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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

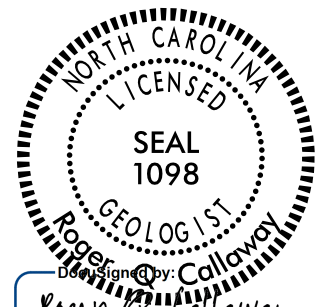
INVESTIGATED BY R.Q. CALLAWAY

DRAWN BY J.K. McCLURE

CHECKED BY C.B. LITTLE

SUBMITTED BY R.Q. CALLAWAY

DATE SEPTEMBER 2014



703C51061D8E9/25/2014

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

SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 206, ASTM D1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY INCLUDE THE FOLLOWING: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. FOR EXAMPLE, VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6

SOIL LEGEND AND AASHTO CLASSIFICATION

Table with columns for General Class, Group Class, Symbol, % Passing, Material Passing, Group Index, Usual Types of Major Materials, Gen. Rating as Subgrade, and Soil Legend symbols for Granular, Silty-clay, and Organic materials.

PI OF A-7-5 SUBGROUP IS ≤ LL - 30; PI OF A-7-6 SUBGROUP IS > LL - 30

CONSISTENCY OR DENSENESS

Table mapping Primary Soil Type (e.g., Generally Granular Material, Silty-clay Material) to Consistency (e.g., Very Loose, Medium Dense) and Range of Unconfined Compressive Strength (tons/ft²).

TEXTURE OR GRAIN SIZE

Table showing U.S. Std. Sieve Size (mm/in) and corresponding percentages for Boulder, Cobble, Gravel, Coarse Sand, Fine Sand, Silt, and Clay.

SOIL MOISTURE - CORRELATION OF TERMS

Table correlating Soil Moisture Scale (Atterberg Limits), Field Moisture Description (Saturated, Wet, Moist, Dry), and Guide for Field Moisture Description (Usually liquid, Semisolid, Solid).

PLASTICITY

Table showing Plasticity Index (PI) ranges (0-5 to 26+) and corresponding Dry Strength (Very Low to High).

COLOR

DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-GRAY). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.

GRADATION

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.

ANGULARITY OF GRAINS

THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

MINERALOGICAL COMPOSITION

MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.

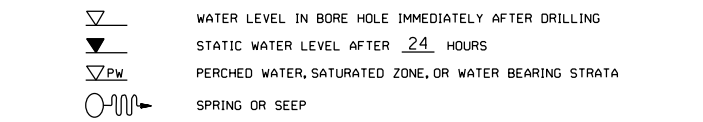
COMPRESSIBILITY

Slightly Compressible (LL < 31), Moderately Compressible (LL = 31 - 50), Highly Compressible (LL > 50)

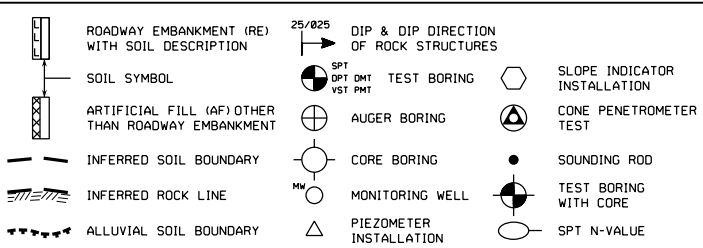
PERCENTAGE OF MATERIAL

Table showing percentages for Organic Material, Granular Soils, Silty-clay Soils, and Other Material.

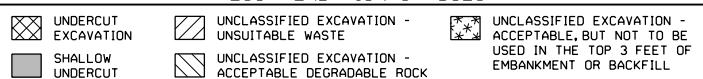
GROUND WATER



MISCELLANEOUS SYMBOLS



RECOMMENDATION SYMBOLS



ABBREVIATIONS

- List of abbreviations: AR - Auger Refusal, BT - Boring Terminated, CL - Clay, CPT - Cone Penetration Test, CSE - Coarse, DMT - Dilatometer Test, DPT - Dynamic Penetration Test, e - Void Ratio, F - Fine, FOSS. - Fossiliferous, FRAC. - Fractured, FRAGS. - Fragments, HI. - Highly, MED. - Medium, MICA. - Micaceous, MOD. - Moderately, NP - Non Plastic, ORG. - Organic, PMT - Pressuremeter Test, SAP. - Saprolitic, SD. - Sand, Sandy, SL. - Silty, SLI. - Slightly, TCR - Tricone Refusal, w - Moisture Content, V - Very, VST - Vane Shear Test, WE. - Weathered, UNIT WEIGHT, DRY UNIT WEIGHT, SAMPLE ABBREVIATIONS: S - Bulk, SS - Split Spoon, ST - Shelby Tube, RS - Rock, RT - Recompact Triaxial, CBR - California Bearing Ratio.

EQUIPMENT USED ON SUBJECT PROJECT

Checklist for equipment used: 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 2 1/8" Steel Teeth, Tricone 2 1/8" Tung-Carb., Core Bit), Hammer Type (Automatic, Manual), Core Size (-B, -H, -N O/NQ), Hand Tools (Post Hole Digger, Hand Auger, Sounding Rod, Vane Shear Test).

ROCK DESCRIPTION

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:

WEATHERED ROCK (WR): NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT N VALUES > 100 BLOWS PER FOOT IF TESTED.

CRYSTALLINE ROCK (CR): FINE TO COARSE GRAIN IGNEOUS AND METAMORPHIC ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES GRANITE, GNEISS, GABBRO, SCHIST, ETC.

NON-CRYSTALLINE ROCK (NCR): FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED. ROCK TYPE INCLUDES PHYLLITE, SLATE, SANDSTONE, ETC.

COASTAL PLAIN SEDIMENTARY ROCK (CP): COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL. ROCK TYPE INCLUDES LIMESTONE, SANDSTONE, CEMENTED SHELL BEDS, ETC.

WEATHERING

FRESH: ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.
VERY SLIGHT (V SLI.): ROCK GENERALLY FRESH, JOINTS STAINED, SOME JOINTS MAY SHOW THIN CLAY COATINGS IF OPEN. CRYSTALS ON A BROKEN SPECIMEN FACE SHINE BRIGHTLY. ROCK RINGS UNDER HAMMER BLOWS IF OF A CRYSTALLINE NATURE.
SLIGHT (SLI.): ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS.
MODERATE (MOD.): SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK.
MODERATELY SEVERE (MOD. SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. 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.

ROCK HARDNESS

VERY HARD: CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK.
HARD: CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN.
MODERATELY HARD: CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD: CAN BE 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.

FRACTURE SPACING

Table for Fracture Spacing: Term (Very Wide to Very Close) vs Spacing (More than 10 feet to Less than 0.16 feet).

BEDDING

Table for Bedding: Term (Very Thickly Bedded to Thinly Laminated) vs Thickness (4 feet to < 0.008 feet).

INDURATION

FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC.
FRILABLE: 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.

TERMS AND DEFINITIONS

- 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.

