

REFERENCE: B-5102

PROJECT: 42237

**CONTENTS**

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

**STRUCTURE**  
**SUBSURFACE INVESTIGATION**

COUNTY PERSON  
 PROJECT DESCRIPTION BRIDGE NO. 11 ON US 158  
OVER SOUTH HYCO CREEK

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5102	1	17

**CAUTION NOTICE**

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF PREPARING THE SCOPE OF WORK TO BE INCLUDED IN THE REQUEST FOR PROPOSAL. 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.

SOIL AND ROCK BOUNDARIES WITHIN A BOREHOLE ARE BASED ON GEOTECHNICAL INTERPRETATION UNLESS ENCOUNTERED IN A SAMPLE. INTERPRETED BOUNDARIES MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN SAMPLED STRATA AND BOREHOLE INFORMATION MAY NOT NECESSARILY REFLECT ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS. 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

J.R. SWARTLEY

D.G. PINTER

R.E. SMITH

N.D. MOHS

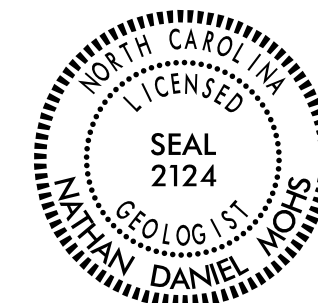
INVESTIGATED BY N.D. MOHS

DRAWN BY N.D. MOHS

CHECKED BY N.T. ROBERSON

SUBMITTED BY N.T. ROBERSON

DATE JULY 2015

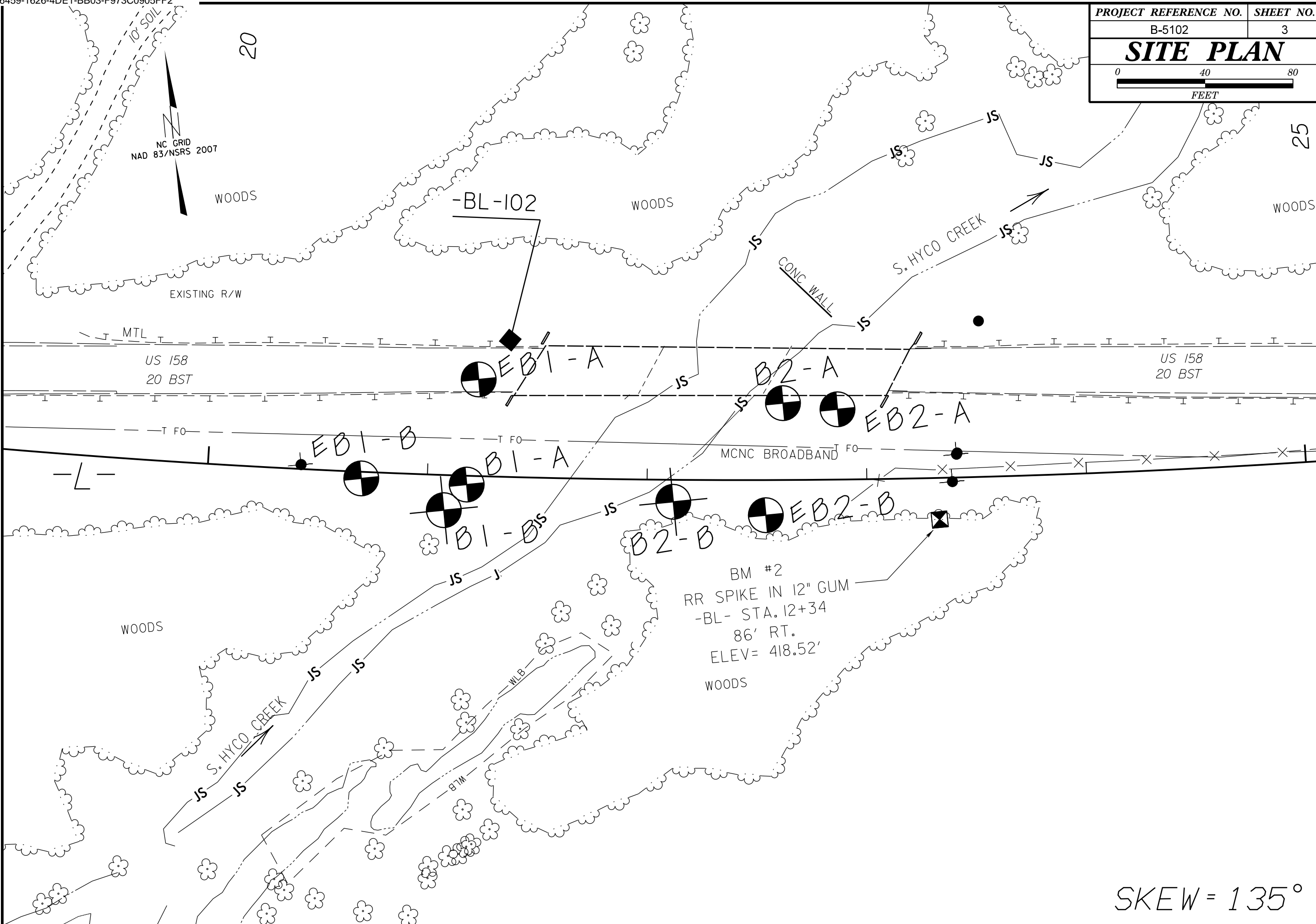


DocuSigned by:  
Nathan Mohs 7/8/2015  
 C4CF720937E246B SIGNATURE DATE

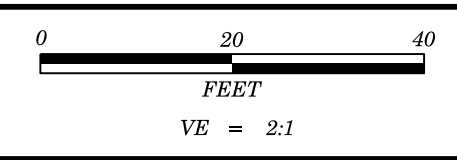
**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION**  
**DIVISION OF HIGHWAYS**  
**GEOTECHNICAL ENGINEERING UNIT**  
**SUBSURFACE INVESTIGATION**  
**SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS**

