

PROJECT: 32572.1.FS10 REFERENCE: A-0009CB

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SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	LEGEND (SOIL & ROCK)
3	SITE PLAN
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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY GRAHAM
 PROJECT DESCRIPTION UPGRADE NC 143 FROM SR 1223 (BEECH CREEK ROAD) TO 0.5 MILES NORTH OF APPALACHIAN TRAIL
 SITE DESCRIPTION RETAINING WALL #17: SOIL NAIL WALL WITH ARCHITECTURAL FORM LINER FINISH ON -L- FROM 369+40 LT TO 375+26 LT

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	A-0009CB	1	16

CAUTION NOTICE

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

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

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

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

- PERSONNEL
- CG2 EXPLORATION
 - BRECCIA
 - N. MCLAREN
 - D. GOODNIGHT
 - GEL SOLUTIONS

INVESTIGATED BY CG2
 DRAWN BY M. BREWER, P.E.
 CHECKED BY R. KRAL, P.E.
 SUBMITTED BY M. BREWER, P.E.
 DATE MAY 2022

Prepared in the Office of:



**CAROLINAS
 GEOTECHNICAL
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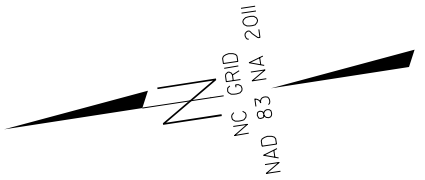


DocuSigned by:
D. Matthew Brewer 6/7/2022
386129C0A4C1462
 SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL
 UNLESS ALL SIGNATURES COMPLETED**

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

SOIL DESCRIPTION										GRADATION										ROCK DESCRIPTION										TERMS AND DEFINITIONS																																																																																																																																																																																
<p>SOIL IS CONSIDERED UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO THE STANDARD PENETRATION TEST (AASHTO T 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, <i>VERY STIFF, GRAY, SILTY CLAY, MOIST WITH INTERBEDDED FINE SAND LAYERS, HIGHLY PLASTIC, A-7-6</i></p>										<p>WELL GRADED - INDICATES A GOOD REPRESENTATION OF PARTICLE SIZES FROM FINE TO COARSE. UNIFORMLY GRADED - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLE SIZES OF TWO OR MORE SIZES.</p>										<p>HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WOULD YIELD SPT REFUSAL IF TESTED, AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS IN NON-COASTAL PLAIN MATERIAL. THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS:</p>										<p>ALLUVIUM (ALLUV.) - SOILS THAT HAVE BEEN TRANSPORTED BY WATER. AQUIFER - A WATER BEARING FORMATION OR STRATA. ARENACEOUS - APPLIED TO ROCKS THAT HAVE BEEN DERIVED FROM SAND OR THAT CONTAIN SAND. ARGILLACEOUS - APPLIED TO ALL ROCKS OR SUBSTANCES COMPOSED OF CLAY MINERALS, OR HAVING A NOTABLE PROPORTION OF CLAY IN THEIR COMPOSITION, SUCH AS SHALE, SLATE, ETC. ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL DEPOSITED BY GRAVITY ON SLOPE OR AT BOTTOM OF SLOPE. CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL DIVIDED BY TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. DIKE - A TABULAR BODY OF IGNEOUS ROCK THAT CUTS ACROSS THE STRUCTURE OF ADJACENT ROCKS OR CUTS MASSIVE ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED FROM THE HORIZONTAL. DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE OF THE LINE OF DIP, MEASURED CLOCKWISE FROM NORTH. FAULT - A FRACTURE OR FRACTURE ZONE ALONG WHICH THERE HAS BEEN DISPLACEMENT OF THE SIDES RELATIVE TO ONE ANOTHER PARALLEL TO THE FRACTURE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOAT - ROCK FRAGMENTS ON SURFACE NEAR THEIR ORIGINAL POSITION AND DISLODGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS. MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (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>																																																																																																																																																																																
<p style="text-align: center;">SOIL LEGEND AND AASHTO CLASSIFICATION</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th>GENERAL CLASS.</th> <th colspan="5">GRANULAR MATERIALS (≤ 35% PASSING #200)</th> <th colspan="5">SILT-CLAY MATERIALS (> 35% PASSING #200)</th> <th colspan="5">ORGANIC MATERIALS</th> </tr> <tr> <th>GROUP CLASS.</th> <th>A-1</th> <th>A-3</th> <th>A-2</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> <th colspan="5"></th> </tr> <tr> <th>SYMBOL</th> <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></td> <td></td> </tr> <tr> <th>% PASSING #10 #40 #200</th> <td>50 MX 30 MX 15 MX</td> <td>50 MX 25 MX 10 MX</td> <td>51 MN 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>GRANULAR SOILS</td> <td>SILT-CLAY SOILS</td> <td>MUCK, PEAT</td> <td colspan="7"></td> </tr> <tr> <th>MATERIAL PASSING #40 LL PI</th> <td colspan="2">-</td> <td>40 MX 10 MX</td> <td>41 MN 10 MX</td> <td>41 MN 11 MN</td> <td>40 MX 10 MX</td> <td>41 MN 11 MN</td> <td colspan="5">SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER</td> <td colspan="5">HIGHLY ORGANIC SOILS</td> </tr> <tr> <th>GROUP INDEX</th> <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 colspan="7"></td> <td colspan="5"></td> </tr> <tr> <th>USUAL TYPES OF MAJOR MATERIALS</th> <td colspan="2">STONE FRAGS. 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ARE USED IN DESCRIPTIONS WHEN THEY ARE CONSIDERED OF SIGNIFICANCE.</p>										<p style="text-align: center;">WEATHERING</p> <p>FRESH: ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE.</p> <p>VERY SLIGHT (IV 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.</p> <p>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.</p> <p>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.</p> <p>MODERATELY SEVERE (MOD. SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. <i>IF TESTED, WOULD YIELD SPT REFUSAL</i></p> <p>SEVERE (SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. <i>IF TESTED, WOULD YIELD SPT N VALUES > 100 BPF</i></p> <p>VERY SEVERE (IV 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. <i>IF TESTED, WOULD YIELD SPT N VALUES < 100 BPF</i></p> <p>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.</p>										<p style="text-align: center;">GROUND WATER</p> <p> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING</p> <p> STATIC WATER LEVEL AFTER 24 HOURS</p> <p> PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA</p> <p> SPRING OR SEEP</p>									
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EXTREMELY INDURATED	SHARP HAMMER BLOWS REQUIRED TO BREAK SAMPLE; SAMPLE BREAKS ACROSS GRAINS.																																																																																																																																																																																																													
<p style="text-align: center;">COLOR</p> <p>DESCRIPTIONS MAY INCLUDE COLOR OR COLOR COMBINATIONS (TAN, RED, YELLOW-BROWN, BLUE-BROWN). MODIFIERS SUCH AS LIGHT, DARK, STREAKED, ETC. ARE USED TO DESCRIBE APPEARANCE.</p>										<p style="text-align: center;">ELEVATION: _____ FEET</p>																																																																																																																																																																																																				



PROP. RETAINING WALL #17
 W/9' WIW WILDLIFE FENCE
 & CONCRETE DITCH
 BEGIN -L- STA. 369+40±
 END -L- STA. 375+26±

-L- PT 368+11.01

370

-L- PC 375+53.58

USFS
BOUNDARY
POST

WOODS

USFS
BOUNDARY
POST

END
17.3

LINE
RWAL17.3

BEGIN
17.3

L_37519L

70° (FOLIATION)

LINE
RWAL17.2

WOODS

END
17.2

END BEGIN
17.1 17.2

ROCK OUTCROP 20

LINE
RWAL17.1

BEGIN
17.1

WOODS

ROCK OUTCROP 19

L_37299L

GRAVEL

RWAL16_B-5

L_37079L

18" CMP

GREU TL-3

BS1 SHOULDER

18" CMP

CONC. BARRIER WALL

MTL

BL-56

MTL

GREU TL-3

WOODS

WOODS

WOODS

3" HDPE

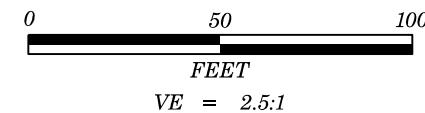


NOTE:
SOIL, WEATHERED ROCK, AND CRYSTALLINE ROCK
LINE ARE BASED ON AN INTERPRETATION OF
BORE HOLE AND SEISMIC REFRACTION DATA AND
SHALL BE CONSIDERED AS APPROXIMATE.

