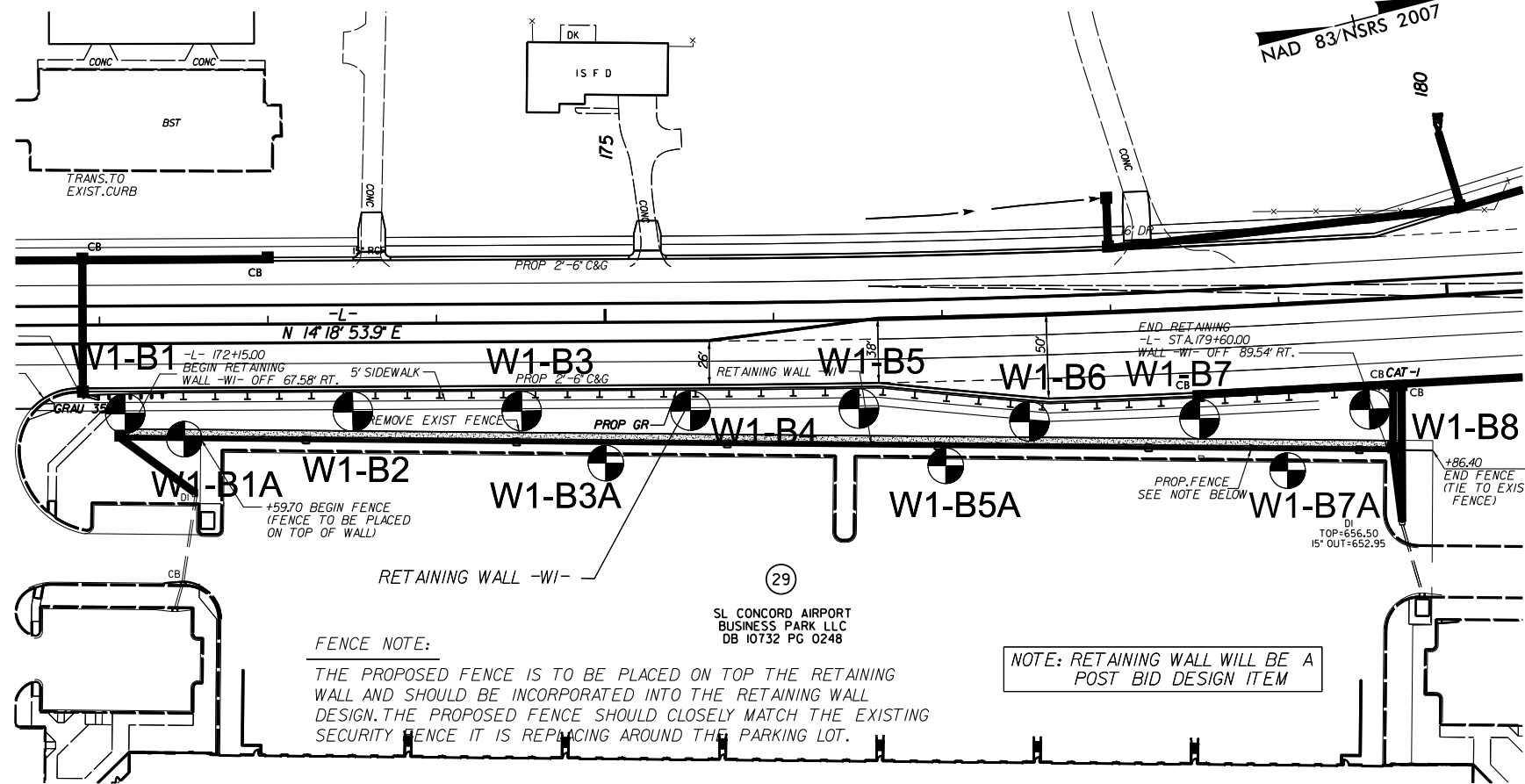
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT**

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																																																																		
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST 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. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</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, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR 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 (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (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 TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.</p>																																																																																																																																																																																		
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RETAINING WALL DETAIL -W1-