SOIL DESCRIPTION				GRADATION				ROCK DESCRIPTION				TERMS AND DEFINITIONS			
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 209, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6				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.				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:				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 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 (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.			
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>				<b>ANGULARITY OF GRAINS</b>				<b>WEATHERED ROCK (WR)</b>				<b>CRYSTALLINE ROCK (CR)</b>			
GENERAL CLASS. GRANULAR MATERIALS (≤ 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS				THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.				FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.				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.			
<b>MINERALOGICAL COMPOSITION</b>				<b>COMPRESSION</b>				<b>NON-CRYSTALLINE ROCK (NCR)</b>				<b>COASTAL PLAIN SEDIMENTARY ROCK (CP)</b>			
MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.				SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50				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.				COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.			
<b>COMPRESSIBILITY</b>				<b>PERCENTAGE OF MATERIAL</b>				<b>WEATHERING</b>				<b>WEATHERING</b>			
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				FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL.) ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE. SLIGHT (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL. SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF. VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF. COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.							
<b>GROUND WATER</b>				<b>MISCELLANEOUS SYMBOLS</b>				<b>ROCK HARDNESS</b>				<b>ROCK HARDNESS</b>			
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				ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY				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 PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. 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.							
<b>CONSISTENCY OR DENSENESS</b>				<b>RECOMMENDATION SYMBOLS</b>				<b>FRACTURE SPACING</b>				<b>BEDDING</b>			
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )				UNDERCUT EXCAVATION UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE UNCLASSIFIED EXCAVATION - ACCEPTABLE BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL SHALLOW UNDERCUT UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK				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				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 FEET THINLY LAMINATED < 0.008 FEET			
GENERALLY GRANULAR MATERIAL (NON-COHESIVE) VERY LOOSE 4 TO 10 MEDIUM DENSE 10 TO 30 DENSE 30 TO 50 VERY DENSE > 50				AR - AUGER REFUSAL MED. - MEDIUM VST - VANE SHEAR TEST BT - BORING TERMINATED MICA - MICACEOUS WEA. - WEATHERED CL. - CLAY MOD. - MODERATELY NP - NON PLASTIC U - UNIT WEIGHT CPT - CONE PENETRATION TEST CSE. - COARSE PMT - PRESSUREMETER TEST W - DRY UNIT WEIGHT DPT - DILATOMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY e - VOID RATIO F - FINE SL. - SILTY FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES TCR - TRICONE REFUSAL FRAGS. - FRAGMENTS W - MOISTURE CONTENT HI. - HIGHLY V - VERY				S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO							
<b>TEXTURE OR GRAIN SIZE</b>				<b>ABBREVIATIONS</b>				<b>EQUIPMENT USED ON SUBJECT PROJECT</b>				<b>EQUIPMENT USED ON SUBJECT PROJECT</b>			
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				DRILL UNITS: CME-45C CME-55 CME-550 VANE SHEAR TEST PORTABLE HOIST				ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE *STEEL TEETH TRICONE *TUNG-CARB. CORE BIT				HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: -B -H -N CW3 HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST			
BOULDER (BLDR.) COBBLE (COB.) GRAVEL (GR.) COARSE SAND (CSE. SD.) FINE SAND (F SD.) SILT (SL.) CLAY (CL.)				GRAIN SIZE MM 305 75 2.0 0.25 0.05 0.005 IN. 12 3				SOIL MOISTURE - CORRELATION OF TERMS				BENCH MARK: BL-2: N 959329.8220 E 1968260.8400			
GRAIN SIZE MM 305 75 2.0 0.25 0.05 0.005 IN. 12 3				SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION				ELEVATION: 431.51 FEET				NOTES:			
LL - LIQUID LIMIT PL - PLASTIC LIMIT OM - OPTIMUM MOISTURE SL - SHRINKAGE LIMIT				- SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE				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.							
<b>PLASTICITY</b>				<b>COLOR</b>				INDURATION				INDURATION			
NON PLASTIC SLIGHTLY PLASTIC MODERATELY PLASTIC HIGHLY PLASTIC				PLASTICITY INDEX (PI) DRY STRENGTH VERY LOW SLIGHT MEDIUM HIGH				INDURATION				INDURATION			
DESCRIPTORS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.				INDURATION				INDURATION				INDURATION			

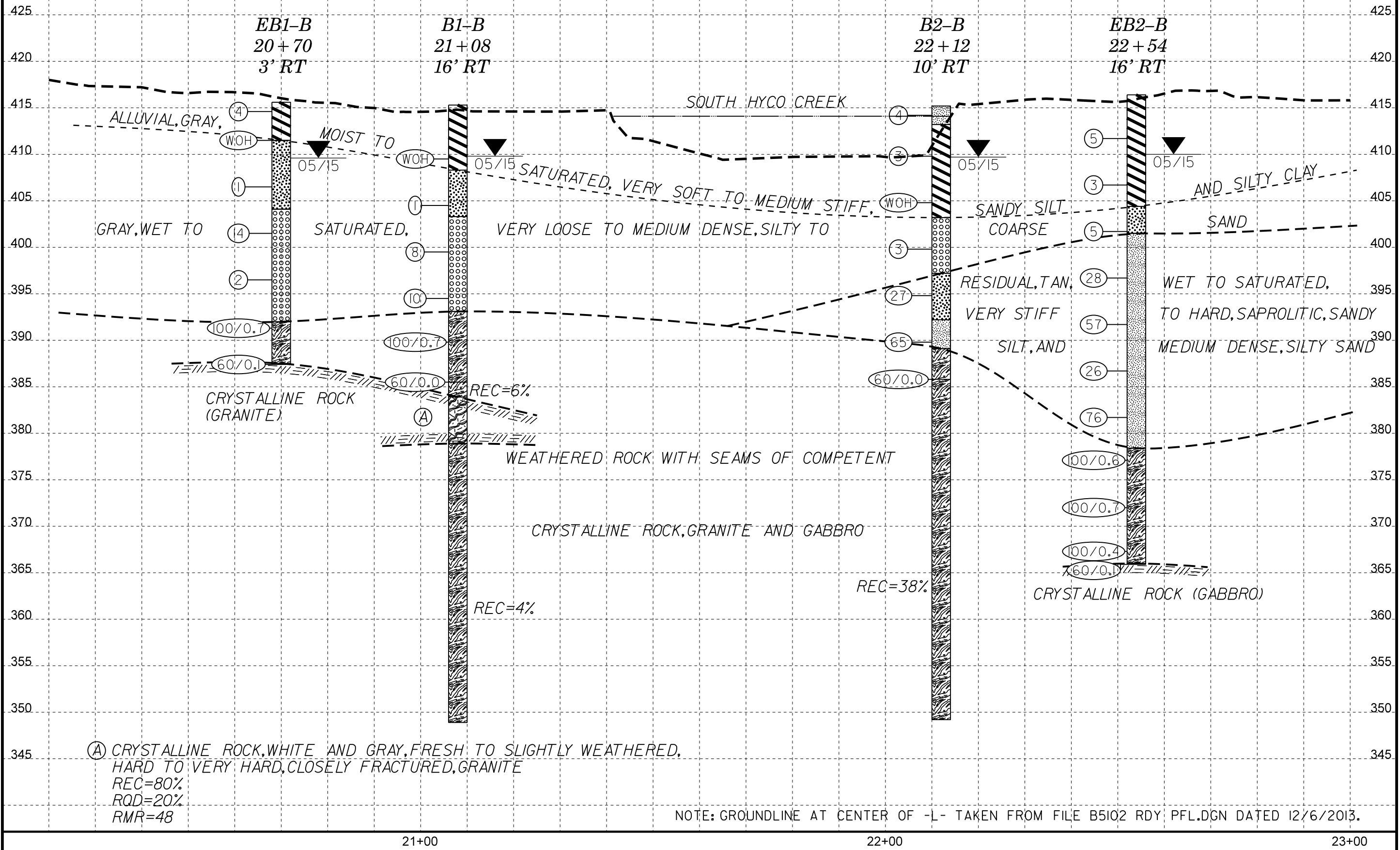
PROJECT REFERENCE NO.	SHEET NO.
B-5102	3
<b>SITE PLAN</b>	
 0 40 80 FEET	



