

REFERENCE: B-4972

PROJECT: 40096.1.1

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4972	1	26

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STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CABARRUS
PROJECT DESCRIPTION BRIDGE 227 OVER ROCKY RIVER
ON SR 1006 (MT. PLEASANT RD.)

SITE DESCRIPTION _____

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 1919 TOT-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

J.K. STICKNEY

C.L. SMITH

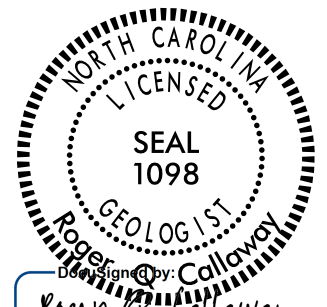
INVESTIGATED BY R.Q. CALLAWAY

DRAWN BY J.K. McCLURE

CHECKED BY C.B. LITTLE

SUBMITTED BY R.Q. CALLAWAY

DATE SEPTEMBER 2014



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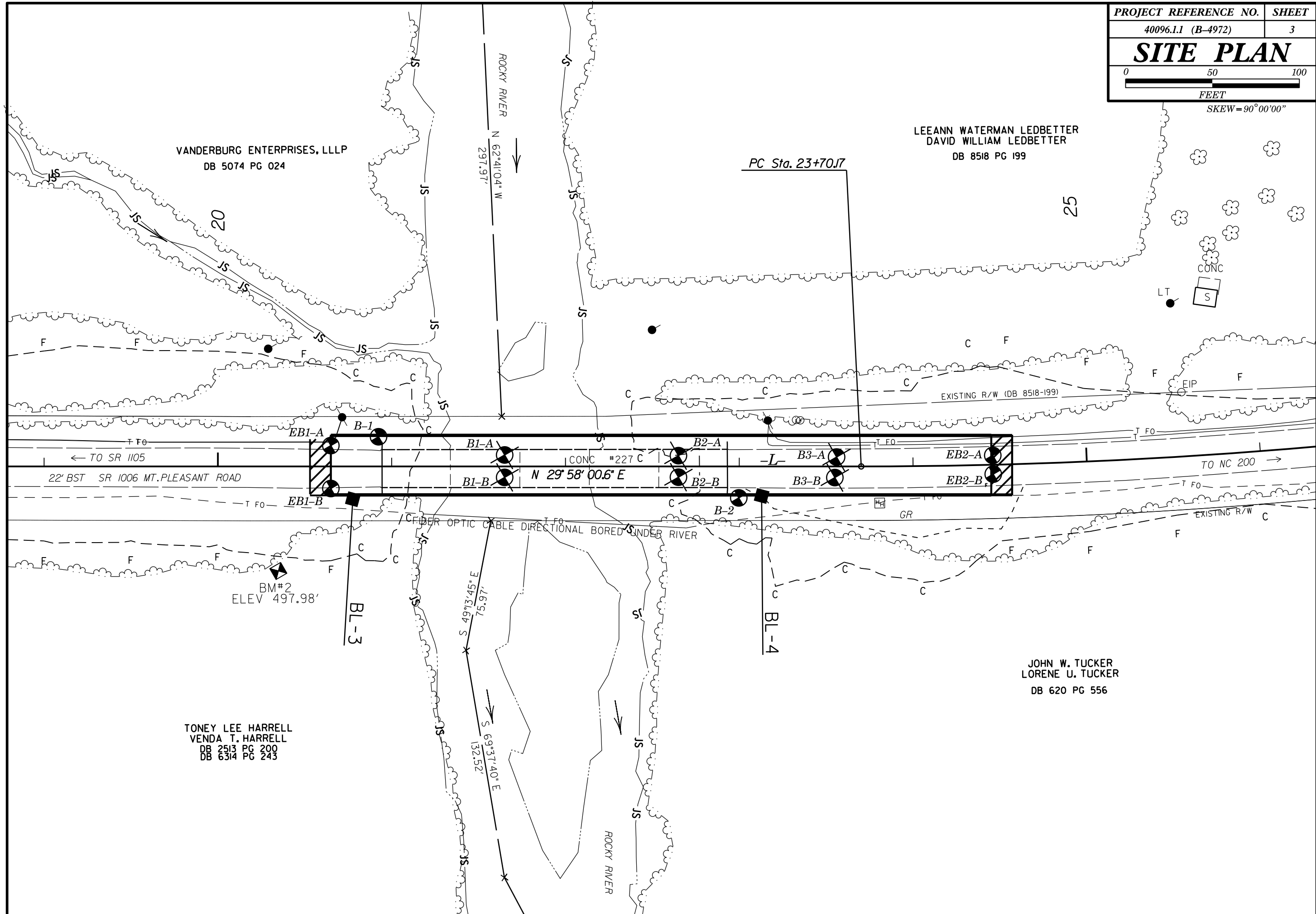
SIGNATURE _____ DATE _____

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 208, 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, 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.																																																																																																																																																																																																																																																																																																																																																																						
<p align="center">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1"> <thead> <tr> <th>GENERAL CLASS.</th> <th colspan="6">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="6">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="2">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</th> <th>A-2-4</th> <th>A-2-5</th> <th>A-2-6</th> <th>A-2-7</th> <th>A-4</th> <th>A-5</th> <th>A-6</th> <th>A-7</th> <th>A-1, A-2</th> <th>A-3</th> <th>A-4, A-5</th> <th>A-6, A-7</th> </tr> </thead> <tbody> <tr> <td>SYMBOL</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>○</td> </tr> <tr> <td>% PASSING #10 #40 #200</td> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX 10 MX</td> <td>51 MN 35 MX 35 MX 35 MX</td> <td>35 MX 35 MX 35 MX</td> <td>35 MX 35 MX 35 MX</td> <td>35 MX 35 MX 35 MX</td> <td>36 MN 36 MN 36 MN</td> <td>36 MN 36 MN 36 MN</td> <td>36 MN 36 MN 36 MN</td> <td>36 MN 36 MN 36 MN</td> <td>36 MN 36 MN 36 MN</td> <td>36 MN 36 MN 36 MN</td> <td>36 MN 36 MN 36 MN</td> <td>36 MN 36 MN 36 MN</td> <td>36 MN 36 MN 36 MN</td> </tr> <tr> <td>MATERIAL PASSING #40 LL PI</td> <td>- 6 MX</td> <td>- NP</td> <td>40 MX 41 MN 10 MX 10 MX</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> <td>40 MX 41 MN 11 MN 11 MN</td> </tr> <tr> <td>GROUP INDEX</td> <td>0</td> <td>0</td> <td>0</td> <td>4 MX</td> <td>8 MX</td> <td>12 MX</td> <td>16 MX</td> <td>NO MX</td> <td>NO MX</td> <td>NO MX</td> <td>NO MX</td> <td>NO MX</td> <td>NO MX</td> <td>NO MX</td> <td>NO MX</td> </tr> <tr> <td>USUAL TYPES OF MAJOR MATERIALS</td> <td>STONE FRAGS. GRAVEL, AND SAND</td> <td>FINE SAND</td> <td>SILTY OR CLAYEY GRAVEL AND SAND</td> <td>SILTY SOILS</td> <td>CLAYEY SOILS</td> <td colspan="5">SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td colspan="5">HIGHLY ORGANIC SOILS</td> </tr> <tr> <td>GEN. RATING AS SUBGRADE</td> <td colspan="6">EXCELLENT TO GOOD</td> <td colspan="6">FAIR TO POOR</td> <td>FAIR TO POOR</td> <td>POOR</td> <td>UNSUITABLE</td> </tr> <tr> <td colspan="16">PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30</td> </tr> </tbody> </table>																																								GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)						SILT-CLAY MATERIALS (> 35% PASSING #200)						ORGANIC MATERIALS		GROUP CLASS.	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GRAVEL, AND SAND	FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND	SILTY SOILS	CLAYEY SOILS	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER					HIGHLY ORGANIC SOILS					GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD						FAIR TO POOR						FAIR TO POOR	POOR	UNSUITABLE	PI OF A-7-5 SUBGROUP IS ≤ LL - 30 ; PI OF A-7-6 SUBGROUP IS > LL - 30																<p align="center">ANGULARITY OF GRAINS</p> <p>THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.</p> <p align="center">MINERALOGICAL COMPOSITION</p> <p>MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p> <p align="center">COMPRESSIBILITY</p> <p>SLIGHTLY COMPRESSIBLE LL < 31 MODERATELY COMPRESSIBLE LL = 31 - 50 HIGHLY COMPRESSIBLE LL > 50</p> <p align="center">PERCENTAGE OF MATERIAL</p> <table border="1"> <thead> <tr> <th></th> <th>GRANULAR SOILS</th> <th>SILT - CLAY SOILS</th> <th>OTHER MATERIAL</th> </tr> </thead> <tbody> <tr> <td>TRACE OF ORGANIC MATTER</td> <td>2 - 3%</td> <td>3 - 5%</td> <td>TRACE 1 - 10%</td> </tr> <tr> <td>LITTLE ORGANIC MATTER</td> <td>3 - 5%</td> <td>5 - 12%</td> <td>LITTLE 10 - 20%</td> </tr> <tr> <td>MODERATELY ORGANIC</td> <td>5 - 10%</td> <td>12 - 20%</td> <td>SOME 20 - 35%</td> </tr> <tr> <td>HIGHLY ORGANIC</td> <td>> 10%</td> <td>> 20%</td> <td>HIGHLY 35% AND ABOVE</td> </tr> </tbody> </table> <p align="center">GROUND WATER</p> <p>∇ - WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING ▼ - STATIC WATER LEVEL AFTER 24 HOURS ∇PW - PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA - SPRING OR SEEP</p> <p align="center">MISCELLANEOUS SYMBOLS</p> <table border="1"> <tbody> <tr> <td> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION</td> <td> DIP & DIP DIRECTION OF ROCK STRUCTURES</td> <td> SLOPE INDICATOR INSTALLATION</td> </tr> <tr> <td> SOIL SYMBOL</td> <td> TEST BORING</td> <td> CONE PENETROMETER TEST</td> </tr> <tr> <td> ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT</td> <td> AUGER BORING</td> <td> SOUNDING ROD</td> </tr> <tr> <td> INFERRED SOIL BOUNDARY</td> <td> CORE BORING</td> <td> MONITORING WELL</td> </tr> <tr> <td> INFERRED ROCK LINE</td> <td> PIEZOMETER INSTALLATION</td> <td> SPT N-VALUE</td> </tr> <tr> <td> ALLUVIAL SOIL BOUNDARY</td> <td></td> <td></td> </tr> </tbody> </table>																																									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	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION	DIP & DIP DIRECTION OF ROCK STRUCTURES	SLOPE INDICATOR INSTALLATION	SOIL SYMBOL	TEST BORING	CONE PENETROMETER TEST	ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT	AUGER BORING	SOUNDING ROD	INFERRED SOIL BOUNDARY	CORE BORING	MONITORING WELL	INFERRED ROCK LINE	PIEZOMETER INSTALLATION	SPT N-VALUE	ALLUVIAL SOIL BOUNDARY			<p align="center">TEXTURE OR GRAIN SIZE</p> <table border="1"> <thead> <tr> <th>U.S. STD. 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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 FINGERNAIL.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
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EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													
<p align="center">PLASTICITY</p> <table border="1"> <thead> <tr> <th>NON PLASTIC</th> <th>PLASTICITY INDEX (PI)</th> <th>DRY STRENGTH</th> </tr> </thead> <tbody> <tr> <td>SLIGHTLY PLASTIC</td> <td>0-5</td> <td>VERY LOW</td> </tr> <tr> <td>MODERATELY PLASTIC</td> <td>6-15</td> <td>SLIGHT</td> </tr> <tr> <td>HIGHLY PLASTIC</td> <td>16-25</td> <td>MEDIUM</td> </tr> <tr> <td></td> <td>26 OR MORE</td> <td>HIGH</td> </tr> </tbody> </table> <p align="center">COLOR</p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>										NON PLASTIC	PLASTICITY INDEX (PI)	DRY STRENGTH	SLIGHTLY PLASTIC	0-5	VERY LOW	MODERATELY PLASTIC	6-15	SLIGHT	HIGHLY PLASTIC	16-25	MEDIUM		26 OR MORE	HIGH	<p align="center">REMARKS</p> <p>STATION: 21+08.56 - BL - N 572558, 9429 E 1558978, 6030 ELEVATION: 500.80 FEET</p> <p>NOTES: SOIL STRATIGRAPHY IS THROUGH THE BORINGS FOR PROFILE AND CROSS-SECTIONS.</p>																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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VANDEBURG ENTERPRISES, LLLP
DB 5074 PG 024

