

REFERENCE: U-5510

PROJECT: 45532

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

STRUCTURE
SUBSURFACE INVESTIGATION

COUNTY CATAWBA
PROJECT DESCRIPTION SR 1468 (SWEETWATER ROAD)
EXTENSION FROM US 70 TO SR 1005 (STARTOWN
ROAD)
SITE DESCRIPTION RETAINING WALL ON SR 1468
FROM -L- STATION 27+70 TO 32+50 RIGHT

CONTENTS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	TITLE SHEET
2	LEGEND
3	SITE PLAN
4	PROFILE
5-II	CROSS SECTIONS
12-15	BORE LOGS
16	SOIL TEST RESULTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5510	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 CONTRACTOR 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

- HPC
C. BUKOVITZ
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J. FRAZIER

INVESTIGATED BY ECS CAROLINAS, LLP
DRAWN BY C. BUKOVITZ
CHECKED BY M. BREWER
SUBMITTED BY ECS CAROLINAS, LLP
DATE JULY 2016



DocuSigned by:
D. Matthew Brewer
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8/18/2016

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 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.

CONSISTENCY OR DENSENESS table with columns for PRIMARY SOIL TYPE, COMPACTNESS OR CONSISTENCY, RANGE OF STANDARD PENETRATION RESISTANCE, RANGE OF UNCONFINED COMPRESSIVE STRENGTH.

TEXTURE OR GRAIN SIZE table with columns for U.S. STD. SIEVE SIZE, BOULDER, COBBLE, GRAVEL, COARSE SAND, FINE SAND, SILT, CLAY, GRAIN SIZE.

SOIL MOISTURE - CORRELATION OF TERMS table with columns for SOIL MOISTURE SCALE, FIELD MOISTURE DESCRIPTION, GUIDE FOR FIELD MOISTURE DESCRIPTION.

PLASTICITY table with columns for NON PLASTIC, SLIGHTLY PLASTIC, MODERATELY PLASTIC, HIGHLY PLASTIC, PLASTICITY INDEX (PI), DRY STRENGTH.

COLOR 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.

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.

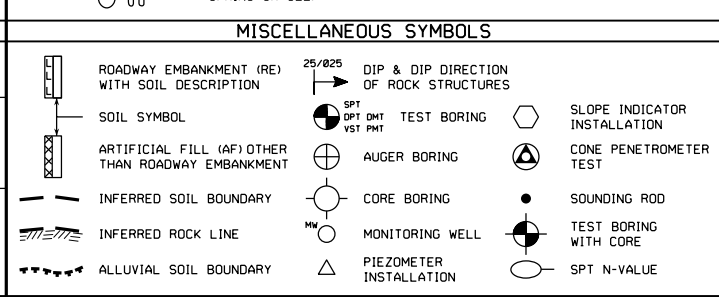
ANGULARITY OF GRAINS THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.

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, MODERATELY COMPRESSIBLE, HIGHLY COMPRESSIBLE

PERCENTAGE OF MATERIAL table with columns for ORGANIC MATERIAL, GRANULAR SOILS, SILT-CLAY SOILS, OTHER MATERIAL.

GROUND WATER WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING, STATIC WATER LEVEL AFTER 24 HOURS, PERCHED WATER, SPRING OR SEEP.



RECOMMENDATION SYMBOLS UNDERCUT, UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE, UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK.

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, FRAGMENTS, FRAGS. - FRAGMENTS, HI. - HIGHLY, MED. - MEDIUM, MICA. - MICACEOUS, MOD. - MODERATELY, NP - NON PLASTIC, ORG. - ORGANIC, PMT - PRESSUREMETER TEST, SAP. - SAPROLITE, SD. - SAND, SANDY, SIL. - SILT, SILTY, SLI. - SLIGHTLY, TCR - TRICONE REFUSAL, w - MOISTURE CONTENT, V - VERY, VST - VANE SHEAR TEST, WEA. - WEATHERED, UNIT WEIGHT, DRY UNIT WEIGHT, SAMPLE ABBREVIATIONS: S - BULK, SS - SPLIT SPOON, ST - SHELBY TUBE, RS - ROCK, RT - RECOMPACTED TRIAXIAL, CBR - CALIFORNIA BEARING RATIO.

EQUIPMENT USED ON SUBJECT PROJECT DRILL UNITS: CME-45C, CME-55, CME-550X, VANE SHEAR TEST, PORTABLE HOIST. ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 6" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE *STEEL TEETH, TRICONE *TUNG-CARB. CORE BIT. HAMMER TYPE: AUTOMATIC, MANUAL. CORE SIZE: B, H, N. 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.

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.

NON-CRYSTALLINE ROCK (NCR) FINE TO COARSE GRAIN METAMORPHIC AND NON-COASTAL PLAIN SEDIMENTARY ROCK THAT WOULD YIELD SPT REFUSAL IF TESTED.

COASTAL PLAIN SEDIMENTARY ROCK (CP) COASTAL PLAIN SEDIMENTS CEMENTED INTO ROCK, BUT MAY NOT YIELD SPT REFUSAL.

WEATHERING FRESH: ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. VERY SLIGHT (IV SLI): ROCK GENERALLY FRESH, JOINTS STAINED. SLIGHT (SLI): ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH.

MODERATE (MOD.): SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. MODERATELY SEVERE (MOD. SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. SEVERE (SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED.

VERY SEVERE (IV SEV.): ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. COMPLETE: ROCK REDUCED TO SOIL.

ROCK HARDNESS VERY HARD: CANNOT BE SCRATCHED BY KNIFE. HARD: CAN BE SCRATCHED BY KNIFE. MODERATELY HARD: CAN BE SCRATCHED BY KNIFE OR PICK. MEDIUM HARD: CAN BE GROUDED OR GOUGED. SOFT: CAN BE GROUDED OR GOUGED. VERY SOFT: CAN BE CARVED WITH KNIFE.

FRACTURE SPACING and BEDDING tables with columns for TERM, SPACING, THICKNESS.

INDURATION FOR SEDIMENTARY ROCKS, INDURATION IS THE HARDENING OF MATERIAL BY CEMENTING, HEAT, PRESSURE, ETC. FRIABLE, MODERATELY INDURATED, INDURATED, EXTREMELY INDURATED.

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.

ARTESIAN - GROUND WATER THAT IS UNDER SUFFICIENT PRESSURE TO RISE ABOVE THE LEVEL AT WHICH IT IS ENCOUNTERED. CALCAREOUS (CALC.) - SOILS THAT CONTAIN APPRECIABLE AMOUNTS OF CALCIUM CARBONATE. COLLUVIUM - ROCK FRAGMENTS MIXED WITH SOIL.