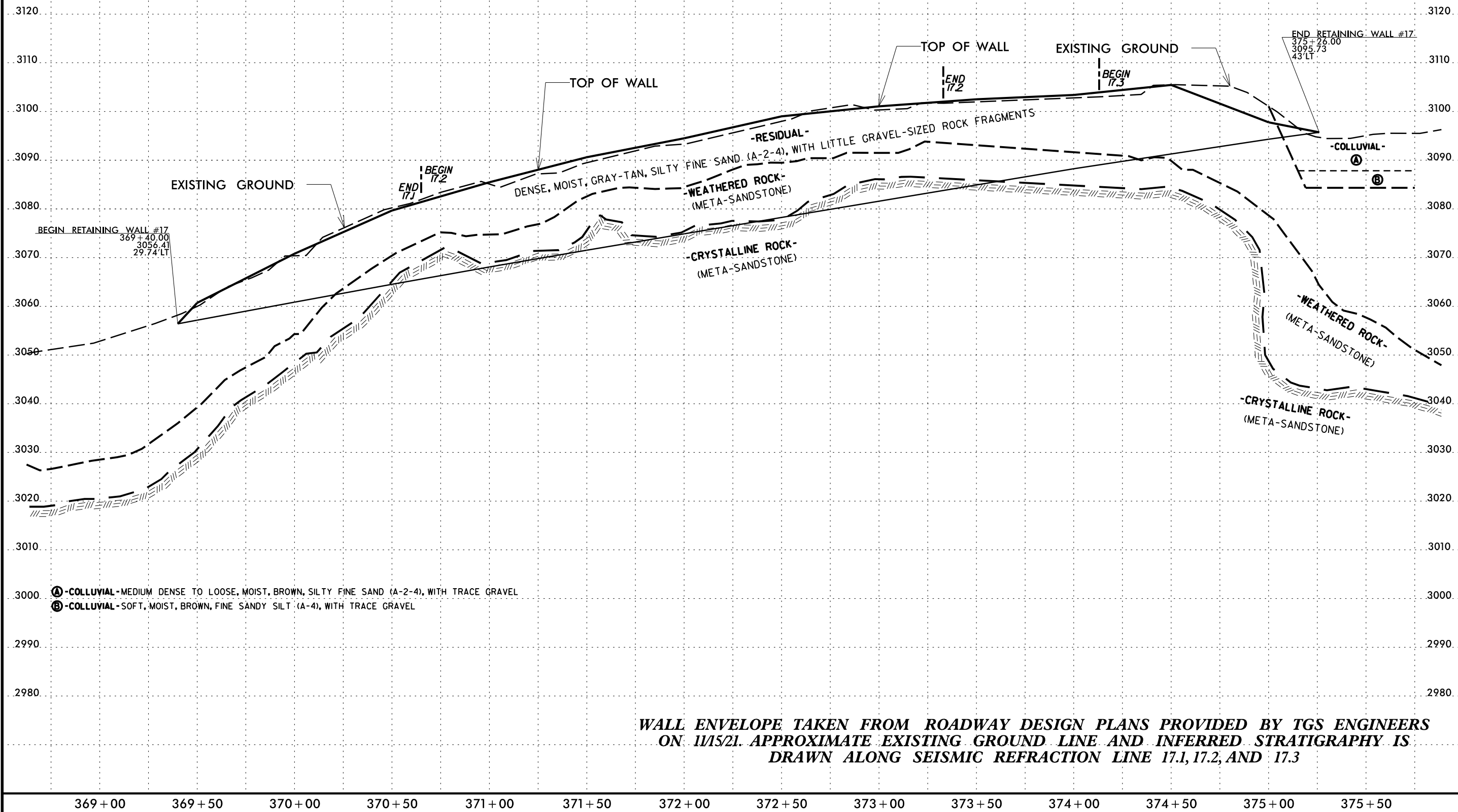
Prepared in the Office of:



CAROLINAS
 GEOTECHNICAL
 GROUP



PROJECT REFERENCE NO.	SHEET NO.
A-0009CB	4
RETAINING WALL #17 SEISMIC REFRACTION LINE 17.1, 17.2, & 17.3 PROJECTED ALONG WALL ENVELOPE	

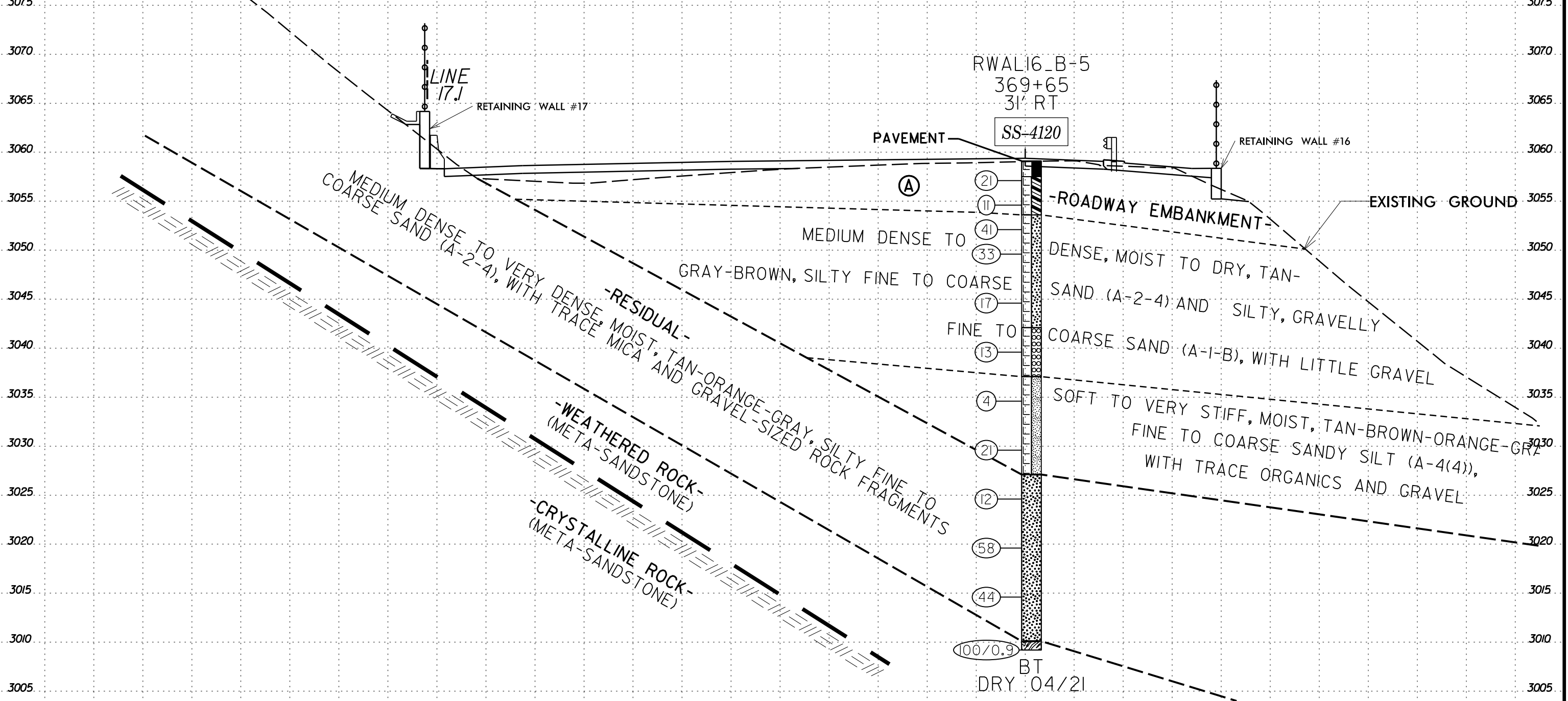


WALL ENVELOPE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS
ON 11/15/21. APPROXIMATE EXISTING GROUND LINE AND INFERRED STRATIGRAPHY IS
DRAWN ALONG SEISMIC REFRACTION LINE 17.1, 17.2, AND 17.3