LEEANN WATERMAN LEDBETTER
DAVID WILLIAM LEDBETTER
DB 8518 PG 199



TONEY LEE HARRELL
VENDA T. HARRELL
DB 2513 PG 200
DB 6314 PG 243

JOHN W. TUCKER
LORENE U. TUCKER
DB 620 PG 556

PC Sta. 23+70.17

← TO SR 1105
22' BST SR 1006 MT. PLEASANT ROAD

TO NC 200 →

FIBER OPTIC CABLE DIRECTIONAL BORED UNDER RIVER

CONC #227 C

N 29°58'00.6" E

BM#2
ELEV 497.98'

S 49°31'45" E
15.97'
S 69°37'40" E
132.52'

BL-3

BL-4

CONC
S

EXISTING R/W (DB 8518-199)

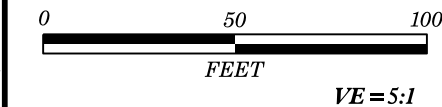
EXISTING R/W

ROCKY RIVER
N 62°41'04" W
297.97'

ROCKY RIVER

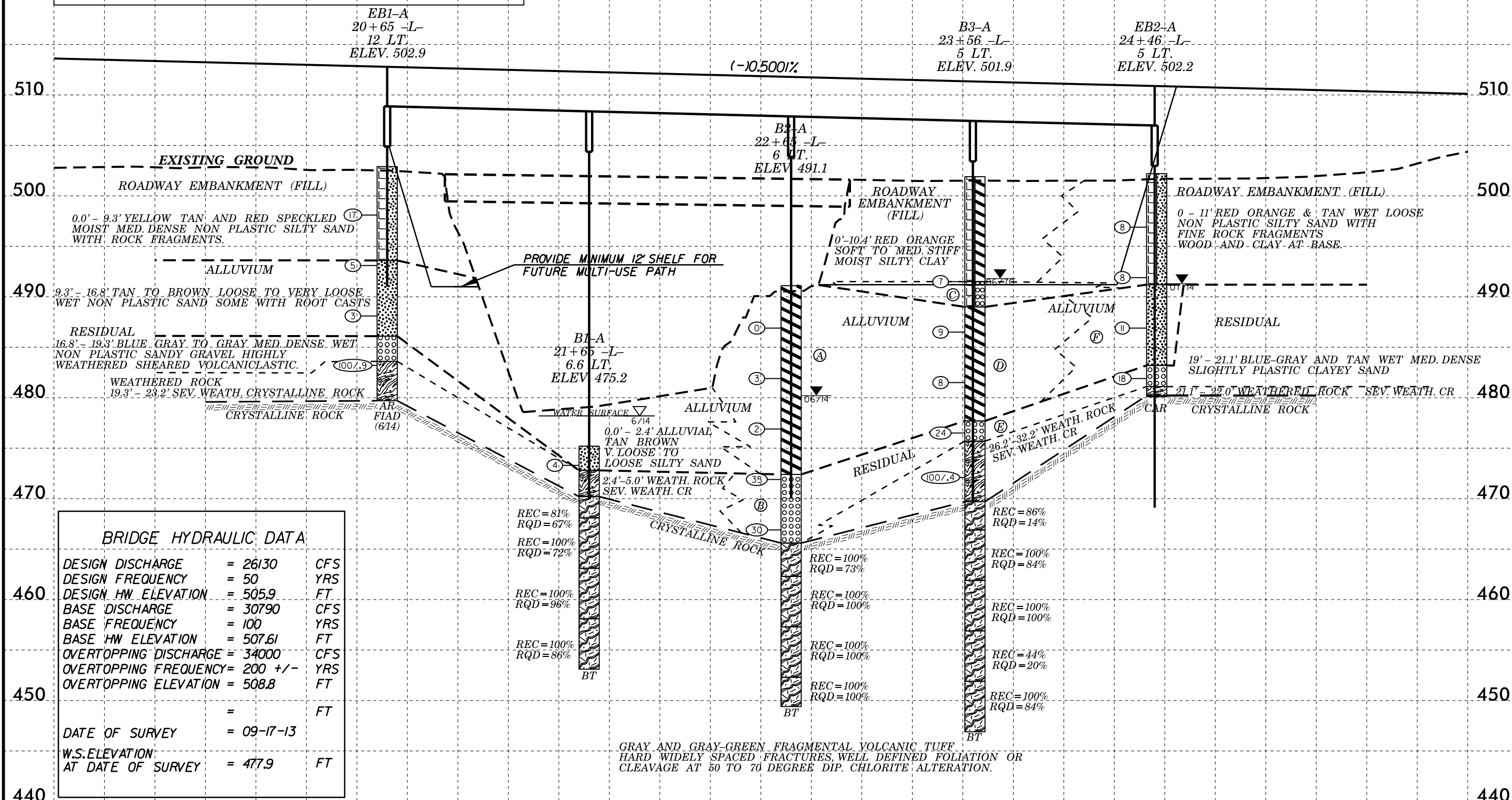
BORING DESCRIPTIONS

- Ⓐ 0' - 18.7' ALLUVIAL BROWN V. SOFT TO SOFT WET HIGHLY PLASTIC CLAY (APPEARS SLIGHTLY GRANULAR)
- Ⓑ 18.7' - 25.5' RESIDUAL GRAVEL GRAY TO BLUE GRAY DENSE WET NON PLASTIC VERY HIGHLY WEATHERED SHEARED VOLCANICLASTIC.
- Ⓒ ROADWAY EMBANKMENT 10.4' - 12.9' DARK GRAY ROCK FILL
- Ⓓ 12.9' - 24.2' ALLUVIAL RED TO RED BROWN MED. STIFF TO STIFF HIGHLY PLASTIC MOIST TO WET CLAY AND SANDY CLAY
- Ⓔ 24.2' - 26.2' RESIDUAL GRAY AND BLUE GRAY WET MED. DENSE TO DENSE SANDY GRAVEL FROM HIGHLY WEATH. SHEARED FRAGMENTAL VOLCANIC ROCK
- Ⓕ 11.0' - 19' ALLUVIAL BROWN WET MED. DENSE SAND WITH ROOT CASTS.



PROJECT REFERENCE NO.	SHEET
40096.1.1 (B-4972)	4
BRIDGE OVER ROCKY RIVER ON SR 1006 BETWEEN SR 1105 AND NC 200 PROFILE ALONG -L-	