BENCH MARK: BL-4
STA. 21+08.56 -BL-
N 572558,9429 E 1558978,6030 ELEVATION: 500.80 FEET

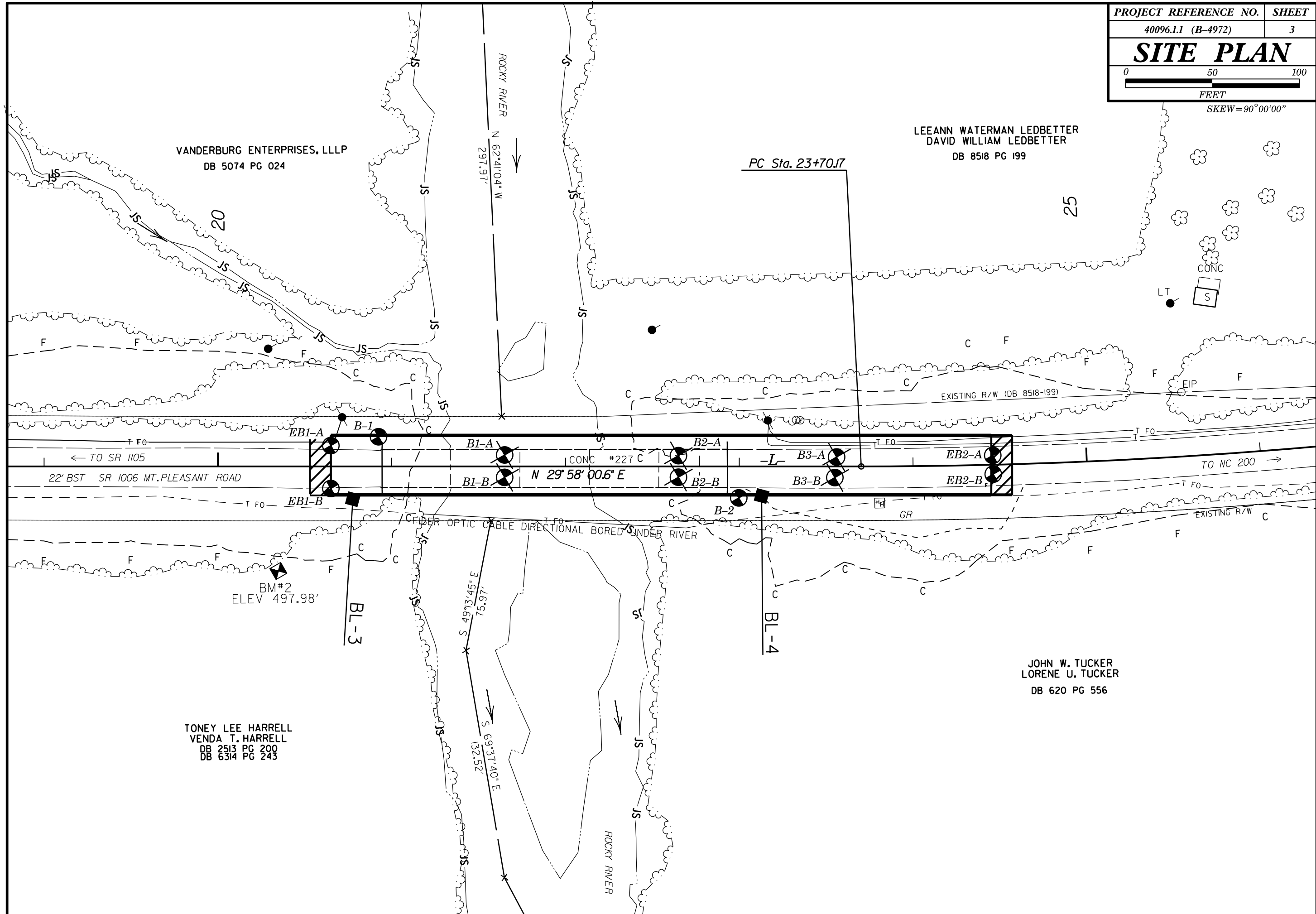
NOTES:

SOIL STRATIGRAPHY IS THROUGH THE BORINGS FOR PROFILE AND CROSS-SECTIONS.

SKEW = 90°00'00"