19-MAY-2022 16:25
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SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-4120	31' RT	369+65 -L-	23.5' - 25.0'	A-4(4)	40	7	21	18	34	27	96	81	64	28	-

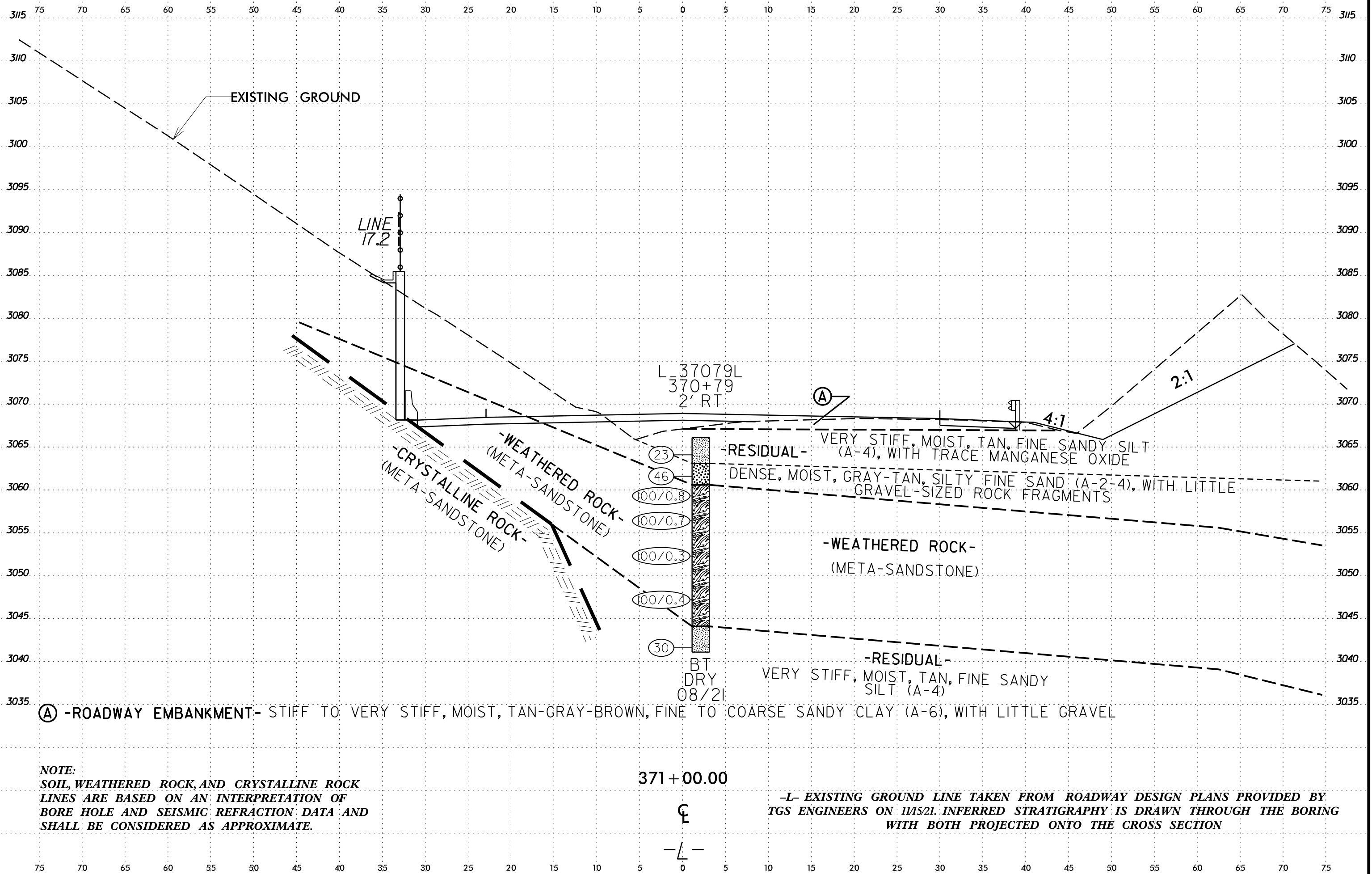


(A) -ROADWAY EMBANKMENT- STIFF TO VERY STIFF, MOIST, TAN-GRAY-BROWN, FINE TO COARSE SANDY CLAY (A-6), WITH LITTLE GRAVEL

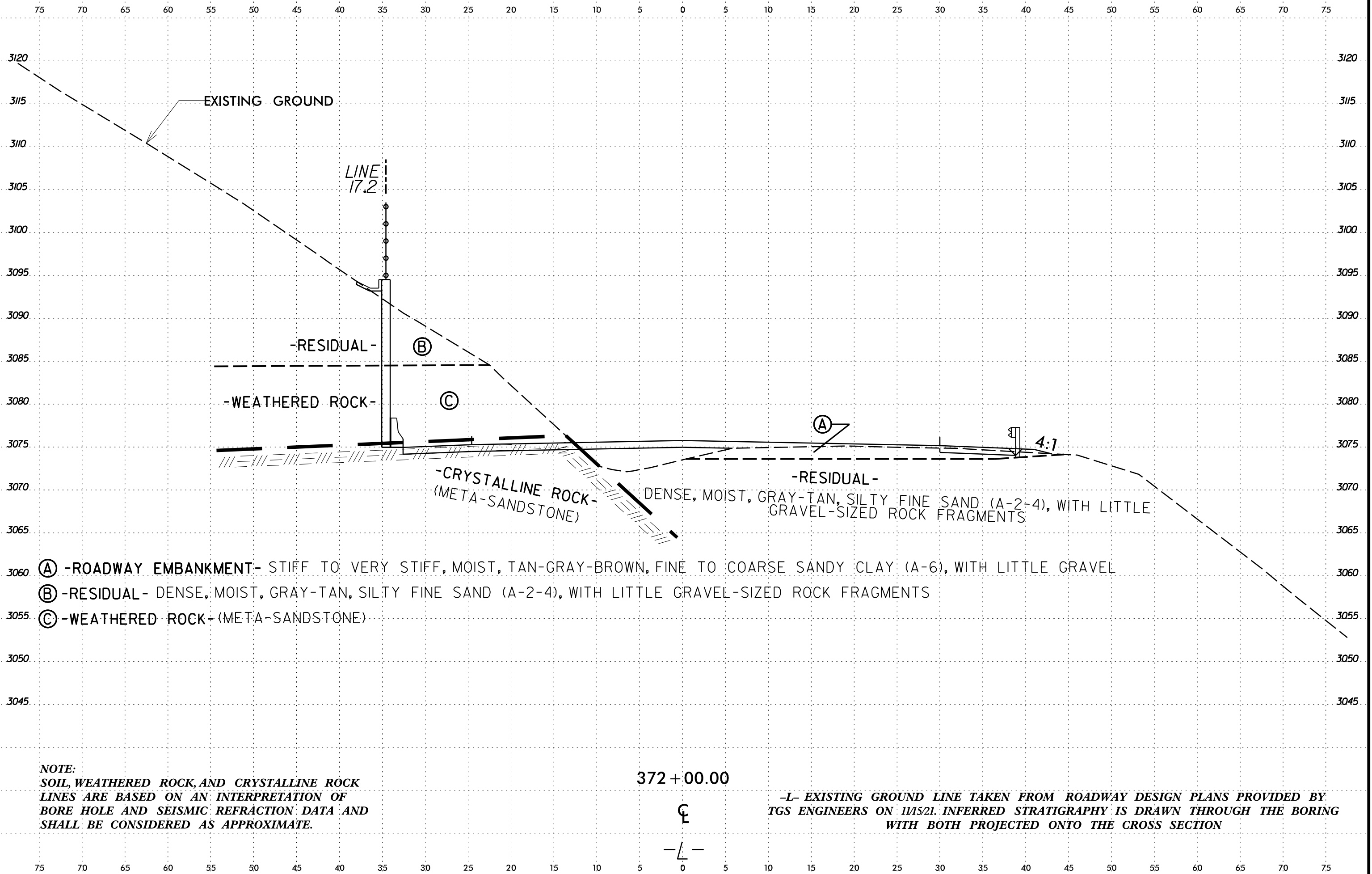
NOTE: SOIL, WEATHERED ROCK, AND CRYSTALLINE ROCK LINES ARE BASED ON AN INTERPRETATION OF BORE HOLE AND SEISMIC REFRACTION DATA AND SHALL BE CONSIDERED AS APPROXIMATE.