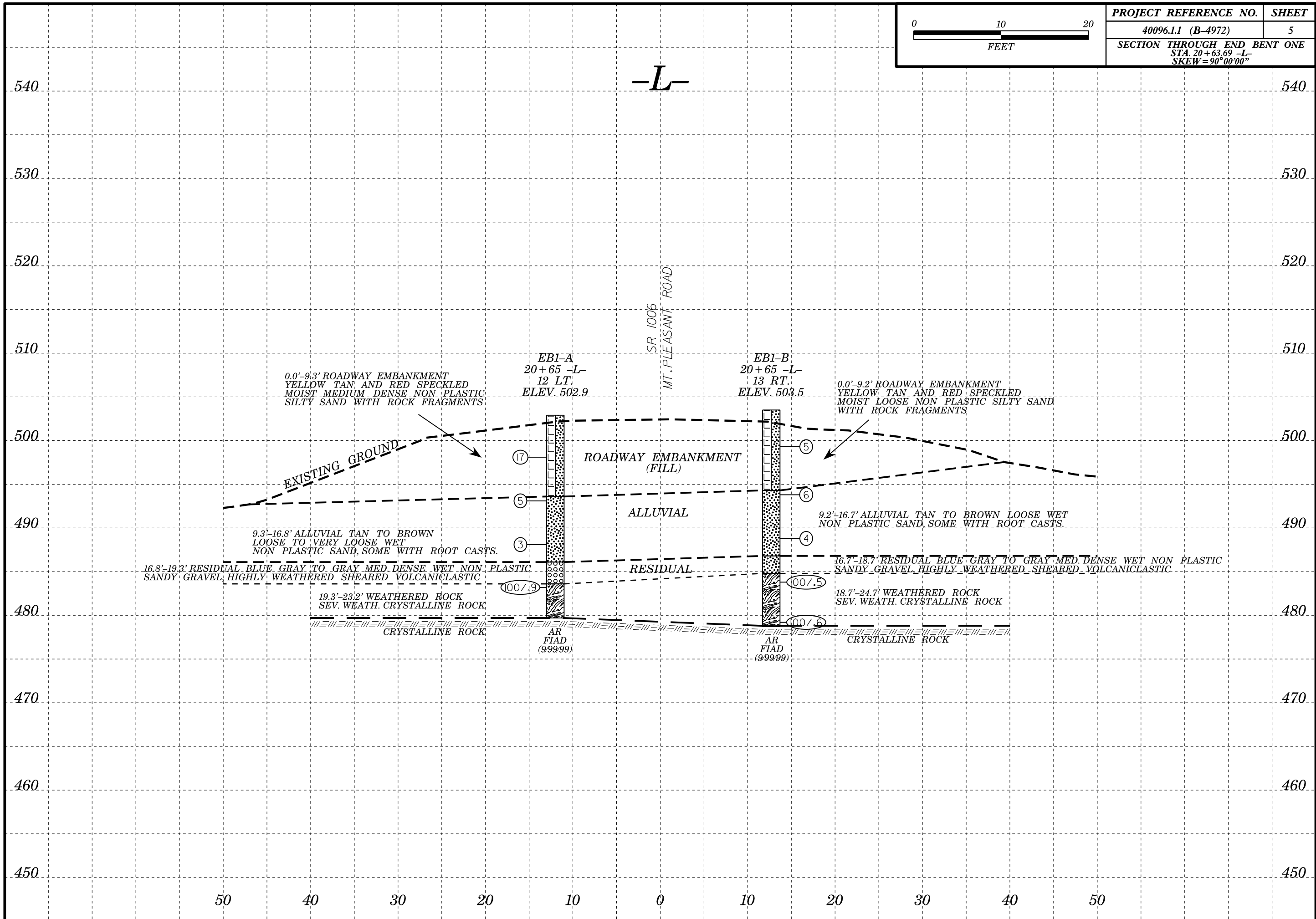
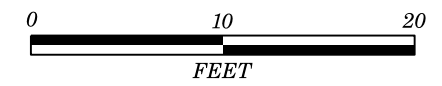
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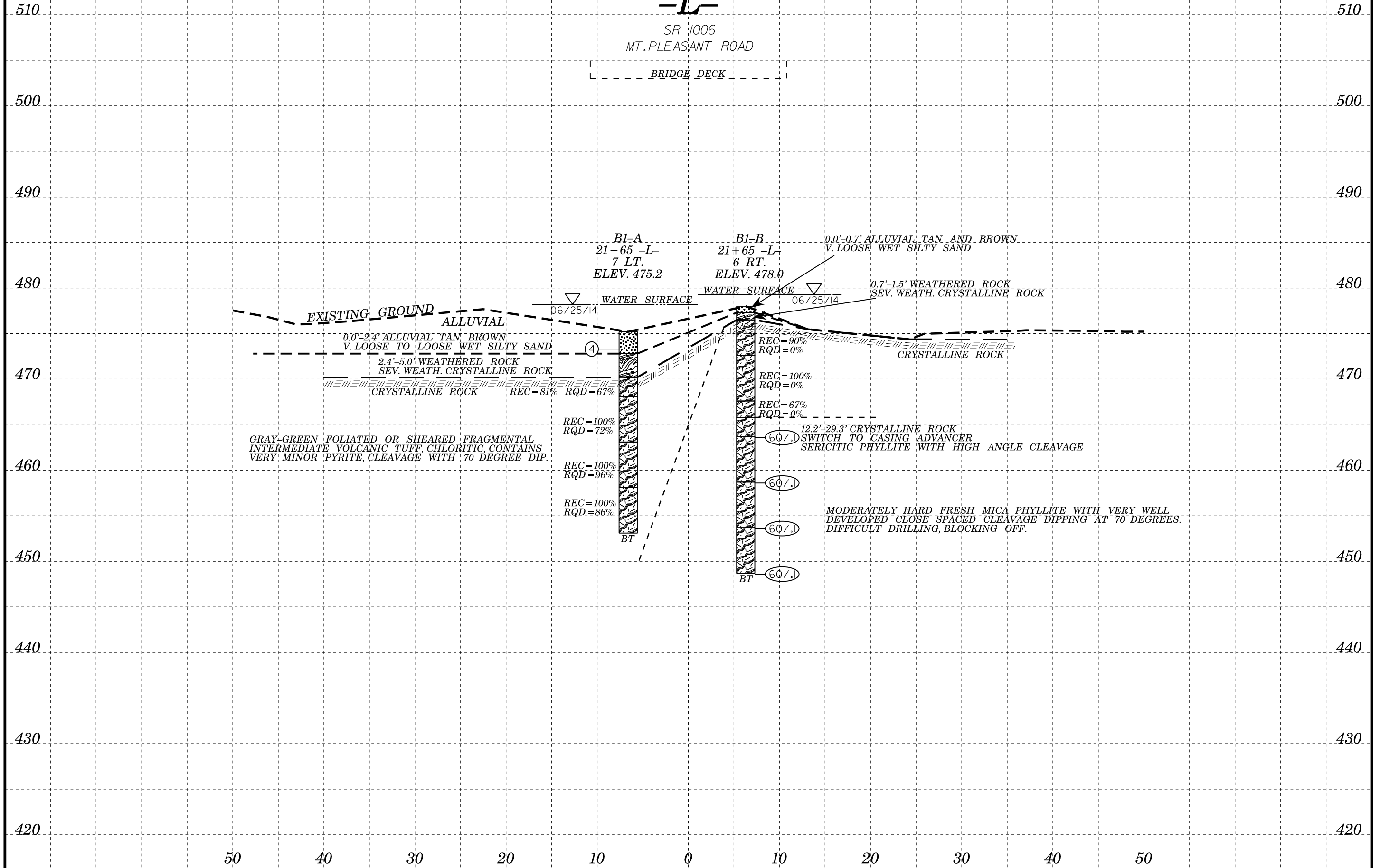
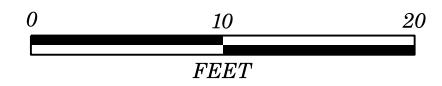


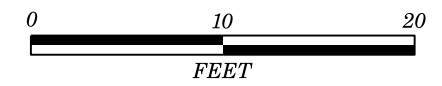
BRIDGE HYDRAULIC DATA		
DESIGN DISCHARGE	= 26130	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 505.9	FT
BASE DISCHARGE	= 30790	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 507.61	FT
OVERTOPPING DISCHARGE	= 34000	CFS
OVERTOPPING FREQUENCY	= 200 +/-	YRS
OVERTOPPING ELEVATION	= 508.8	FT
	=	FT
DATE OF SURVEY	= 09-17-13	
W.S. ELEVATION AT DATE OF SURVEY	= 477.9	FT

REC = 81%	RQD = 67%
REC = 100%	RQD = 72%
REC = 100%	RQD = 96%
REC = 100%	RQD = 86%
REC = 86%	RQD = 14%
REC = 100%	RQD = 84%
REC = 100%	RQD = 100%
REC = 100%	RQD = 100%
REC = 44%	RQD = 20%
REC = 100%	RQD = 84%