LEEANN WATERMAN LEDBETTER
 DAVID WILLIAM LEDBETTER
 DB 8518 PG 199

VANDEBURG ENTERPRISES, LLLP
 DB 5074 PG 024

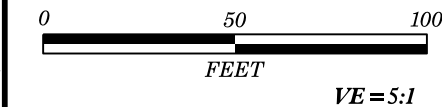


JOHN W. TUCKER
 LORENE U. TUCKER
 DB 620 PG 556

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

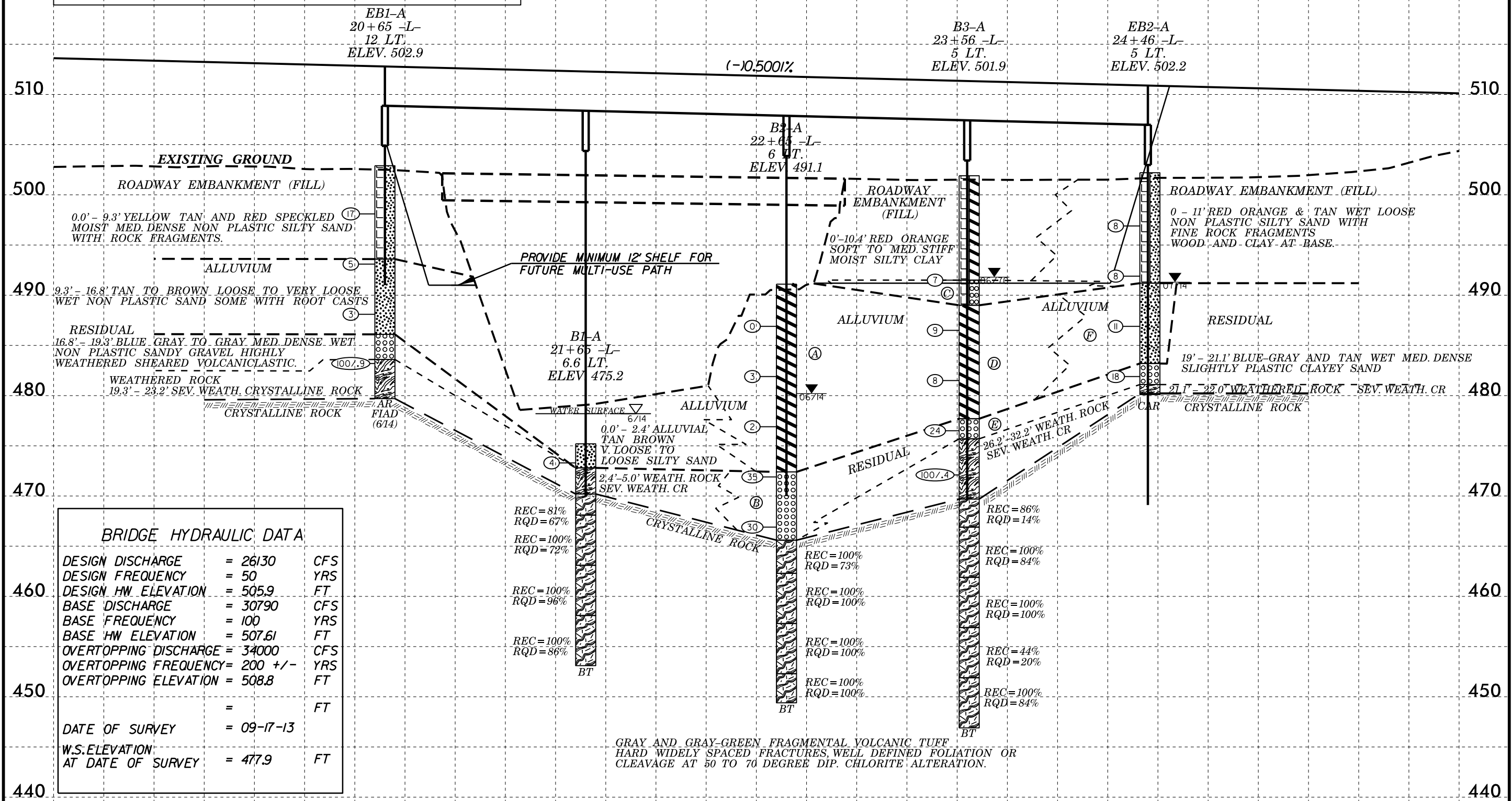
BORING DESCRIPTIONS

- Ⓐ 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- | |

530 520 510 500 490 480 470 460 450 440

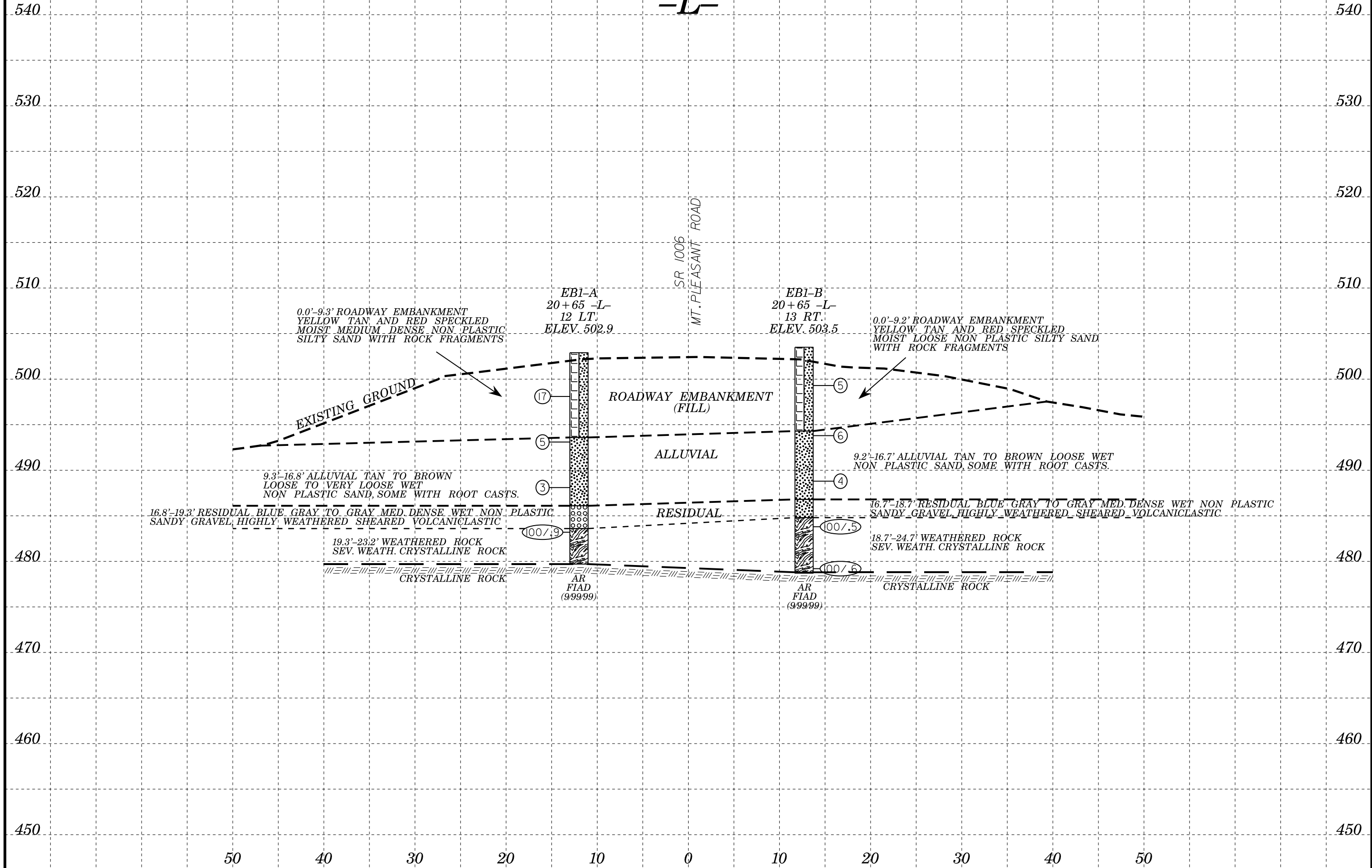
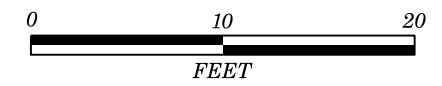


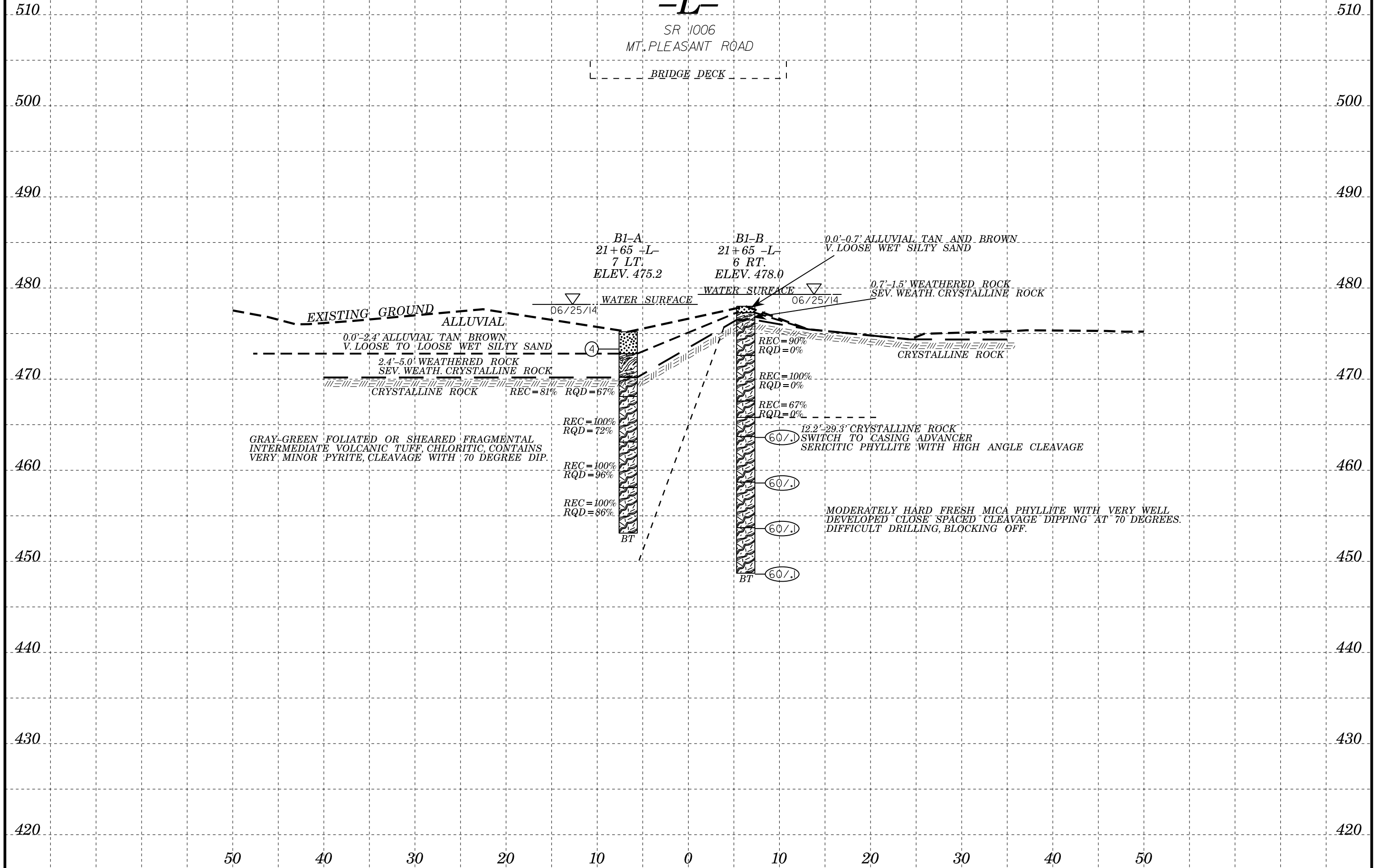
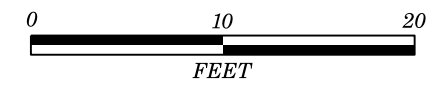
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| DESIGN FREQUENCY | = 50 | YRS |
| DESIGN HW ELEVATION | = 505.9 | FT |
| BASE DISCHARGE | = 30790 | CFS |
| BASE FREQUENCY | = 100 | YRS |
| BASE HW ELEVATION | = 507.61 | FT |
| OVERTOPPING DISCHARGE | = 34000 | CFS |
| OVERTOPPING FREQUENCY | =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