369 + 65.00 -L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

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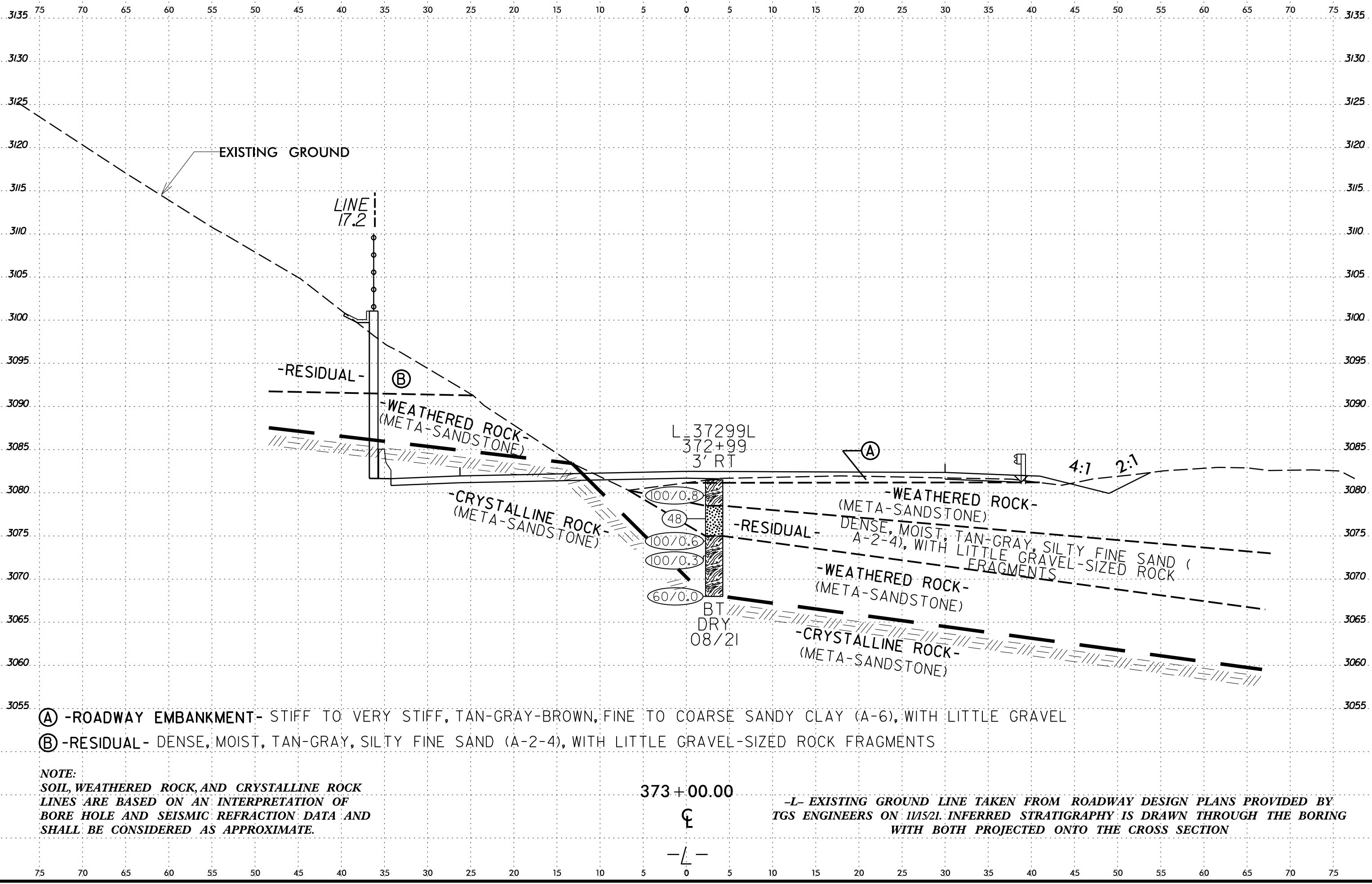
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 \$\$\$SUBSERIAL\$\$\$



