STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5510	1	42

REFERENCE: U-5510

PROJECT: 45532

SEE SHEET 3 FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

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APPENDICES

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

ROADWAY SUBSURFACE INVESTIGATION

COUNTY *CATAWBA*

PROJECT DESCRIPTION *SR 1468 (SWEETWATER ROAD) EXTENSION FROM US 70 TO SR 1005 (STARTOWN ROAD)*

INVENTORY

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

HPC

C. BUKOVITZ

A. ROTH

M. BREWER, P.E.

J. FRAZIER

INVESTIGATED BY *ECS CAROLINAS, LLP*

DRAWN BY *M. BREWER, P.E.*

CHECKED BY *M. WALKO, P.E.*

SUBMITTED BY *ECS CAROLINAS, LLP*

DATE *AUGUST 2016*

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

DocuSigned by:
D. Matthew Brewer
EC2ABBEE99DB48C...

8/29/2016

SIGNATURE DATE

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.	SHEET NO.
U-5510	2

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

GENERAL CLASS.	GRANULAR MATERIALS (≤ 35% PASSING #200)							SILT-CLAY MATERIALS (> 35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5, A-7-6			
SYMBOL														
% PASSING #10	50 MX													
#40	30 MX	50 MX	51 MN											
#200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN	GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
MATERIAL PASSING #40 LL PI	— 6 MX		— NP	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	40 MX 10 MX	41 MN 10 MX	40 MX 11 MN	41 MN 11 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
GROUP INDEX	0		0	0		4 MX		8 MX	12 MX	16 MX	NO MX			
USUAL TYPES OF MAJOR MATERIALS	STONE FRAGS. GRAVEL, AND SAND		FINE SAND	SILTY OR CLAYEY GRAVEL AND SAND				SILTY SOILS		CLAYEY SOILS				
GEN. RATING AS SUBGRADE	EXCELLENT TO GOOD							FAIR TO POOR				FAIR TO POOR	POOR	UNSUITABLE

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

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH ($TONS/FT^2$)
GENERALLY GRANULAR MATERIAL (NON-COHESIVE)	VERY LOOSE LOOSE MEDIUM DENSE DENSE VERY DENSE	< 4 4 TO 10 10 TO 30 30 TO 50 > 50	N/A
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT SOFT MEDIUM STIFF STIFF VERY STIFF HARD	< 2 2 TO 4 4 TO 8 8 TO 15 15 TO 30 > 30	< 0.25 0.25 TO 0.5 0.5 TO 1.0 1 TO 2 2 TO 4 > 4

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.00	0.42	0.25	0.075	0.053

BOULDER (BLDR.)	COBBLE (COB.)	GRAVEL (GR.)	COARSE SAND (CSE. SD.)	FINE SAND (F SD.)	SILT (SL.)	CLAY (CL.)

GRAIN SIZE	MM	305	75	2.0	0.25	0.05	0.005
	IN.	12	3				

SOIL MOISTURE - CORRELATION OF TERMS

SOIL MOISTURE SCALE (ATTERBERG LIMITS)	FIELD MOISTURE DESCRIPTION	GUIDE FOR FIELD MOISTURE DESCRIPTION
	- SATURATED - (SAT.)	USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE
LL — LIQUID LIMIT		
PLASTIC RANGE (PI)	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
PL — PLASTIC LIMIT		
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NON PLASTIC	0-5	VERY LOW
SLIGHTLY PLASTIC	6-15	SLIGHT
MODERATELY PLASTIC	16-25	MEDIUM
HIGHLY PLASTIC	26 OR MORE	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

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS	OTHER MATERIAL	
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%	TRACE	1 - 10%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%	LITTLE	10 - 20%
MODERATELY ORGANIC	5 - 10%	12 - 20%	SOME	20 - 35%
HIGHLY ORGANIC	> 10%	> 20%	HIGHLY	35% AND ABOVE

GROUND WATER

- WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING
- STATIC WATER LEVEL AFTER 24 HOURS
- PW — PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA
- SPRING OR SEEP

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT
- INFERRED SOIL BOUNDARY
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP & DIP DIRECTION OF ROCK STRUCTURES
- SPT, DPT, DMT, VST, PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- CONE PENETROMETER TEST
- SOUNDING ROD
- TEST BORING WITH CORE
- SPT N-VALUE