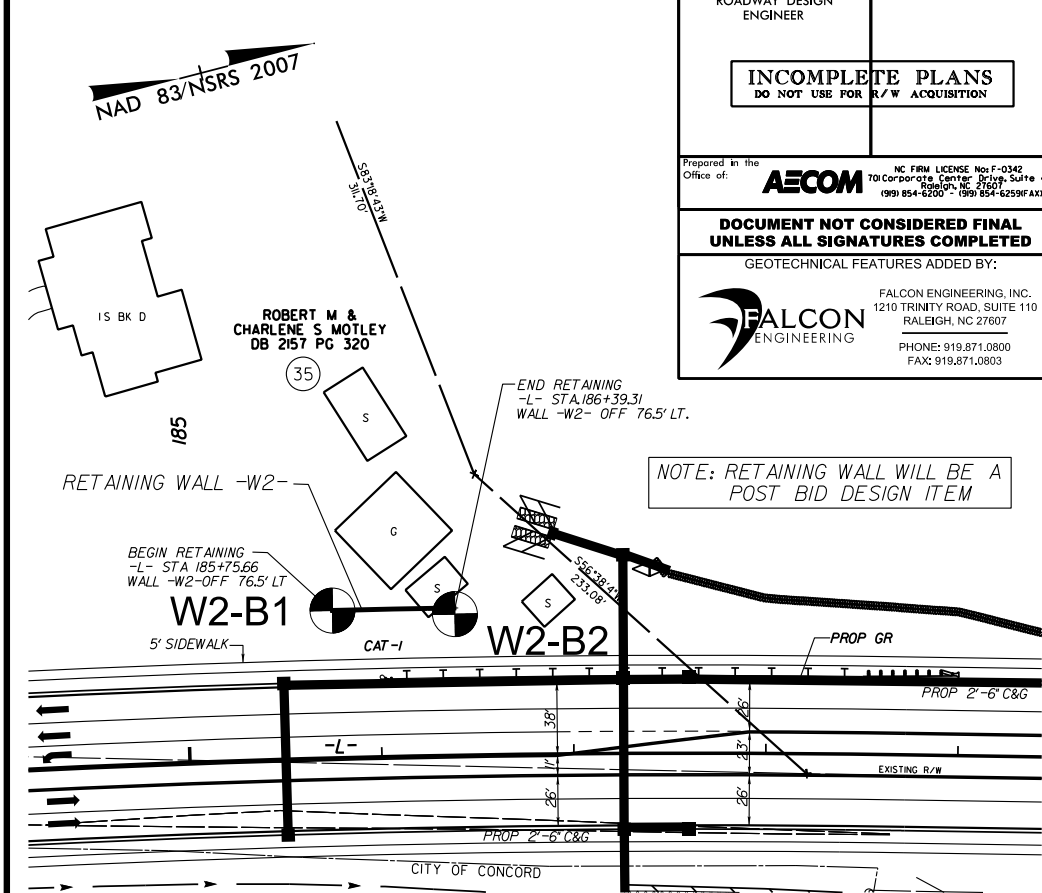
FENCE NOTE:

THE PROPOSED FENCE IS TO BE PLACED ON TOP THE RETAINING WALL AND SHOULD BE INCORPORATED INTO THE RETAINING WALL DESIGN. THE PROPOSED FENCE SHOULD CLOSELY MATCH THE EXISTING SECURITY FENCE IT IS REPLACING AROUND THE PARKING LOT.

NOTE: RETAINING WALL WILL BE A POST BID DESIGN ITEM

SL CONCORD AIRPORT BUSINESS PARK LLC DB 10732 PG 0248

RETAINING WALL DETAIL -W2-



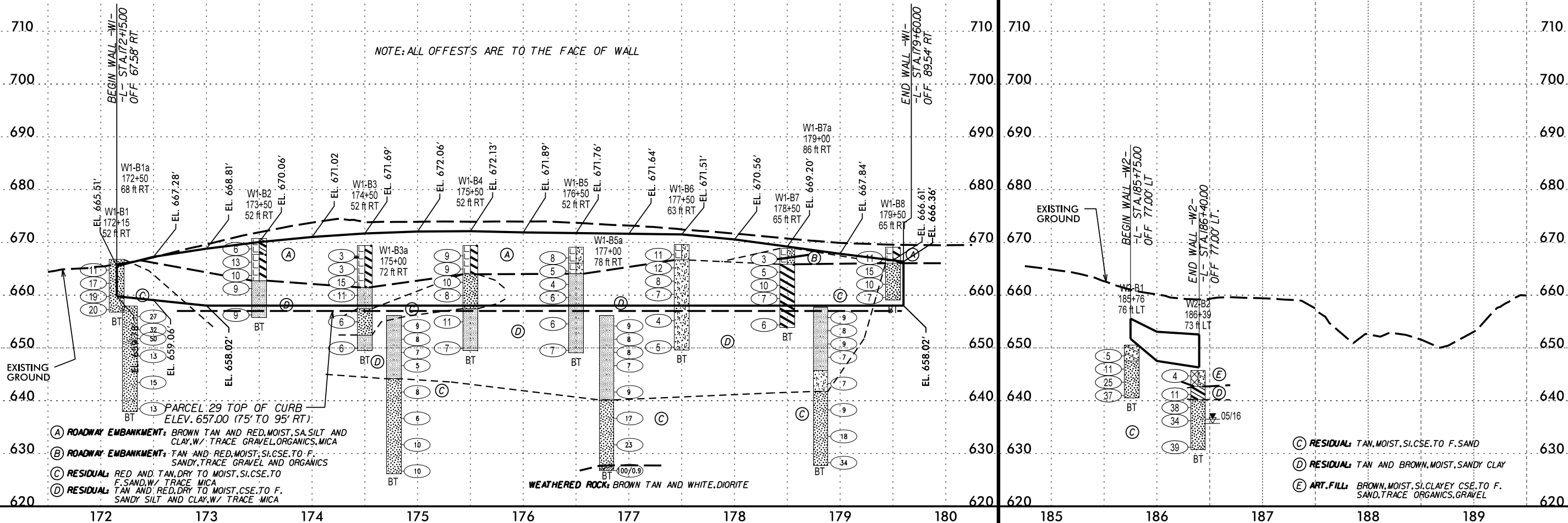
NOTE: RETAINING WALL WILL BE A POST BID DESIGN ITEM