SKEW = 135°



PROJECT REFERENCE NO.	SHEET NO.
B-5102	4
PROFILE OF BORINGS ALONG -L-	



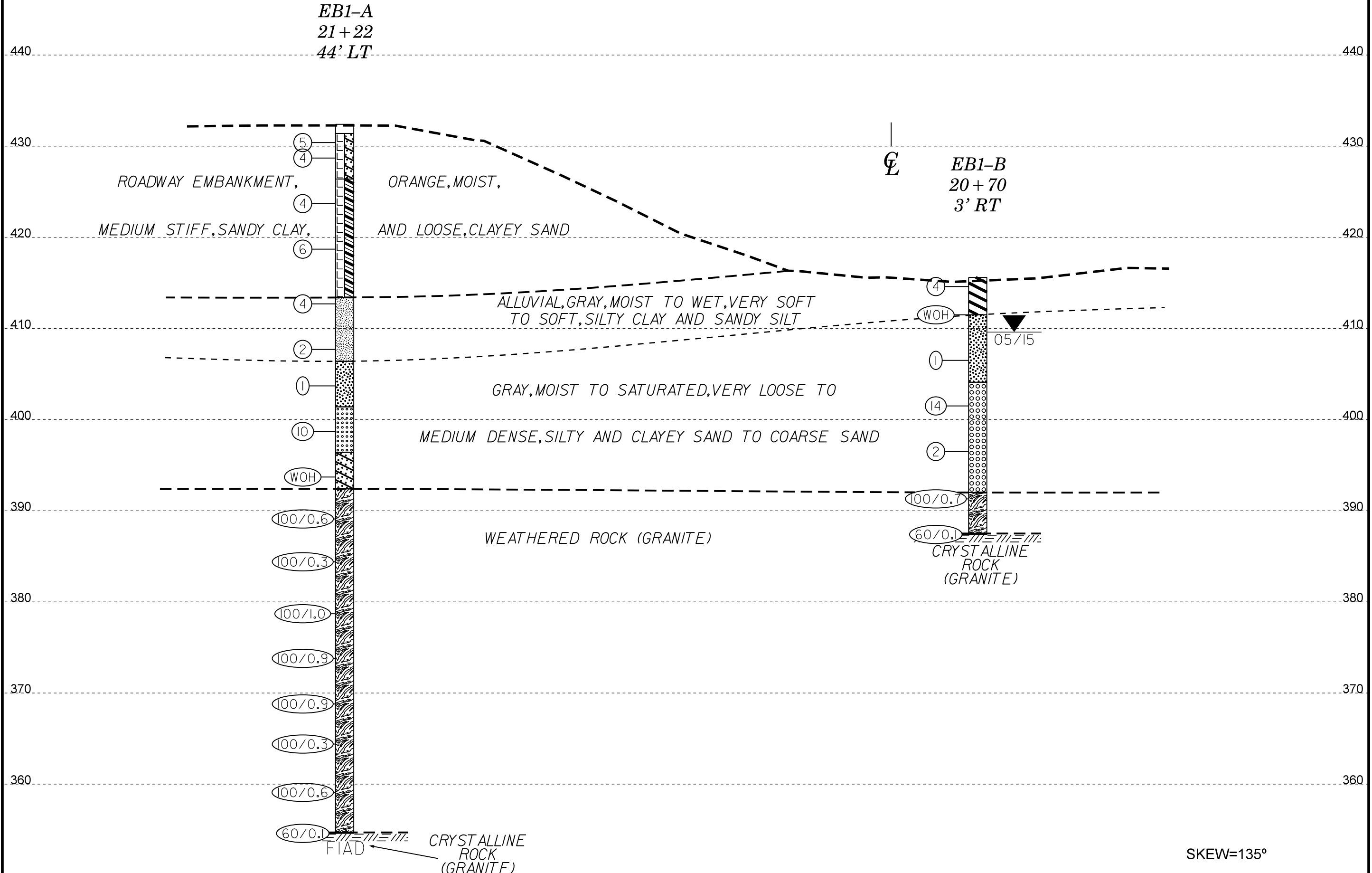
Ⓐ CRYSTALLINE ROCK, WHITE AND GRAY, FRESH TO SLIGHTLY WEATHERED, HARD TO VERY HARD, CLOSELY FRACTURED, GRANITE  
 REC=80%  
 RQD=20%  
 RMR=48

NOTE: GROUNDLINE AT CENTER OF -L- TAKEN FROM FILE B5102 RDY PFL.DGN DATED 12/6/2013.