RECOMMENDATION SYMBOLS

- UNDERCUT
- SHALLOW UNDERCUT
- UNCLASSIFIED EXCAVATION - UNSUITABLE WASTE
- UNCLASSIFIED EXCAVATION - ACCEPTABLE DEGRADABLE ROCK
- UNCLASSIFIED EXCAVATION - ACCEPTABLE, BUT NOT TO BE USED IN THE TOP 3 FEET OF EMBANKMENT OR BACKFILL

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, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
NP - NON PLASTIC
ORG. - ORGANIC
PMT - PRESSUREMETER TEST
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
w - MOISTURE CONTENT
V - VERY
VST - VANE SHEAR TEST
WEA. - WEATHERED
γ - UNIT WEIGHT
γ_d - 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
- [X] CME-550X
- [ ] VANE SHEAR TEST
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 6" HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [ ] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____" STEEL TEETH
- [ ] TRICONE _____" TUNG.-CARB.
- [ ] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] 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. 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 YEILD 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 GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK.
SOFT	CAN BE GROVED 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

TERM	SPACING
VERY WIDE	MORE THAN 10 FEET
WIDE	3 TO 10 FEET
MODERATELY CLOSE	1 TO 3 FEET
CLOSE	0.16 TO 1 FOOT
VERY CLOSE	LESS THAN 0.16 FEET

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	4 FEET
THICKLY BEDDED	1.5 - 4 FEET
THINLY BEDDED	0.16 - 1.5 FEET
VERY THINLY BEDDED	0.03 - 0.16 FEET
THICKLY LAMINATED	0.008 - 0.03 FEET
THINLY LAMINATED	< 0.008 FEET

INDURATION

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

FRIABLE	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 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 (RQD) - 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 (SRQD) - 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 SW12; N-716241.0901, E-1322059.7824 Elevation : 937.05 FEET
BL SW14; N-716660.8392, E-1322116.2983 ELEVATION: 963.23 FEET

NOTES:

NORTHING AND EASTING OBTAINED USING A TRIMBLE GEO 7X WITH SUB FOOT ACCURACY.

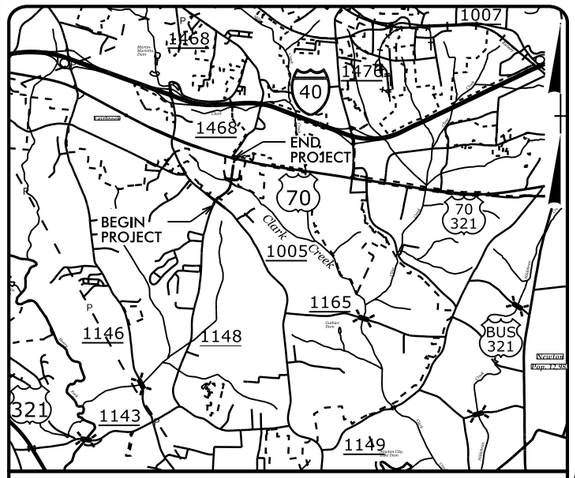
DATE: 8-15-14

09/08/99

TIP PROJECT: U-5510

CONTRACT:

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

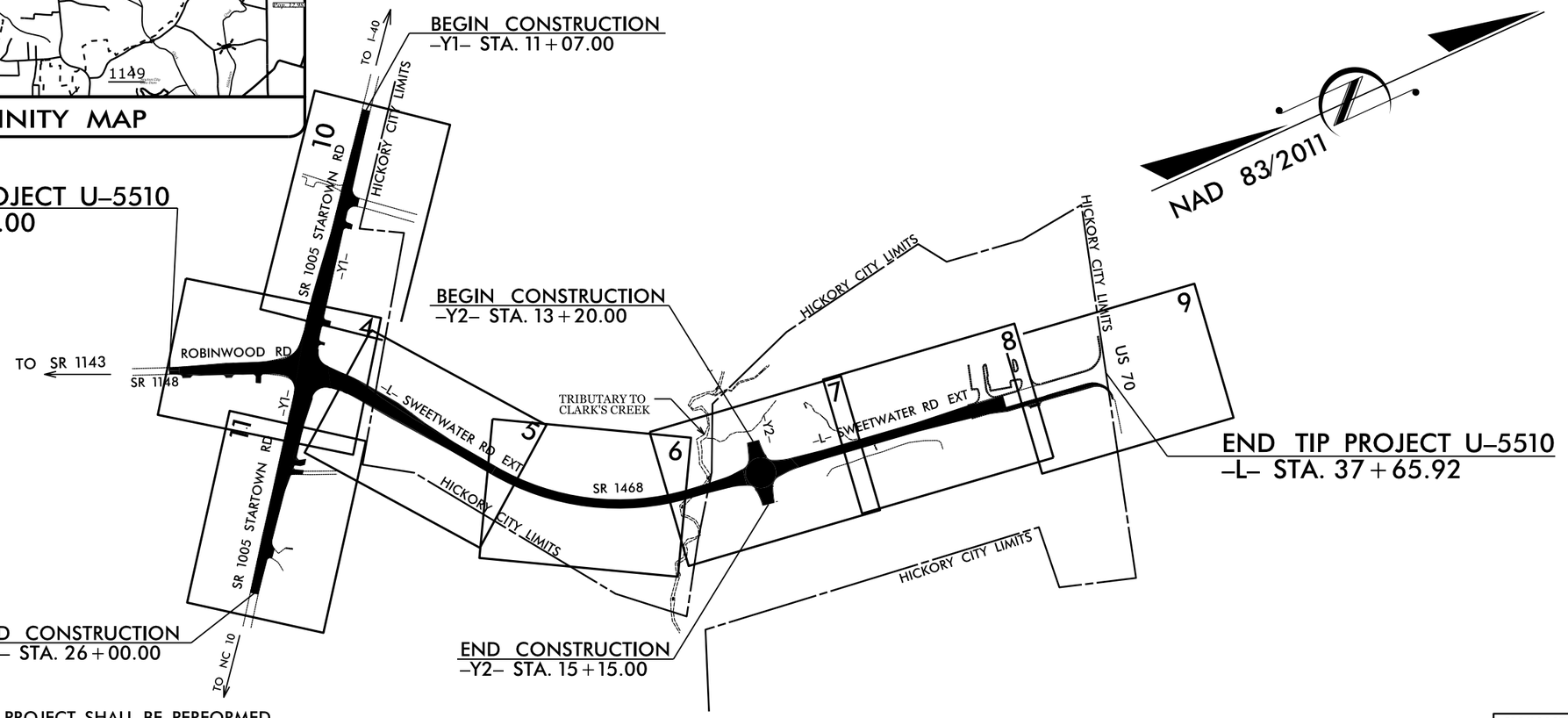
CATAWBA COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-5510	3	42

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
45532.1.1	TCSP-1468(2)	PE
45532.2.1	TCSP-1468(2)	R/W, UTIL.

LOCATION: SR 1468 (SWEETWATER RD) EXTENSION FROM US 70 TO SR 1005 (STARTOWN RD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, SIGNING, AND STRUCTURE



CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.

THIS PROJECT IS WITHIN THE MINICIPAL BOUNDARIES OF THE CITY OF HICKORY.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES

20 10 0 20 40
PLANS

20 10 0 20 40
PROFILE (HORIZONTAL)

4 2 0 4 8
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 400
ADT 2040 = 9500
K = 9 %
D = 55 %
T = 3 % *
V = 40 MPH
* TTST = 1% DUAL 2%
FUNC CLASS = URBAN COLLECTOR
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-5510 = 0.562 MILES
TOTAL LENGTH TIP PROJECT U-5510 = 0.562 MILES

NCDOT CONTACT: JACKIE McSWAIN

PLANS PREPARED BY:
TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

PLANS PREPARED FOR:
NORTH CAROLINA DEPARTMENT OF TRANSPORATION
DIVISION 12
1710 East Marion St.
Shelby, NC 28151

RIGHT OF WAY DATE: _____

LETTING DATE: _____

2012 STANDARD SPECIFICATIONS

LEONARD G. FLETCHER, PE
PROJECT ENGINEER

JIMMY L. TERRY, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

P.E.
SIGNATURE:

ROADWAY DESIGN ENGINEER

P.E.
SIGNATURE:

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION •

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mbrewer2 AT ECS-T044P6HLL0

ECS Carolinas, LLP

1812 Center Park Drive, Suite D
Charlotte, NC 28217
T 704.525.5152 I F 704.357.0023
www.ecslimited.com

August 18, 2016

WBS NO:	45532.1.1
TIP NO:	U-5510
F.A. NUMBER:	TCSP-1468(2)
PROJECT ID:	28070
COUNTY:	Catawba
DESCRIPTION:	SR 1468 (Sweetwater Road) Extension from US 70 to SR 1005 (Startown Road)

SUBJECT: **Geotechnical Report – Inventory**

ECS Carolinas, LLP, (ECS) has completed the roadway exploration for this project. More specifically, this report includes the following design segments:

Line	Stations(±)
-L- (SR 1148 – Robinwood Road)	8+00 to 12+04
-L- (SR 1468 – Sweetwater Road Extension / 21st Street Drive SE)	12+04 to 37+66
-Y1- (SR 1005 – Startown Road)	11+07 to 26+00
-Y2- (Future Roadway)	13+20 to 15+15

Geotechnical cross sections and profiles presented in this report are based on the roadway plans and design files provided by the NCDOT on April 1, 2016, and the subsurface exploration information obtained by ECS. In cases where other areas of concern are encountered in addition to the areas addressed in this report, ECS should be notified for further evaluation based on the actual field conditions.

Site Description

The majority of the existing project site is undeveloped and heavily wooded. The proposed roadway corridor encounters residential properties at the intersection with SR 1005 and commercial properties at the tie in to 21st Street Drive SE. SR 1005 – Startown Road (-Y1-) is an existing asphalt paved two-lane road with 10-foot wide lanes and 2-foot wide paved shoulders. A portion of -L- has been previously constructed in the vicinity of SR 1005 and US 70. The section in the vicinity of SR 1005 consists of an asphalt paved two-lane roadway with 10-foot wide lanes and 2-foot wide shoulders. The section in the vicinity of US 70 consists of an existing asphalt paved, 36-foot wide roadway with existing curb and gutter. The site topography along -L- ranges from approximate EL 1,034 feet at the southern end of the project to approximate EL 917 at the water crossing and to approximate EL 997 feet at the northern end of the project.

Project Description

The proposed construction consists of approximately 0.56 miles of new roadway alignment along the main alignment (-L-) with additional widening of the secondary roads (Y-lines). The beginning of the project site is located approximately 400 feet south of the intersection of SR 1148 (-L-) and SR 1005 (-Y1-) at -L- Station 12+04. The end of the project is located at the intersection of 21st Street Drive SE (-L-) and US HWY 70 at -L- Station 37+66. A traffic circle will be utilized to tie the proposed main line (-L-) to a proposed future roadway (-Y2-) at Station 26+85.

Based on the grading information provided to us by the NCDOT, the proposed roadway subgrade will typically encounter fills on the order of 1 to 5 feet along the main line (-L-) and SR 1005 (-Y1-). Cuts on the order of 5 to 17 feet in height are anticipated from approximate -L- Station 16+00 to 23+00 and -L- Station 27+00 to 31+00. A retaining wall supported cut slope will be constructed from approximately -L- Station 27+70 to 32+50 RT. The larger fill sections of the project are to be constructed at -L- Station 23+50 to 27+00 with proposed fill heights on the order of 5 to 24 feet. There is one water crossing along the main alignment (-L-) shown on the roadway plans. The crossing occurs near -L- Station 25+00. A Reinforced Concrete Box Culvert (RCBC) will be utilized at the water crossing.

Subsurface Exploration

A geotechnical field investigation was performed by ECS between May 31 and June 6, 2016. During this time period, a total of twenty-five (25) standard penetration test (SPT) borings were advanced with an ATV-mounted CME 550X drill rig equipped with an automatic hammer.