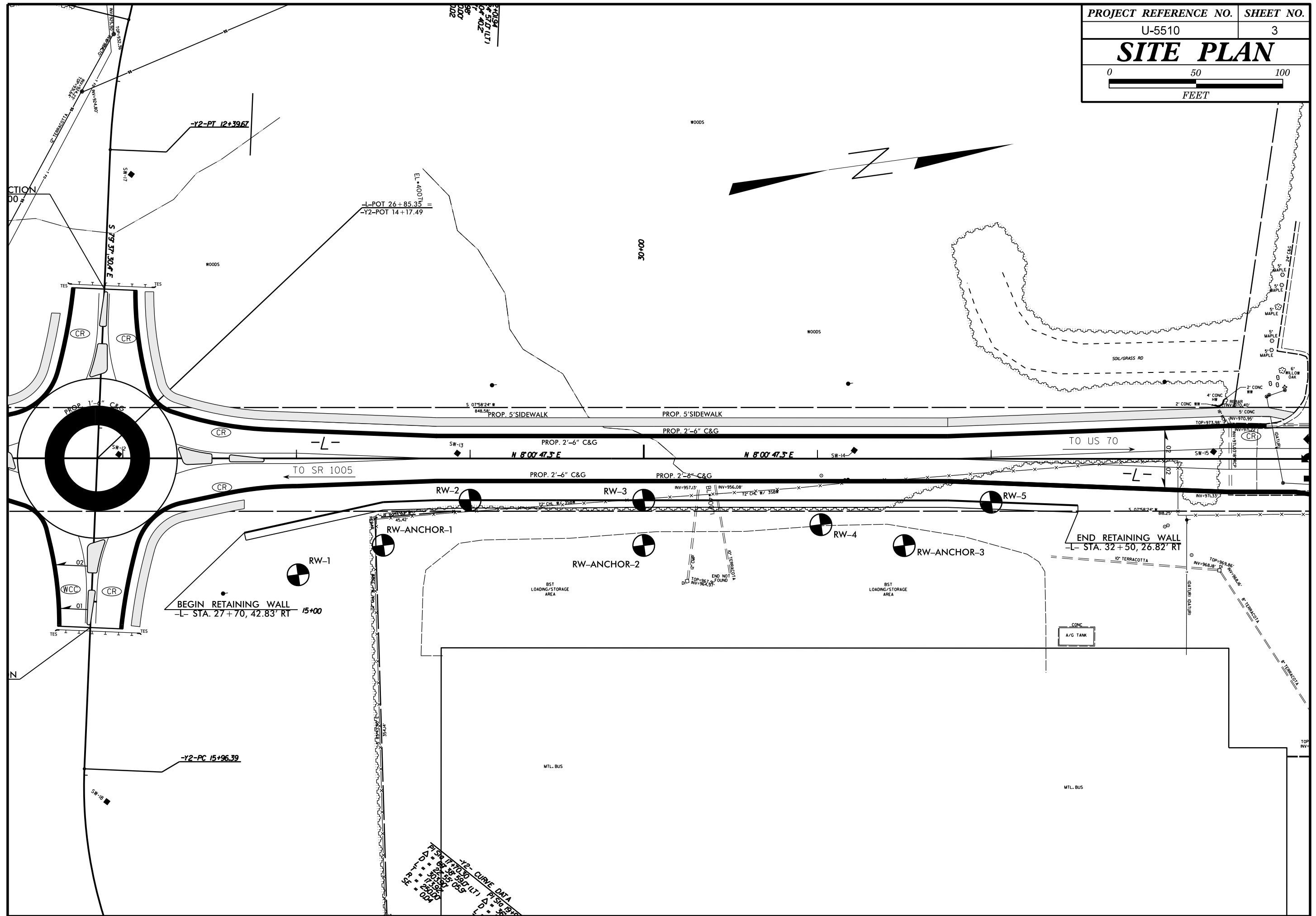
CORE RECOVERY (REC.) - TOTAL LENGTH OF ALL MATERIAL RECOVERED IN THE CORE BARREL. DIKE - A TABULAR BODY OF IGNEOUS ROCK. DIP - THE ANGLE AT WHICH A STRATUM OR ANY PLANAR FEATURE IS INCLINED.

DIP DIRECTION (DIP AZIMUTH) - THE DIRECTION OR BEARING OF THE HORIZONTAL TRACE. FAULT - A FRACTURE OR FRACTURE ZONE. FISSILE - A PROPERTY OF SPLITTING ALONG CLOSELY SPACED PARALLEL PLANES. FLOOD PLAIN (FP) - LAND BORDERING A STREAM.

FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT. JOINT - FRACTURE IN ROCK. LEDEGE - A SHELF-LIKE RIDGE. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT. MOTTLED (MOT) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS.

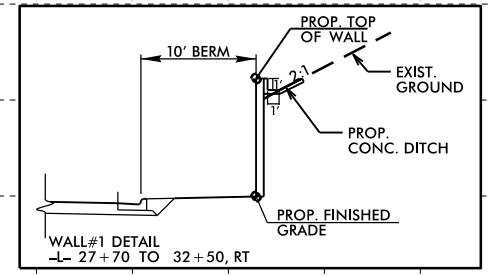
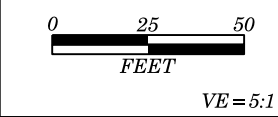
PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE. ROCK QUALITY DESIGNATION (ROD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES.

SAPPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK. SLICKENSIDE - POLISHED AND STRIATED SURFACE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT). STRATA CORE RECOVERY (SREC.). STRATA ROCK QUALITY DESIGNATION (SROD). TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER. BENCH MARK: BL SWI2; N-716241.090, E-1322059.7824 ELEVATION: 937.05 FEET.

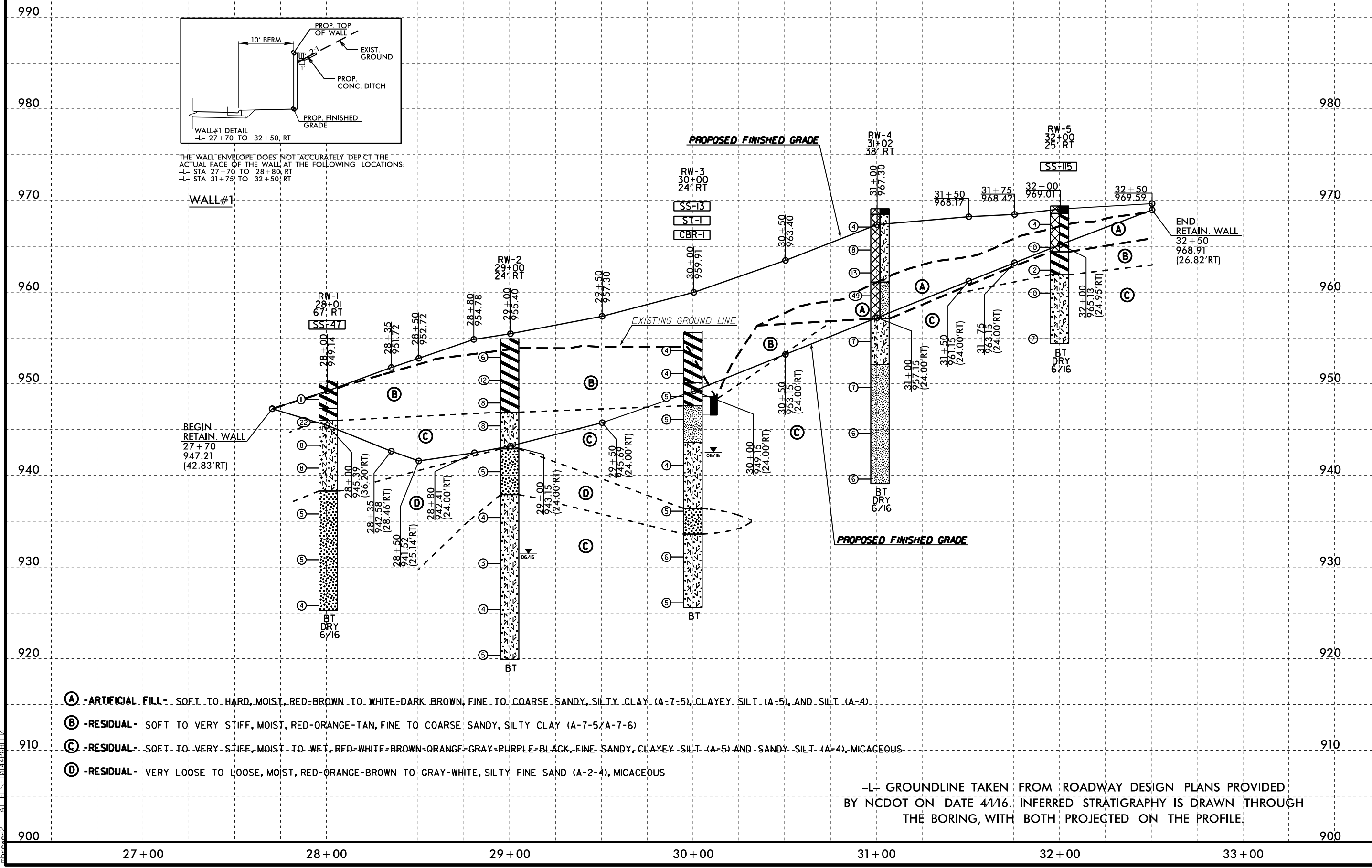


-12- CURVE DATA
 P = 300.00
 R = 300.00
 L = 180.00
 Δ = 90.00
 SE = 0.04

5/14/99
 U-5510 Retaining Wall - GEO/CADD.GEOTECH/Site&Sub/U5510.GEO.RWAL.PFI.dgn
 PROJECT REFERENCE NO. U-5510 SHEET NO. 4
 PROFILE BORINGS PROJECTED ALONG RETAINING WALL ENVELOPE
 VE=5:1
 PROJECT REFERENCE NO. U-5510 SHEET NO. 4
 PROFILE BORINGS PROJECTED ALONG RETAINING WALL ENVELOPE
 VE=5:1