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Prepared in the Office of: **AECOM** NC FIRM LICENSE No. F-0342 701 Corporate Center Drive, Suite 4175 Raleigh, NC 27607 (919) 854-6200 • (919) 854-6259(FAX)

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GEOTECHNICAL FEATURES ADDED BY: **FALCON ENGINEERING** FALCON ENGINEERING, INC. 1210 TRINITY ROAD, SUITE 110 RALEIGH, NC 27607 PHONE: 919.871.0800 FAX: 919.871.0803



REVISIONS:

Revisions:

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 40373.1.1		TIP U-4910		COUNTY CABARRUS		GEOLOGIST Goodnight, D. J.									
SITE DESCRIPTION SR 1445 DERITA ROAD WIDENING FROM NORTH OF SR 2894 TO SR 1394							GROUND WTR (ft)								
BORING NO. W1-B2		STATION 173+50		OFFSET 52 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 670.7 ft		TOTAL DEPTH 15.0 ft		NORTHING 601,196		EASTING 1,487,772									
DRILL RIG/HAMMER EFF./DATE MOBILE B-57, TRI 88016		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Estep, J. E.		START DATE 05/17/16		COMP. DATE 05/17/16		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					
675															
670	669.7	1.0	3	3	3								M	670.7	0.0
	667.2	3.5	5	5	8								M	667.7	3.0
665	664.7	6.0	3	4	6								M	662.7	8.0
	662.2	8.5	3	4	5								M	662.7	8.0
660	657.2	13.5	4	4	5								M	655.7	15.0
Boring Terminated at Elevation 655.7 ft IN RESIDUAL: SANDY SILT															

WBS 40373.1.1		TIP U-4910		COUNTY CABARRUS		GEOLOGIST Goodnight, D. J.									
SITE DESCRIPTION SR 1445 DERITA ROAD WIDENING FROM NORTH OF SR 2894 TO SR 1394							GROUND WTR (ft)								
BORING NO. W1-B3		STATION 174+50		OFFSET 52 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 669.4 ft		TOTAL DEPTH 20.0 ft		NORTHING 601,293		EASTING 1,487,797									
DRILL RIG/HAMMER EFF./DATE MOBILE B-57, TRI 88016		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Estep, J. E.		START DATE 05/17/16		COMP. DATE 05/17/16		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					
670															
	668.4	1.0	2	1	2								M	669.4	0.0
665	665.9	3.5	2	1	2								M	665.9	3.0
	663.4	6.0	5	6	9								M	663.4	6.0
660	660.9	8.5	3	5	6								M	660.9	8.5
	655.9	13.5	2	3	3								M	655.9	13.5
650	650.9	18.5	1	2	4								M	650.9	18.5
Boring Terminated at Elevation 649.4 ft IN RESIDUAL: SANDY SILT															

NCDOT BORE DOUBLE U4910_GEO_GINT_BORING LOGS.GPJ_NC_DOT.GDT 11/8/16

Falcon Engineering, Inc.			1210 Trinity Road, Suite 110, Raleigh, NC 27607								
LABORATORY TEST RESULTS											
SR 1445 Derita Road Widening from north of SR 2894 Concord Mills Boulevard to Sr 1394 Poplar Tent Road											
City of Concord Cabarrus County, NC											
WBS: 40373.1.1 TIP No.: U-4910											
Falcon Engineering Project No.: G16014.00											
SAMPLE		DEPTH	AASHTO CLASS	ATTERBERG LIMITS			% PASSING (SIEVES)			% MOISTURE	% ORGANICS
NO.	BORING			LL	PL	PI	#10	#40	#200		
SS-1	W1_B2	6.0-7.5	A-7-5	57	39	18	100	85	58	31.2	-
SS-2	W1_B3	6.0-7.5	A-7-5	65	40	25	99	83	63	25.4	-
SS-3	W1_B4	3.5-5.0	A-7-5	57	41	16	100	79	55	25.2	-
SS-4	W1_B5	3.5-5.0	A-5	49	43	6	100	81	51	24.7	-
SS-5	W1_B6	8.5-10.0	A-5	52	51	1	100	96	71	31.2	-
SS-6	W1_B7	3.5-5.0	A-7-5	52	32	20	100	90	72	27.3	-
SS-7	W2_B2	3.5-5.0	A-6	38	21	17	97	78	51	22.8	-

Notes: LL Liquid Limit
 PL Plastic Limit
 PI Plasticity Index = LL - PL