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Ò REFERENCE

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CROSS SECTIONS

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PROFILE

SHEET NO.

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7-9

46086

STATE OF NORTH CAROLINA

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

STRUCTURE SUBSURFACE INVESTIGATION

COUNTY <u>UNION</u> PROJECT DESCRIPTION BRIDGE NO. 71 OVER CLEAR CREEK ON US 601

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-5371	1	10

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 1991 707-6805. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

CENERAL 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 LABDRATORY SAMPLE DATA AND THE IN SITU (IM-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 NIDICATED 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 SATISTY 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 FOOD THE PROJECT OF THE 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.

	C. C. MURRAY
	C. L. SMITH
INVECTION	TED BY <u>C. C. MURRAY</u>
	W. D. FIELDS
	DS
CHECKED	BY J. E. BEVERLY JEB
	BY K. B. MILLER
SORWILLET) Bf



UNLESS ALL SIGNATURES COMPLETED

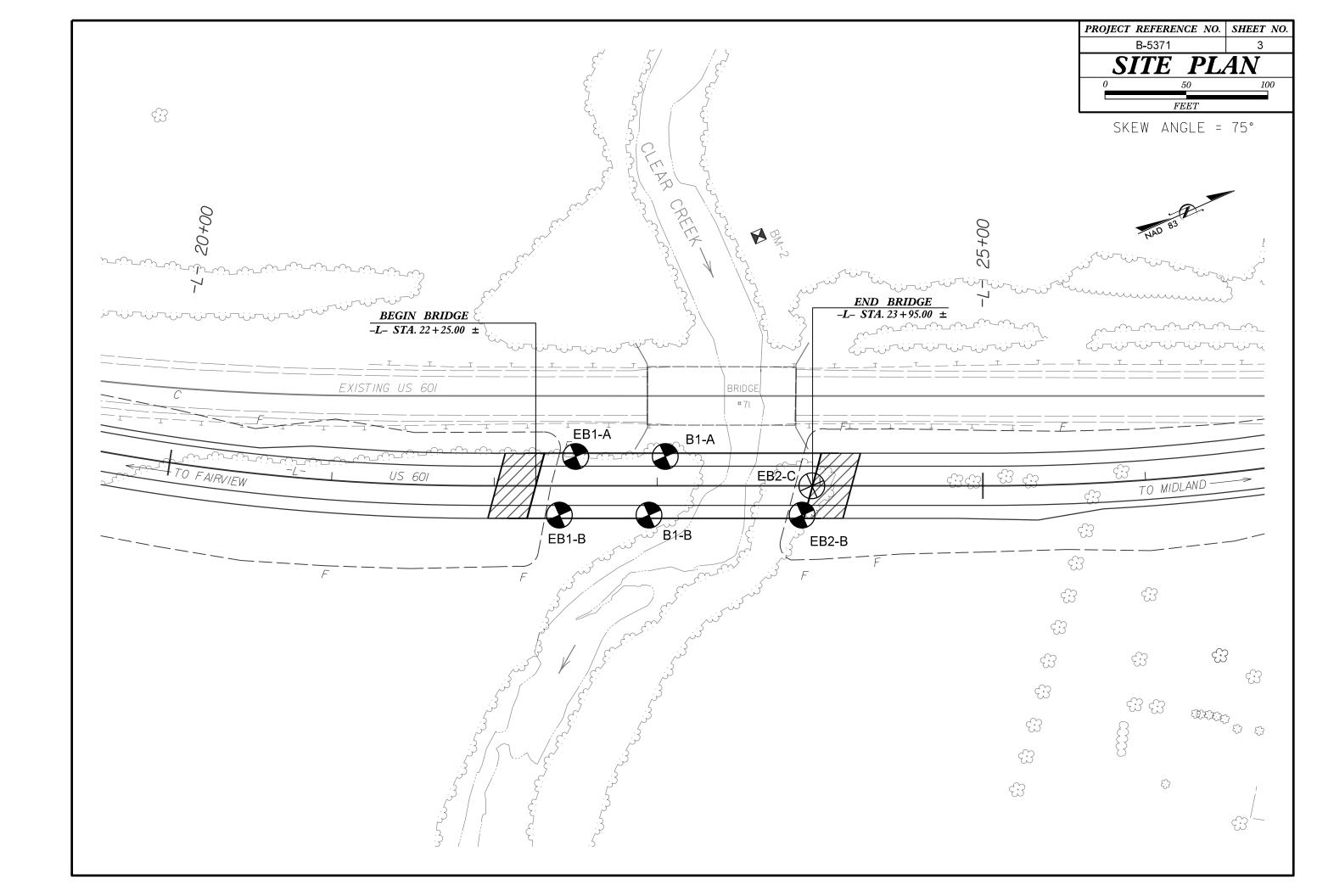
PROJECT REFERENCE NO. SHEET NO. 2

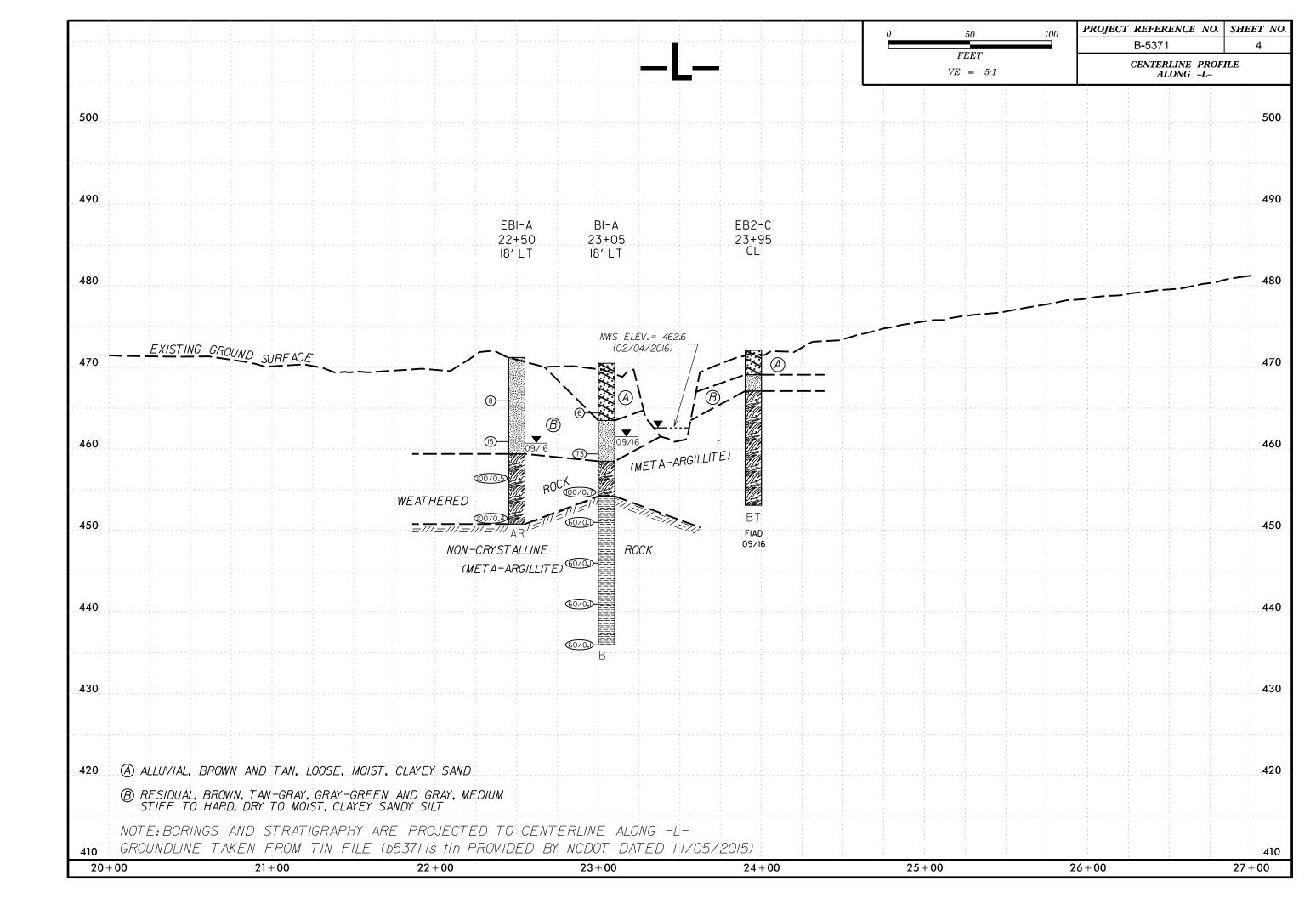
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIVISION OF HIGHWAYS GEOTECHNICAL ENGINEERING UNIT