THE WALL ENVELOPE DOES NOT ACCURATELY DEPICT THE ACTUAL FACE OF THE WALL AT THE FOLLOWING LOCATIONS:
 -L- STA 27+70 TO 28+80, RT
 -L- STA 31+75 TO 32+50, RT

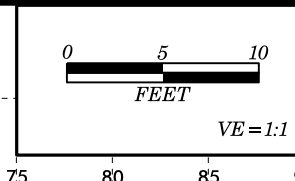


- A -ARTIFICIAL FILL- SOFT TO HARD, MOIST, RED-BROWN TO WHITE-DARK BROWN, FINE TO COARSE SANDY, SILTY CLAY (A-7-5), CLAYEY SILT (A-5), AND SILT (A-4)
- B -RESIDUAL- SOFT TO VERY STIFF, MOIST, RED-ORANGE-TAN, FINE TO COARSE SANDY, SILTY CLAY (A-7-5/A-7-6)
- C -RESIDUAL- SOFT TO VERY STIFF, MOIST TO WET, RED-WHITE-BROWN-ORANGE-GRAY-PURPLE-BLACK, FINE SANDY, CLAYEY SILT (A-5) AND SANDY SILT (A-4), MICACEOUS
- D -RESIDUAL- VERY LOOSE TO LOOSE, MOIST, RED-ORANGE-BROWN TO GRAY-WHITE, SILTY FINE SAND (A-2-4), MICACEOUS

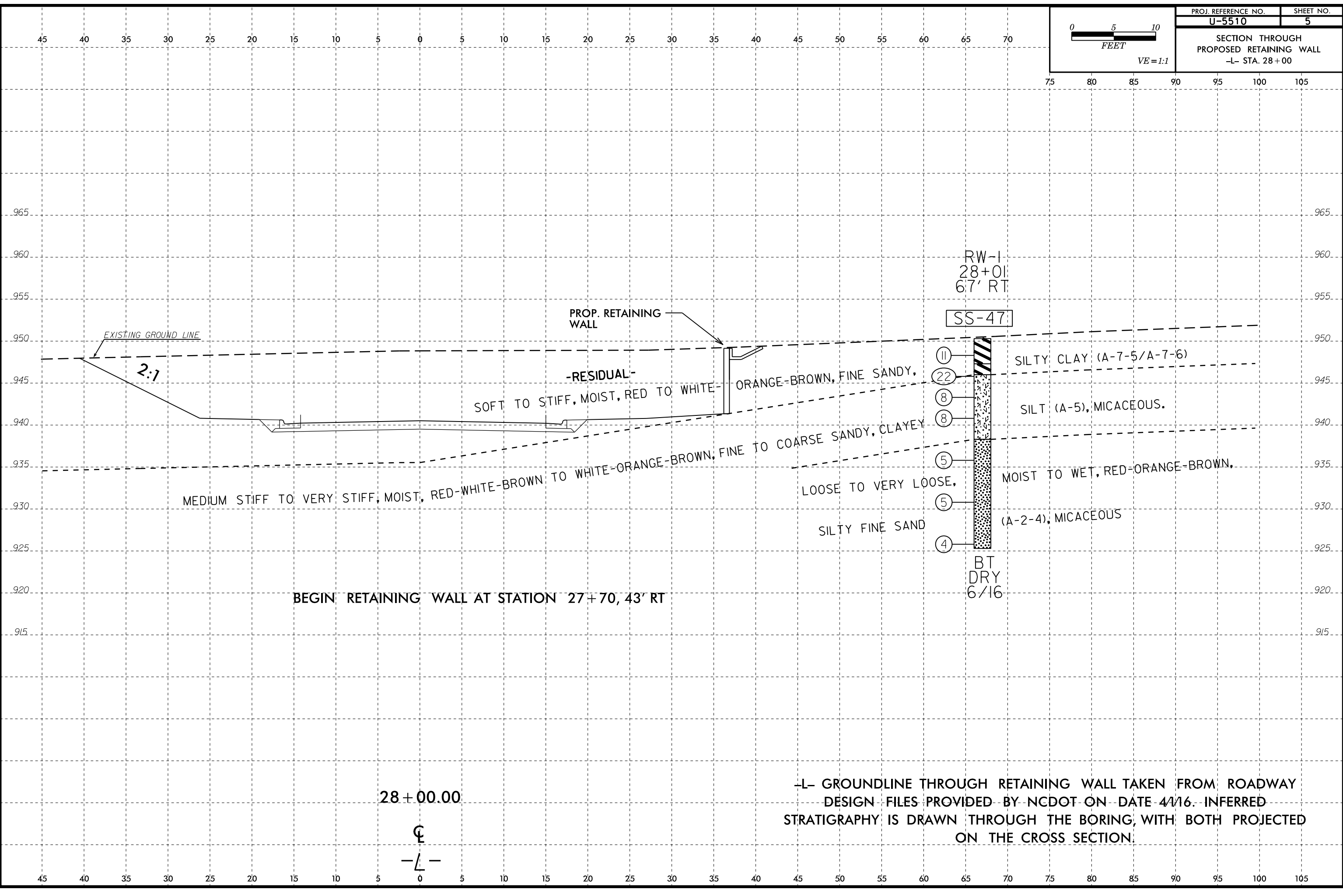
-L- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT ON DATE 4/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