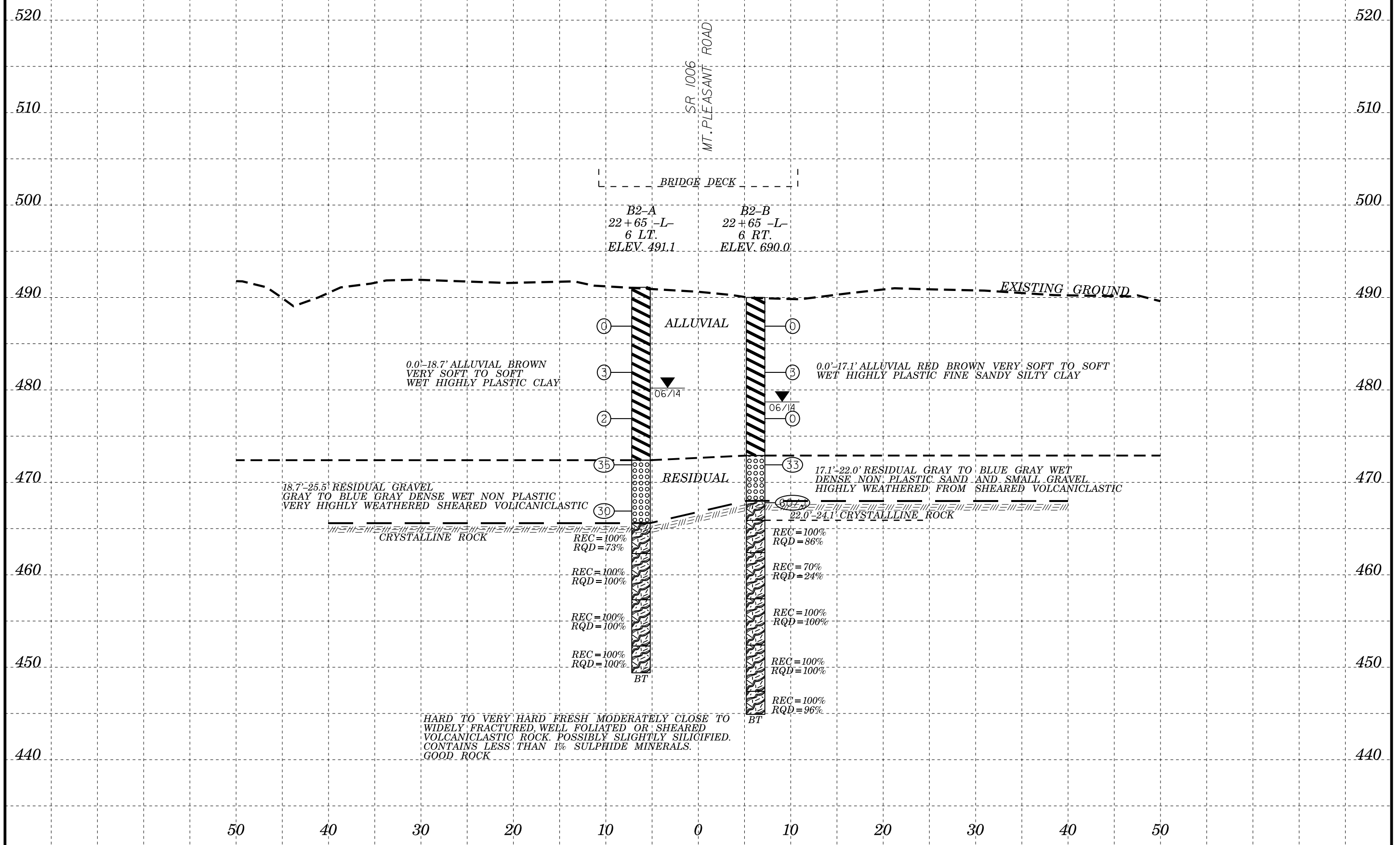
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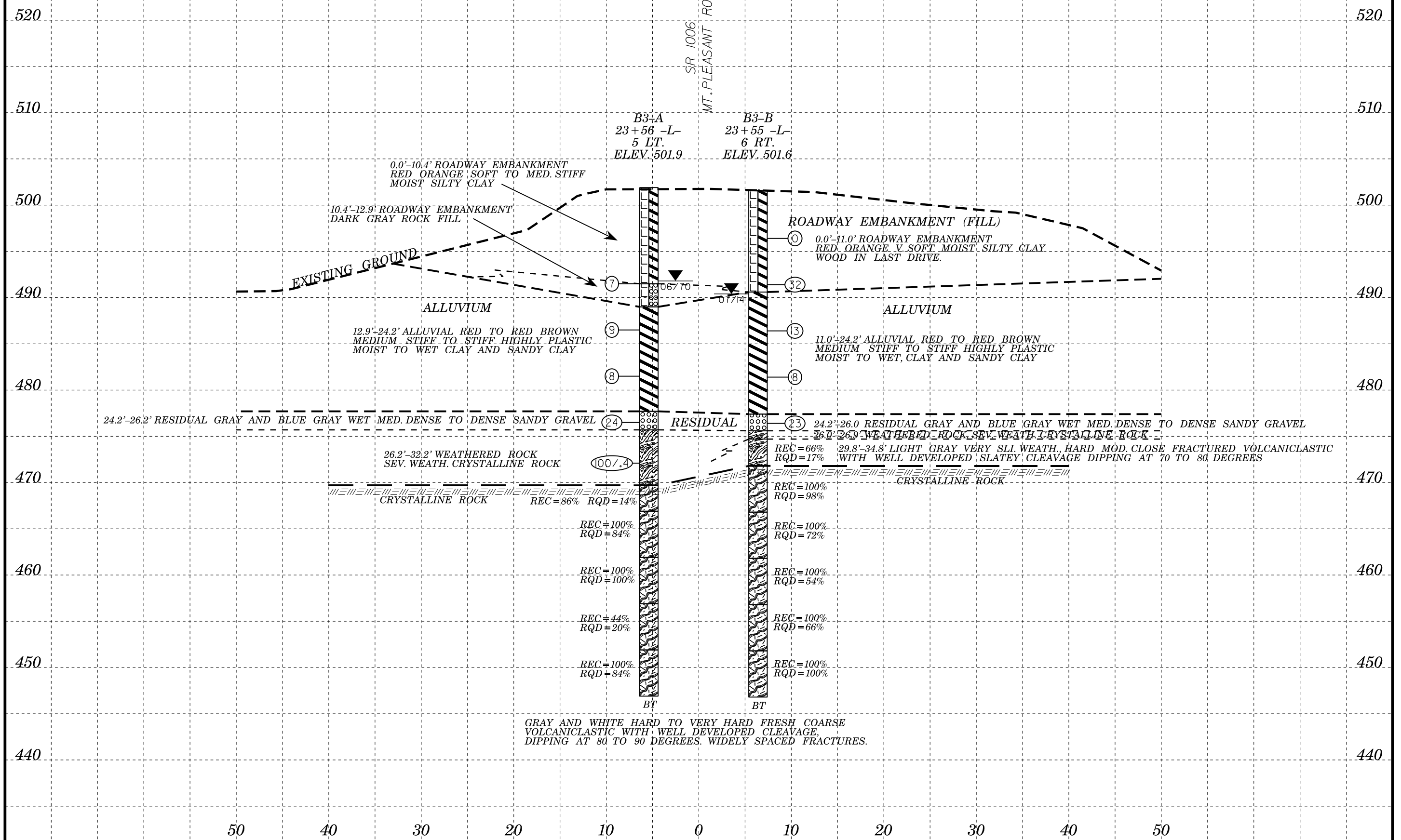
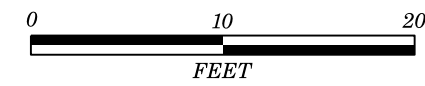


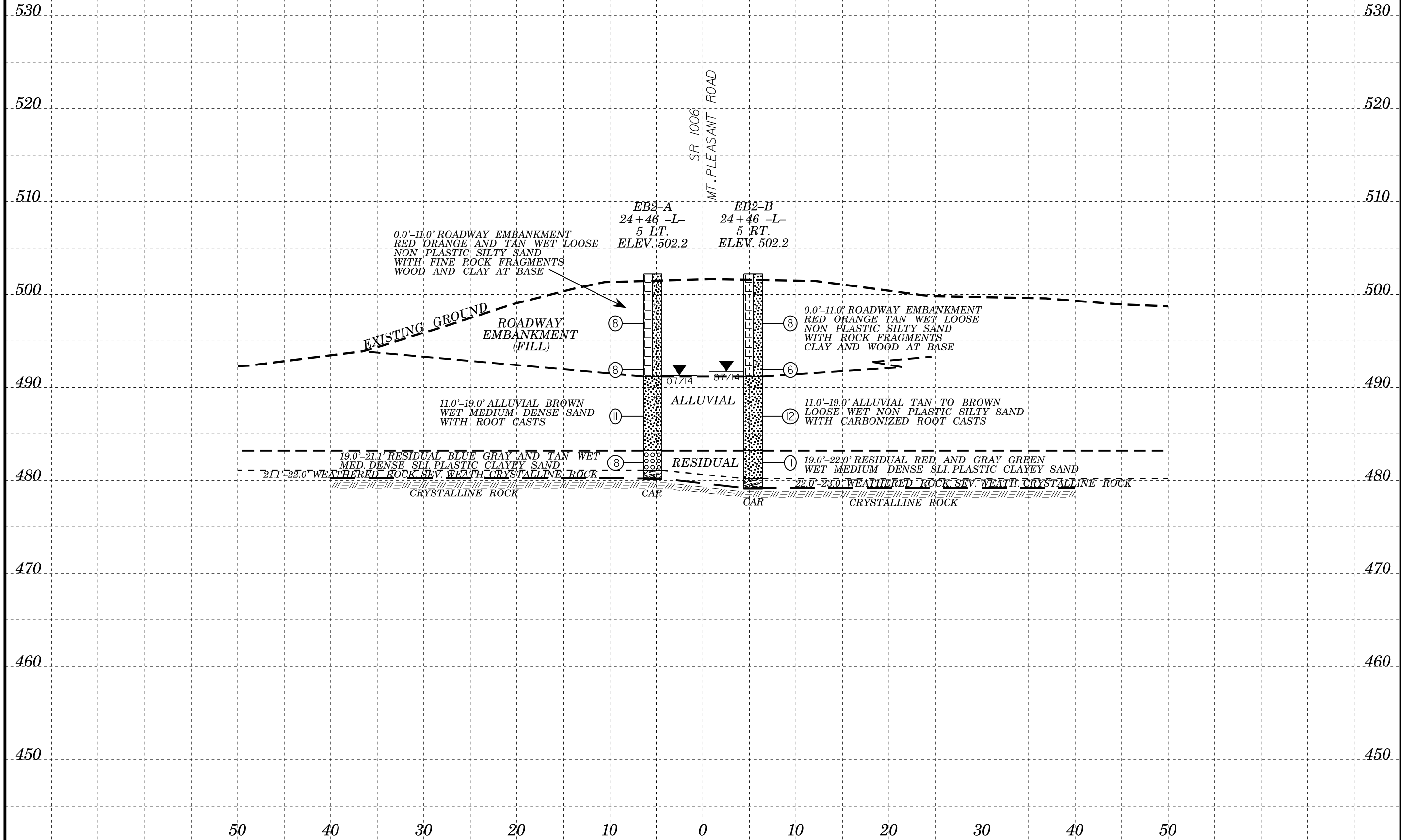
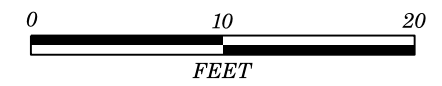




PROJECT REFERENCE NO.	SHEET
40096.1.1 (B-4972)	7
SECTION THROUGH BENT TWO	
STA. 22+65.00 -L-	
SKEW=90°00'00"	







-L-

SR 1006
MT. PLEASANT ROAD

EB2-A
24+46 -L-
5 LT.
ELEV. 502.2

EB2-B
24+46 -L-
5 RT.
ELEV. 502.2

0.0'-11.0' ROADWAY EMBANKMENT
RED ORANGE AND TAN WET LOOSE
NON PLASTIC SILTY SAND
WITH FINE ROCK FRAGMENTS
WOOD AND CLAY AT BASE

0.0'-11.0' ROADWAY EMBANKMENT
RED ORANGE TAN WET LOOSE
NON PLASTIC SILTY SAND
WITH ROCK FRAGMENTS
CLAY AND WOOD AT BASE

11.0'-19.0' ALLUVIAL BROWN
WET MEDIUM DENSE SAND
WITH ROOT CASTS

11.0'-19.0' ALLUVIAL TAN TO BROWN
LOOSE WET NON PLASTIC SILTY SAND
WITH CARBONIZED ROOT CASTS

19.0'-21.1' RESIDUAL BLUE GRAY AND TAN WET
MED. DENSE SLI. PLASTIC CLAYEY SAND

19.0'-22.0' RESIDUAL RED AND GRAY GREEN
WET MEDIUM DENSE SLI. PLASTIC CLAYEY SAND

21.1'-22.0' WEATHERED ROCK SEV. WEATH. CRYSTALLINE ROCK

22.0'-23.0' WEATHERED ROCK SEV. WEATH. CRYSTALLINE ROCK

EXISTING GROUND
ROADWAY
EMBANKMENT
(FILL)

ALLUVIAL

RESIDUAL

8

8

11

18

8

6

12

11

0.7/14

CAR

CAR

50

40

30

20

10

0

10

20

30

40

50

530

520

510

500

490

480

470

460

450

530

520

510

500

490

480

470

460

450



NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

WBS 40096.1.1	TIP B-4972	COUNTY CABARRUS	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)			GROUND WTR (ft)
BORING NO. EB1-A	STATION 20+65	OFFSET 12 ft LT	ALIGNMENT -L-
COLLAR ELEV. 502.9 ft	TOTAL DEPTH 23.2 ft	NORTHING 572,359	EASTING 1,558,830
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Smith, C. L.	START DATE 06/12/14	COMP. DATE 06/12/14	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	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75				
505												502.9	0.0
500	499.1	3.8	6	8	9								
495	494.1	8.8	5	3	2								
490	489.1	13.8	1	1	2								
485	484.1	18.8	18	82/4									
480													