Representative portions of the split-barrel soil samples obtained throughout the exploration program were transported to our laboratory. In the laboratory, representative split-barrel soil samples were selected and tested for gradation and Atterberg Limits in accordance with AASHTO test methods T-87, T-88, T-89, and T-90 as modified by the NCDOT Materials and Tests Unit. The natural soil water content was also determined for these samples in accordance with AASHTO T-265. The purpose of the laboratory testing was to aid in our classification of the soil samples and development of engineering recommendations. Bulk samples and Shelby tube samples of selected soil materials were obtained for additional testing, if requested.

Split-barrel samples, bulk samples and Shelby tube samples recovered on this project will be stored at the ECS Charlotte office for a period of 90 days. After 90 days, the samples can be transferred to the NCDOT Western Regional Geotechnical Office in Harrisburg, North Carolina, if requested.

Areas of Special Geotechnical Interest

1) High Plasticity Soils: The following areas contain high plasticity soils with plasticity indices (PI's) in excess of 25. High plasticity soils have the potential to cause subgrade problems during construction, embankment stability or long term settlement problems:

Line	Station (±)	Offsets
-L-	12+50 to 14+50, 18+00 to 22+00	CL
-L-	28+00 to 33+00	CL and RT
-Y1-	16+00	CL

2) Wet or Saturated Soils: The following areas contain soils with natural moisture contents in excess of the liquid limit, high moisture contents noted in the field during drilling, or soils encountered below the water table:

Line	Station (±)	Offsets
-L-	24+72 to 25+12, 27+00, 29+00 to 30+00	LT to RT

3) Alluvial Soils: The following locations were found to have near surface very loose to loose alluvial soils at the approximate stationing:

Line	Station (±)	Offsets
-L-	24+20 to 25+80	LT to RT

4) Soft/Very Loose Soils: The following areas contain relatively soft or very loose to loose soils that have the potential for subgrade problems, embankment stability or long-term settlement problems during construction:

Line	Station (±)	Offsets
-L-	12+00 to 16+00, 27+00 to 31+00	CL to RT
-L-	24+20 to 25+80	LT to RT
-Y1-	16+00	LT

5) Shallow Groundwater: The following areas indicated relatively shallow groundwater which has the potential to cause subgrade problems or constructability issues.

Line	Station (±)	Offsets
-L-	24+72 to 25+12	LT to RT

6) Micaceous Soils: Micaceous soils were encountered at various depths and locations along the proposed alignments. Soils containing high amounts of mica have low strength properties, difficult to compact, and are generally lightweight in nature. Below is a summary of the locations where micaceous soils were noted by our field professional(s) at the time of drilling.

Line	Station (±)	Offsets
-L-	11+45, 15+00, 21+00 to 33+00	CL and RT
-Y1-	13+00, 16+00, 22+50	LT

Physiography and Geology

The project site is located in the Piedmont Physiographic Province. In accordance with the Geologic Map of North Carolina, 1985, the predominant rock types in this area are mapped as amphibolite and biotite gneiss. Weathered rock samples recovered from our borings exhibited the characteristics of Gneiss. The virgin soils are the residual product of in-place chemical weathering of rock that was similar to the rock presently underlying the site.

The topography along the project slopes towards the natural drainage area near approximate Station 25+00. A sanitary sewer utility easement runs perpendicular to the proposed alignment, through the NCDOT right-of-way (ROW), near approximate -L- Station 25+64. One area of the project contained a rock outcropping in the vicinity of the proposed culvert (near -L- Station 25+00).

Based on a review of the Design Drawings available at the time of our exploration, approximate cut and fill depths along the profile centerline are as follows for the provided sections:

Line	Station (±)	Approximate Cut/Fill Depths
-L-	8+00 to 12+20	Minimal Cut and Fill
-L-	12+20 to 14+90	Minimal Cut, Fill up to 3 ft.
-L-	14+90 to 23+50	Cut up to 17 ft.
-L-	23+50 to 27+30	Fill up to 23 ft.
-L-	27+30 to 32+50	Cut up to 17 ft.
-L-	32+50 to 34+50	Minimal Cut and Fill
-Y1-	11+07 to 26+00	Minimal Cut, Fill up to 4 ft.