21+00

22+00

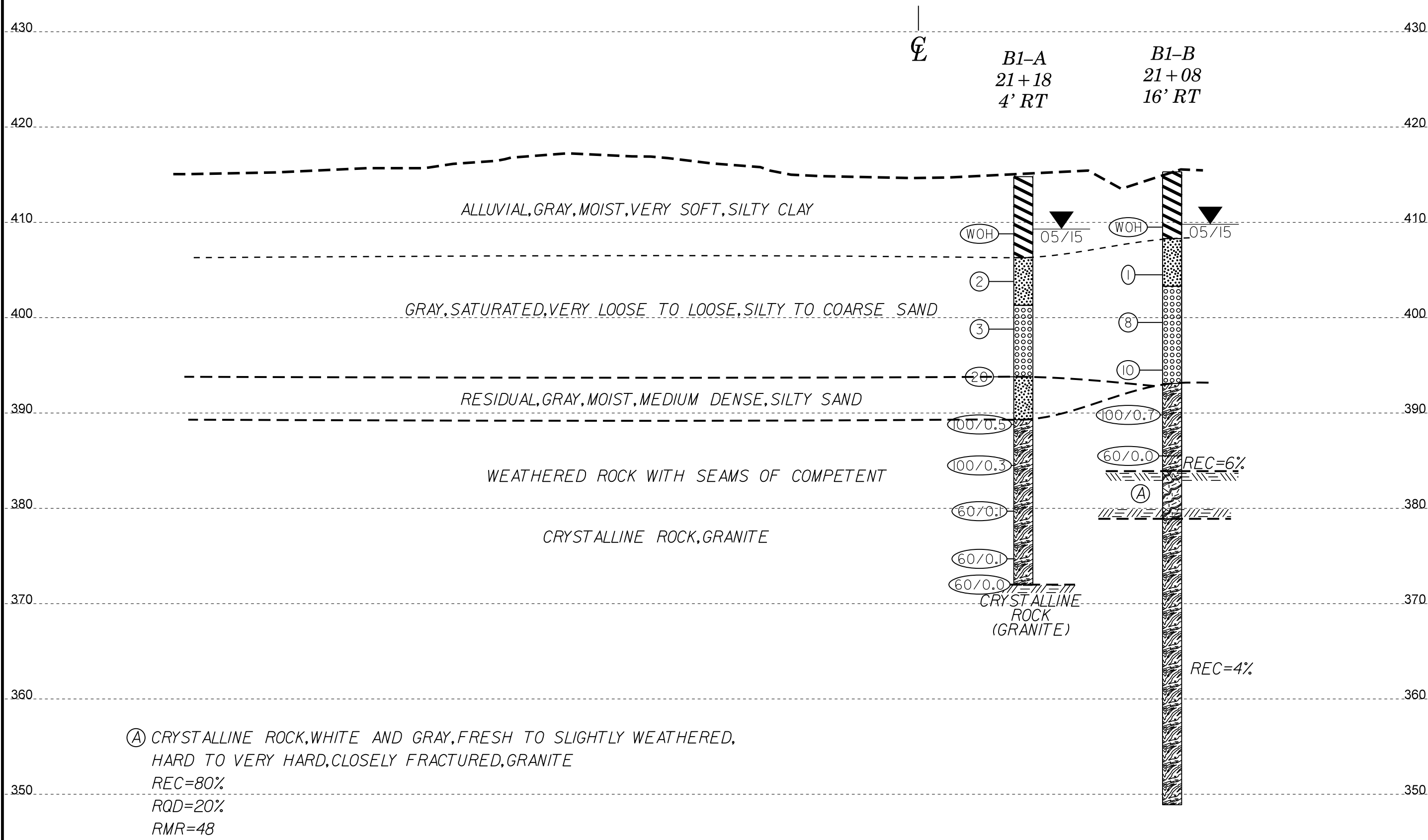
23+00



VE = 1:1

END BENT 1 CROSS SECTION

SKIEW=135°

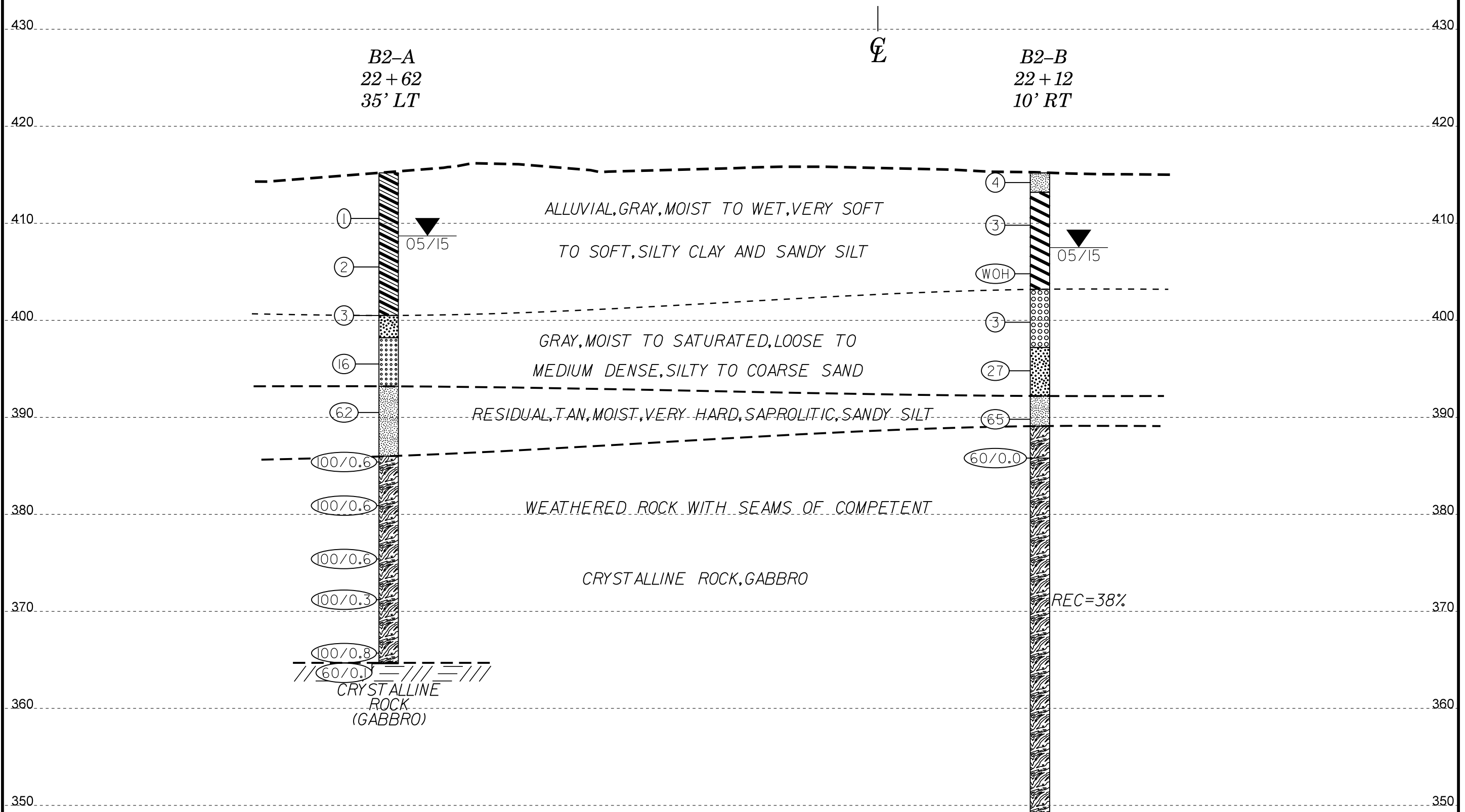


SKEW=135°



VE = 1:1

**BENT 1 CROSS SECTION**

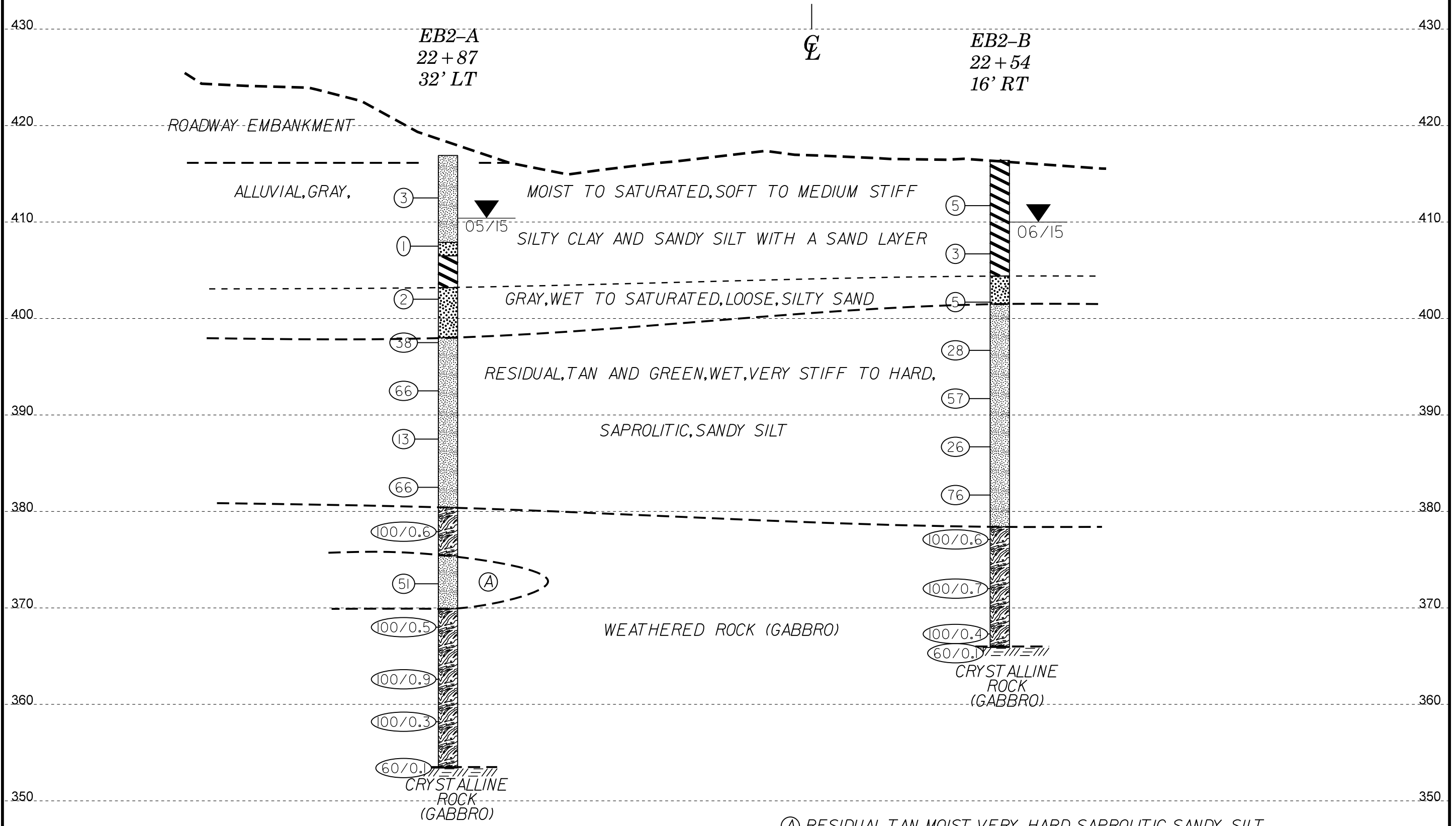


SKREW=135°



VE = 1:1

**BENT 2 CROSS SECTION**



(A) RESIDUAL, TAN, MOIST, VERY HARD, SAPROLITIC, SANDY SILT

SKEW=135°



VE = 1:1

END BENT 2 CROSS SECTION



# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 42237.1.1		TIP B-5102		COUNTY PERSON		GEOLOGIST Swartley, J. R.									
SITE DESCRIPTION BRIDGE NO. 11 ON US 158 OVER SOUTH HYCO CREEK							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 21+22		OFFSET 44 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 432.3 ft		TOTAL DEPTH 77.8 ft		NORTHING 959,313		EASTING 1,968,245									
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 86% 02/09/2015			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Pinter, D. G.		START DATE 06/03/15		COMP. DATE 06/03/15		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
435															
430	431.3	1.0	2	3	2										432.3 GROUND SURFACE 0.0
	429.6	2.7	3	2	2										431.3 ASPHALT 1.0
425	424.6	7.7	1	2	2										426.3 ROADWAY EMBANKMENT 6.0
															ORANGE, CLAYEY SAND
420	419.6	12.7	1	1	5										426.3 ORANGE, SANDY CLAY 6.0
415	413.6	18.7	4	2	2										
410	408.6	23.7	1	1	1										413.3 ALLUVIAL 19.0
405	404.6	27.7	WOH	WOH	1										GRAY, SANDY SILT WITH TRACE GRAVEL
400	399.6	32.7	4	5	5										406.3 GRAY, SILTY SAND 26.0
395	394.6	37.7	WOH	WOH	WOH										401.3 GRAY, ANGULAR, SAND 31.0
390	389.6	42.7	90	100/0.1											396.3 GRAY, CLAYEY SAND 36.0
385	384.6	47.7	100/0.3												392.3 WEATHERED ROCK (GRANITE) 40.0
380	379.6	52.7	40	60/0.5											
375	374.6	57.7	22	78/0.4											
370	369.6	62.7	42	58/0.4											
365	364.6	67.7	50	50/0.3											
360	359.6	72.7	60	35/0.1											
355															

NCDOT BORE DOUBLE B5102\_GEO\_BRDG0011\_BH.GPJ NC\_DOT.GDT 6/25/15

WBS 42237.1.1		TIP B-5102		COUNTY PERSON		GEOLOGIST Swartley, J. R.									