WBS 40096.1.1	TIP B-4972	COUNTY CABARRUS	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)			GROUND WTR (ft)
BORING NO. EB1-B	STATION 20+65	OFFSET 13 ft RT	ALIGNMENT -L-
COLLAR ELEV. 503.5 ft	TOTAL DEPTH 24.8 ft	NORTHING 572,346	EASTING 1,558,851
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Smith, C. L.	START DATE 06/12/14	COMP. DATE 06/12/14	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	DEPTH (ft)
			0.5ft	0.5ft	0.5ft	0	25	50	75				
505												503.5	0.0
500	500.3	3.2	1	1	4								
495	494.8	8.7	3	3	3								
490	489.8	13.7	1	2	2								
485	484.8	18.7											
480	479.8	23.7	73	27/0.1									

NCDOT BORE DOUBLE_B4972_GEO_BH_BRD0227.GPJ NC_DOT.GDT 9/17/14

WBS 40096.1.1		TIP B-4972		COUNTY CABARRUS		GEOLOGIST Stickney, J. K.								
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)							GROUND WTR (ft)							
BORING NO. B1-A		STATION 21+65		OFFSET 7 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 475.2 ft		TOTAL DEPTH 22.1 ft		NORTHING 572,443		EASTING 1,558,884								
0 HR. N/A		24 HR. N/A												
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic								
DRILLER Smith, C. L.		START DATE 06/25/14		COMP. DATE 06/25/14		SURFACE WATER DEPTH 3.0ft								
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					
480														
475	474.3	0.9	0	1	3								475.2 GROUND SURFACE	0.0
470													472.8 0.0' - 2.4' ALLUVIAL TAN BROWN V. LOOSE TO LOOSE SILTY SAND	2.4
465													470.2 2.4' - 5.0' PROBABLY WEATHERED ROCK. CASING ADVANCER REFUSAL AT BASE	5.0
460													468.1 5.0' - 7.1' CORED ROCK	7.1
455													463.1 7.1' - 12.1' CORED ROCK	12.1
													458.1 12.1' - 17.1' CORED ROCK	17.1
													453.1 17.1' - 22.1' CORED ROCK	22.1
Boring Terminated at Elevation 453.1 ft IN CRYSTALLINE ROCK														

NCDOT BORE SINGLE B4972_GEO_BH_BRD0227.GPJ_NC_DOT.GDT 9/15/14

WBS 40096.1.1		TIP B-4972		COUNTY CABARRUS		GEOLOGIST Stickney, J. K.								
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)							GROUND WTR (ft)							
BORING NO. B1-A		STATION 21+65		OFFSET 7 ft LT		ALIGNMENT -L-								
COLLAR ELEV. 475.2 ft		TOTAL DEPTH 22.1 ft		NORTHING 572,443		EASTING 1,558,884								
0 HR. N/A		24 HR. N/A												
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014				DRILL METHOD NW Casing W/SPT & Core		HAMMER TYPE Automatic								
DRILLER Smith, C. L.		START DATE 06/25/14		COMP. DATE 06/25/14		SURFACE WATER DEPTH 3.0ft								
ELEV (ft)	RUN ELEV (ft)	DEPTH (ft)	RUN (ft)	DRILL RATE (Min/ft)	RUN		STRATA		SAMP. NO.	REC. (%)	RQD (%)	LOG	DESCRIPTION AND REMARKS	DEPTH (ft)
					REC. (%)	RQD (%)	REC. (%)	RQD (%)						
475.2													Begin Coring @ 5.0 ft	
470.2	470.2	5.0	2.1		(1.7)	(1.4)	(1.7)	(1.4)		81%	67%		470.2 5.0' - 7.1' GRAY GREEN, FOLIATED OR SHEARED FRAGMENTAL INTERMEDIATE VOLCANIC TUFF. CHLORITIC, CONTAINS VERY MINOR PYRITE. CLEAVAGE WITH 70 DEGREE DIP. JOINTING AT 90. R1:4 R2:13 R3:20 R4:20 R5:4 RMR 61, GOOD ROCK, CLASS II, ROCK TYPE D	5.0
465	468.1	7.1	5.0		(5.0)	(3.6)	(5.0)	(3.6)		100%	72%		468.1	7.1
460	463.1	12.1	5.0		(5.0)	(4.8)	(5.0)	(4.8)		100%	96%		463.1	12.1
455	458.1	17.1	5.0		(5.0)	(4.3)	(5.0)	(4.3)		100%	86%		458.1	17.1
	453.1	22.1											453.1	22.1
Boring Terminated at Elevation 453.1 ft IN CRYSTALLINE ROCK														

NCDOT CORE SINGLE B4972_GEO_BH_BRD0227.GPJ_NC_DOT.GDT 9/17/14

WBS 40096.1.1	TIP B-4972	COUNTY CABARRUS	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)			GROUND WTR (ft)
BORING NO. B1-B	STATION 21+65	OFFSET 6 ft RT	ALIGNMENT -L-
COLLAR ELEV. 478.0 ft	TOTAL DEPTH 29.4 ft	NORTHING 572,436	EASTING 1,558,895
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER Smith, C. L.	START DATE 06/25/14	COMP. DATE 06/25/14	SURFACE WATER DEPTH 1.3ft

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				
480													478.0 GROUND SURFACE 0.0	
													477.3 ALLUVIAL 0.7	
													476.5 0-0.7' ALLUVIAL, TAN AND BROWN V. LOOSE WET SILTY SAND. 1.5	
475													472.6 WEATHERED ROCK 0.7' - 1.5' WEATHERED ROCK, CASING ADVANCER REFUSAL AT BASE. 5.4	
470													467.6 CRYSTALLINE ROCK 1.5' - 5.4' CORED ROCK 10.4	
													465.8 CRYSTALLINE ROCK 5.4' - 10.4' CORED ROCK 12.2	
465	463.7	14.3	60/1										463.7 CRYSTALLINE ROCK 10.4' - 12.2' CORED ROCK 14.3	
													458.7 CRYSTALLINE ROCK 12.2' - 14.3' SWITCH TO CASING ADVANCER, SERICITIC PHYLLITE WITH HIGH ANGLE CLEAVAGE. CORE AT TOP, SPT REFUSAL AT BASE; ROCK 19.3	
460	458.7	19.3	60/1										453.7 CRYSTALLINE ROCK 14.3' - 19.3' SPT REFUSAL AT TOP AND BASE; ROCK 24.3	
													453.7 CRYSTALLINE ROCK 19.3' - 24.3' SPT REFUSAL AT TOP AND BASE; ROCK 24.3	
455	453.7	24.3	60/1										448.7 CRYSTALLINE ROCK 24.3' - 29.3' SPT REFUSAL AT TOP AND BASE; ROCK. 29.3	
450	448.7	29.3	60/1										Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 448.6 ft IN CRYSTALLINE ROCK	

NCDOT BORE SINGLE B4972_GEO_BH_BRD0227.GPJ NC_DOT.GDT 9/15/14

WBS 40096.1.1	TIP B-4972	COUNTY CABARRUS	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)			GROUND WTR (ft)
BORING NO. B1-B	STATION 21+65	OFFSET 6 ft RT	ALIGNMENT -L-
COLLAR ELEV. 478.0 ft	TOTAL DEPTH 29.4 ft	NORTHING 572,436	EASTING 1,558,895
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER Smith, C. L.	START DATE 06/25/14	COMP. DATE 06/25/14	SURFACE WATER DEPTH 1.3ft

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 (%)			
476.5											Begin Coring @ 1.5 ft	
475	476.5	1.5	3.9		(3.5)	(0.0)		(3.5)	(0.0)		CRYSTALLINE ROCK	1.5
	472.6	5.4	5.0		(5.0)	(0.0)		(5.0)	(0.0)		1.5' - 5.4' MODERATELY HARD, FRESH, MICA PHYLLITE WITH VERY WELL DEVELOPED CLOSE SPACED CLEAVAGE, DIPPING AT 70 DEGREES. DIFFICULT DRILLING, BLOCKING OFF. R1:4 R2:3 R3:10 R4:6 R5:4 RMR 27, POOR ROCK, CLASS IV, ROCK TYPE B	5.4
470	467.6	10.4	1.8		(1.2)	(0.0)		(1.2)	(0.0)		CRYSTALLINE ROCK	10.4
	465.8	12.2			(67)	(0)		(67)	(0)		5.4' - 10.4' MODERATELY HARD, FRESH, MICA PHYLLITE WITH WELL DEVELOPED CLEAVAGE DIPPING AT 70 DEGREES R1:4 R2:3 R3:5 R4:6 R5:4 RMR 27, POOR ROCK, CLASS IV, ROCK TYPE B	12.2
465				N=60/1							CRYSTALLINE ROCK	14.3
				N=60/1							10.4' - 12.2 MODERATELY HARD, FRESH, MICA PHYLLITE WITH WELL DEVELOPED CLEAVAGE, DIFFICULT DRILLING; BLOCKING OFF. R1:4 R2:3 R3:5 R4:6 R5:4 RMR 22, POOR ROCK, CLASS IV, ROCK TYPE B	19.3
460				N=60/1							CRYSTALLINE ROCK	19.3
				N=60/1							CRYSTALLINE ROCK	24.3
455				N=60/1							CRYSTALLINE ROCK	24.3
450				N=60/1							CRYSTALLINE ROCK	29.3
											Boring Terminated WITH STANDARD PENETRATION TEST REFUSAL at Elevation 448.6 ft IN CRYSTALLINE ROCK	

NCDOT BORE SINGLE B4972_GEO_BH_BRD0227.GPJ NC_DOT.GDT 9/17/14

WBS 40096.1.1	TIP B-4972	COUNTY CABARRUS	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)			GROUND WTR (ft)
BORING NO. B2-A	STATION 22+65	OFFSET 6 ft LT	ALIGNMENT -L-
COLLAR ELEV. 491.1 ft	TOTAL DEPTH 41.7 ft	NORTHING 572,529	EASTING 1,558,935
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER Smith, C. L.	START DATE 06/26/14	COMP. DATE 06/26/14	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				
495													GROUND SURFACE	0.0
490	487.9	3.2	0	0	0								ALLUVIAL 0' - 18.7' (FROM B2-B SAMPLE): ALLUVIAL, BROWN, WET, HIGHLY PLASTIC, VERY SOFT TO SOFT, CLAY. APPEARS SLIGHTLY GRANULAR..	
485	482.9	8.2	1	2	1									
480	477.9	13.2	0	0	2									
475	472.9	18.2	1	12	23									
470	467.9	23.2	73	18	12									
465													RESIDUAL 18.7' - 25.5' RESIDUAL, GRAVEL, GRAY TO BLUE GRAY, DENSE WET, NON PLASTIC. VERY HIGHLY WEATHERED SHEARED VOLCANICLASTIC.	18.7
460													CRYSTALLINE ROCK 25.5' - 28.8' CORED ROCK	25.5
455													CRYSTALLINE ROCK 28.8' - 33.8' CORED ROCK	28.8
450													CRYSTALLINE ROCK 33.8' - 38.8' CORED ROCK	33.8
													CRYSTALLINE ROCK 38.8' - 41.7' CORED ROCK	38.8
													CRYSTALLINE ROCK 38.8' - 41.7' CORED ROCK	41.7