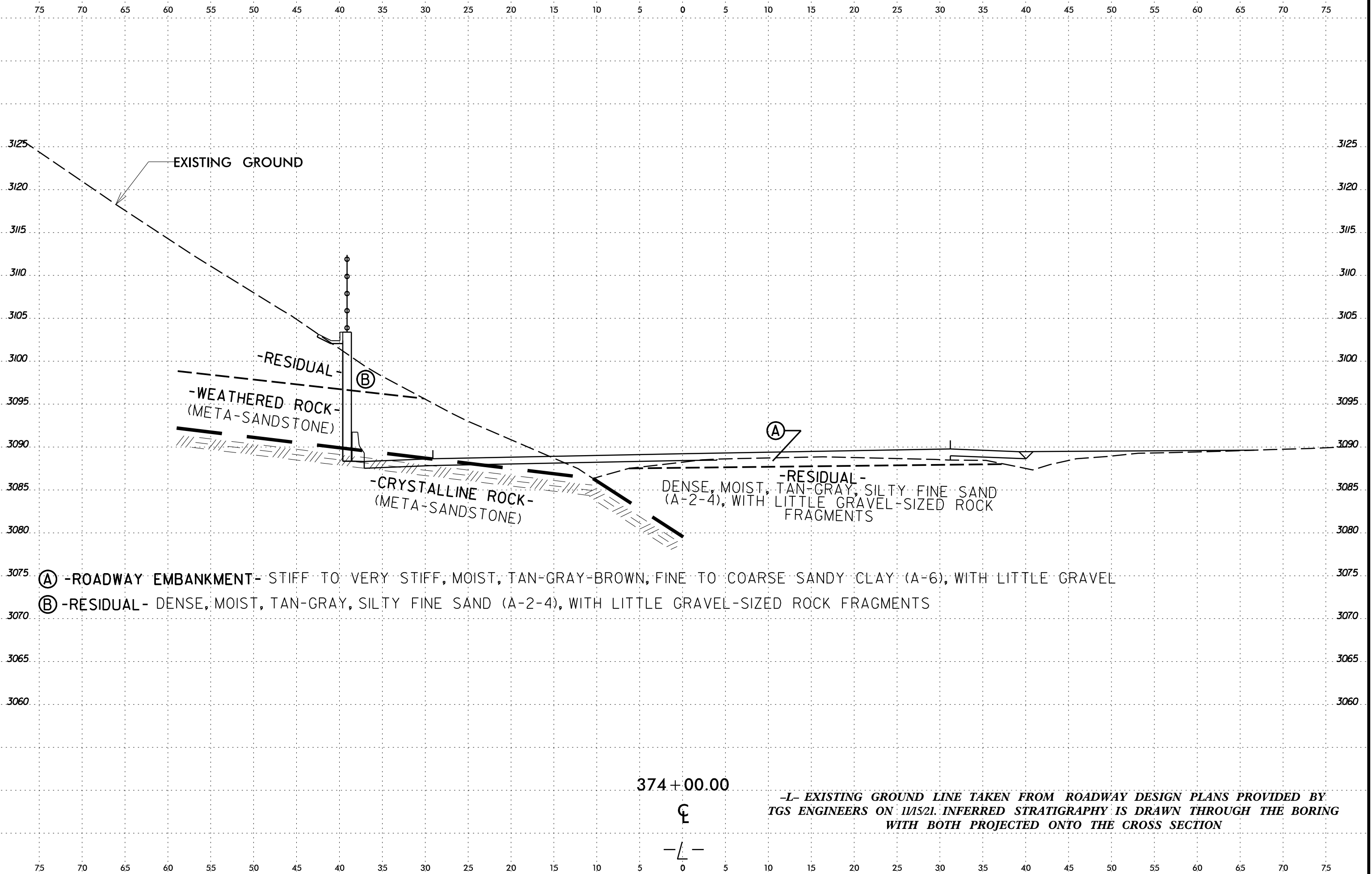
- (A) -ROADWAY EMBANKMENT- STIFF TO VERY STIFF, MOIST, TAN-GRAY-BROWN, FINE TO COARSE SANDY CLAY (A-6), WITH LITTLE GRAVEL
- (B) -RESIDUAL- DENSE, MOIST, GRAY-TAN, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL-SIZED ROCK FRAGMENTS
- (C) -WEATHERED ROCK- (META-SANDSTONE)

NOTE:
 SOIL, WEATHERED ROCK, AND CRYSTALLINE ROCK
 LINES ARE BASED ON AN INTERPRETATION OF
 BORE HOLE AND SEISMIC REFRACTION DATA AND
 SHALL BE CONSIDERED AS APPROXIMATE.

6/23/16
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EXISTING GROUND

-RESIDUAL-

-WEATHERED ROCK-
(META-SANDSTONE)

-CRYSTALLINE ROCK-
(META-SANDSTONE)