8/23/99

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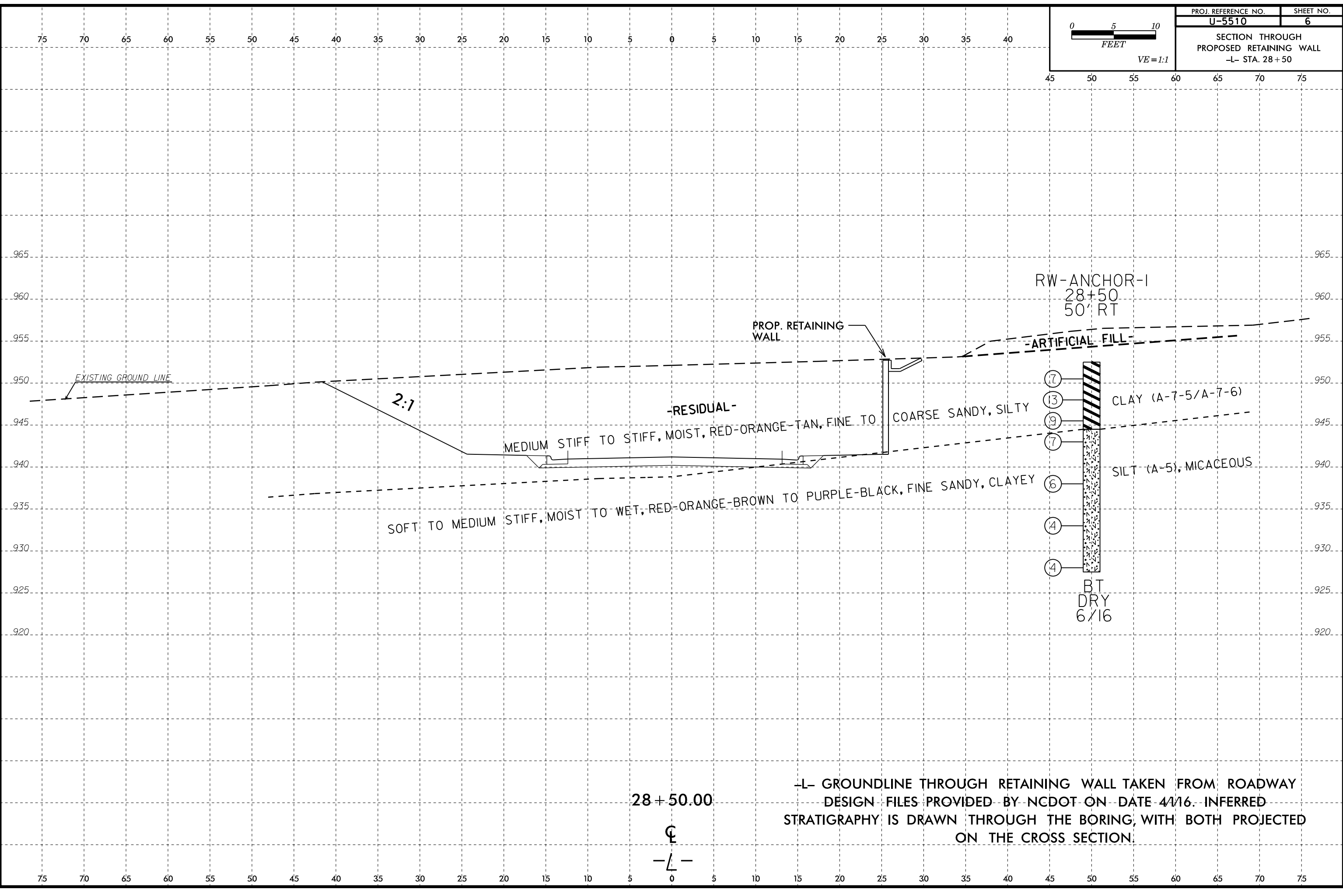


PROJ. REFERENCE NO.	SHEET NO.
U-5510	5
SECTION THROUGH PROPOSED RETAINING WALL -L- STA. 28+00	



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SECTION THROUGH PROPOSED RETAINING WALL -L- STA. 28+50		



75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

28 + 50.00
☺
-L-

-L- GROUNDLINE THROUGH RETAINING WALL TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

RW-ANCHOR-1
28+50
50' RT

PROP. RETAINING WALL

-ARTIFICIAL FILL-

EXISTING GROUND LINE

2:1

-RESIDUAL-

MEDIUM STIFF TO STIFF, MOIST, RED-ORANGE-TAN, FINE TO COARSE SANDY, SILTY

SOFT TO MEDIUM STIFF, MOIST TO WET, RED-ORANGE-BROWN TO PURPLE-BLACK, FINE SANDY, CLAYEY

- ⑦
- ⑬
- ⑨
- ⑦
- ⑥
- ④
- ④

CLAY (A-7-5/A-7-6)

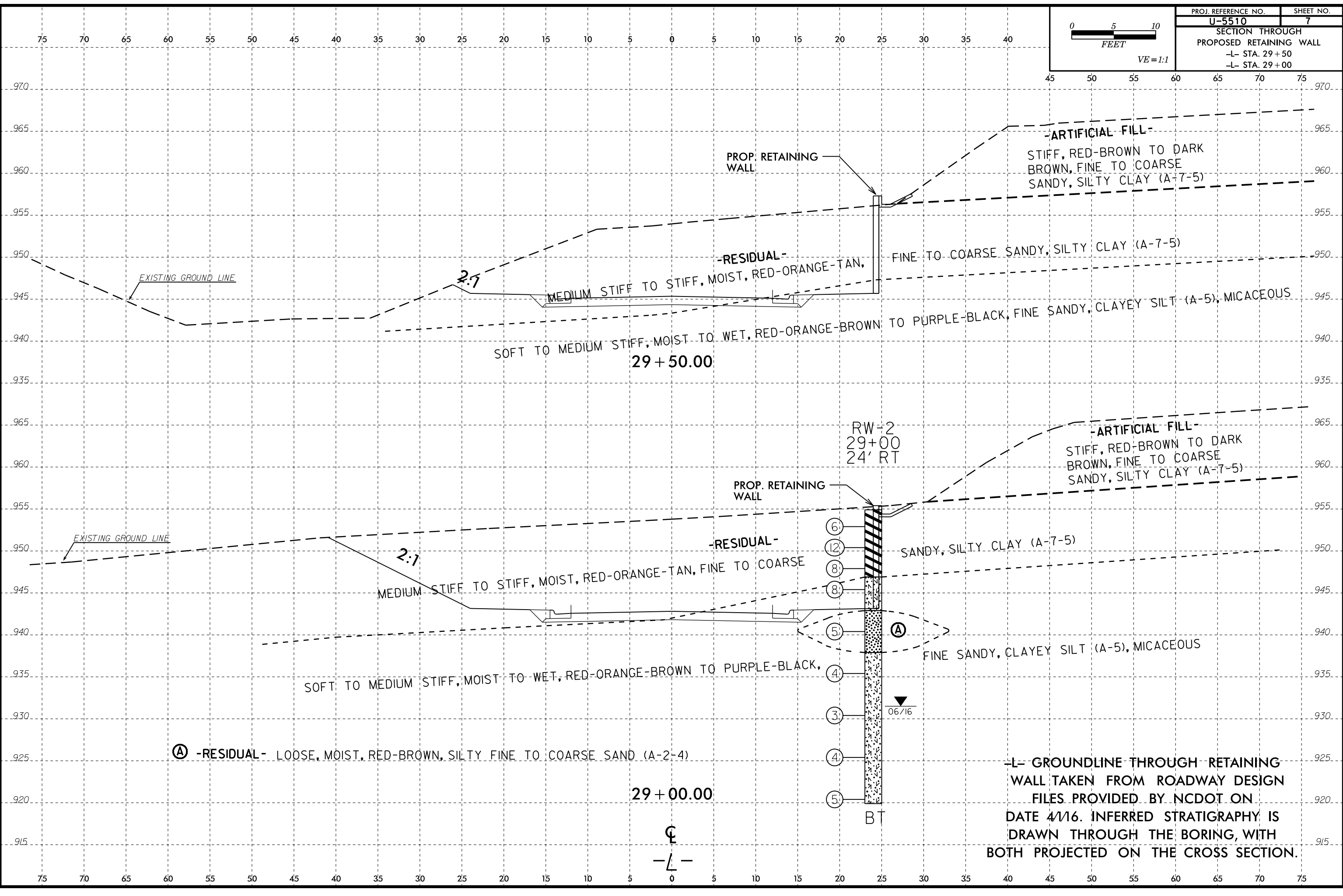
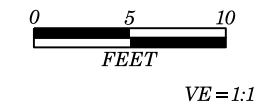
SILT (A-5), MICACEOUS

BT
DRY
6/16

8/23/99

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PROJ. REFERENCE NO.	SHEET NO.
U-5510	7
SECTION THROUGH PROPOSED RETAINING WALL	
-L- STA. 29+50	
-L- STA. 29+00	



-L- GROUNDLINE THROUGH RETAINING WALL TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

Ⓐ -RESIDUAL- LOOSE, MOIST, RED-BROWN, SILTY FINE TO COARSE SAND (A-2-4)