Boring Terminated at Elevation 449.4 ft IN CRYSTALLINE ROCK

NCDOT BORE SINGLE B4972_GEO_BH_BRD0227 GPJ NC_DOT.GDT 9/15/14

WBS 40096.1.1	TIP B-4972	COUNTY CABARRUS	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)			GROUND WTR (ft)
BORING NO. B2-A	STATION 22+65	OFFSET 6 ft LT	ALIGNMENT -L-
COLLAR ELEV. 491.1 ft	TOTAL DEPTH 41.7 ft	NORTHING 572,529	EASTING 1,558,935
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER Smith, C. L.	START DATE 06/26/14	COMP. DATE 06/26/14	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) %			
465.6	465.6	25.5	3.3		(3.3) 100%	(2.4) 73%		(3.3) 100%	(2.4) 73%		Begin Coring @ 25.5 ft	25.5
460	462.3	28.8	5.0		(5.0) 100%	(5.0) 100%		(5.0) 100%	(5.0) 100%		25.5' - 28.8' HARD TO VERY HARD FRESH, MODERATELY CLOSELY FRACTURED, WELL FOLIATED OR SHEARED, VOLCANICLASTIC ROCK. POSSIBLY SLIGHTLY SILICIFIED. CONTAINS LESS THAN 1% SULPHIDE MINERALS. R1:7 R2:13 R3:20 R4:12 R5:4 RMR 56, FAIR ROCK, CLASS III, ROCK TYPE D	28.8
455	457.3	33.8	5.0		(5.0) 100%	(5.0) 100%		(5.0) 100%	(5.0) 100%		28.8' - 33.8' HARD TO VERY HARD FRESH, MODERATELY CLOSE TO WIDELY FRACTURED, WELL FOLIATED OR SHEARED, VOLCANICLASTIC ROCK. POSSIBLY SLIGHTLY SILICIFIED. CONTAINS LESS THAN 1% SULPHIDE MINERALS. R1:12 R2:20 R3:25 R4:20 R5:4 RMR 81, VERY GOOD ROCK, CLASS I, ROCK TYPE D	33.8
450	452.3	38.8	2.9		(2.9) 100%	(2.9) 100%		(2.9) 100%	(2.9) 100%		33.8' - 38.8' HARD TO VERY HARD FRESH, MODERATELY CLOSE TO WIDELY FRACTURED, WELL FOLIATED OR SHEARED, VOLCANICLASTIC ROCK. POSSIBLY SLIGHTLY SILICIFIED. CONTAINS LESS THAN 1% SULPHIDE MINERALS. R1:12 R2:20 R3:25 R4:20 R5:4 RMR 81, VERY GOOD ROCK, CLASS I, ROCK TYPE D	38.8
	449.4	41.7									38.8' - 41.7' HARD TO VERY HARD FRESH, MODERATELY CLOSE TO WIDELY FRACTURED, WELL FOLIATED OR SHEARED, VOLCANICLASTIC ROCK. POSSIBLY SLIGHTLY SILICIFIED. CONTAINS LESS THAN 1% SULPHIDE MINERALS. R1:12 R2:20 R3:25 R4:20 R5:4 RMR 81, VERY GOOD ROCK, CLASS I, ROCK TYPE D	41.7

Boring Terminated at Elevation 449.4 ft IN CRYSTALLINE ROCK

NCDOT CORE SINGLE B4972_GEO_BH_BRD0227 GPJ NC_DOT.GDT 9/17/14

WBS 40096.1.1	TIP B-4972	COUNTY CABARRUS	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)			GROUND WTR (ft)
BORING NO. B2-B	STATION 22+65	OFFSET 6 ft RT	ALIGNMENT -L-
COLLAR ELEV. 490.0 ft	TOTAL DEPTH 45.1 ft	NORTHING 572,523	EASTING 1,558,945
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER Smith, C. L.	START DATE 06/26/14	COMP. DATE 06/26/14	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					
490													490.0	GROUND SURFACE	0.0
485	487.9	2.1	0	0	0							W	0-17.1' ALLUVIAL, RED BROWN, VERY SOFT TO SOFT, WET, HIGHLY PLASTIC, FINE SANDY SILTY CLAY.		
480	482.9	7.1	1	1	2							W			
475	477.9	12.1	0	0	0							W			
470	472.9	17.1	2	15	18							W	17.1' - 22.0' RESIDUAL, GRAY TO BLUE GRAY, WET, DENSE, NON PLASTIC, SAND AND SMALL GRAVEL HIGHLY WEATHERED FROM SHEARED VOLCANICLASTIC.	17.1	
465	467.9	22.1	60/1										22.0' - 24.1' CRYSTALLINE ROCK AT TOP, CASING ADVANCER REFUSAL AT BASE.	22.0	
460													24.1' - 27.6' CORED ROCK	24.1	
455													27.6' - 32.6' CORED ROCK	27.6	
450													32.6' - 37.6' CORED ROCK	32.6	
445													37.6' - 42.6' CORED ROCK	37.6	
													42.6' - 45.1' CORED ROCK	42.6	
													Boring Terminated at Elevation 444.9 ft IN CRYSTALLINE ROCK	44.9	

NCDOT BORE_SINGLE_B4972_GEO_BH_BRD0227.GPJ_NC_DOT_GDT_9/15/14

WBS 40096.1.1	TIP B-4972	COUNTY CABARRUS	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)			GROUND WTR (ft)
BORING NO. B2-B	STATION 22+65	OFFSET 6 ft RT	ALIGNMENT -L-
COLLAR ELEV. 490.0 ft	TOTAL DEPTH 45.1 ft	NORTHING 572,523	EASTING 1,558,945
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD NW Casing W/SPT & Core	HAMMER TYPE Automatic
DRILLER Smith, C. L.	START DATE 06/26/14	COMP. DATE 06/26/14	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) %			
465.9											Begin Coring @ 24.1 ft	
465	465.9	24.1	3.5		100%	86%		100%	86%		24.1' - 27.6' HARD, FRESH, LIGHT GRAY, MODERATELY CLOSE FRACTURED, VOLCANICLASTIC ROCK, WITH WELL DEVELOPED CLEAVAGE. 26.1' TO 27' MEDIUM GRAY, WITH MORE SULPHIDE CONTENT SIMILAR TO FOLLOWING RUN. R1:7 R2:17 R3:10 R4:12 R5:4 RMR 60, FAIR ROCK, CLASS III, ROCK TYPE D	24.1
460	462.4	27.6	5.0		70%	24%		70%	24%			27.6
455	457.4	32.6	5.0		100%	100%		100%	100%		27.6' - 32.6' HARD CLOSE FRACTURED SULPHIDE BEARING VOLCANICLASTIC, SHATTERED IN LOWER TWO FEET. RESISTANT TO DRYING; MAY CONTAIN A LITTLE CLAY. R1:4 R2:3 R3:10 R4:12 R5:4 RMR 33, POOR ROCK, CLASS IV, ROCK TYPE D	32.6
450	452.4	37.6	5.0		100%	100%		100%	100%		32.6' - 37.6' HARD, FRESH, LIGHT GRAY, WIDELY SPACED FRACTURED, COARSE GRAINED, VOLCANICLASTIC WITH WELL DEVELOPED CLEAVE AT 80 TO 90 DEGREE DIP. R1:12 R2:20 R3:20 R4:20 R5:4 RMR 76, GOOD ROCK, CLASS II, ROCK TYPE D	37.6
445	444.9	45.1	2.5		100%	96%		100%	96%		37.6' - 42.6' HARD, FRESH, LIGHT GRAY, WIDELY SPACED FRACTURED, COARSE GRAINED, VOLCANICLASTIC WITH WELL DEVELOPED CLEAVE AT 80 TO 90 DEGREE DIP. R1:12 R2:20 R3:25 R4:20 R5:4 RMR 81, VERY GOOD ROCK, CLASS I, ROCK TYPE D	42.6
											42.6' - 45.1' HARD, FRESH, LIGHT GRAY, WIDELY SPACED FRACTURED, COARSE GRAINED, VOLCANICLASTIC WITH WELL DEVELOPED CLEAVAGE AT 80 TO 90 DEGREE DIP. R1:12 R2:20 R3:25 R4:20 R5:4 RMR 81, VERY GOOD ROCK, CLASS I, ROCK TYPE D	45.1
											Boring Terminated at Elevation 444.9 ft IN CRYSTALLINE ROCK	

NCDOT BORE_SINGLE_B4972_GEO_BH_BRD0227.GPJ_NC_DOT_GDT_9/17/14

WBS 40096.1.1	TIP B-4972	COUNTY CABARRUS	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)			GROUND WTR (ft)
BORING NO. B3-A	STATION 23+56	OFFSET 5 ft LT	ALIGNMENT -L-
COLLAR ELEV. 501.9 ft	TOTAL DEPTH 55.0 ft	NORTHING 572,607	EASTING 1,558,981
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014			DRILL METHOD NW Casing W/SPT & Core
DRILLER Smith, C. L.			HAMMER TYPE Automatic
START DATE 06/27/70		COMP. DATE 06/27/70	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				
505													GROUND SURFACE	0.0
500													ROADWAY EMBANKMENT 0 - 10.4 ROADWAY EMBANKMENT, RED ORANGE, SOFT TO MED. STIFF MOIST, SILTY CLAY, PROBABLY DERIVED FROM HIGHLY WEATHERED SLATE BELT.	
495														
490	492.5	9.4	2	2	5								ROADWAY EMBANKMENT 10.4' - 12.9 DARK GRAY, ROCK FILL	10.4
485	487.5	14.4	2	3	6								ALLUVIAL 12.9' - 24.2' ALLUVIAL, RED TO RED BROWN, MEDIUM STIFF TO STIFF, HIGHLY PLASTIC, MOIST TO WET, CLAY AND SANDY CLAY.	12.9
480	482.5	19.4	2	3	5									
475	477.5	24.4	11	12	12								RESIDUAL 24.2' - 26.2' RESIDUAL, GRAY AND BLUE GRAY, WET, MEDIUM DENSE TO DENSE, SANDY GRAVEL FROM HIGHLY WEATHERED SHEARED, FRAGMENTAL VOLCANIC ROCK.	24.2
470	472.5	29.4	100/4										WEATHERED ROCK 26.2' - 32.2' WEATHERED ROCK. CASING ADVANCER REFUSAL AT BASE.	26.2
465													CRYSTALLINE ROCK 32.2' - 35.0' CORED ROCK	32.2
460													CRYSTALLINE ROCK 35.0' - 40.0' CORED ROCK	35.0
455													CRYSTALLINE ROCK 40.0' - 45.0' CORED ROCK	40.0
450													CRYSTALLINE ROCK 45.0' - 50.0' CORED ROCK	45.0
													CRYSTALLINE ROCK 50.0' - 55.0' CORED ROCK	50.0
													Boring Terminated at Elevation 446.9 ft IN CRYSTALLINE ROCK	55.0