-RESIDUAL -
DENSE, MOIST, TAN-GRAY, SILTY FINE SAND
(A-2-4), WITH LITTLE GRAVEL-SIZED ROCK
FRAGMENTS

(A) -ROADWAY EMBANKMENT- STIFF TO VERY STIFF, MOIST, TAN-GRAY-BROWN, FINE TO COARSE SANDY CLAY (A-6), WITH LITTLE GRAVEL

(B) -RESIDUAL- DENSE, MOIST, TAN-GRAY, SILTY FINE SAND (A-2-4), WITH LITTLE GRAVEL-SIZED ROCK FRAGMENTS

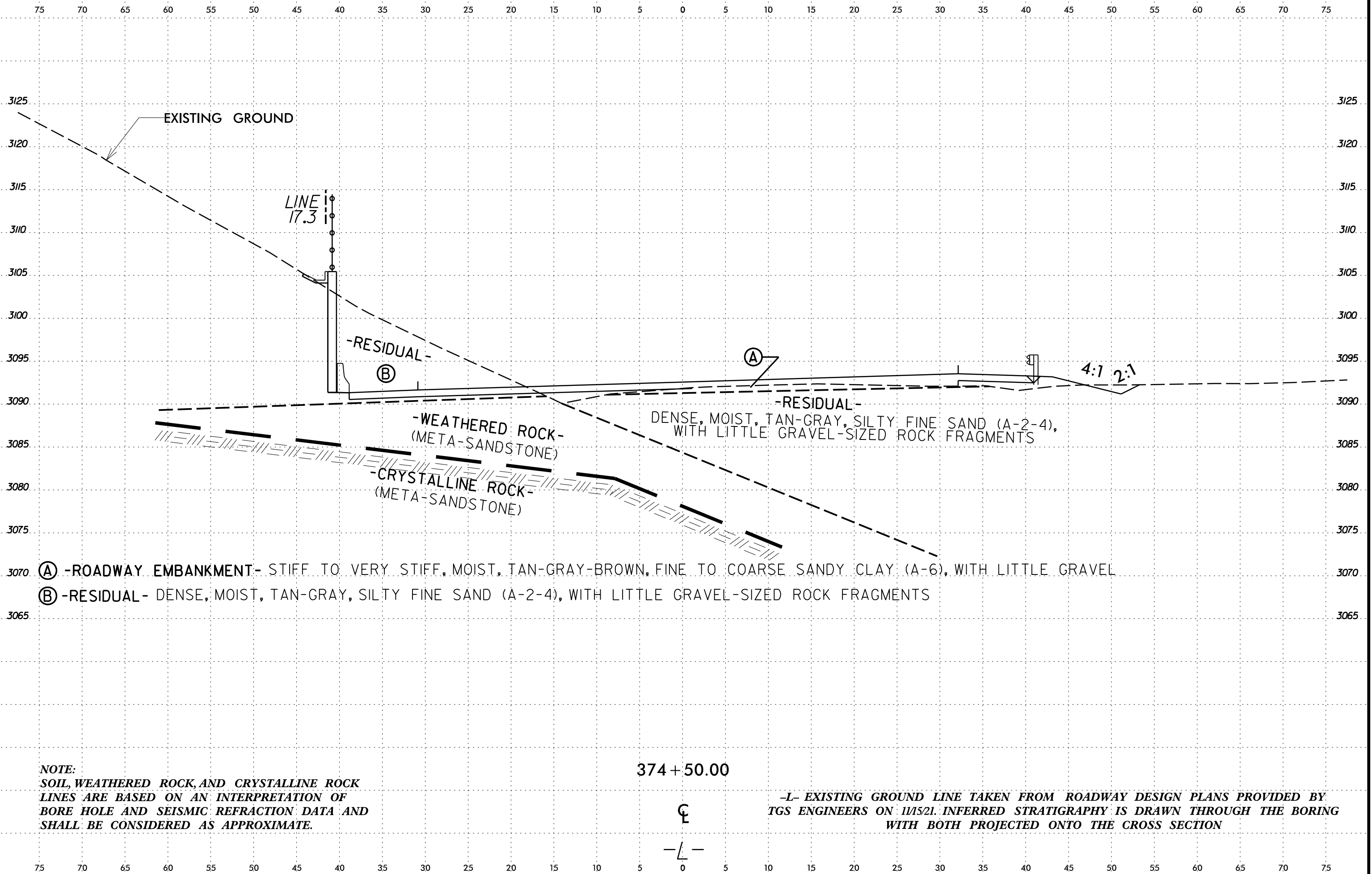
374+00.00

☪

-L-

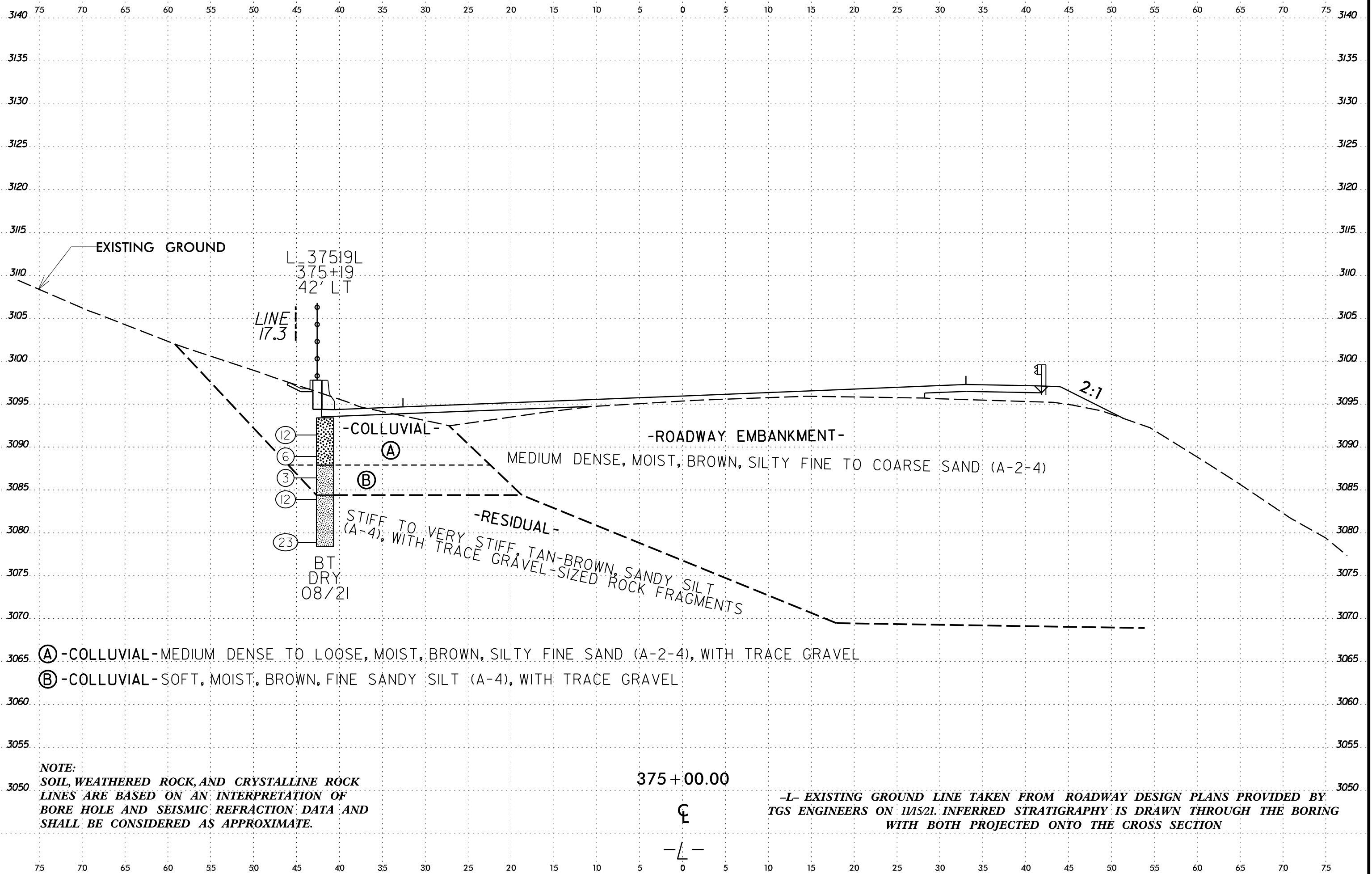
-L- EXISTING GROUND LINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY TGS ENGINEERS ON 11/15/21. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING WITH BOTH PROJECTED ONTO THE CROSS SECTION

6/23/16
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NOTE:
SOIL, WEATHERED ROCK, AND CRYSTALLINE ROCK
LINES ARE BASED ON AN INTERPRETATION OF
BORE HOLE AND SEISMIC REFRACTION DATA AND
SHALL BE CONSIDERED AS APPROXIMATE.

6/23/16
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EXISTING GROUND

L 37519L
375+19
42' LT

LINE 1
17.3

- 12
- 6
- 3
- 12
- 23

-COLLUVIAL-

(A)

(B)

-ROADWAY EMBANKMENT-

MEDIUM DENSE, MOIST, BROWN, SILTY FINE TO COARSE SAND (A-2-4)

-RESIDUAL-

STIFF TO VERY STIFF, TAN-BROWN, SANDY SILT (A-4), WITH TRACE GRAVEL-SIZED ROCK FRAGMENTS

BT
DRY
08/21

(A) -COLLUVIAL-MEDIUM DENSE TO LOOSE, MOIST, BROWN, SILTY FINE SAND (A-2-4), WITH TRACE GRAVEL

(B) -COLLUVIAL-SOFT, MOIST, BROWN, FINE SANDY SILT (A-4), WITH TRACE GRAVEL

NOTE:
 SOIL, WEATHERED ROCK, AND CRYSTALLINE ROCK
 LINES ARE BASED ON AN INTERPRETATION OF
 BORE HOLE AND SEISMIC REFRACTION DATA AND
 SHALL BE CONSIDERED AS APPROXIMATE.

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 32572.1.FS10		TIP A-0009CB		COUNTY GRAHAM		GEOLOGIST D. Goodnight									
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail							GROUND WTR (ft)								
BORING NO. L_37079L		STATION 370+79		OFFSET 2 ft RT		ALIGNMENT L									
COLLAR ELEV. 3,066.1 ft		TOTAL DEPTH 25.0 ft		NORTHING 619,405		EASTING 593,200									
DRILL RIG/HAMMER EFF./DATE FIVE9553 CME-550X 80% 03/12/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER J. Phillips		START DATE 08/12/21		COMP. DATE 08/12/21		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					
3070															
3065	3,065.1	1.0	5	11	12									3,066.1	GROUND SURFACE
	3,062.6	3.5	11	22	24									3,063.1	RESIDUAL Very Stiff, Tan, Fine Sandy SILT (A-4), with trace manganese oxide
3060	3,060.1	6.0	45	55/0.3										3,060.1	Dense, Gray-Tan, Silty Fine SAND (A-2-4), with little gravel-sized rock fragments
	3,057.6	8.5	26	66	34/0.2									3,060.1	WEATHERED ROCK Tan-Gray, (META-SANDSTONE)
3055															
	3,052.6	13.5	100/0.3												
3050															
	3,047.6	18.5	100/0.4												
3045															
	3,042.6	23.5	9	12	18									3,044.1	RESIDUAL Very Stiff, Tan, Fine Sandy SILT (A-4)
														3,041.1	Boring Terminated at Elevation 3,041.1 ft In Residual Sandy Silt (A-4)