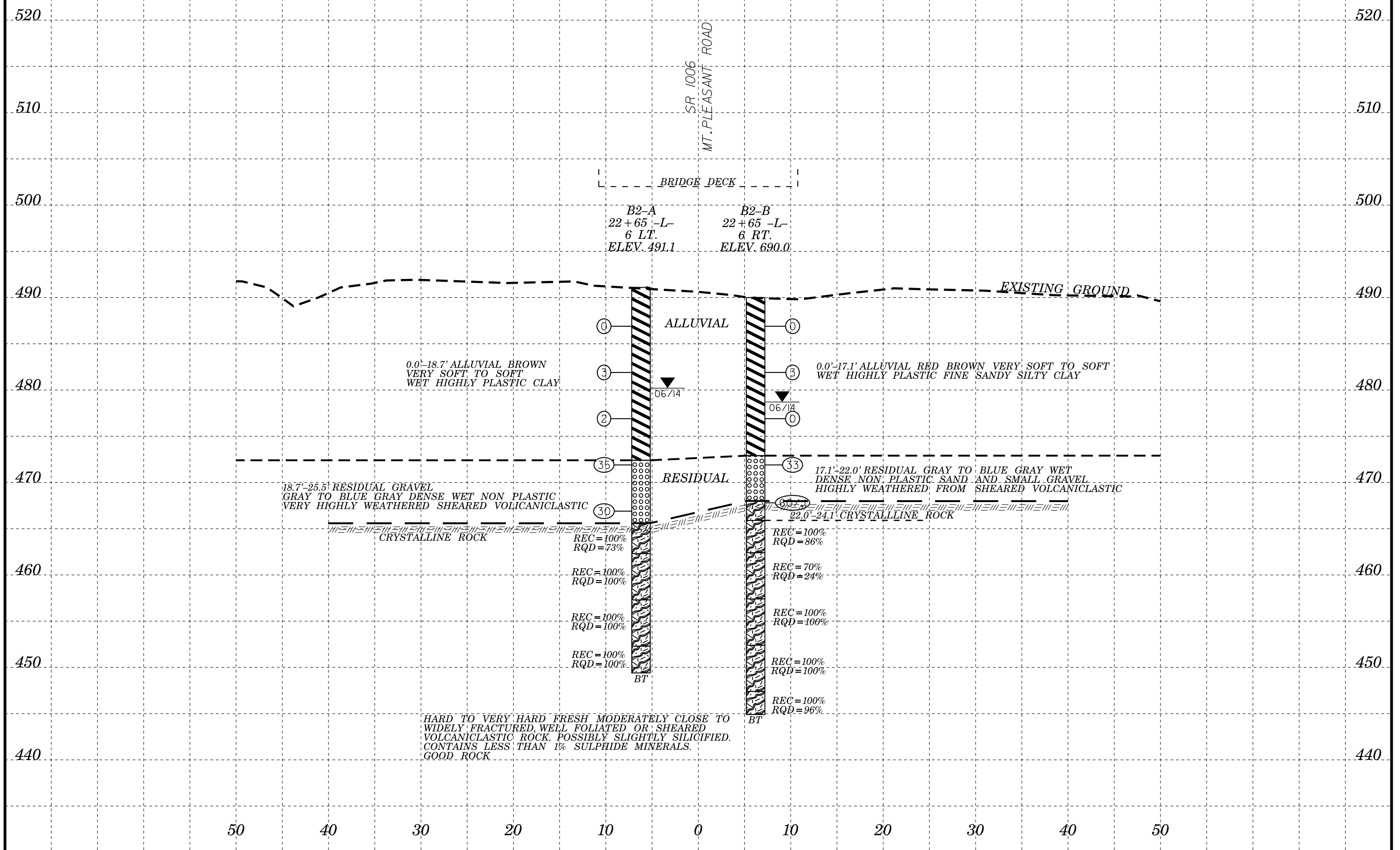
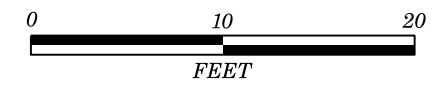
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|------------|------------|
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| REC = 100% | RQD = 72% |
| REC = 100% | RQD = 96% |
| REC = 100% | RQD = 86% |
| REC = 100% | RQD = 73% |
| REC = 100% | RQD = 100% |
| REC = 100% | RQD = 100% |
| REC = 86% | RQD = 14% |
| REC = 100% | RQD = 84% |
| REC = 100% | RQD = 100% |
| REC = 44% | RQD = 20% |
| REC = 100% | RQD = 84% |

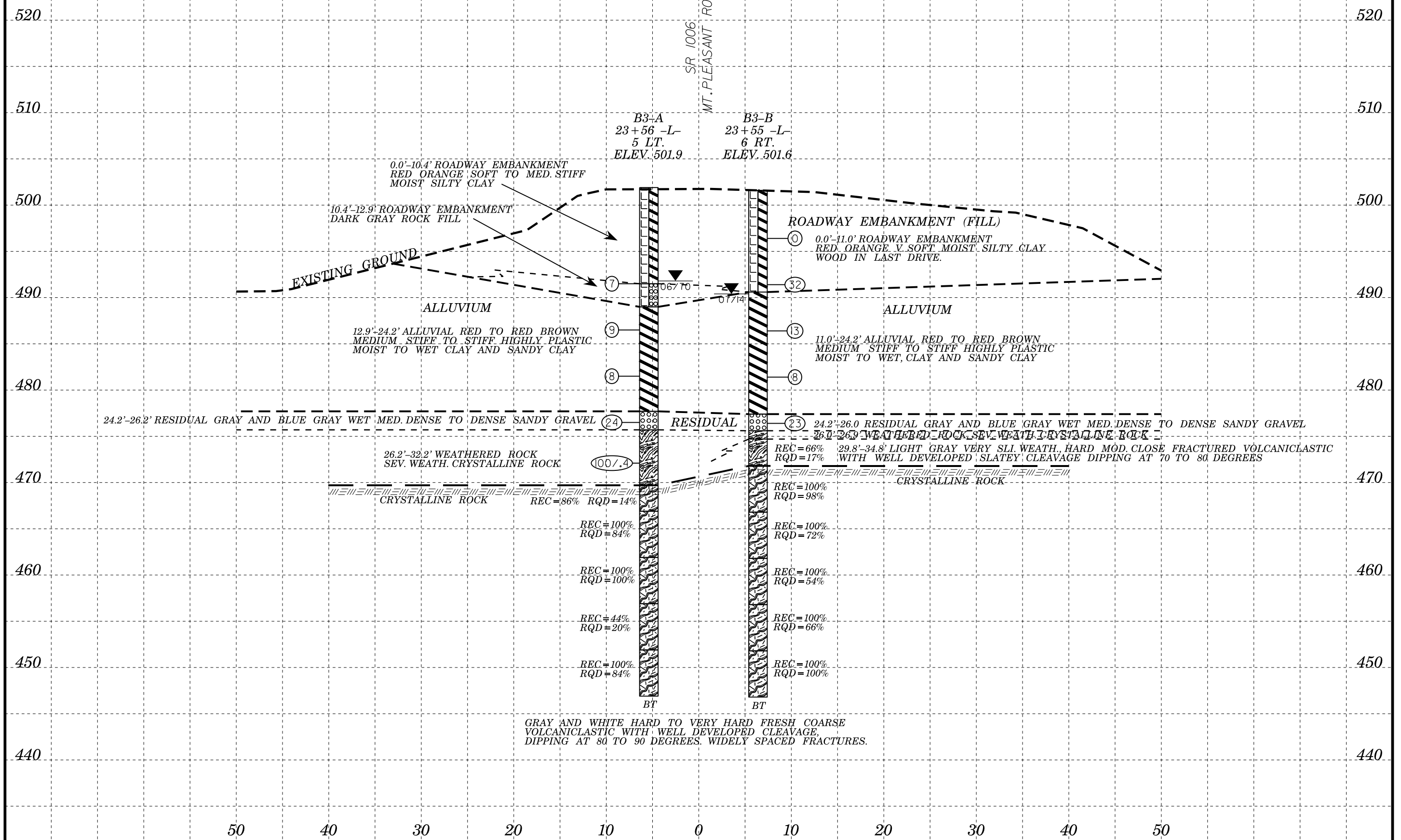
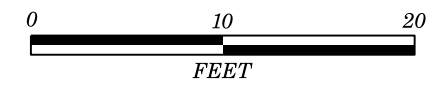
GRAY AND GRAY-GREEN FRAGMENTAL VOLCANIC TUFF
HARD WIDELY SPACED FRACTURES, WELL DEFINED FOLIATION OR CLEAVAGE AT 50 TO 70 DEGREE DIP. CHLORITE ALTERATION.