NCDOT BORE SINGLE B4972_GEO_BH_BRD0227.GPJ_NC_DOT.GDT 9/17/14

WBS 40096.1.1	TIP B-4972	COUNTY CABARRUS	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)			GROUND WTR (ft)
BORING NO. B3-A	STATION 23+56	OFFSET 5 ft LT	ALIGNMENT -L-
COLLAR ELEV. 501.9 ft	TOTAL DEPTH 55.0 ft	NORTHING 572,607	EASTING 1,558,981
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014			DRILL METHOD NW Casing W/SPT & Core
DRILLER Smith, C. L.			HAMMER TYPE Automatic
START DATE 06/27/70		COMP. DATE 06/27/70	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 (%)			
469.7											Begin Coring @ 32.2 ft	
469.7	32.2	2.8			(2.4) 86%	(0.4) 14%		(2.4) 86%	(0.4) 14%		CRYSTALLINE ROCK 32.2' - 35.0' GRAY, HARD, FRESH, VUGGY SHEARED, FRACTURED, SLIGHTLY SILICIFIED VOLCANICLASTIC WITH DISSEMINATED PYRITE. RETAINS MOISTURE. BROKEN ALONG HIGH ANGLE FRACTURES. R1:4 R2:3 R3:10 R4:6 R5:4 RMR 27, POOR ROCK, CLASS IV, ROCK TYPE D	32.2
465	466.9	35.0	5.0		(5.0) 100%	(4.2) 84%		(5.0) 100%	(4.2) 84%			40.0
460	461.9	40.0	5.0		(5.0) 100%	(5.0) 100%		(5.0) 100%	(5.0) 100%		CRYSTALLINE ROCK 35.0' - 40.0' CONTINUATION OF FIRST RUN, GRAY, HARD, FRESH, SHEARED, SLIGHTLY SILICIFIED VOLCANICLASTIC, CUT BY PYRITE FILLED FRACTURE WITH OPEN SPACE THAT IS PARALLEL TO CORE AXIS. RETAINS MOISTURE. R1:4 R2:17 R3:20 R4:6 R5:4 RMR 51, FAIR ROCK, CLASS III, ROCK TYPE D	40.0
455	456.9	45.0	5.0		(2.2) 44%	(1.0) 20%		(2.2) 44%	(1.0) 20%		CRYSTALLINE ROCK 40.0' - 45.0' GRAY AND WHITE, HARD TO VERY HARD, FRESH, COARSE VOLCANICLASTIC WITH WELL- DEVELOPED CLEAVAGE, DIPPING AT 80 TO 90 DEGREES. WIDELY SPACED FRACTURES. R1:12 R2:20 R3:25 R4:20 R5:4 RMR 81, VERY GOOD ROCK, CLASS I, ROCK TYPE D	45.0
450	451.9	50.0	5.0		(5.0) 100%	(4.2) 84%		(5.0) 100%	(4.2) 84%		CRYSTALLINE ROCK 45.0' - 50.0' GRAY AND WHITE, HARD TO VERY HARD, FRESH, COARSE VOLCANICLASTIC WITH WELL- DEVELOPED CLEAVAGE, DIPPING AT 80 TO 90 DEGREES. CLOSELY FRACTURED, SOME WITH OPEN SPACE. INTERVAL OF SHATTERED ROCK LOST TO RECOVERY. R1:7 R2:3 R3:5 R4:6 R5:4 RMR 25, POOR ROCK, CLASS IV, ROCK TYPE D	50.0
	446.9	55.0									CRYSTALLINE ROCK 50.0' - 55.0' GRAY AND WHITE, HARD TO VERY HARD, FRESH, COARSE VOLCANICLASTIC WITH WELL- DEVELOPED CLEAVAGE, DIPPING AT 80 TO 90 DEGREES. CLOSELY FRACTURED, SOME WITH OPEN SPACE. R1:7 R2:17 R3:20 R4:20 R5:4 RMR 68, GOOD ROCK, CLASS II, ROCK TYPE D Boring Terminated at Elevation 446.9 ft IN CRYSTALLINE ROCK	55.0

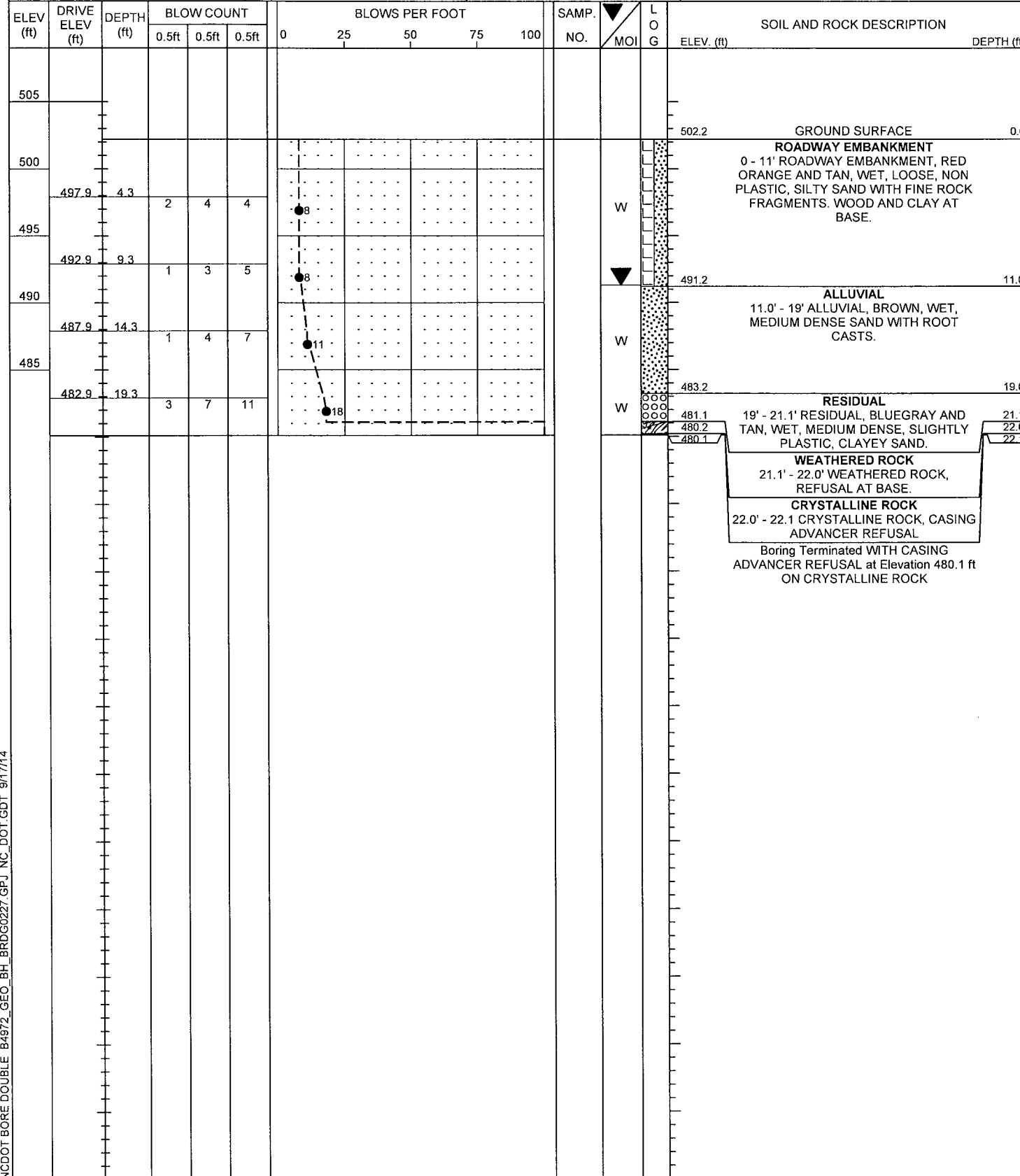
NCDOT CORE SINGLE B4972_GEO_BH_BRD0227.GPJ_NC_DOT.GDT 9/17/14