SITE DESCRIPTION BRIDGE NO. 11 ON US 158 OVER SOUTH HYCO CREEK							GROUND WTR (ft)								
BORING NO. EB1-A		STATION 21+22		OFFSET 44 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 432.3 ft		TOTAL DEPTH 77.8 ft		NORTHING 959,313		EASTING 1,968,245									
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 86% 02/09/2015			DRILL METHOD Mud Rotary		HAMMER TYPE Automatic										
DRILLER Pinter, D. G.		START DATE 06/03/15		COMP. DATE 06/03/15		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
355															
	354.6	77.7	60/0.1												Match Line
															354.6 CRISTALLINE ROCK (GRANITE) 77.7
															354.5 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 354.5 ft IN CRISTALLINE ROCK (GRANITE) 77.8

WBS 42237.1.1		TIP B-5102		COUNTY PERSON		GEOLOGIST Swartley, J. R.								
SITE DESCRIPTION BRIDGE NO. 11 ON US 158 OVER SOUTH HYCO CREEK							GROUND WTR (ft)							
BORING NO. EB1-B		STATION 20+70		OFFSET 3 ft RT		ALIGNMENT -L-								
COLLAR ELEV. 415.6 ft		TOTAL DEPTH 28.2 ft		NORTHING 959,274		EASTING 1,968,187								
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 86% 02/09/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic								
DRILLER Pinter, D. G.		START DATE 05/21/15		COMP. DATE 05/21/15		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
420														
415	415.6	0.0	1	2	2									415.6 GROUND SURFACE 0.0
	412.5	3.1	WOH	WOH	WOH									411.5 ALLUVIAL ORANGE AND BROWN, SILTY CLAY 4.1
410														411.5 GRAY, SILTY SAND 4.1
	407.5	8.1	WOH	WOH	1									
405														
	402.5	13.1	6	5	9									404.1 GRAY, COARSE SAND 11.5
400														
	397.5	18.1	4	1	1									
395														
	392.5	23.1	11	67	33/0.2									392.0 WEATHERED ROCK (GRANITE) 23.6
390														
	387.5	28.1												387.5 WEATHERED ROCK (GRANITE) 28.1
			60/0.1											387.4 CRYSTALLINE ROCK (GRANITE) 28.2
														387.4 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 387.4 ft IN CRYSTALLINE ROCK (GRANITE)