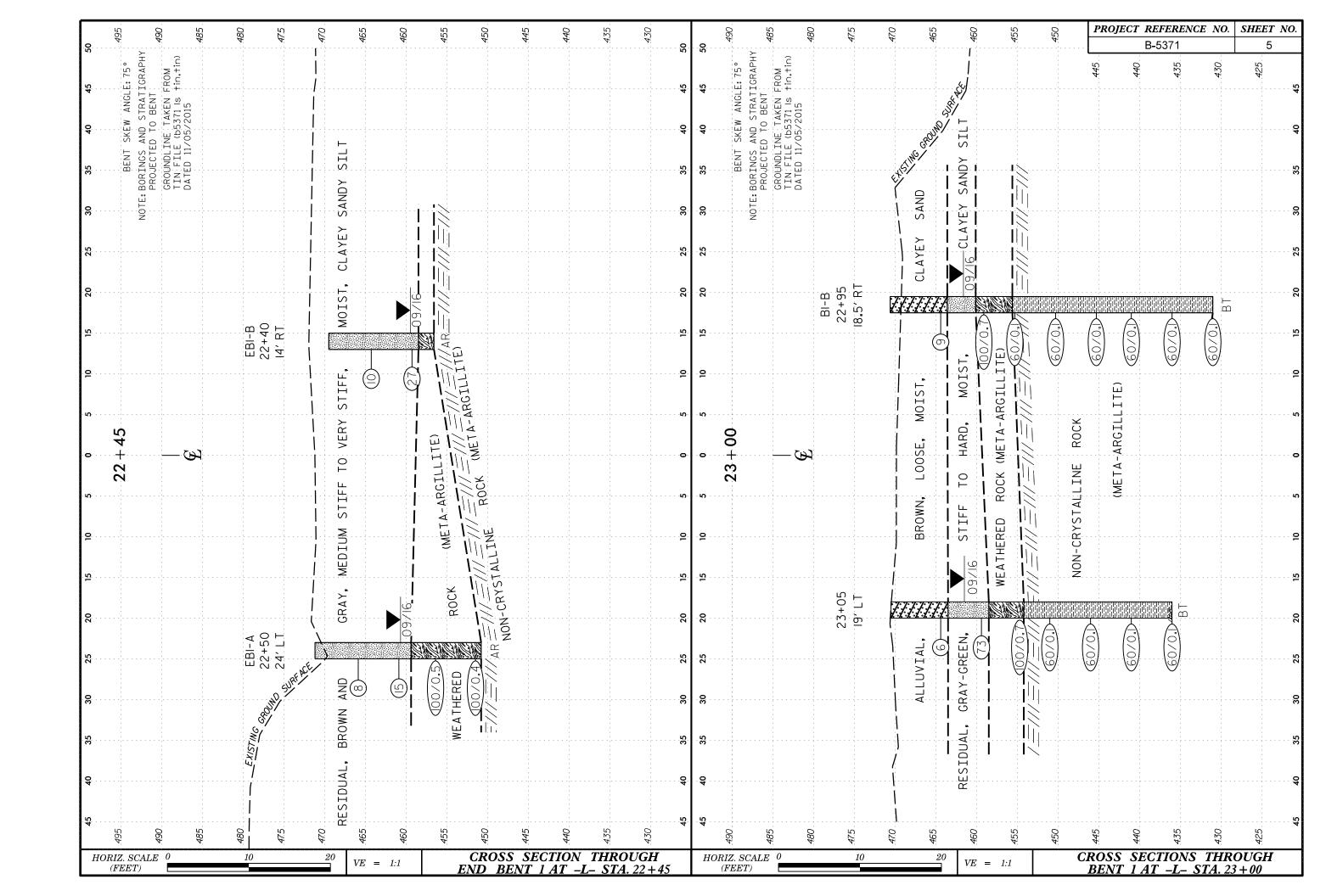
SUBSURFACE INVESTIGATION

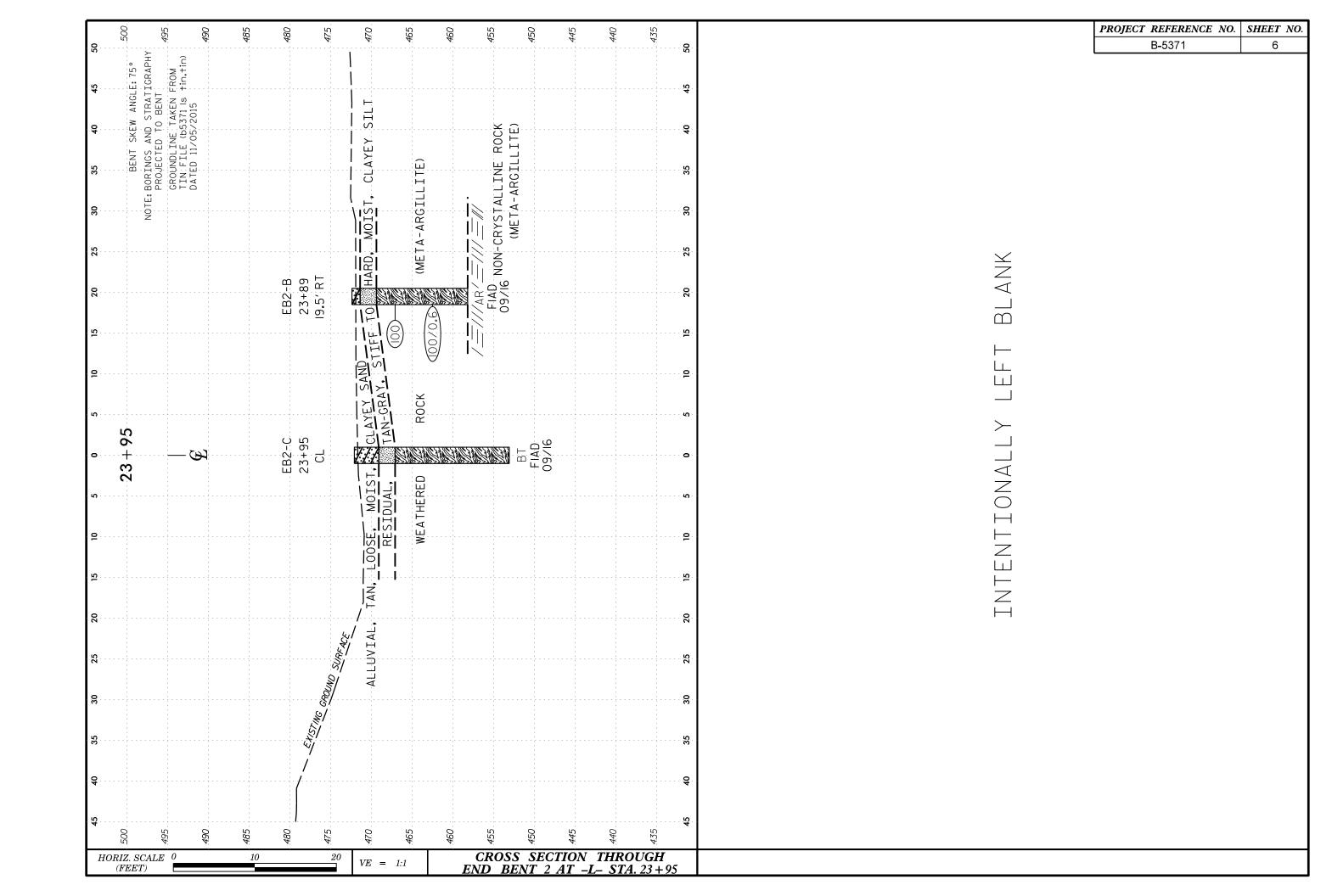
SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