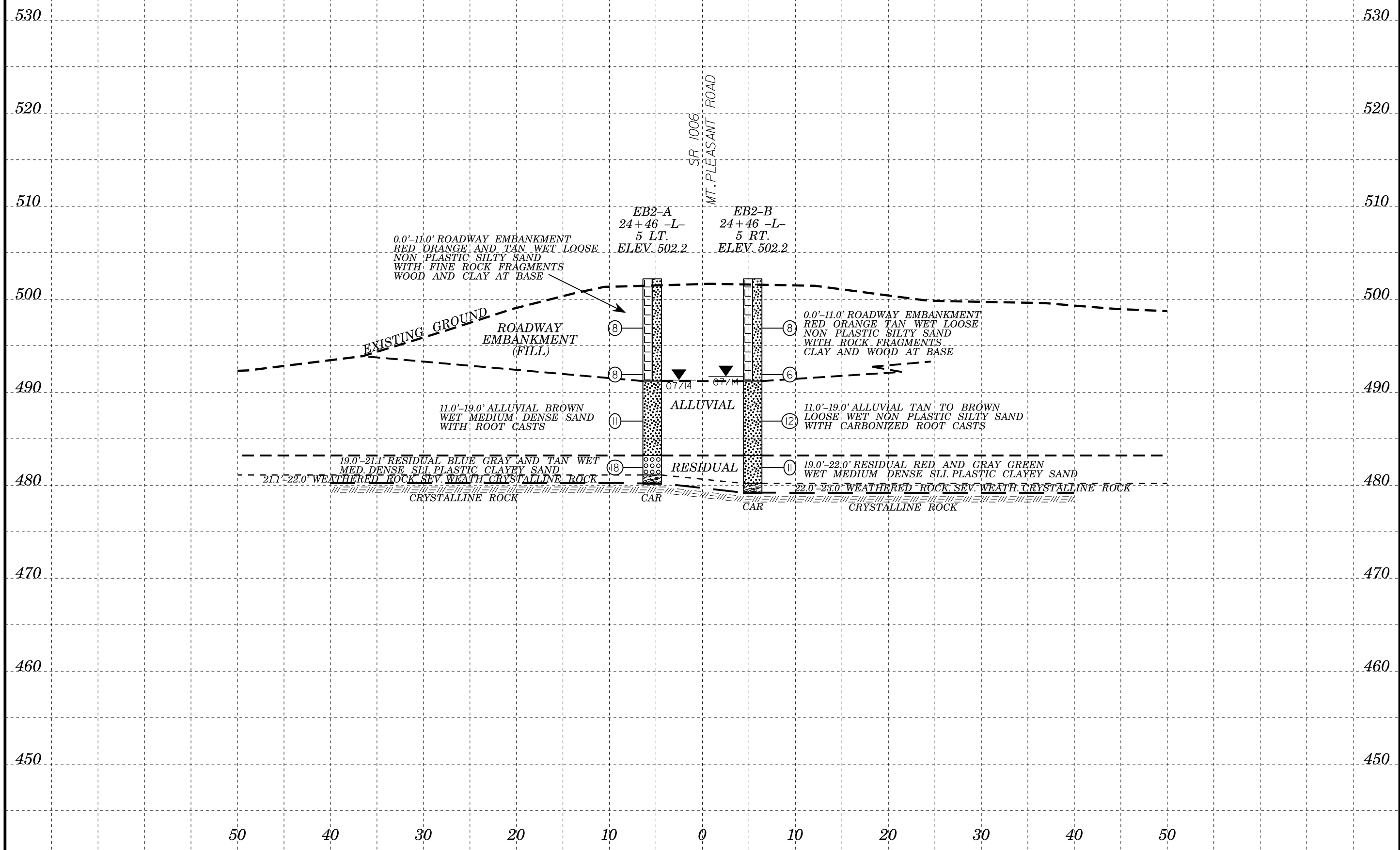
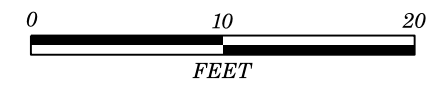
19 20 21 22 23 24 25 26













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 | LOG G | 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 | | | | | | | | 493.6 | 9.3 |
| 495 | 494.1 | 8.8 | 5 | 3 | 2 | | | | | | | | 486.1 | 16.8 |
| 490 | 489.1 | 13.8 | 1 | 1 | 2 | | | | | | | | 483.6 | 19.3 |
| 485 | 484.1 | 18.8 | 18 | 82/4 | | | | | | | | | 479.7 | 23.2 |
| 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 | LOG G | 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 | | | | | | | | 494.3 | 9.2 |
| 495 | 494.8 | 8.7 | 3 | 3 | 3 | | | | | | | | 486.8 | 16.7 |
| 490 | 489.8 | 13.7 | 1 | 2 | 2 | | | | | | | | 484.8 | 18.7 |
| 485 | 484.8 | 18.7 | 100/0.5 | | | | | | | | | | 478.8 | 24.7 |
| 480 | 479.8 | 23.7 | 73 | 27/0.1 | | | | | | | | | 478.7 | 24.8 |
| | | | | | | | | | | | | | | |

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 | | | | | | | | | |
| 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 | | |
| | | | 0.5ft | 0.5ft | 0.5ft | 0 | 25 | 50 | 75 | | | | 100 | ELEV. (ft) | DEPTH (ft) |
| 480 | | | | | | | | | | | | | | | |
| 475 | 474.3 | 0.9 | 0 | 1 | 3 | | | | | | | W | 475.2 | GROUND SURFACE | 0.0 |
| | | | | | | | | | | | | | 472.8 | 0.0' - 2.4' ALLUVIAL TAN BROWN V. LOOSE TO LOOSE SILTY SAND | 2.4 |
| 470 | | | | | | | | | | | | | 470.2 | 2.4' - 5.0' PROBABLY WEATHERED ROCK. CASING ADVANCER REFUSAL AT BASE | 5.0 |
| | | | | | | | | | | | | | 468.1 | CRYSTALLINE ROCK 5.0' - 7.1' CORED ROCK | 7.1 |
| 465 | | | | | | | | | | | | | 463.1 | CRYSTALLINE ROCK 7.1' - 12.1' CORED ROCK | 12.1 |
| 460 | | | | | | | | | | | | | 458.1 | CRYSTALLINE ROCK 12.1' - 17.1' CORED ROCK | 17.1 |
| 455 | | | | | | | | | | | | | 453.1 | CRYSTALLINE ROCK 17.1' - 22.1' CORED ROCK | 22.1 |
| | | | | | | | | | | | | | 453.1 | 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 | | | | | | | | |
| 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 | |
| | | | | | REC. (%) | RQD (%) | REC. (%) | RQD (%) | | | | | ELEV. (ft) | DEPTH (ft) |
| 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 | CRYSTALLINE ROCK |
| 468.1 | 468.1 | 7.1 | 5.0 | | (5.0) | (3.6) | (5.0) | (3.6) | | 100% | 72% | | 468.1 | 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 |
| 465 | | | | | | | | | | | | | 463.1 | CRYSTALLINE ROCK |
| 460 | | | | | (5.0) | (4.8) | (5.0) | (4.8) | | 100% | 96% | | 458.1 | 7.1' - 12.1' GRAY FOLIATED OR SHEARED INTERMEDIATE COMPOSITION FRAGMENTAL VOLCANIC ROCK. CRUSHED ZONE MAY BE FROM CORE REMOVAL. R1:4 R2:13 R3:20 R4:20 R5:4 RMR 61, GOOD ROCK, CLASS II, ROCK TYPE D |
| 455 | | | | | (5.0) | (4.3) | (5.0) | (4.3) | | 100% | 86% | | 453.1 | CRYSTALLINE ROCK |
| | | | | | | | | | | | | | 453.1 | 12.1' - 17.1' GRAY, AND GRAY GREEN, SHEARED, FRAGMENTAL TUFF. HARD, WIDELY SPACED FRACTURES. WELL DEFINED HIGH ANGLE SHEARING. R1:7 R2:20 R3:25 R4:20 R5:4 RMR 76, GOOD ROCK, CLASS II, ROCK TYPE D |
| | | | | | | | | | | | | | 453.1 | CRYSTALLINE ROCK |
| | | | | | | | | | | | | | 453.1 | 17.1' - 22.1' GRAY AND GRAY-GREEN FRAGMENTAL VOLCANIC TUFF, HARD, WIDELY SPACED FRACTURES, WELL DEFINED FOLIATION OR CLEAVAGE AT 50 DEGREE DIP. CHLORITE ALTERATION. R1:12 R2:17 R3:25 R4:20 R5:4 RMR 78, GOOD ROCK, CLASS II, ROCK TYPE D |
| | | | | | | | | | | | | | 453.1 | 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 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-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 | 45.1 | |