RW-2
29+00
24' RT

06/16

BT

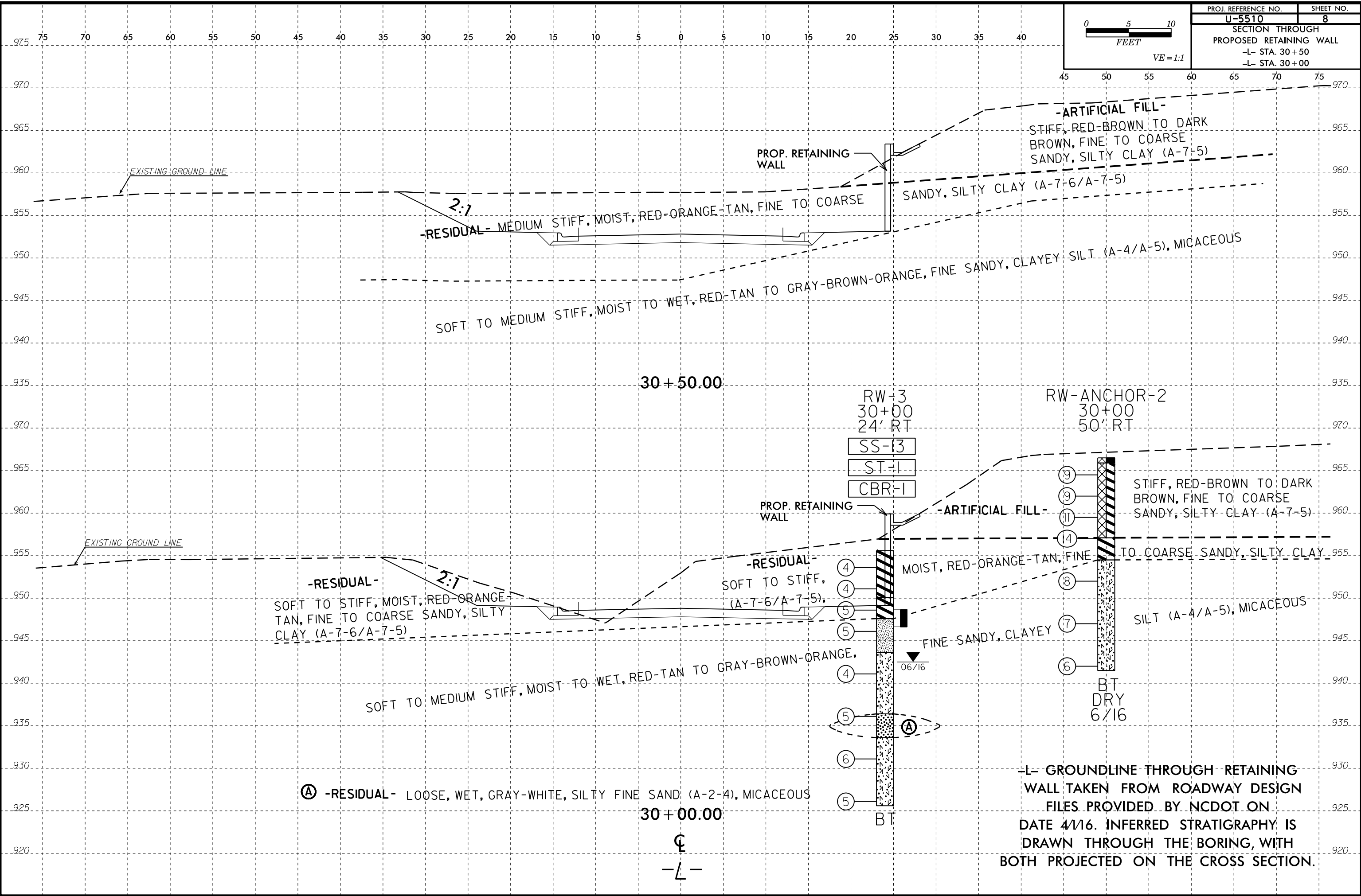
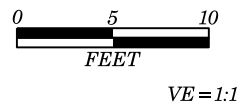
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29 + 50.00

8/23/99

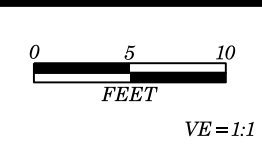
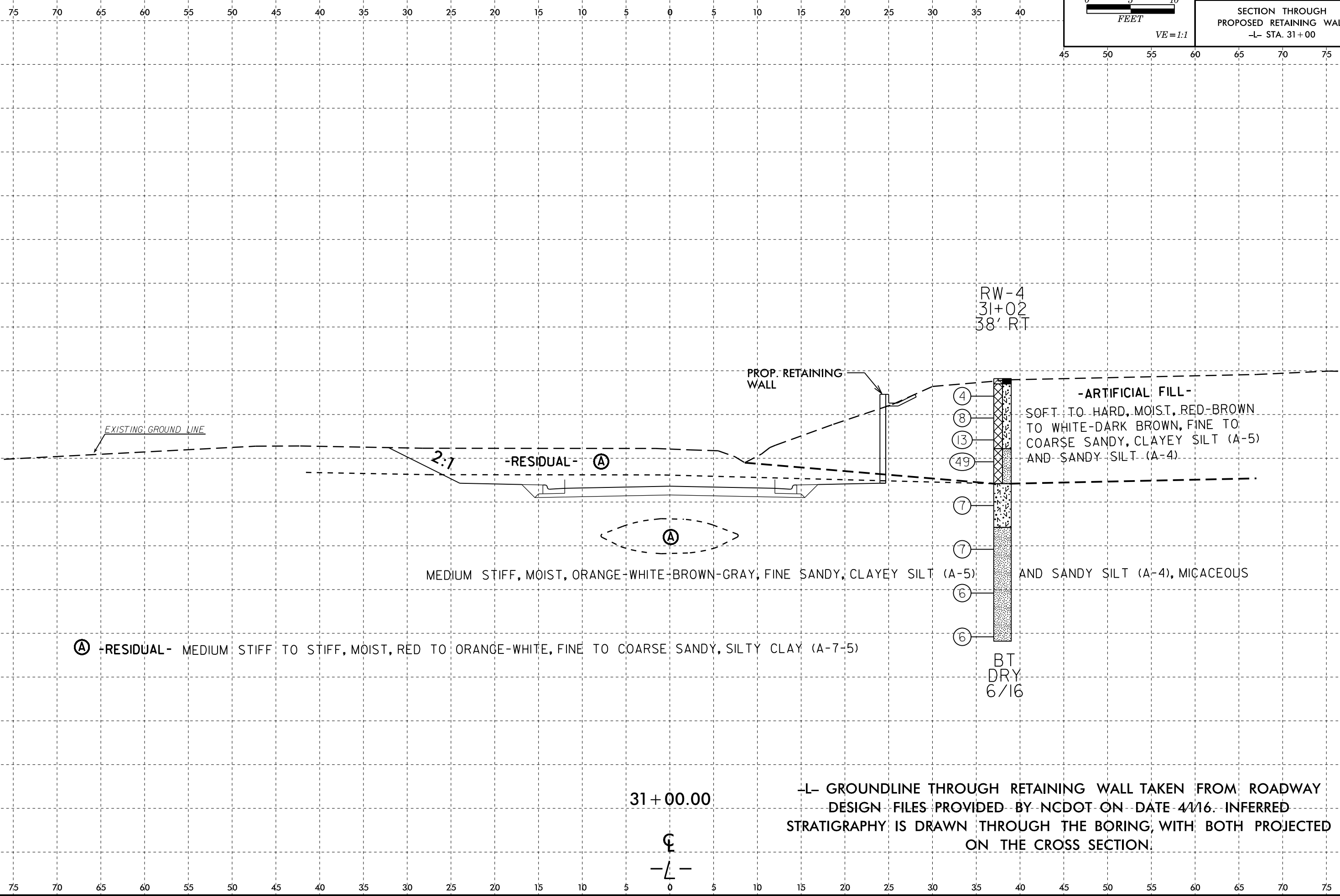
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PROJ. REFERENCE NO.	SHEET NO.
U-5510	8
SECTION THROUGH PROPOSED RETAINING WALL	
-L- STA. 30+50	
-L- STA. 30+00	



-L- GROUNDLINE THROUGH RETAINING WALL TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