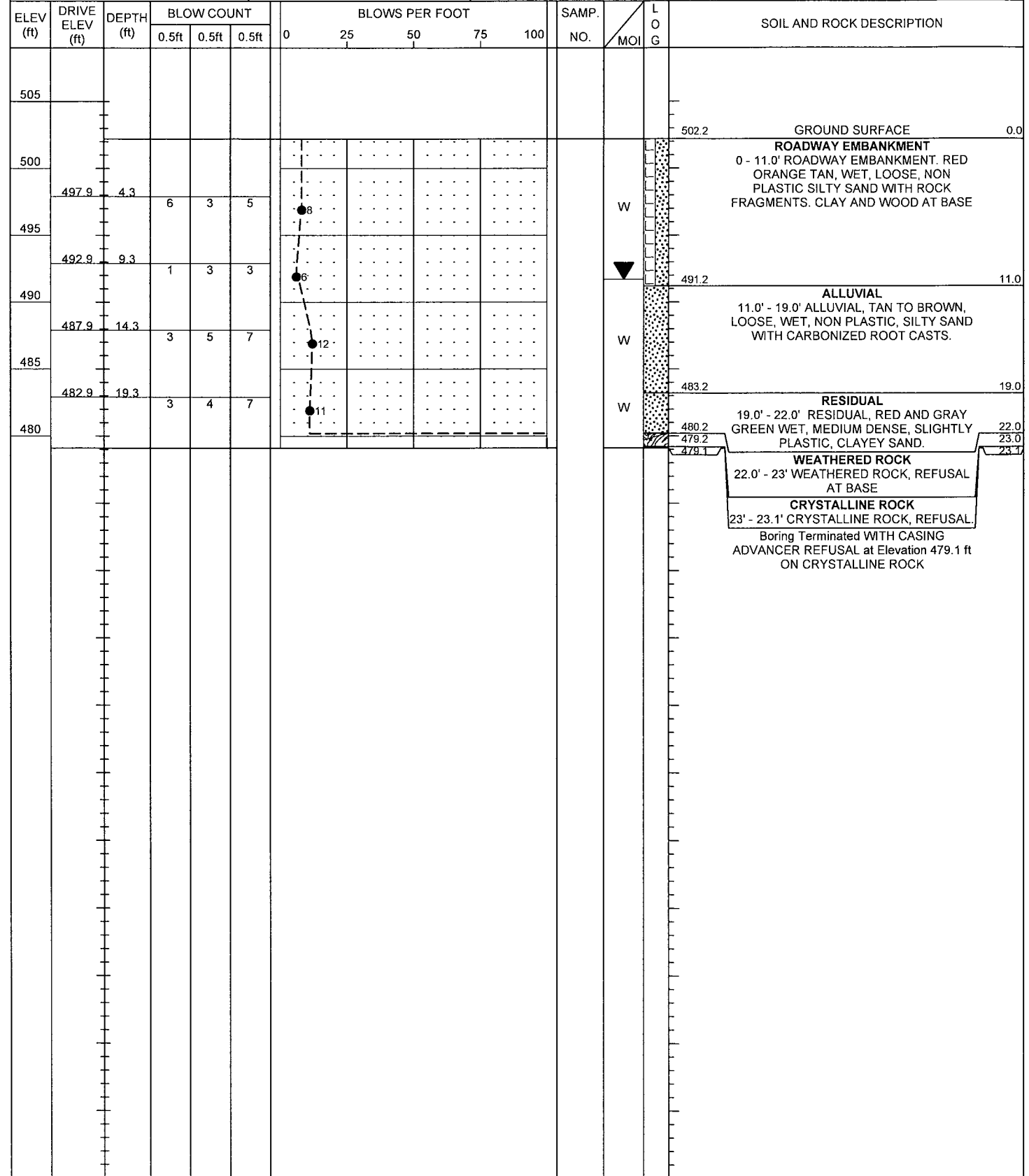
NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

WBS 40096.1.1	TIP B-4972	COUNTY CABARRUS	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)			GROUND WTR (ft)
BORING NO. EB2-A	STATION 24+46	OFFSET 5 ft LT	ALIGNMENT -L-
COLLAR ELEV. 502.2 ft	TOTAL DEPTH 22.1 ft	NORTHING 572,686	EASTING 1,559,025
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014			DRILL METHOD NW Casing w/ SPT
DRILLER Smith, C. L.			HAMMER TYPE Automatic
START DATE 06/30/14	COMP. DATE 06/30/14	SURFACE WATER DEPTH N/A	



WBS 40096.1.1	TIP B-4972	COUNTY CABARRUS	GEOLOGIST Stickney, J. K.
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)			GROUND WTR (ft)
BORING NO. EB2-B	STATION 24+46	OFFSET 5 ft RT	ALIGNMENT -L-
COLLAR ELEV. 502.2 ft	TOTAL DEPTH 23.1 ft	NORTHING 572,681	EASTING 1,559,034
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014			DRILL METHOD NW Casing w/ SPT
DRILLER Smith, C. L.			HAMMER TYPE Automatic
START DATE 06/30/14	COMP. DATE 06/30/14	SURFACE WATER DEPTH N/A	



NCDOT BORE DOUBLE B4972_GEO_BH_BRD0227.GPJ NC_DOT_GDT 9/17/14



NCDOT GEOTECHNICAL ENGINEERING UNIT

BORELOG REPORT

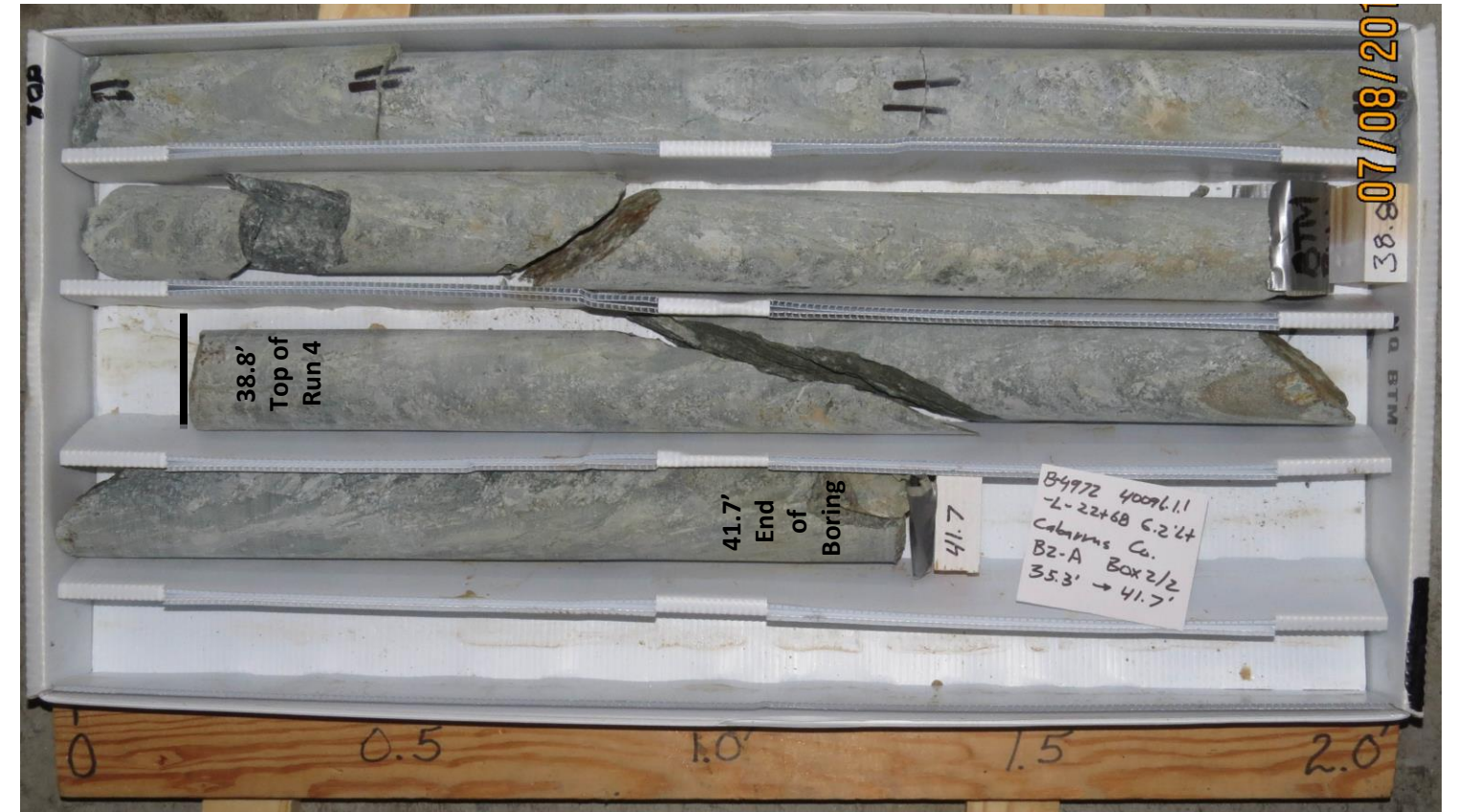
WBS 40096.1.1		TIP B-4972		COUNTY CABARRUS		GEOLOGIST Stickney, J. K.									
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)						GROUND WTR (ft)									
BORING NO. B-1		STATION 20+92		OFFSET 17 ft LT		ALIGNMENT -L-									
COLLAR ELEV. 500.4 ft		TOTAL DEPTH 31.1 ft		NORTHING 572,385		EASTING 1,558,839									
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 89% 09/02/2009		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Smith, C. L.		START DATE 01/21/09		COMP. DATE 01/21/09		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
505															
500														500.4	0.0
495														494.4	6.0
490	492.1	8.3	0	1	1							SS-1	M	492.1	8.3
485	487.1	13.3	3	4	3							SS-2	M/W	487.1	13.3
480	482.1	18.3	10	6	8							SS-3	Sat.	482.1	18.3
475	477.1	23.3	100/0.3									D		477.1	23.3
470	472.1	28.3	100/0.3									D		472.1	28.3
														469.3	31.1
Boring Terminated BY AUGER REFUSAL at Elevation 469.3 ft ON CRYSTALLINE ROCK															
NOTE: THE GROUND ELEVATION FOR THIS BORING WAS OBTAINED FROM THE B4972_LS_TIN.TIN FILE.															

WBS 40096.1.1		TIP B-4972		COUNTY CABARRUS		GEOLOGIST Stickney, J. K.									
SITE DESCRIPTION BRIDGE # 277 OVER ROCKY RIVER ON SR 1006 (MOUNT PLEASANT ROAD)						GROUND WTR (ft)									
BORING NO. B-2		STATION 23+00		OFFSET 18 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 499.2 ft		TOTAL DEPTH 34.0 ft		NORTHING 572,547		EASTING 1,558,973									
DRILL RIG/HAMMER EFF./DATE HFO0072 CME-550 88% 03/19/2014		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER Smith, C. L.		START DATE 01/21/09		COMP. DATE 01/21/09		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	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100					
500														499.2	0.0
495	495.7	3.5	2	3	3							SS-4	M	495.7	3.5
490	490.7	8.5	5	3	4							SS-5	M	490.7	8.5
485	485.7	13.5	2	3	4							SS-6	M	485.7	13.5
480	480.7	18.5	8	29	55							SS-7	D	480.7	18.5
475	475.7	23.5	100/0.4									D		475.7	23.5
470	470.7	28.5	100/0.3									D		470.7	28.5
	465.7	33.5	100/0.5									D		465.7	33.5
Boring Terminated at Elevation 465.2 ft IN SEV. WEATH. CRYSTALLINE ROCK															
NOTE: THE GROUND ELEVATION FOR THIS BORING WAS OBTAINED FROM THE B4972_LS_TIN.TIN FILE.															

NCDOT BORE DOUBLE B4972_GEO_BH_BRD0227.GPJ NC_DOT_GDT_9/17/14











Label cards in core boxes
2 and 3 were switched.
Blocks are correct.





ROCKY RIVER

PC Sta. 23+70.17

20

25

← TO SR 1105
22' BST SR 1006 MT. PLEASANT ROAD

CONC #227
N 29° 58' 00.6\"/>

TO NC 200 →

BM#2
ELEV 497.98'

BL-3

BL-4

ROCKY RIVER

EB1-A

B-1

B1-A

B2-A

B3-A

EB2-A

EB1-B

B1-B

B2-B

B3-B

EB2-B

GR

LT