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% | | (3.5) 100% | (3.0) 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% | | (3.5) 70% | (1.2) 24% | | | 27.6 |
| 455 | 457.4 | 32.6 | 5.0 | | 100% | 100% | | (5.0) 100% | (5.0) 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% | | (5.0) 100% | (5.0) 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 | 447.4 | 42.6 | 2.5 | | 100% | 96% | | (2.5) 100% | (2.4) 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 |
| | 444.9 | 45.1 | | | | | | | | | 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 | HAMMER TYPE Automatic |
| DRILLER Smith, C. L. | 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 | | | | | | | W | ROADWAY EMBANKMENT 10.4' - 12.9 DARK GRAY, ROCK FILL | 10.4 |
| 485 | 487.5 | 14.4 | 2 | 3 | 6 | | | | | | | W | ALLUVIAL 12.9' - 24.2' ALLUVIAL, RED TO RED BROWN, MEDIUM STIFF TO STIFF, HIGHLY PLASTIC, MOIST TO WET, CLAY AND SANDY CLAY. | |
| 480 | 482.5 | 19.4 | 2 | 3 | 5 | | | | | | | W | | |
| 475 | 477.5 | 24.4 | 11 | 12 | 12 | | | | | | | W | 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 |

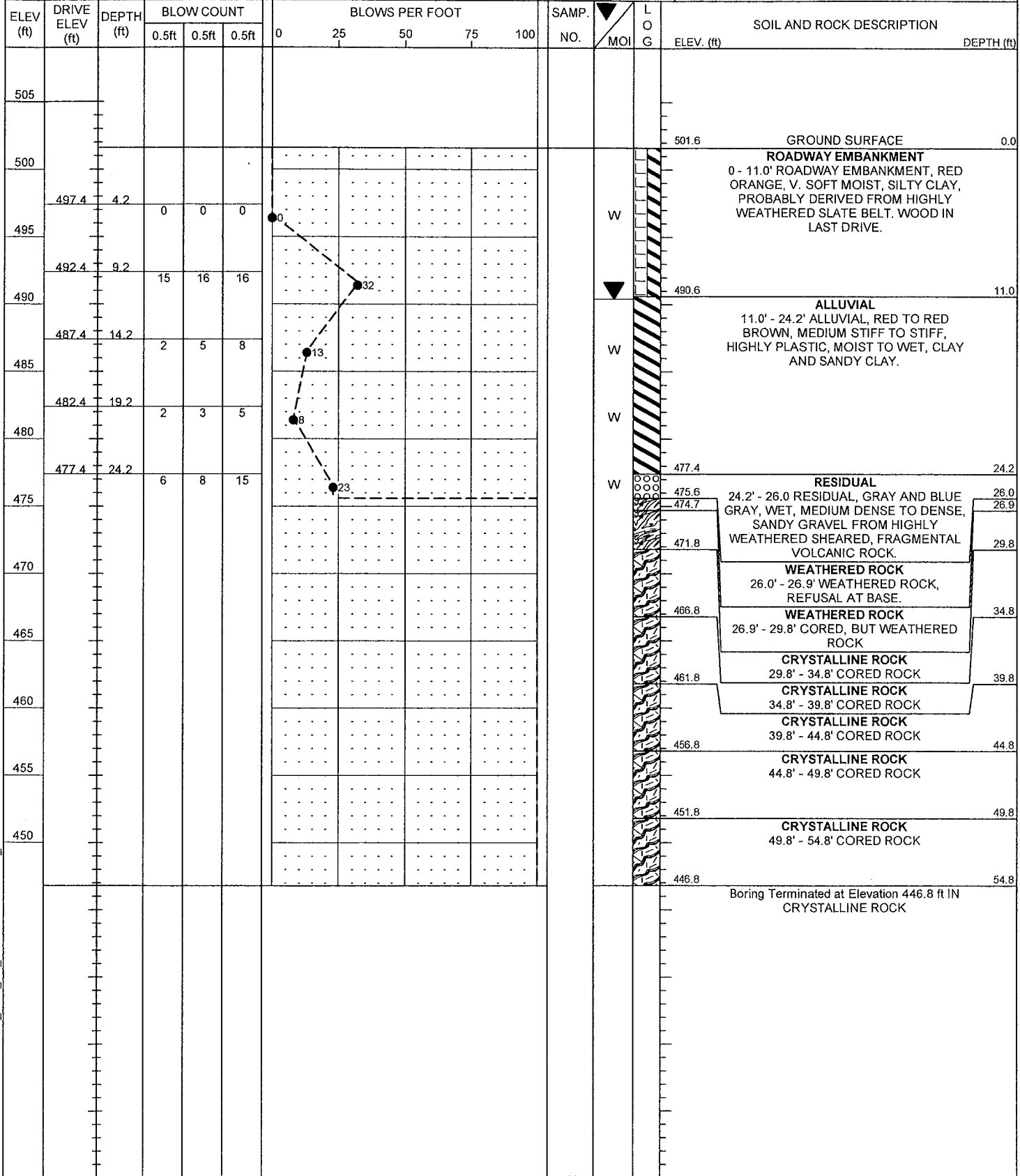
NCDOT BORE SINGLE B4972_GEO_BH_BRDG0227.GPJ_NC_DOT.GDT 9/17/14

| | | | |
|---|---------------------|-------------------------------------|---------------------------|
| 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 | HAMMER TYPE Automatic |
| DRILLER Smith, C. L. | 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% | | | 35.0 |
| 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 |