WBS 32572.1.FS10		TIP A-0009CB		COUNTY GRAHAM		GEOLOGIST N. McLaren									
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail							GROUND WTR (ft)								
BORING NO. RWAL16_B-5		STATION 369+65		OFFSET 31 ft RT		ALIGNMENT L									
COLLAR ELEV. 3,059.1 ft		TOTAL DEPTH 49.9 ft		NORTHING 619,519		EASTING 593,174									
DRILL RIG/HAMMER EFF./DATE CG20446 Diedrich D50 83% 06/16/2020				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic									
DRILLER J. Estep		START DATE 04/27/21		COMP. DATE 04/27/21		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					
3060															
	3,057.5	1.6	22	11	10									3,059.1	GROUND SURFACE
3055	3,055.6	3.5	12	5	6									3,057.5	ROADWAY EMBANKMENT Asphalt (1.2') and ABC (0.4')
	3,053.1	6.0	14	16	25									3,053.6	Stiff to Very Stiff, Tan-Gray-Brown, Fine to Coarse Sandy CLAY (A-6), with little gravel
3050	3,050.6	8.5	8	17	16									3,053.6	Medium Dense to Dense, Tan-Brown-Gray, Silty Fine to Coarse SAND (A-2-4), with little gravel
3045	3,045.6	13.5	5	8	9										
3040	3,040.6	18.5	4	7	6									3,042.1	Medium Dense, Tan-Brown-Gray, Silty, Gravelly Fine to Coarse SAND (A-1-b)
3035	3,035.6	23.5	4	1	3									3,037.1	Soft to Very Stiff, Tan-Brown-Orange-Gray, Fine Sandy SILT (A-4(4)), with trace organics and gravel
3030	3,030.6	28.5	6	10	11									SS-4120 28%	
3025	3,025.6	33.5	5	5	7										
3020	3,020.6	38.5	11	22	36									3,027.1	RESIDUAL Medium Dense to Very Dense, Tan-Orange-Gray, Silty Fine to Coarse SAND (A-2-4), with trace mica and gravel-sized rock fragments
3015	3,015.6	43.5	9	10	34										
3010	3,010.6	48.5	23	53	47/0.4									3,010.1	WEATHERED ROCK Gray-Tan-Orange, (META-SANDSTONE)
														3,009.2	Boring Terminated at Elevation 3,009.2 ft In Weathered Rock (META-SANDSTONE)

NCDOT BORE DOUBLE A-0009CB_GEO_RDY_GTM.GPJ NC_DOT.GDT 5/18/22

GEOTECHNICAL BORING REPORT

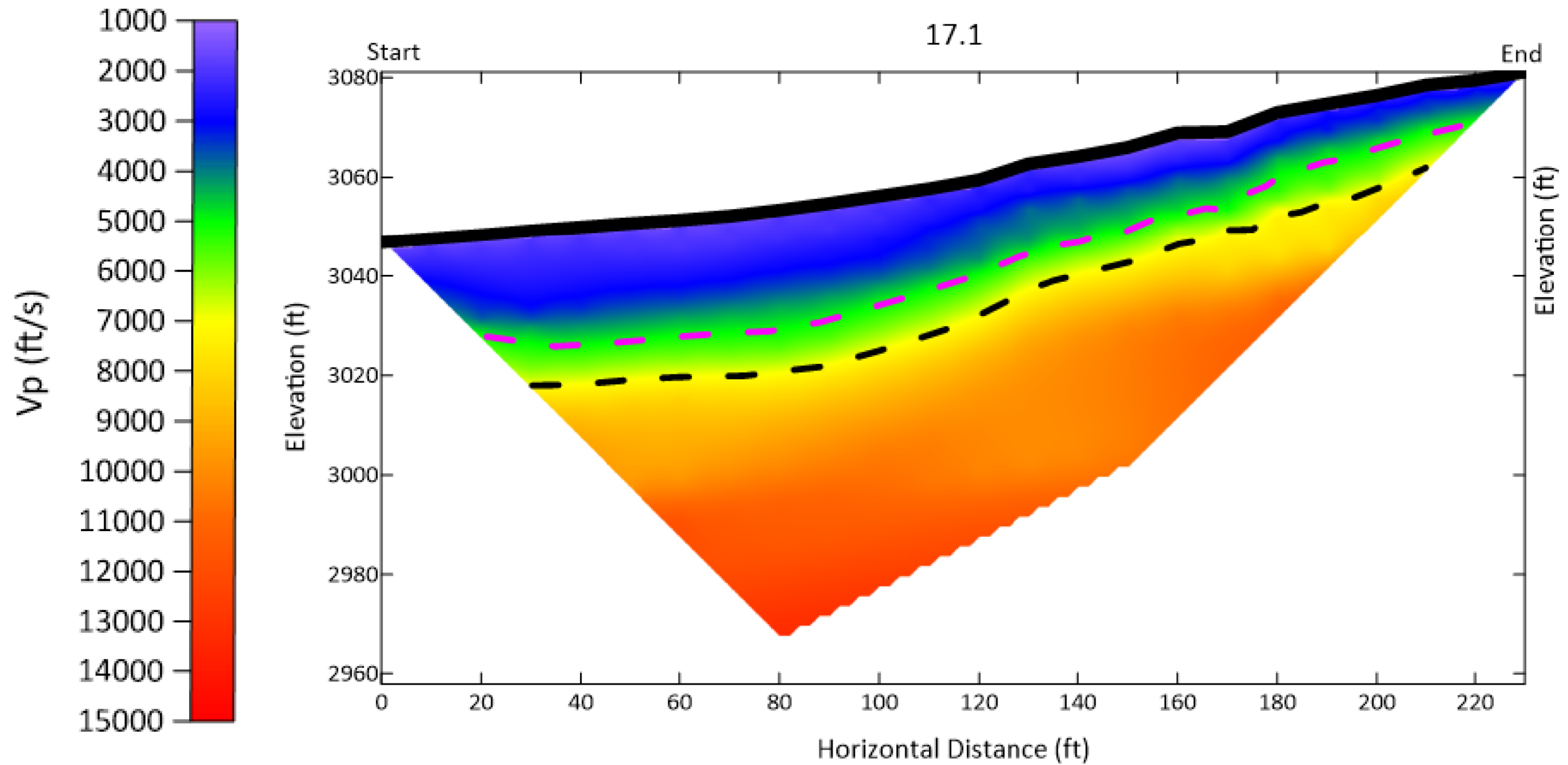
BORE LOG

WBS 32572.1.FS10		TIP A-0009CB		COUNTY GRAHAM		GEOLOGIST D. Goodnight										
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail							GROUND WTR (ft)									
BORING NO. L_37299L		STATION 372+99		OFFSET 3 ft RT		ALIGNMENT L										
COLLAR ELEV. 3,081.5 ft		TOTAL DEPTH 13.5 ft		NORTHING 619,185		EASTING 593,194										
DRILL RIGHAMMER EFF./DATE FIVE9553 CME-550X 80% 03/12/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER J. Phillips		START DATE 08/13/21		COMP. DATE 08/13/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
3085																
3080	3,080.5	1.0	45	55	0.3								M		3,081.5	0.0
	3,078.0	3.5	18	18	30								M		3,078.5	3.0
3075	3,075.5	6.0	8	86	14/0.1								M		3,075.0	6.5
	3,073.0	8.5	100	0.3									M			
3070													M			
	3,068.0	13.5	60	0.0									M		3,068.0	13.5
Boring Terminated with Standard Penetration Test Refusal at Elevation 3,068.0 ft On Crystalline Rock (META-SANDSTONE)																

WBS 32572.1.FS10		TIP A-0009CB		COUNTY GRAHAM		GEOLOGIST D. Goodnight										
SITE DESCRIPTION Upgrade NC 143 from SR 1223 (Beech Creek Road) to 0.5 Miles North of Appalachian Trail							GROUND WTR (ft)									
BORING NO. L_37519L		STATION 375+19		OFFSET 42 ft LT		ALIGNMENT L										
COLLAR ELEV. 3,093.4 ft		TOTAL DEPTH 15.0 ft		NORTHING 618,964		EASTING 593,234										
DRILL RIGHAMMER EFF./DATE FIVE9553 CME-550X 80% 03/12/2021				DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER J. Phillips		START DATE 08/13/21		COMP. DATE 08/13/21		SURFACE WATER DEPTH N/A										
ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
3095																
	3,092.4	1.0	10	7	5								M		3,093.4	0.0
3090	3,089.9	3.5	4	3	3								M			
	3,087.4	6.0	1	2	1								M		3,087.9	5.5
3085	3,084.9	8.5	1	4	8								M		3,084.4	9.0
													M			
3080	3,079.9	13.5	6	7	16								M		3,078.4	15.0
Boring Terminated at Elevation 3,078.4 ft In Residual Sandy Silt (A-4)																