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PROJ. REFERENCE NO.	SHEET NO.
U-5510	9

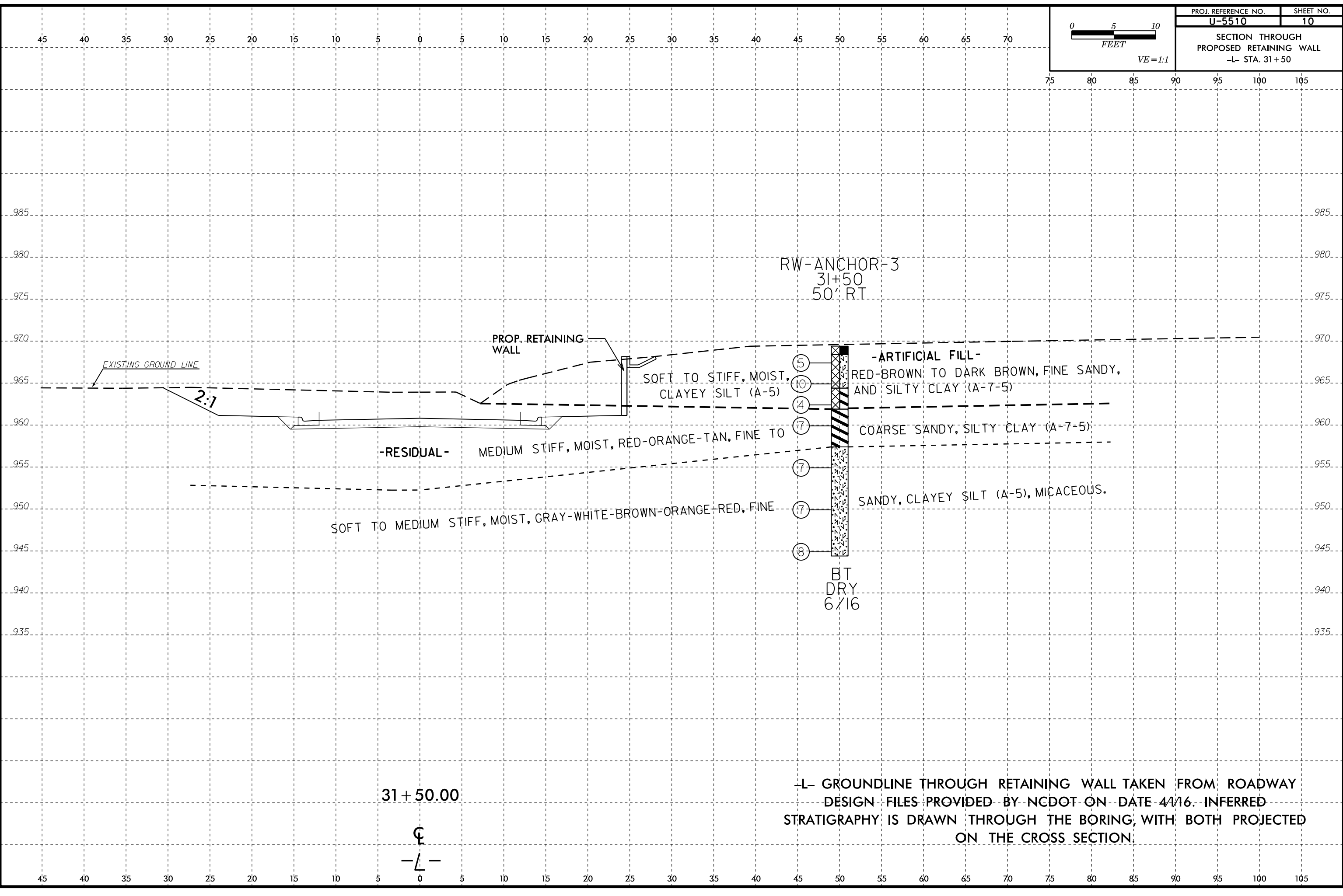
SECTION THROUGH
PROPOSED RETAINING WALL
-L- STA. 31+00

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SECTION THROUGH PROPOSED RETAINING WALL -L- STA. 31+50	

VE = 1:1



31 + 50.00

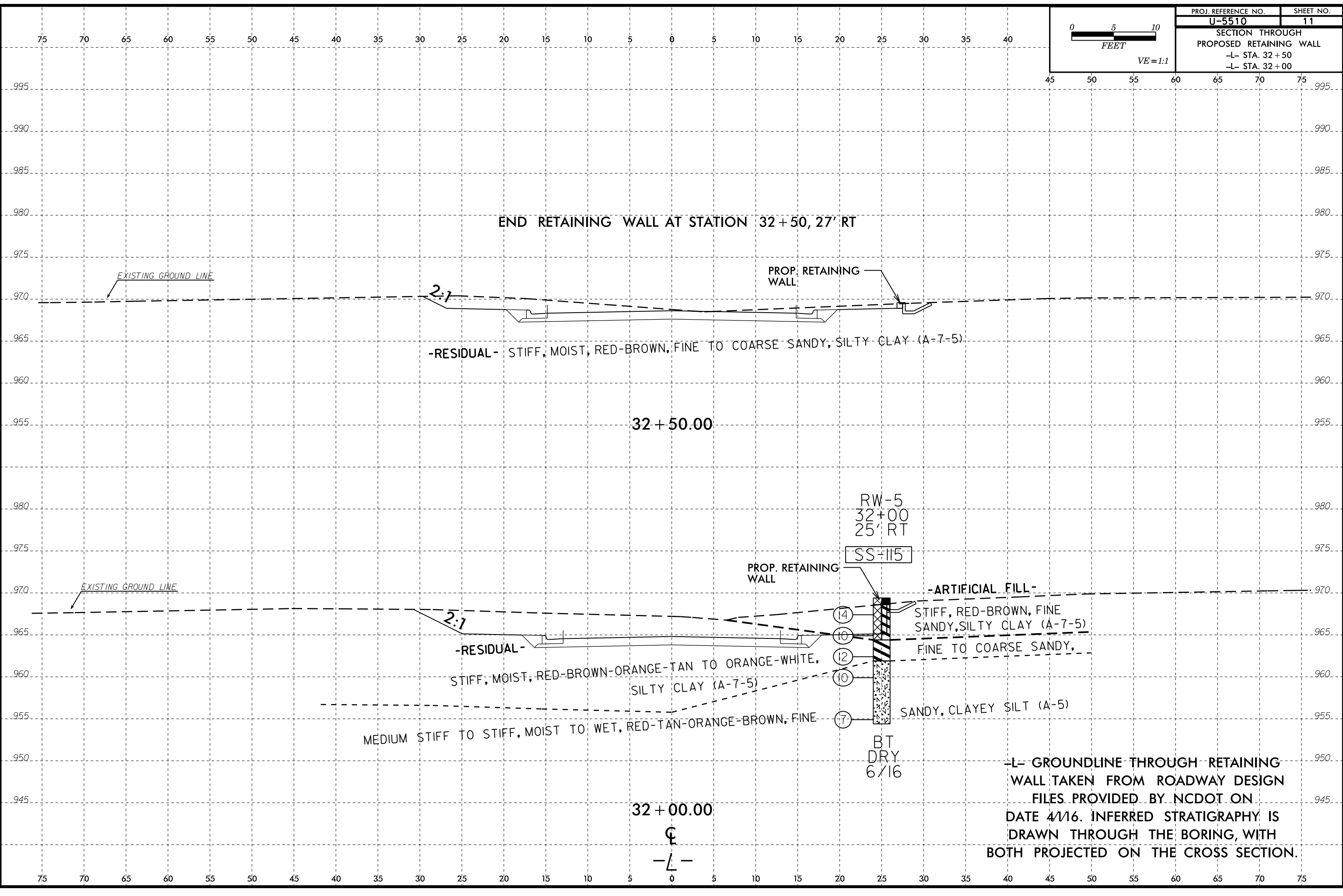
⊕
-L-

-L- GROUNDLINE THROUGH RETAINING WALL TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