WBS 42237.1.1		TIP B-5102		COUNTY PERSON		GEOLOGIST Swartley, J. R.								
SITE DESCRIPTION BRIDGE NO. 11 ON US 158 OVER SOUTH HYCO CREEK							GROUND WTR (ft)							
BORING NO. B1-A		STATION 21+18		OFFSET 4 ft RT		ALIGNMENT -L-	0 HR. N/A							
COLLAR ELEV. 414.8 ft		TOTAL DEPTH 42.8 ft		NORTHING 959,266		EASTING 1,968,235	24 HR. 5.5							
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 86% 02/09/2015				DRILL METHOD NW Casing w/ Advancer		HAMMER TYPE Automatic								
DRILLER Pinter, D. G.		START DATE 05/20/15		COMP. DATE 05/21/15		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
415														414.8 GROUND SURFACE 0.0
														ALLUVIAL GRAY, SILTY CLAY
410	409.8	5.0				WOH	WOH	WOH						
405	404.8	10.0												406.3 GRAY, SILTY SAND 8.5
400	399.8	15.0	1	1	1									401.3 TAN, COARSE SAND AND GRAVEL 13.5
395	394.8	20.0	1	2	1									
390	389.8	25.0	3	10	10									393.8 RESIDUAL GRAY, SILTY SAND 21.0
385	384.8	30.0	8	100/0.5										389.3 WEATHERED ROCK WITH SEAMS OF COMPETENT CRYSTALLINE ROCK, GRANITE 25.5
380	379.8	35.0												
375	374.8	40.0												
	372.0	42.8												372.0 Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 372.0 ft IN CRYSTALLINE ROCK (GRANITE) 42.8
														*CASING ADVANCER REFUSAL AT 42.8'

## GEOTECHNICAL BORING REPORT BORE LOG

## GEOTECHNICAL BORING REPORT CORE LOG

WBS 42237.1.1				TIP B-5102				COUNTY PERSON				GEOLOGIST Swartley, J. R.					
SITE DESCRIPTION BRIDGE NO. 11 ON US 158 OVER SOUTH HYCO CREEK								GROUND WTR (ft)									
BORING NO. B1-B		STATION 21+08		OFFSET 16 ft RT		ALIGNMENT -L-		0 HR. N/A									
COLLAR ELEV. 415.3 ft		TOTAL DEPTH 66.4 ft		NORTHING 959,256		EASTING 1,968,223		24 HR. 5.5									
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 86% 02/09/2015				DRILL METHOD NW Casing W/SPT & Core				HAMMER TYPE Automatic									
DRILLER Pinter, D. G.				START DATE 05/20/15		COMP. DATE 05/21/15		SURFACE WATER DEPTH N/A									
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	SOIL AND ROCK DESCRIPTION				
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					ELEV. (ft)	DEPTH (ft)	
420																	
415																	
410	410.5	4.8	WOH	WOH	WOH										415.3	GROUND SURFACE	
405	405.5	9.8	WOH	WOH	1										408.3	ALLUVIAL GRAY, SILTY CLAY	
400	400.5	14.8			4										403.3	GRAY, SILTY SAND	
395	395.5	19.8			2										403.3	GRAY, FINE TO COARSE SAND	
390	390.5	24.8			40										393.1	WEATHERED ROCK (GRANITE)	
385	385.5	29.8			60/0.0										385.5	WEATHERED ROCK (GRANITE) REC=6%	
380															383.9	CRYSTALLINE ROCK WHITE AND GRAY, FRESH TO SLIGHTLY WEATHERED, HARD TO VERY HARD, CLOSELY FRACTURED, GRANITE REC=80% RQD=20% RMR=48	
375															378.9	WEATHERED ROCK WITH SEAMS OF COMPETENT CRYSTALLINE ROCK, GRANITE REC=4%	
370																	
365																	
360																	
355																	
350																	
																348.9	Boring Terminated at Elevation 348.9 ft IN CRYSTALLINE ROCK (GRANITE)

NCDOT BORE DOUBLE B5102\_GEO\_BRD0011\_BH.GPJ\_NC\_DOT.GDT 6/25/15

WBS 42237.1.1				TIP B-5102				COUNTY PERSON				GEOLOGIST Swartley, J. R.				
SITE DESCRIPTION BRIDGE NO. 11 ON US 158 OVER SOUTH HYCO CREEK								GROUND WTR (ft)								
BORING NO. B1-B		STATION 21+08		OFFSET 16 ft RT		ALIGNMENT -L-		0 HR. N/A								
COLLAR ELEV. 415.3 ft		TOTAL DEPTH 66.4 ft		NORTHING 959,256		EASTING 1,968,223		24 HR. 5.5								
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 86% 02/09/2015				DRILL METHOD NW Casing W/SPT & Core				HAMMER TYPE Automatic								
DRILLER Pinter, D. G.				START DATE 05/20/15		COMP. DATE 05/21/15		SURFACE WATER DEPTH N/A								
CORE SIZE NCW3			TOTAL RUN 36.6 ft			DESCRIPTION AND REMARKS										
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG MOI	ELEV. (ft)					
					REC. (%)	RQD (%)		REC. (%)	RQD (%)				DEPTH (ft)			
385.5	385.5	29.8	1.6	N=60/0.0	(0.1)	(0.0)		(0.1)	(0.0)							
380	383.9	31.4	5.0	2:20/1.0 2:10/0.6 2:50/1.0 2:05/1.0 2:21/1.0 2:40/1.0 2:17/1.0	6%	0%		6%	(1.0) 20%		385.5 383.9	29.8 31.4				
375	378.9	36.4	5.0	3:32/1.0 4:00/1.0 3:50/1.0 3:47/1.0 2:50/1.0	(0.2) 4%	(0.0) 0%		(1.2) 4%			378.9	36.4				
370	373.9	41.4	5.0	4:30/1.0 3:00/1.0 2:10/1.0 3:26/1.0 4:19/1.0	(0.2) 4%	(0.0) 0%										
365	368.9	46.4	5.0	3:23/1.0 1:40/1.0 2:57/1.0 4:15/1.0 3:45/1.0	(0.2) 4%	(0.0) 0%										
360	363.9	51.4	5.0	4:44/1.0 14:00/1.0 4:19/1.0 3:57/1.0 3:10/1.0	(0.2) 4%	(0.0) 0%										
355	358.9	56.4	5.0	2:05/1.0 3:45/1.0 2:17/1.0 2:36/1.0 2:30/1.0	(0.2) 4%	(0.0) 0%										
350	353.9	61.4	5.0	2:45/1.0 4:15/1.0 6:24/1.0 3:15/1.0 3:05/1.0	(0.2) 4%	(0.0) 0%										
	348.9	66.4										348.9	66.4			

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WBS 42237.1.1		TIP B-5102		COUNTY PERSON		GEOLOGIST Swartley, J. R.								
SITE DESCRIPTION BRIDGE NO. 11 ON US 158 OVER SOUTH HYCO CREEK							GROUND WTR (ft)							
BORING NO. B2-A		STATION 22+62		OFFSET 35 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 415.2 ft		TOTAL DEPTH 50.6 ft		NORTHING 959,289		EASTING 1,968,382								
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 86% 02/09/2015				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic								
DRILLER Pinter, D. G.		START DATE 05/27/15		COMP. DATE 05/27/15		SURFACE WATER DEPTH N/A								
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
420														
415														415.2 GROUND SURFACE 0.0
410	411.5	3.7	1	0	1									<b>ALLUVIAL</b> GRAY, SANDY CLAY
405	406.5	8.7	1	1	1									
400	401.5	13.7	WOH	1	2									400.5 GRAY, SILTY SAND 14.7
395	396.5	18.7	6	8	8									398.2 GRAY, SAND 17.0
390	391.5	23.7	12	23	39									393.2 <b>RESIDUAL</b> TAN, SAPROLITIC, SANDY SILT 22.0
385	386.5	28.7	21	60	40/0.1									386.0 <b>WEATHERED ROCK</b> (GABBRO) 29.2
380	381.5	33.7	85	15/0.1										
375	376.5	38.7	21	51	49/0.1									
370	371.5	43.7	100/0.3											
365	366.5	48.7	45	55/0.3										
	364.7	50.5	60/0.1											364.7 50.5
														364.6 <b>CRYSTALLINE ROCK</b> (GABBRO) 50.6

Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 364.6 ft IN CRYSTALLINE ROCK (GABBRO)

# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 42237.1.1		TIP B-5102		COUNTY PERSON		GEOLOGIST Swartley, J. R.										
SITE DESCRIPTION BRIDGE NO. 11 ON US 158 OVER SOUTH HYCO CREEK							GROUND WTR (ft)									
BORING NO. B2-B		STATION 22+12		OFFSET 10 ft RT		ALIGNMENT -L-										
COLLAR ELEV. 415.2 ft		TOTAL DEPTH 66.0 ft		NORTHING 959,249		EASTING 1,968,328										
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 86% 02/09/2015		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic												
DRILLER Pinter, D. G.		START DATE 05/26/15		COMP. DATE 05/27/15		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						
420																
415	415.2	0.0	1	1	3									415.2	GROUND SURFACE	0.0
410	410.8	4.4	1	1	2									413.2	ALLUVIAL TAN, SANDY SILT GRAY, SILTY CLAY	2.0
405	405.8	9.4	WOH	WOH	WOH									403.2	GRAY, COARSE SAND	12.0
400	400.8	14.4	1	2	1									397.2	RESIDUAL TAN, SAPROLITIC, SILTY SAND	18.0
395	395.8	19.4	4	10	17									392.2	TAN, SAPROLITIC, SANDY SILT	23.0
390	390.8	24.4	11	26	39									389.1	WEATHERED ROCK (GABBRO)	26.1
385	385.8	29.4	60/0/0											385.8	WEATHERED ROCK WITH SEAMS OF COMPETENT CRYSTALLINE ROCK, GABBRO REC=38%	29.4
380																
375																
370																
365																
360																
355																
350																
														349.2	Boring Terminated at Elevation 349.2 ft IN CRYSTALLINE ROCK (GABBRO)	66.0

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## CORE LOG

WBS 42237.1.1		TIP B-5102		COUNTY PERSON		GEOLOGIST Swartley, J. R.						
SITE DESCRIPTION BRIDGE NO. 11 ON US 158 OVER SOUTH HYCO CREEK							GROUND WTR (ft)					
BORING NO. B2-B		STATION 22+12		OFFSET 10 ft RT		ALIGNMENT -L-						
COLLAR ELEV. 415.2 ft		TOTAL DEPTH 66.0 ft		NORTHING 959,249		EASTING 1,968,328						
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 86% 02/09/2015		DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic								
DRILLER Pinter, D. G.		START DATE 05/26/15		COMP. DATE 05/27/15		SURFACE WATER DEPTH N/A						
CORE SIZE NCW3			TOTAL RUN 36.6 ft									
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		SAMP. NO.	STRATA		LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)		REC. (%)	RQD (%)			
385.8	385.8	29.4	1.6	N=60/0.0	(1.4)	(0.4)		(13.9)	(0.0)		Begin Coring @ 29.4 ft	
385	384.2	31.0	5.0	2:15/1.0 2:07/0.6 2:33/1.0 1:33/1.0 1:25/1.0 1:45/1.0 2:08/1.0	88%	25%		38%	0%		WEATHERED ROCK WITH SEAMS OF COMPETENT CRYSTALLINE ROCK, GABBRO REC=38%	29.4
380	379.2	36.0	5.0	1:04/1.0 1:08/1.0 0:41/1.0 1:15/1.0 2:37/1.0	(1.0)	(0.0)						
375	374.2	41.0	5.0	1:29/1.0 1:52/1.0 1:40/1.0 2:07/1.0 1:59/1.0	(1.0)	(0.0)						
370	369.2	46.0	5.0	1:32/1.0 1:33/1.0 1:49/1.0 1:52/1.0 2:38/1.0	(2.0)	(0.0)						
365	364.2	51.0	5.0	2:06/1.0 1:34/1.0 1:42/1.0 1:25/1.0 2:20/1.0	(1.0)	(0.0)						
360	359.2	56.0	5.0	2:03/1.0 1:46/1.0 1:03/1.0 1:23/1.0 1:24/1.0	(1.1)	(0.0)						
355	354.2	61.0	5.0	1:49/1.0 2:03/1.0 2:30/1.0 2:05/1.0 2:18/1.0	(4.0)	(0.0)						
350	349.2	66.0									Boring Terminated at Elevation 349.2 ft IN CRYSTALLINE ROCK (GABBRO)	66.0

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# GEOTECHNICAL BORING REPORT

## BORE LOG

WBS 42237.1.1		TIP B-5102		COUNTY PERSON		GEOLOGIST Swartley, J. R.	
SITE DESCRIPTION BRIDGE NO. 11 ON US 158 OVER SOUTH HYCO CREEK							GROUND WTR (ft)
BORING NO. EB2-A		STATION 22+87		OFFSET 32 ft LT		ALIGNMENT -L-	
COLLAR ELEV. 416.9 ft		TOTAL DEPTH 63.5 ft		NORTHING 959,284		EASTING 1,968,406	
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 86% 02/09/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic		
DRILLER Pinter, D. G.		START DATE 05/26/15		COMP. DATE 05/27/15		SURFACE WATER DEPTH N/A	

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
420															416.9	GROUND SURFACE	0.0
415	413.5	3.4	1	2	1											ALLUVIAL GRAY, SANDY SILT	
410	408.5	8.4	1	0	1											GRAY, SILTY SAND	9.0
405	403.0	13.9	WOH	1	1											GRAY, SILTY CLAY	10.4
400	398.5	18.4														GRAY, SILTY SAND	13.7
395	393.5	23.4														RESIDUAL TAN AND GREEN, SAPROLITIC, SANDY SILT	18.9
390	388.5	28.4															
385	383.5	33.4															
380	378.5	38.4	65	35/0.1												WEATHERED ROCK (GABBRO)	36.5
375	373.5	43.4	19	30	21											RESIDUAL TAN, SAPROLITIC, SANDY SILT	41.5
370	368.5	48.4	100/0.5													WEATHERED ROCK (GABBRO)	47.0
365	363.5	53.4	45	55/0.4													
360	358.5	58.4	100/0.3														
355	353.5	63.4	60/0.1													CRYSTALLINE ROCK (GABBRO)	63.4
																Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 353.4 ft IN CRYSTALLINE ROCK (GABBRO)	

Other Samples:  
ST-1 (9.9 - 11.9)  
ST-2 (11.9 - 13.9)