NCDOT BORE DOUBLE A-0009CB_GEO_RDY_GTM.GPJ NC_DOT.GDT 5/10/22

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 17.1

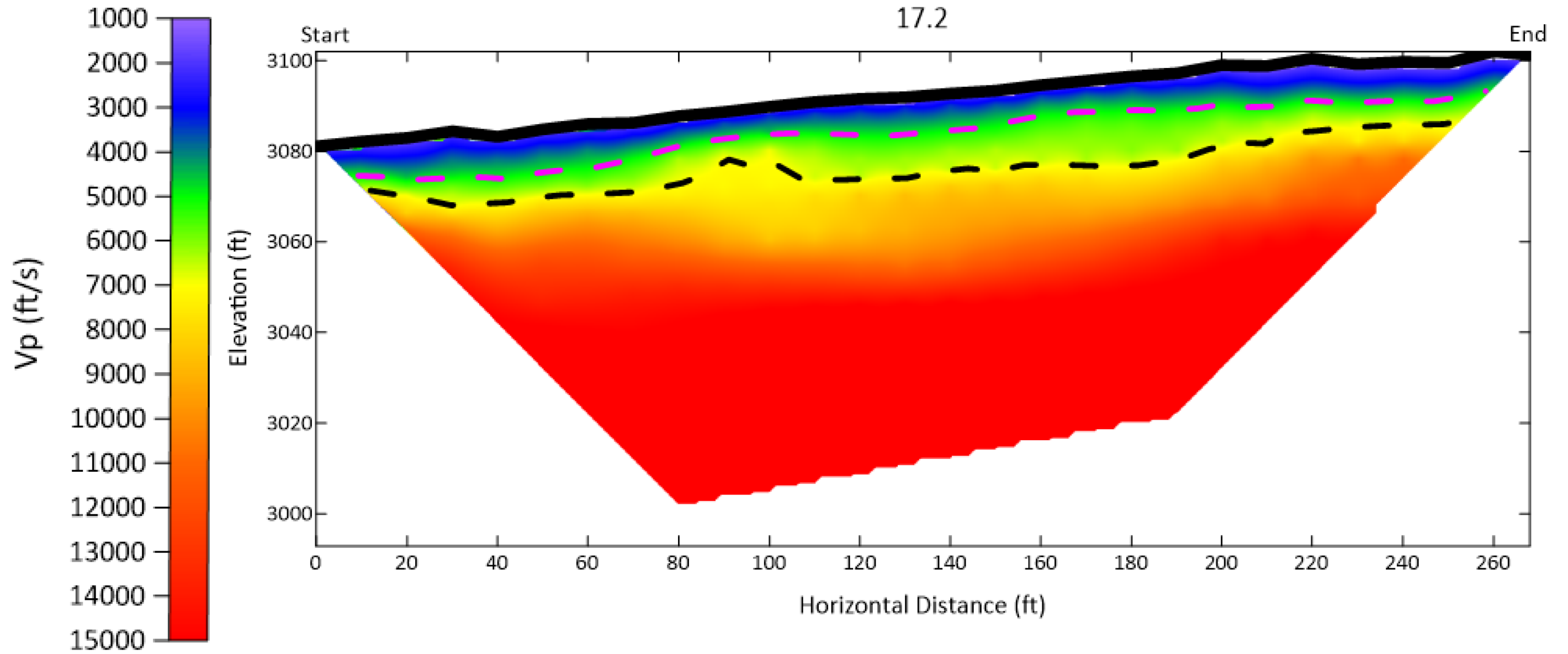


GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

CG2 ESTIMATED WAVE SPEED FOR WEATHERED ROCK: 4,500 FT/SEC

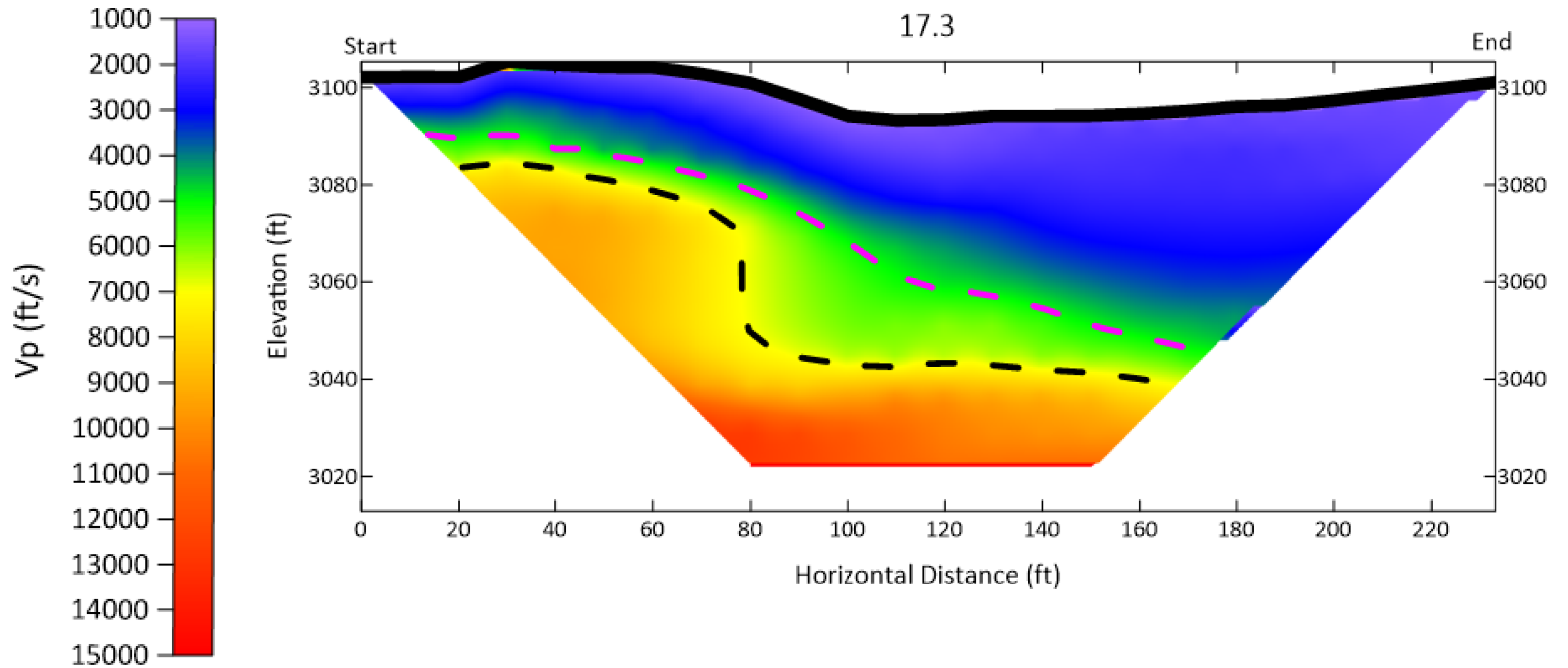
CG2 ESTIMATED WAVE SPEED FOR CRYSTALLINE ROCK: 7,500 FT/SEC

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 17.2



GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021
 CG2 ESTIMATED WAVE SPEED FOR WEATHERED ROCK: 4,500 FT/SEC
 CG2 ESTIMATED WAVE SPEED FOR CRYSTALLINE ROCK: 7,500 FT/SEC

GEOPHYSICAL TEST RESULTS – SEISMIC REFRACTION LINE 17.3



GEOPHYSICAL TESTING PERFORMED BY GEL SOLUTIONS. REFERENCE "SEISMIC REFRACTION SURVEY FOR EVALUATION OF ROCK" DATED 10/01/2021

CG2 ESTIMATED WAVE SPEED FOR WEATHERED ROCK: 4,500 FT/SEC

CG2 ESTIMATED WAVE SPEED FOR CRYSTALLINE ROCK: 7,500 FT/SEC