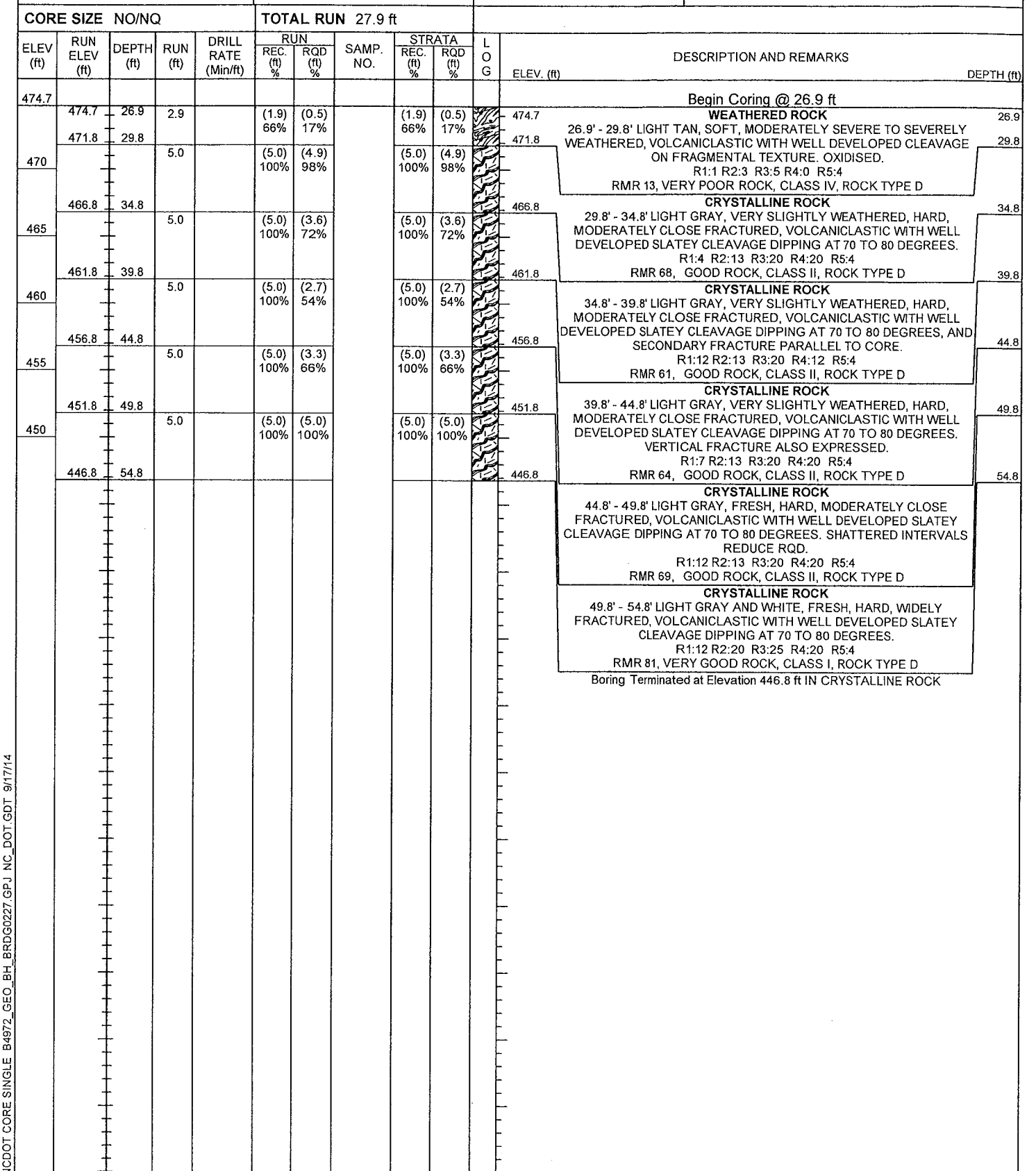
NCDOT CORE SINGLE B4972_GEO_BH_BRDG0227.GPJ_NC_DOT.GDT 9/17/14

| | | | |
|---|---------------------|-------------------------------------|---------------------------|
| 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-B | STATION 23+55 | OFFSET 6 ft RT | ALIGNMENT -L- |
| COLLAR ELEV. 501.6 ft | TOTAL DEPTH 54.8 ft | NORTHING 572,601 | EASTING 1,558,990 |
| 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 06/30/14 | COMP. DATE 06/30/14 | SURFACE WATER DEPTH N/A |



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. B3-B | STATION 23+55 | OFFSET 6 ft RT | ALIGNMENT -L- |
| COLLAR ELEV. 501.6 ft | TOTAL DEPTH 54.8 ft | NORTHING 572,601 | EASTING 1,558,990 |
| 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 06/30/14 | COMP. DATE 06/30/14 | SURFACE WATER DEPTH N/A |