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PROJ. REFERENCE NO. U-5510	SHEET NO. 11
SECTION THROUGH PROPOSED RETAINING WALL	
-L- STA. 32+50	
-L- STA. 32+00	

0 5 10
FEET
VE=1:1



END RETAINING WALL AT STATION 32+50, 27' RT

EXISTING GROUND LINE

PROP. RETAINING WALL

-RESIDUAL- STIFF, MOIST, RED-BROWN, FINE TO COARSE SANDY, SILTY CLAY (A-7-5)

32 + 50.00

RW-5
32+00
25' RT

SS-115

PROP. RETAINING WALL

-ARTIFICIAL FILL-

STIFF, RED-BROWN, FINE SANDY, SILTY CLAY (A-7-5)

FINE TO COARSE SANDY,

-RESIDUAL- STIFF, MOIST, RED-BROWN-ORANGE-TAN TO ORANGE-WHITE, SILTY CLAY (A-7-5)

SANDY, CLAYEY SILT (A-5)

MEDIUM STIFF TO STIFF, MOIST TO WET, RED-TAN-ORANGE-BROWN, FINE

BT
DRY
6/16

32 + 00.00

-L- GROUNDLINE THROUGH RETAINING WALL TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

CL
-L-

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45532.1.1		TIP U-5510		COUNTY CATAWBA		GEOLOGIST C. Bukovitz									
SITE DESCRIPTION SR 1468 (Sweetwater Road) Extension from US 70 to SR 1005 (Startown Road)							GROUND WTR (ft)								
BORING NO. RW-1		STATION 28+01		OFFSET 67 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 950.3 ft		TOTAL DEPTH 25.0 ft		NORTHING 716,334		EASTING 1,322,143									
DRILL RIG/HAMMER EFF./DATE HPC 8513 CME-550X 81% 06/06/2016		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. White		START DATE 06/01/16		COMP. DATE 06/01/16		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					
955															
950	949.3	1.0	3	5	6									950.3	0.0
	946.8	3.5	5	10	12									946.0	4.3
945	944.3	6.0	3	4	4										
	941.8	8.5	3	3	5										
940															
	936.8	13.5	3	2	3									938.3	12.0
935															
	931.8	18.5	2	2	3										
930															
	926.8	23.5	2	2	2									925.3	25.0

WBS 45532.1.1		TIP U-5510		COUNTY CATAWBA		GEOLOGIST C. Bukovitz									
SITE DESCRIPTION SR 1468 (Sweetwater Road) Extension from US 70 to SR 1005 (Startown Road)							GROUND WTR (ft)								
BORING NO. RW-ANCHOR-1		STATION 28+50		OFFSET 50 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 952.5 ft		TOTAL DEPTH 25.0 ft		NORTHING 716,385		EASTING 1,322,133									
DRILL RIG/HAMMER EFF./DATE HPC 8513 CME-550X 81% 06/06/2016		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic											
DRILLER J. White		START DATE 05/31/16		COMP. DATE 05/31/16		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					
955															
	951.5	1.0	3	3	4									952.5	0.0
950	949.0	3.5	4	5	8										
	946.5	6.0	3	3	6										
945	944.0	8.5	3	3	4										
940	939.0	13.5	3	3	3										
935	934.0	18.5	2	2	2										
930	929.0	23.5	2	1	3										

NCDOT BORE DOUBLE U5510_GEO_BORELOGS.GPJ NC_DOT_GDT 7/21/16

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45532.1.1		TIP U-5510		COUNTY CATAWBA		GEOLOGIST C. Bukovitz												
SITE DESCRIPTION SR 1468 (Sweetwater Road) Extension from US 70 to SR 1005 (Startown Road)							GROUND WTR (ft)											
BORING NO. RW-2		STATION 29+00		OFFSET 24 ft RT		ALIGNMENT -L-												
COLLAR ELEV. 954.9 ft		TOTAL DEPTH 35.0 ft		NORTHING 716,438		EASTING 1,322,114												
DRILL RIG/HAMMER EFF./DATE HPC 8513 CME-550X 81% 06/06/2016		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic														
DRILLER J. White		START DATE 05/31/16		COMP. DATE 05/31/16		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								
955														954.9	0.0	GROUND SURFACE		
	953.9	1.0	1	2	4								M			RESIDUAL Medium Stiff to Stiff, Red, Fine to Coarse Sandy, Silty CLAY (A-7-5).		
	951.4	3.5	3	5	7								M					
950	948.9	6.0	4	3	5								M					
	946.4	8.5	3	4	4								M			946.9	8.0	Medium Stiff, Red-Orange, Fine Sandy, Clayey SILT (A-5), Micaceous.
945													M					
	941.4	13.5	2	2	3								M			942.9	12.0	Loose, Red-Brown, Silty Fine to Coarse SAND (A-2-4), with trace gravel-sized rock fragments.
940													M					
	936.4	18.5	3	2	2								M			937.9	17.0	Soft to Medium Stiff, Orange-Red-Brown, Fine Sandy, Clayey SILT (A-5), Micaceous.
935													M					
	931.4	23.5	1	1	2								W					
930													W					
	926.4	28.5	1	1	3								W					
925													W					
	921.4	33.5	2	2	3								W					
920													W					
															919.9	35.0	Boring Terminated at Elevation 919.9 ft In Residual Silt (A-5) 1) Approximately 0.1 ft. of topsoil was encountered at the ground surface.	

WBS 45532.1.1		TIP U-5510		COUNTY CATAWBA		GEOLOGIST C. Bukovitz												
SITE DESCRIPTION SR 1468 (Sweetwater Road) Extension from US 70 to SR 1005 (Startown Road)							GROUND WTR (ft)											
BORING NO. RW-3		STATION 30+00		OFFSET 24 ft RT		ALIGNMENT -L-												
COLLAR ELEV. 955.6 ft		TOTAL DEPTH 30.0 ft		NORTHING 716,537		EASTING 1,322,128												
DRILL RIG/HAMMER EFF./DATE HPC 8513 CME-550X 81% 06/06/2016		DRILL METHOD H.S. Augers		HAMMER TYPE Automatic														
DRILLER J. White		START DATE 05/31/16		COMP. DATE 05/31/16		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								
960														955.6	0.0	GROUND SURFACE		
	954.6	1.0	2	2	2								M			RESIDUAL Soft to Medium Stiff, Red-Orange-Tan, Fine to Coarse Sandy, Silty CLAY (A-7-6(11) / A-7-5), with trace organics.		
	952.1	3.5	3	2	2								M					
955	949.6	6.0	2	2	3								M			947.6	8.0	Medium Stiff, Orange-Tan, Fine Sandy SILT (A-4).
	947.1	8.5	2	2	3								M					
950													M			943.6	12.0	Soft, Red-Brown, Fine Sandy, Clayey SILT (A-5), Micaceous.
	942.1	13.5	2	2	2								M					
945													M					
	937.1	18.5	2	2	3								W			936.4	19.2	Loose, Gray-White, Silty Fine SAND (A-2-4), Micaceous.
940													W			933.6	22.0	Medium Stiff, Red-Brown to Orange-White, Fine Sandy, Clayey SILT (A-5).
	932.1	23.5	2	2	4								W					
935													W					
	927.1	28.5	1	2	3								W					
930													W					
															925.6	30.0	Boring Terminated at Elevation 925.6 ft In Residual Silt (A-5) 1) Approximately 0.1 ft. of topsoil was encountered at the ground surface. Other Samples: CBR-1 (1.0 - 10.0) ST-1 (7.0 - 9.0)	