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WBS 42237.1.1		TIP B-5102		COUNTY PERSON		GEOLOGIST Swartley, J. R.	
SITE DESCRIPTION BRIDGE NO. 11 ON US 158 OVER SOUTH HYCO CREEK							GROUND WTR (ft)
BORING NO. EB2-B		STATION 22+54		OFFSET 16 ft RT		ALIGNMENT -L-	
COLLAR ELEV. 416.4 ft		TOTAL DEPTH 50.5 ft		NORTHING 959,239		EASTING 1,968,369	
DRILL RIG/HAMMER EFF./DATE RFO0067 CME-550X 86% 02/09/2015			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic		
DRILLER Pinter, D. G.		START DATE 06/01/15		COMP. DATE 06/02/15		SURFACE WATER DEPTH N/A	

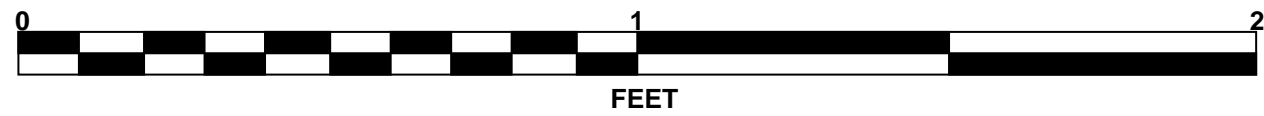
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG MOI	LOG G	SOIL AND ROCK DESCRIPTION	DEPTH (ft)		
			0.5ft	0.5ft	0.5ft	0	25	50	75	100							
420															416.4	GROUND SURFACE	0.0
415	412.7	3.7	3	2	3											ALLUVIAL BROWN AND GRAY, SILTY CLAY	
410	407.7	8.7	1	1	2											GRAY, SILTY SAND	12.0
405	402.7	13.7	2	1	4											RESIDUAL TAN, SAPROLITIC, SANDY SILT	14.9
400	397.7	18.7	8	10	18												
395	392.7	23.7	12	33	24												
390	387.7	28.7	6	11	15												
385	382.7	33.7	9	28	48												
380	377.7	38.7	60	40/0.1												WEATHERED ROCK (GABBRO)	38.0
375	372.7	43.7	43	57/0.2													
370	367.7	48.7	100/0.4														
	366.0	50.4	60/0.1													CRYSTALLINE ROCK (GABBRO)	50.4
																Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 365.9 ft IN CRYSTALLINE ROCK (GABBRO)	



# CORE PHOTOGRAPHS

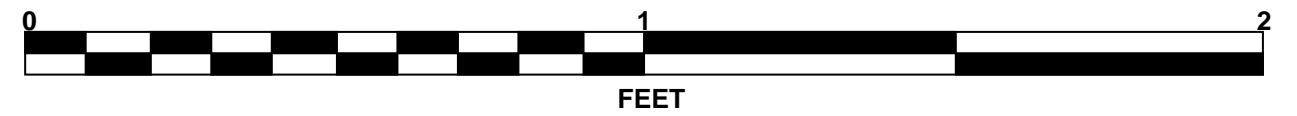
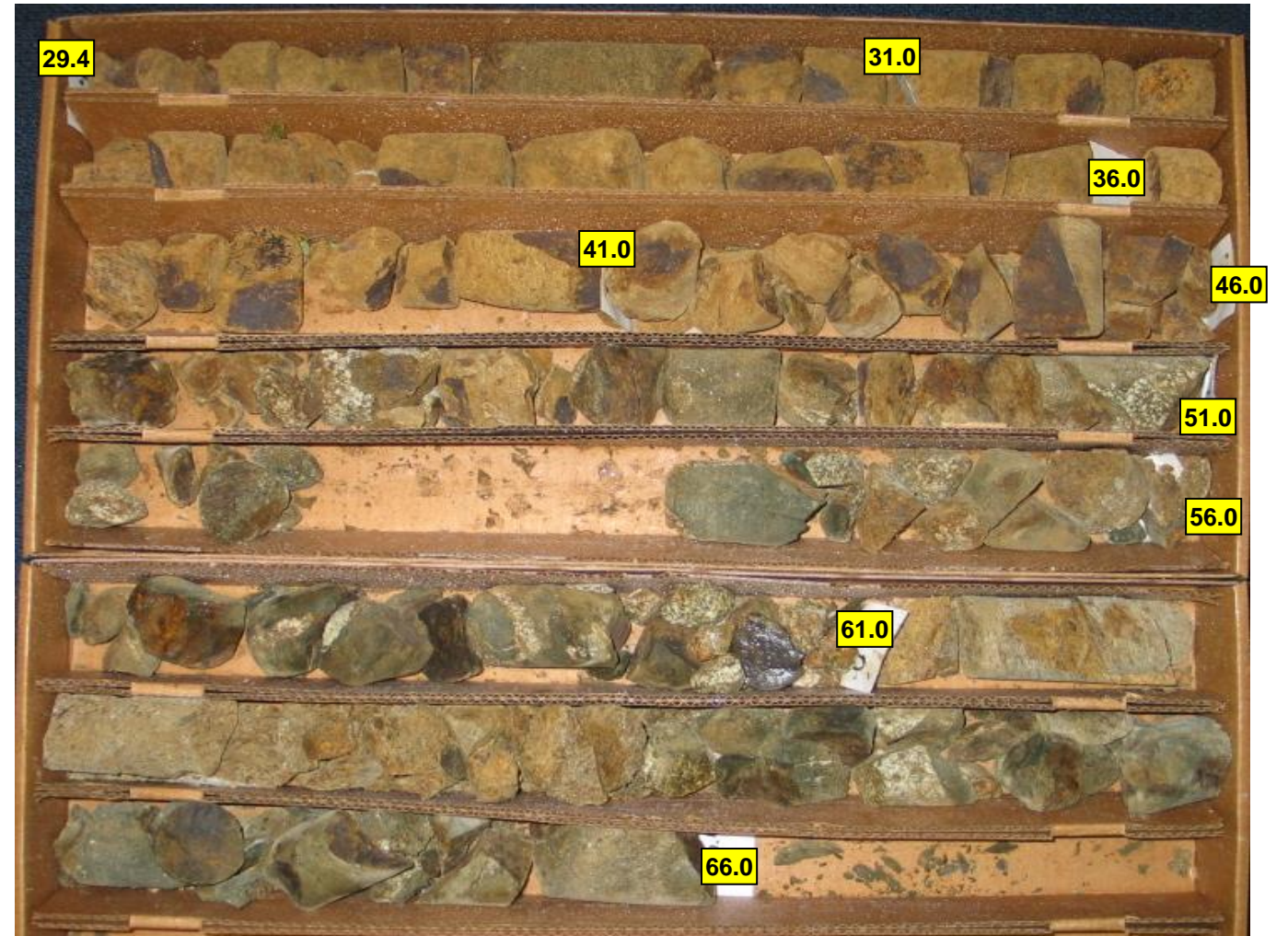
## B1-B

BOXES 1: 29.8 - 66.4 FEET



## B2-B

BOXES 1 & 2: 29.4 - 66.0 FEET





# SITE PHOTOGRAPH

Bridge No. 11 on US 158 over South Hyco Creek



Looking Northwest from End Bent 2