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	WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE.	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.	ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER.
ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION	<u>UNIFORMLY GRADED</u> - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. <u>GAP-GRADED</u> - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.	SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60	AQUIFER - A WATER BEARING FORMATION OR STRATA.
IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH	ANGULARITY OF GRAINS	BLOWS IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK.	ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND.
AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE,	THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS:	ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:	ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING
VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6	ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	WEATHERED NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES >	A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC.
SOIL LEGEND AND AASHTO CLASSIFICATION GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS	MINERALOGICAL COMPOSITION	ROCK (WR) 100 BLOWS PER FOOT IF TESTED.	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
GENERAL GRANULAR MATERIALS SILT-CLAY MATERIALS ORGANIC MATERIALS CLASS. (≤ 35% PASSING *200) (> 35% PASSING *200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC.	CRYSTALLINE ROCK (CR) FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE.	SURFACE.
GROUP A-1 A-3 A-2 A-4 A-5 A-6 A-7 A-1, A-2 A-4, A-5	ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.	UNELSS, OHBERU, SCHIST, ETC.	CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE.
CLASS. A-1-0 A-1-6 A-2-4 A-2-5 A-2-6 A-2-7 A-7-6 A-3 A-6, A-7	COMPRESSIBILITY	NON-CATSTALLINE SEDIMENTARY ROCK THAT WOULD YEILD SPT REFUSAL IF TESTED.	COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM
SYMBOL 0000 dooood	SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50	COASTAL PLAIN COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD	OF SLOPE.
7. PASSING	HIGHLY COMPRESSIBLE LL > 50	SEDIMENTARY ROCK SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED	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.
*10 50 MX GRANULAR CLAY MUCK,	PERCENTAGE OF MATERIAL	(CP) SHELL BEDS, ETC. WEATHERING	DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT
*40 30 MX 50 MX 51 MN SOLS SOLS SOLS SOLS SOLS SOLS SOLS SOL	GRANULAR SILT - CLAY ORGANIC MATERIAL SOILS SOILS OTHER MATERIAL	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER	ROCKS OR CUTS MASSIVE ROCK.
MATERIAL	TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10%	HAMMER IF CRYSTALLINE.	DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL.
PASSING *40 SOILS WITH	LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35%	VERY SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN,	DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE
LL 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN 48 MX 41 MN LITTLE OR PI 6 MX NP 18 MX 18 MX 11 MN 11 MN 18 MX 18 MX 11 MN 11 MN LITTLE OR HIGHLY	HIGHLY ORGANIC > 10% > 20% HIGHLY 35% AND ABOVE	(V SLI.) CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.	LINE OF DIP, MEASURED CLOCKWISE FROM NORTH.
MODERATE ORGANIC CROUP INDEX 0 0 0 4 MX 8 MX 12 MX 16 MX NO MX AMOUNTS OF	GROUND WATER	SLIGHT ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO	FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE
USUAL TYPES STONE FRAGS. FINE CULTY OF CANEY CULTY CLAYER MATTER	✓ WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING	(SLI.) I INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR	SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE.
OF MAJOR GAVELAND SAND GRAVEL AND SAND SOILS SOILS	STATIC WATER LEVEL AFTER 24 HOURS	CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.	FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES.
MATERIALS SANU	→ PW PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA	MODERATE SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN (MOD.) GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS	FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL.
GEN. RATING EXCELLENT TO GOOD FAIR TO POOR POOR UNSUITABLE AS SUBGRADE EXCELLENT TO GOOD FAIR TO POOR UNSUITABLE	<u> </u>	DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED	FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM.
PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30	- SPRING OR SEEP	WITH FRESH ROCK. MODERATELY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL	FORMATION (FM.) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE
CONSISTENCY OR DENSENESS	MISCELLANEOUS SYMBOLS	SEVERE AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH	FIELD.
COMPACTNESS OR RANGE OF STANDARD RANGE OF UNCONFINED	□ 25/025	(MOD. SEV.) AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK, ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL	JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED.
PRIMARY SOIL TYPE CONSISTENCY PENETRATION RESISTENCE COMPRESSIVE STRENGTH (N-VALUE) (TONS/FT ²)	ROADWAY EMBANKMENT (RE) OF ROCK STRUCTURES	SEVERE ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT	LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT.
CENERALLY VERY LOOSE < 4	SOIL SYMBOL SPT TEST BORING SLOPE INDICATOR	(SEV.) REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED	LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS.
GENERALLY LOOSE 4 TO 10 GRANULAR MEDIUM DENSE 10 TO 30 N/A	SOIL SYMBOL DPT DMT TEST BORING () INSTALLATION	TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF	MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS
MATERIAL DENSE 30 TO 50 (NON-COHESIVE) NEDW PENSE	ARTIFICIAL FILL (AF) OTHER AUGER BORING CONE PENETROMETER THAN ROADWAY EMBANKMENT AUGER BORING TEST	VERY ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE	USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE.
VERT DENSE 7 30		SEVERE BUT MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK	PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM.
VERY SOFT < 2 < 0.25 GENERALLY SOFT 2 TO 4 0.25 TO 0.5	— INFERRED SOIL BOUNDARY — CORE BORING SOUNDING ROD	(V SEV.) REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE THAT ONLY MINOR VESTIGES OF ORIGINAL ROCK FABRIC REMAIN. <u>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</u>	RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.
SILT-CLAY MEDIUM STIFF 4 TO 8 0.5 TO 1.0	INFERRED ROCK LINE MONITORING WELL TEST BORING WITH CORE	COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND	ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF
MATERIAL STIFF 8 TO 15 1 TO 2 (COHESIVE) VERY STIFF 15 TO 30 2 TO 4	A ALLINIAL SOIL BOUNDARY A PIEZOMETER	SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.	ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE
HARD > 30 > 4	INSTALLATION OF NOTHER	ROCK HARDNESS	RUN AND EXPRESSED AS A PERCENTAGE.
TEXTURE OR GRAIN SIZE	RECOMMENDATION SYMBOLS	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK, BREAKING OF HAND SPECIMENS REQUIRES	SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK.
U.S. STD. SIEVE SIZE 4 10 40 60 200 270	UNDERCUT UNCLASSIFIED EXCAVATION - UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE ACCEPTABLE BUT NOT TO BE	SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.	SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND
OPENING (MM) 4.76 2.00 0.42 0.25 0.075 0.053	LICED IN THE TOP 2 FEET OF	HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED	RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS.
BOULDER COBBLE GRAVEL COARSE FINE SILT CLAY	SHALLOW UNCERCUT UNCLASSIFIED EXCAVATION - EMBANKMENT OR BACKFILL	TO DETACH HAND SPECIMEN.	SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT
(BLDR.) (COB.) (GR.) (SE. SD.) (F SD.) (SL.) (CL.)	ABBREVIATIONS	MODERATELY CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE HARD EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK, HAND SPECIMENS CAN BE DETACHED	OR SLIP PLANE.
GRAIN MM 305 75 2.0 0.25 0.05 0.005	AR - AUGER REFUSAL MED MEDIUM VST - VANE SHEAR TEST	BY MODERATE BLOWS.	STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS (N OR BPF) OF
SIZE IN. 12 3	BT - BORING TERMINATED MICA MICACEOUS WEA WEATHERED CL CLAY MOD MODERATELY 7 - UNIT WEIGHT	MEDIUM CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. HARD CAN BE EXCAVATED IN SMALL CHIPS TO PEICES I INCH MAXIMUM SIZE BY HARD BLOWS OF THE	A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL
SOIL MOISTURE - CORRELATION OF TERMS	$oldsymbol{oldsymbol{\bot}}$ CPT - CONE PENETRATION TEST NP - NON PLASTIC $oldsymbol{\gamma}_{ m d}$ - DRY UNIT WEIGHT	POINT OF A GEOLOGIST'S PICK.	TO OR LESS THAN 0.1 FOOT PER 60 BLOWS.
SOIL MOISTURE SCALE FIELD MOISTURE (ATTERBERG LIMITS) DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	CSE COARSE ORG ORGANIC DMT - DILATOMETER TEST PMT - PRESSUREMETER TEST SAMPLE ABBREVIATIONS	SOFT CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK, CAN BE EXCAVATED IN FRAGMENTS	STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE.
	DPT - DYNAMIC PENETRATION TEST SAP SAPROLITIC S - BULK	FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE.	STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL
- SATURATED - USUALLY LIQUID; VERY WET, USUALLY (SAT.) FROM BELOW THE GROUND WATER TABLE	e - VOID RATIO SD SAND, SANDY SS - SPLIT SPOON F - FINE SL SILT, SILTY ST - SHELBY TUBE	VERY CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH	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.
	FOSS FOSSILIFEROUS SLI SLIGHTLY RS - ROCK	SOFT OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE, CAN BE SCRATCHED READILY BY FINGERNAIL.	TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
PLASTIC SEMISOLID; REQUIRES DRYING TO	FRAC FRACTURED, FRACTURES TCR - TRICONE REFUSAL RT - RECOMPACTED TRIAXIAL FRAGS FRAGMENTS W - MOISTURE CONTENT CBR - CALIFORNIA BEARING	FRACTURE SPACING BEDDING	
(PI) PL PLASTIC LIMIT	FRAGS FRAGMENTS	TERM SPACING TERM THICKNESS	BENCH MARK: "BM-2" RR SPIKE IN ROOT OF 36" OAK TREE STATION 25+87.7I-BL-I-; OFFSET LEFT 105.37'
	EQUIPMENT USED ON SUBJECT PROJECT	VERY WIDE MORE THAN 10 FEET VERY THICKLY BEDDED 4 FEET	(N=529,335.0233; E=1,543,084.5350) ELEVATION: 472.99 FEET
OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE	DRILL UNITS: ADVANCING TOOLS: HAMMER TYPE:	WIDE	<u> </u>
SL SHRINKAGE LIMIT	CME-45C CLAY BITS X AUTOMATIC MANUAL	CLOSE 0.16 TO 1 FOOT VERY THINLY BEDDED 0.03 - 0.16 FEET	NOTES:
- DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE	X 6' CONTINUOUS FLIGHT AUGER CORE SIZE:	VERY CLOSE LESS THAN 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET	FIAD - FILLED IMMEDIATELY AFTER DRILLING
PLASTICITY	CME-55 X 8" HOLLOW AUGERS COME SIZE:	INDURATION	
PLASTICITY INDEX (PI) DRY STRENGTH		FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.	
NON PLASTIC 0-5 VERY LOW	TUNGCARBIDE INSERTS	RUBBING WITH FINGER FREES NUMEROUS GRAINS;	
SLIGHTLY PLASTIC 6-15 SLIGHT MODERATELY PLASTIC 16-25 MEDIUM	VANE SHEAR TEST X CASING X W/ ADVANCER HAND TOOLS:	GENILE BLUW BY HAMMER DISTRIEGRATES SAMPLE.	
HIGHLY PLASTIC 26 OR MORE HIGH	POST HOLE DIGGER	MODERATELY INDURATED GRAINS CAN BE SEPARATED FROM SAMPLE WITH STEEL PROBE; BREAKS EASILY WHEN HIT WITH HAMMER.	
COLOR	HAND AUGER	CDAING ADE DIEEICH I TO SEDADATE WITH STEEL DOODE.	
	X CME-550X(HF00070)	INDURATED DIFFICULT TO BREAK WITH HAMMER.	
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.	CORE BIT VANE SHEAR TEST	EXTREMELY INDURATED SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE;	
		SAMPLE BREAKS ACROSS GRAINS.	DATE: 8-15-1-