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45532.1.1	TIP U-5510	COUNTY CATAWBA	GEOLOGIST C. Bukovitz
SITE DESCRIPTION SR 1468 (Sweetwater Road) Extension from US 70 to SR 1005 (Startown Road)			GROUND WTR (ft)
BORING NO. RW-ANCHOR-2	STATION 30+00	OFFSET 50 ft RT	ALIGNMENT -L-
COLLAR ELEV. 966.5 ft	TOTAL DEPTH 25.0 ft	NORTHING 716,533	EASTING 1,322,154
DRILL RIG/HAMMER EFF./DATE HPC 8513 CME-550X 81% 06/06/2016		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER J. White	START DATE 06/03/16	COMP. DATE 06/03/16	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100				
970														
965	965.5	1.0	4	5	4							M	GROUND SURFACE Asphalt (0.1') and Gravel (0.5'). ARTIFICIAL FILL Stiff, Red-Brown to Dark Brown, Fine to Coarse Sandy, Silty CLAY (A-7-5).	
	963.0	3.5	6	5	4							M		
960	960.5	6.0	4	5	6							M		
	958.0	8.5	6	6	8							M		
955	953.0	13.5	3	4	4							M	RESIDUAL Stiff, Red, Fine Sandy, Silty CLAY (A-7-5). Medium Stiff, Red-Tan to Gray-Brown-Orange, Fine Sandy, Clayey SILT (A-5).	
950	948.0	18.5	3	3	4							M		
945	943.0	23.5	3	3	3							M		
												M	Boring Terminated at Elevation 941.5 ft In Residual Silt (A-5)	

WBS 45532.1.1	TIP U-5510	COUNTY CATAWBA	GEOLOGIST C. Bukovitz
SITE DESCRIPTION SR 1468 (Sweetwater Road) Extension from US 70 to SR 1005 (Startown Road)			GROUND WTR (ft)
BORING NO. RW-4	STATION 31+02	OFFSET 38 ft RT	ALIGNMENT -L-
COLLAR ELEV. 969.1 ft	TOTAL DEPTH 30.0 ft	NORTHING 716,638	EASTING 1,322,157
DRILL RIG/HAMMER EFF./DATE HPC 8513 CME-550X 81% 06/06/2016		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER J. White	START DATE 06/02/16	COMP. DATE 06/02/16	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	LOG	SOIL AND ROCK DESCRIPTION
			0.5ft	0.5ft	0.5ft	0	25	50	75	100			
970													
965	968.1	1.0	2	2	2							M	GROUND SURFACE Asphalt (0.3') and Gravel (0.3'). ARTIFICIAL FILL Soft to Stiff, Red-Brown, Fine to Coarse Sandy, Clayey SILT (A-5).
	965.6	3.5	3	3	5							M	
	963.1	6.0	3	5	8							M	
960	960.6	8.5	8	18	31							M	Hard, White-Dark Brown, Fine to Coarse Sandy SILT (A-4), with trace gravel.
	955.6	13.5	3	3	4							M	RESIDUAL Medium Stiff, Orange-Red, Fine Sandy, Clayey SILT (A-5).
950	950.6	18.5	3	3	4							M	Medium Stiff, Orange-Brown-Gray-White, Fine Sandy SILT (A-4), Micaceous.
945	945.6	23.5	3	3	3							M	
940	940.6	28.5	2	3	3							M	
												M	Boring Terminated at Elevation 939.1 ft In Residual Silt (A-4)

GEOTECHNICAL BORING REPORT

BORE LOG

WBS 45532.1.1		TIP U-5510		COUNTY CATAWBA		GEOLOGIST C. Bukovitz									
SITE DESCRIPTION SR 1468 (Sweetwater Road) Extension from US 70 to SR 1005 (Startown Road)							GROUND WTR (ft)								
BORING NO. RW-ANCHOR-3		STATION 31+50		OFFSET 50 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 969.4 ft		TOTAL DEPTH 25.0 ft		NORTHING 716,682		EASTING 1,322,175									
DRILL RIG/HAMMER EFF./DATE HPC 8513 CME-550X 81% 06/06/2016			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER J. White		START DATE 06/03/16		COMP. DATE 06/03/16		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					
970														969.4 GROUND SURFACE 0.0	
	968.4	1.0	3	2	3								M	968.4 Asphalt (0.4') and Gravel (0.6') 1.0	
	965.9	3.5	3	4	6								M	ARTIFICIAL FILL Medium Stiff to Stiff, Red-Brown, Fine Sandy, Clayey SILT (A-5). 5.0	
	963.4	6.0	3	2	2								M	ARTIFICIAL FILL Soft, Dark Brown, Silty CLAY (A-7-5), with trace organics. 7.5	
	960.9	8.5	2	3	4								M	RESIDUAL Medium Stiff, Red-Orange, Fine Sandy, Silty CLAY (A-7-5). 12.0	
	955.9	13.5	3	3	4								M	Medium Stiff, Gray-White-Brown-Orange, Fine Sandy, Clayey SILT (A-5), Micaceous. 15.0	
	950.9	18.5	3	3	4								M		
	945.9	23.5	3	3	5								M		
													M	944.4 Boring Terminated at Elevation 944.4 ft In Residual Silt (A-5) 25.0	

WBS 45532.1.1		TIP U-5510		COUNTY CATAWBA		GEOLOGIST C. Bukovitz									
SITE DESCRIPTION SR 1468 (Sweetwater Road) Extension from US 70 to SR 1005 (Startown Road)							GROUND WTR (ft)								
BORING NO. RW-5		STATION 32+00		OFFSET 25 ft RT		ALIGNMENT -L-									
COLLAR ELEV. 969.4 ft		TOTAL DEPTH 15.0 ft		NORTHING 716,735		EASTING 1,322,157									
DRILL RIG/HAMMER EFF./DATE HPC 8513 CME-550X 81% 06/06/2016			DRILL METHOD H.S. Augers		HAMMER TYPE Automatic										
DRILLER J. White		START DATE 06/03/16		COMP. DATE 06/03/16		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					
970														969.4 GROUND SURFACE 0.0	
	968.4	1.0	3	6	8								M	968.6 Asphalt (0.3') and Gravel (0.5') 0.8	
	965.9	3.5	6	6	4								M	ARTIFICIAL FILL Stiff, Red-Brown, Fine Sandy, Silty CLAY (A-7-5). 5.0	
	963.4	6.0	3	5	7								M	RESIDUAL Stiff, Red, Fine to Coarse Sandy, Silty CLAY (A-7-5(27)). 7.5	
	960.9	8.5	5	5	5								M	Highly Plastic (PI=25) Stiff to Medium Stiff, Red-Tan-Orange-Brown, Fine Sandy, Clayey SILT (A-5). 12.0	
	955.9	13.5	3	3	4								M		
													M	954.4 Boring Terminated at Elevation 954.4 ft In Residual Silt (A-5) 15.0	

NCDOT BORE DOUBLE U5510_GEO_BORELOGS.GPJ NC_DOT.GDT 7/20/16

SOIL TEST RESULTS

SAMPLE NO.	BORING	OFFSET	STATION -L-	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
								C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-47	RW-1	67' RT	28+01	6.0-7.5	A-5 (0)	47	2	32.9	33.4	10.8	22.8	100.0	81.0	38.0	27.0	-
SS-13	RW-3	24' RT	30+00	3.5-5.0	A-7-6(11)	50	22	20.5	19.3	12.2	48.0	93.0	81.0	59.0	27.5	-
SS-115	RW-5	25' RT	32+00	6.0-7.5	A-7-5(27)	66	25	4.9	13.2	23.5	58.4	100.0	97.0	86.0	29.1	-
CBR-1	RW-3	24' RT	30+00	1.0-10.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	-
ST-1	RW-3	24' RT	30+00	7.0-9.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	-

SS = Split-Barrel Sample (ASTM D-1586)

ST= Shelby Tube Sample (ASTM D-1587) - Informed by NCDOT that testing would not be necessary

CBR = California Bearing Ratio Sample - Transferred to NCDOT, no testing performed

Lab Technician: Amanda R. Roth

NCDOT Certification No.: 112-09-1003

Signature:  _____