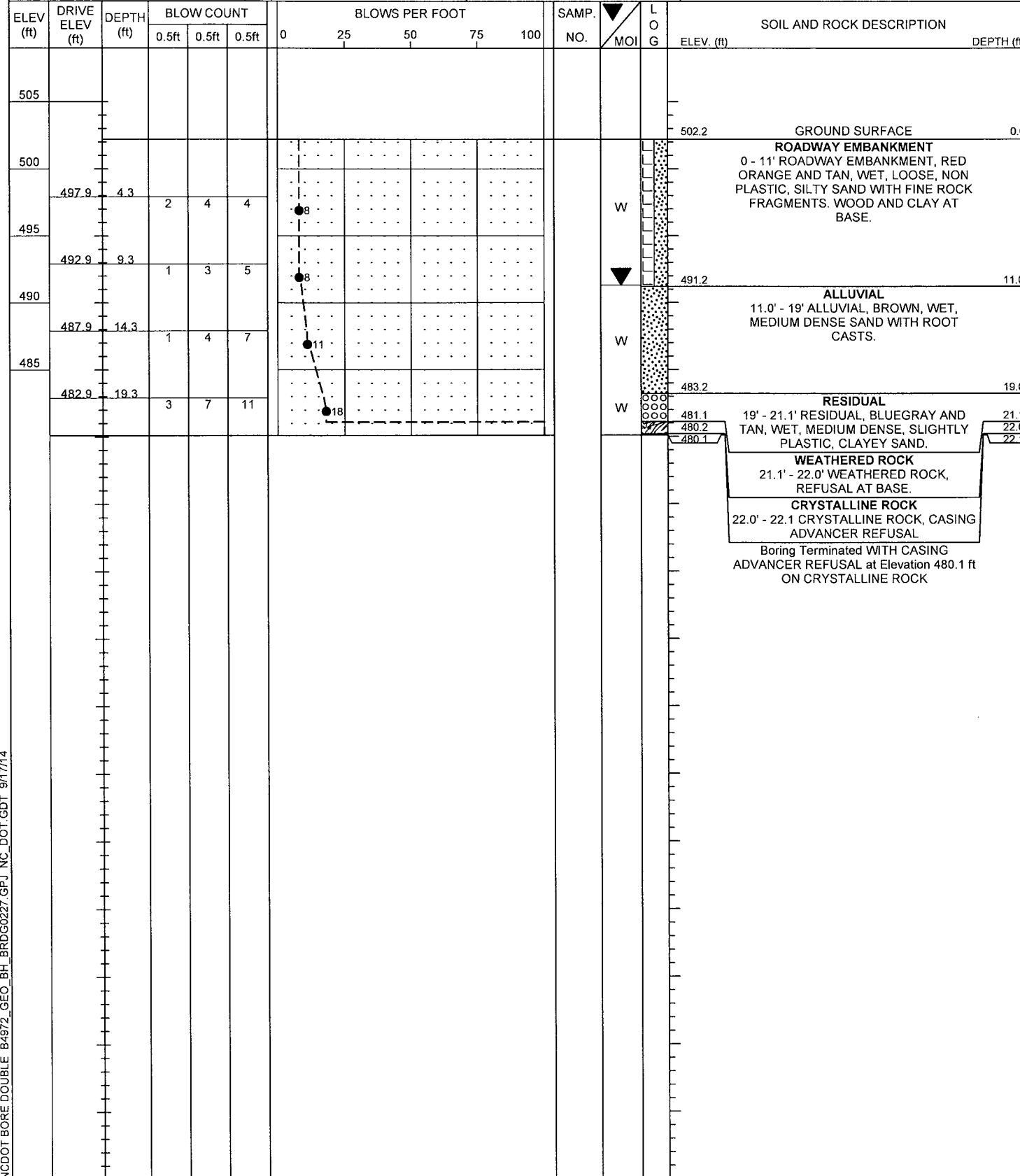


NCDOT CORE SINGLE B4972_GEO_BH_BRD0227.GPJ NC_DOT_GDT 9/17/14

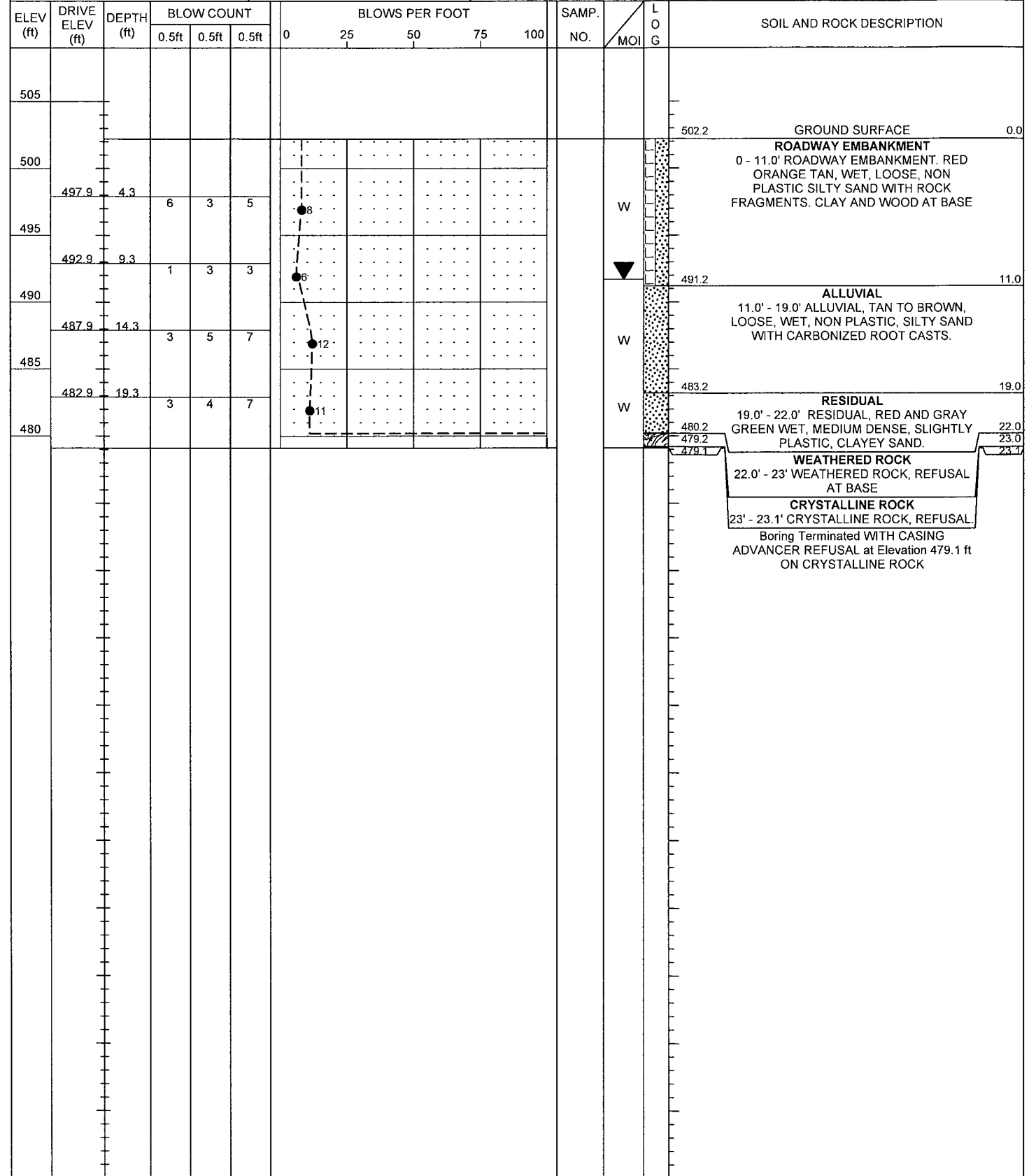


NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

| | | | |
|---|---------------------|-------------------------|-------------------------------|
| 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

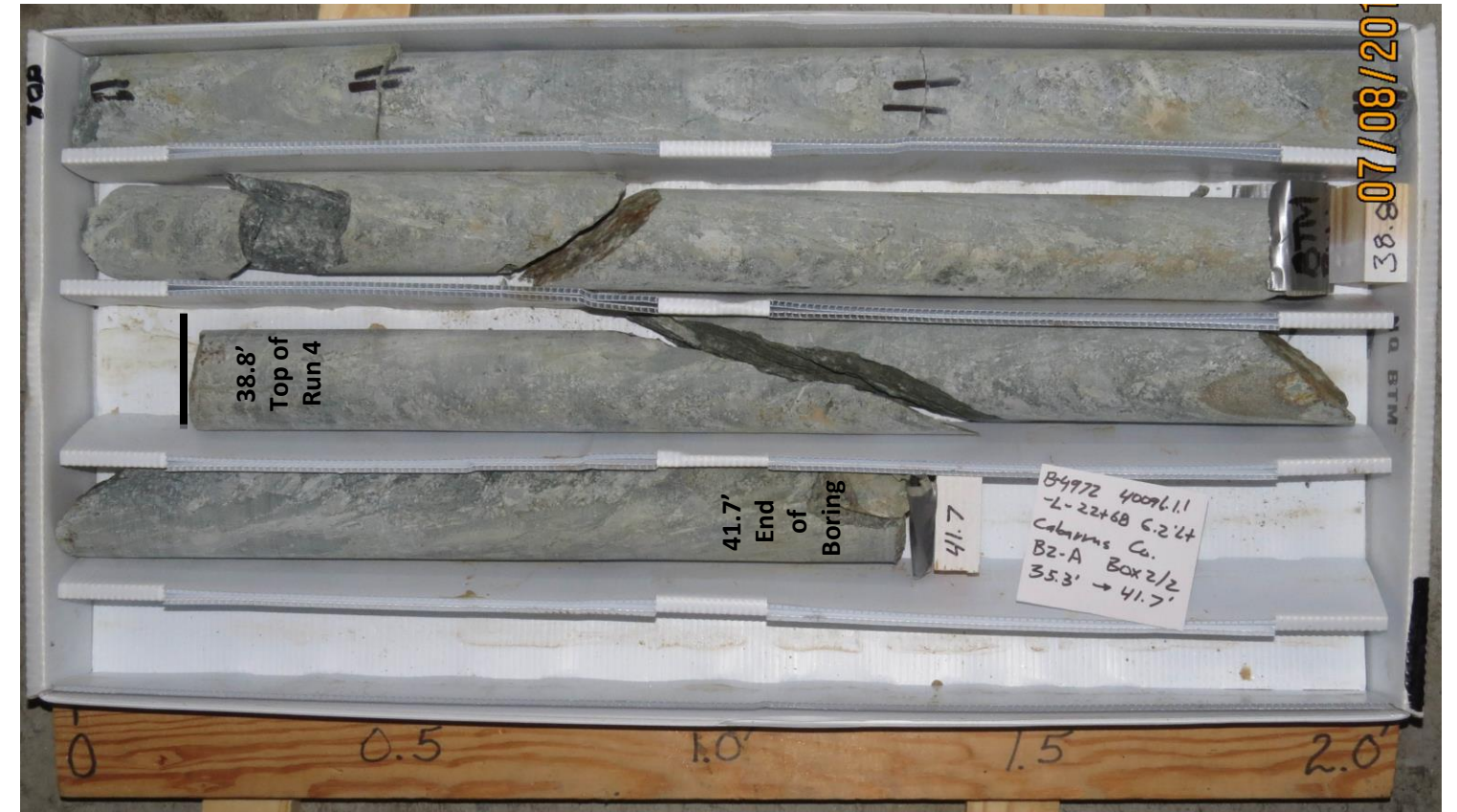
| WBS 40096.1.1 | | TIP B-4972 | | COUNTY CABARRUS | | GEOLOGIST Stickney, J. K. | | | | | | | | | |
|---|-----------------|--------------------------|------------|-----------------------|-------|---------------------------|----|----|----|-----|-----------|---------|---------------------------|------------|------|
| 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 | | | | | | | | | | | | | | | |
| 495 | 495.7 | 3.5 | 2 | 3 | 3 | | | | | | | | | 499.2 | 0.0 |
| 490 | 490.7 | 8.5 | 5 | 3 | 4 | | | | | | | | | 490.7 | 8.5 |
| 485 | 485.7 | 13.5 | 2 | 3 | 4 | | | | | | | | | 486.2 | 13.0 |
| 480 | 480.7 | 18.5 | 8 | 29 | 55 | | | | | | | | | 480.2 | 19.0 |
| 475 | 475.7 | 23.5 | 100/0.4 | | | | | | | | | | | 475.7 | 23.5 |
| 470 | 470.7 | 28.5 | 100/0.3 | | | | | | | | | | | 470.7 | 28.5 |
| | 465.7 | 33.5 | 100/0.5 | | | | | | | | | | | 465.2 | 34.0 |
| 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.