GEOTECHNICAL BORING REPORT BORE LOG

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	46086						B-53				_	UNT	Υ	UNIC	ON					GEOLOG	IST Murray, 0	C. C.			
	DESCR			ge No.						on US	S 60	1	_										1	ND WTR	(ft)
	ING NO.				_			22					0	FFS	ET ·	18	ft LT			ALIGNME			0 HR.	١	N/A
	LAR ELI					TOTAL DEPTH 20.4 ft								NORTHING 529,177							1,543,162		24 HR.		0.5
DRILL RIG/HAMMER EFF./DATE HF00070 CME-550X													_						D H	I.S. Augers	S. Augers HAMMER TYPE Au				
DRIL	LER SI		1			TAF	RT D	ATE		/14/1				OMP	. DA	_	09/1	4/16	4 .	SURFACE	WATER DEF	PTH N/	A		
(ft)	ELEV (ft) 0.5ft 0.5ft					0		2	BLC 5	OWS I	PER 50	F00	T 75		100	Т	SAMP. NO.	MOI	0 I G		SOIL AND RO	CK DES	CRIPTION	N DEPTI	<u>H (ft)</u>
475 470 465	466.9		2	2	6		- - - - - - - - - -											M		- 471.2 - B - S	RE ROWN AND GE TIFF, MOIST, (ID SURF, SIDUAL RAY, ME CLAYEY (A-4)	D. STIFF	TO SILT	0.0
460	-	Ļ	7	8	7		(15		• •	ŀ	• •								- 459.4					11.8
455	456.9 - - -	14.3	100/0.5					! - 	:		- - - - - -			10	0/0.5			W		459.4	GRAY-GREEI FOLIATEI		LY VERT BELT		11.0
	451.9 -	19.3	100/0.4						: :		:	: :	-	: :	0/0.4			D		450.8					20.4
																				NE NE	ARLY VERT. F. (META-	OLIATED ARGILLÍ		BELT	

GEOTECHNICAL BORING REPORT BORE LOG

SHEET 7 OF 10

		ORE LOG		
WBS 46086	TIP B-5371 COUNT	Y UNION	GEOLOGIST Murray, C. C.	
SITE DESCRIPTION Bridge No. #7	71 over Clear Creek on US 601			GROUND WTR (ft)
BORING NO. EB1-B	STATION 22+40	OFFSET 18 ft RT	ALIGNMENT -L-	0 HR. 10.5
COLLAR ELEV. 469.5 ft	TOTAL DEPTH 12.9 ft	NORTHING 529,153	EASTING 1,543,191	24 HR. 10.0
DRILL RIG/HAMMER EFF./DATE HFO00	70 CME-550X 84% 05/20/2016	DRILL METHOD H.S	. Augers HAMM	ER TYPE Automatic
DRILLER Smith, C. L.	START DATE 09/14/16	COMP. DATE 09/14/16	SURFACE WATER DEPTH N	Ά
	T BLOWS PER FOOT .5ft 0 25 50	75 100 SAMP. V L O O NO. MOI G	SOIL AND ROCK DES	CRIPTION DEPTH (ft
460 460.3 9.2	6 . •10	M	BROWN, STIFF TO V. STI WET, CLAYEY SANDY	PF, MOIST TO (SILT (A-4)) DCK (RT. FOLIATED 12.: RGILLITE) CIGHT GRAY (SILTE BELT)

GEOTECHNICAL BORING REPORT BORE LOG

							<u>B</u>	ORE L	<u>.OG</u>			T			
WBS 4608					P B-5371			Y UNION				GEOLOGIST Murray, C	C. C.	T	
SITE DESC			ge No.				S 601	T				T		GROUND W	TR (
BORING N	O. B1-A			S	TATION 2	23+05		OFFSET	18 ft LT			ALIGNMENT -L-		0 HR.	10
COLLAR E	LEV. 4	70.5 ft		TO	OTAL DEF	TH 34.5 f	t	NORTHIN	3 529,2	27		EASTING 1,543,185		24 HR.	9
			E HFC	0070 C	ME-550X 84	1% 05/20/20	16	Г	DRILL N		NW	/ Casing w/ Advancer		ER TYPE Auto	matic
DRILLER	_				TART DAT	E 09/14/1		COMP. DA				SURFACE WATER DEP	TH N/	A	
ELEV DRIVI	E DEPTH (ft)	0.5ft	0.5ft		0		PER FOOT 50	75 100	SAMP.	MOI	O G	SOIL AND ROO	CK DESC		EPTH
475	<u> </u> 										-	- CDOUNIE	D CURE	ACE	
70	‡				1						/////	BROWN, LOOSE, I	UVIAL		
65 465.4	1 5.1 + 5.1	2	3	3	9 6					М		- - 463.5			
460.4	1 1 10.1 1	13	25	48				• 73		M		GRAY-GREEN, ST CLAYEY 458.5	SIDUAL IFF TO H / SILT (A	HARD, MOIST, A-4)	
.55 455.4	1 15.1	49	51/0.2							w		WEATHE GRAY-GREEN NEA SLATE BELT (I	RLY VE	RT. FOLIATED)
451.1	1 19.4		51/0.2					. 100/0.7		"		MON-CRYS GRAY-GREEN NEA SLATE BELT (I	RLY VE	RT. FOLIATED)
50	+	60/0.1						60/0.1				-			
446.1	1 24.4	60/0.1						60/0.1				-			
441.1	1 29.4	60/0.1						60/0.1				: - -			
436.1	34.4 +	60/0.1						60/0.1				436.0 Boring Terminate PENETRATION	d WITH	STANDARD	
	†										-	Elevation 436.0 Elevation 436.0 NEARLY VERT. FO	ft on Lic DLIATED	GHT GRAY SLATE BELT	
	‡											CASING ADV CONTINUED W BORING T	ITH TRI	-CONE TO	
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GEOTECHNICAL BORING REPORT BORE LOG

SHEET 8 OF 10

							В	<u>ORE L</u>	<u>UG</u>				
WBS	46086				TI	P B-5371	COUNT	Y UNION				GEOLOGIST Murray, C. C.	
SITE	DESCRI	PTION	Bridg	ge No.	# 71 o	ver Clear Creek on US	601						GROUND WTR (ft)
BORI	NG NO.	В1-В			S	TATION 22+95		OFFSET 1	8 ft RT			ALIGNMENT -L-	0 HR. 10.0
COLL	AR ELE	V . 47	0.6 ft		TO	OTAL DEPTH 39.6 ft		NORTHING	529,20	04		EASTING 1,543,213	24 HR. 9.0
DRILL	RIG/HAM	MER EF	F./DATE	E HFC	00070 C	CME-550X 84% 05/20/201	6		DRILL M	IETHOL	NN C	/ Casing w/ Advancer HAMN	MER TYPE Automatic
DRILI	LER Sm	nith, C.	L.		S	TART DATE 09/14/1	6	COMP. DAT	ΓE 09/1	14/16		SURFACE WATER DEPTH N	/A
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	0.5ft	0.5ft		{	PER FOOT 50	75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DES	CCRIPTION DEPTH (fi
470	465.4											GROUND SURF - 470.6 GROUND SURF - ALLUVIAL BROWN, LOOSE, MOIST, (A-2-6)	
465 -	465.4	5.2	4	4	5	9				M	///	- · 463.6 · RESIDUAL · GRAY-GREEN, STIFF TO	
460	460.4	10.2	24	48	52/3			100/0.7		М		CLAYEY SANDY SI WEATHERED R GRAY-GREEN NEARLY VE SLATE BELT (META-A	LT (A-4) _{10.} OCK ERT. FOLIATED
455	455.4	15.2	60/0.1					60/0.1				- 455.6 - NONCRYSTALLINI - GRAY-GREEN NEARLY VE - SLATE BELT (META-A	15. EROCK ERT. FOLIATED
450	450.4	20.2	60/0.1					60/0.1				· · · · · · · · · · · · · · · · · · ·	·
145	445.4	25.2	60/0.1					60/0.1				- -	
440	441.1	29.5	60/0.1					60/0.1				-	
435	436.1	34.5	60/0.1					60/0.1					
-	431.1	39.5	60/0.1					60/0.1				. 431.0 Boring Terminated WITH	
	† †											PENETRATION TEST I Elevation 431.0 ft ON L NEARLY VERT. FOLIATEI (META-ARGILL	IGHT GRAY D SLATE BELT
												CASING ADVANCED CONTINUED WITH TR BORING TERMIN CONTINUED WITH TR	I-CONE TO
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GEOTECHNICAL BORING REPORT BORE LOG

											E	<u> 301</u>	RE	<u>L</u> (<u>OG</u>							
WBS	46086				Т	IP	B-5371	1		C	COUNT	Υι	INION					GEOLOGI	ST Murray,	C. C.		
				ge No.						JS 6	01										1	D WTR (ft)
					_							-									0 HR.	N/A
					!							NC	RTHII						1,543,252	1	J	N/A
COLLAR ELEV. 472.4 ft TOTAL DEPTH 14.2 ft NORTHING 529,289																						
	DD11/5		1	W CO		TAR	T DAT				D EOO		MP. C	DAT		13/16	1 L	SURFACE	WATER DE	PTH N/	<u> </u>	
	ELEV					$\left\ \cdot \right\ _{0}$							10	00		MOI	0		SOIL AND RO	OCK DES	CRIPTION	DEPTH (f
	()															14101		LLL V. (II)				DEI III (I
475																		_				
	-	-																- - 472.4	GROUN	ID SURF	ACE	0.
470	-	-							· · · ·									471.4	Al	LUVIAL		1.0
470	468 1	- - 43						-		-				7			979	469.4	RE	SIDUAL		
	-	-	7	23	78	11		-		-		- -	- 10	00		D		<u> </u>	CLAYE	Y SILT (A	\-4)	,
465	_					\parallel		+		+	· · ·								AY-GREEN NE	ARLY VE	RT. FOLIA	
	463.1	9.3	85	15/0.1									100/0.	.6♥		D			SLATE BEET	(IVIL I A-A	NGILLIT L)	
460	_	_						<u>.</u>										_				
	-					Ш		•		•		- -		.			979		ing Torminator	I DV ALIC	ED DEELIG	14.:
	-	-																Γ at	t Elevation 458	.2 ft ON L	IGHT GRA	·Υ
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GEOTECHNICAL BORING REPORT BORE LOG

SHEET 9 OF 10

											<u> </u>	JK	<u> </u>	<u>OG</u>							
WBS	46086	5			TI	P B-	5371			COUN	TY	UNIC	NC				GEOLOG	IST Murray,	C. C.		
SITE	DESCR	IPTION	I Bridg	ge No.	# 71 o	ver Cle	ear Cr	eek on	US 6	601										GROUND W	/TR (ft)
BOR	RING NO.	. EB2-	С		ST	ΓΑΤΙΟ	N 23	+95			С	FFSI	ET (CL			ALIGNME	NT -L-		0 HR.	N/A
COL	LAR ELI	EV . 47	72.1 ft		тс	OTAL	DEPT	H 19.0	O ft		N	IORT	HING	529,3	02		EASTING	1,543,238		24 HR.	N/A
DRILL	L RIG/HAN	MER EF	F./DATI	E HFC	00070 C	ME-550	X 84%	05/20/	2016					DRILL N	METHOE) Sol	id Augers		HAMM	ER TYPE Auto	matic
DRIL	LER S	mith, C	. L.		SI	TART	DATE	09/13	3/16		С	ОМР	. DA	FE 09/	13/16		SURFACE	WATER DE	PTH N/	′A	
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	O.5ft	0.5ft		0	2	BLOW 5	'S PE 50		75 75	5	100	SAMP. NO.	MOI	L O G	ELEV. (ft)	SOIL AND RO	OCK DES		DEPTH (ft)
475 470	-	 							-							/\^/\/	472.1	AL	ID SURF		0.0
470	† -	‡							-		-	• •					469.1		A-2-6)		3.0
465	-	† † † †							· ·		-		· · · · · · · · · · · · · · · · · · ·				_	AN-GRAY, HAR WEATH	(A-4) IERED R ARLY VE	CLAYEY SILT OCK ERT. FOLIATED	5.0
460	- - - -	- - - -					· · ·		·				· · · · · · · · · · · · · · · · · · ·				- - -				
455	-	<u> </u>							-		-						- 453.1	ring Terminator	at Flow	ation 453.1 ft IN	19.0

SITE PHOTOGRAPH

Replace Bridge No. 71 on -L- (US 601) over Clear Creek



Looking B-1B toward B1-A



Looking from centerline of EB-1 toward centerline of EB-2