Soil Properties

The subsurface conditions discussed below represent the subsurface conditions based on interpretation of the boring data using normally accepted geotechnical engineering judgments. The transitions between different soil strata are usually less distinct than those shown on the Borelogs. Sometimes the relatively small sample obtained in the field is insufficient to definitively describe the origin of the subsurface material. Although individual soil test borings are representative of the subsurface conditions at the boring locations on the dates shown, they are not necessarily indicative of subsurface conditions at other locations or at other times.

Soils within the area of this project have been divided into four categories: surficial materials (topsoil), artificial fill/roadway embankment, alluvial soils and residual soils.

Surficial Materials: With the exception of two isolated locations along the proposed centerline of the roadway, surficial organic soils (topsoil/rootmat) were encountered at the surface of the roadway and culvert borings and ranged in thickness from approximately 0.1 to 0.2 feet. It should be noted that in some locations, mechanical clearing was performed and some of the surficial soils may have been removed during clearing. In the wooded areas, surficial organic soil depths are anticipated to be deeper than what is reported on the boring logs.

Artificial Fill/Roadway Embankment: Artificial fill (A.F.) was encountered along the following alignments and at the approximate stationing:

Line	Station (±)	Offsets
-L-	28+50 to 33+00	RT

The artificial fill encountered generally consisted of red, gray, brown, white, tan and red-brown moist, soft to stiff, silty clay (A-7-5), clayey silt (A-5) or fine sandy silt (A-4) and extend to depths ranging from approximately 5.0 to 12.0 feet below existing grades.

Alluvial: Alluvial soils were encountered along the following alignments and at the approximate stationing:

Line	Station (±)	Offsets
-L-	24+20 to 25+80	LT to RT

The alluvial soils encountered generally consisted of red-brown, moist, very soft, sandy silt (A-4) and brown-white-orange to red-brown, moist to wet, very loose to loose, silty sand (A-2-4). The alluvial soils were encountered at depths ranging from approximately 0 to 5.5 feet below existing grades. Laboratory testing of the alluvial soils indicated that the material was non-plastic.

Residual Soils: Residual soils throughout the proposed alignments are derived from the weathering of the underlying parent bedrock. A majority of the residual soils encountered generally consisted of red, brown, orange, tan, purple, gray, white and black, moist to wet, soft to very stiff, fine to coarse sandy, silty clay (A-7-5, A-7-6) clayey and sandy silt (A-5, A-4) or very loose to very dense, moist to wet, silty fine to coarse sand (A-2-4). In general, the residual soils transitioned from fine-grained (clay) near the surface to coarse-grained (silt, sand) with increasing depth. Laboratory testing indicated PI's ranging from 53 to non-plastic for the A-7-5, A-7-6, A-5, A-4, and A-2-4 soils.

Rock Properties

Weathered Rock: Weathered Rock (WR) was encountered in two of the borings along the -L- Line. Weathered rock is defined as residual material exhibiting an SPT N-value of at least 100 blows per foot.

Line	Station (±)	Offsets
-L-	24+72, 24+93	LT and CL

Along the L-Line, the top of the weathered rock was encountered at depths ranging from approximately 11 to 13.5 feet below existing grades.

Crystalline Rock: Crystalline Rock (CR) is defined by SPT refusal (i.e., 60/0.1' or 60/0.0'). Crystalline rock was not encountered in any of the borings performed during this exploration. A rock outcrop was observed in the vicinity of the proposed culvert location and is discussed in Geology and Physiography section of this report.

Groundwater Properties

Groundwater levels were measured in the borings both immediately after drilling and, where applicable, after a stabilization period of at least 24 hours. At the time of drilling, water was encountered in five (5) borings at depths ranging from approximately 4.0 to 31.0 feet below existing grades. After a stabilization period of at least 24 hours, groundwater was encountered in five (5) borings at depths ranging from approximately 3.6 to 23.4 feet below existing grades. For safety reasons, several of the borings were backfilled immediately after drilling, making stabilized water readings unobtainable. The recovered soil samples were generally described as moist above the groundwater level and moist to wet below the groundwater level.

Line	Station (±)	Offsets
-L-	24+72 to 25+12	LT to RT
-L-	29+00, 30+00	RT

Bulk Samples / Undisturbed Samples

Four bulk soil samples from 0 to 15’ were obtained from Borings RW-3, L_2700, L-1900, and L_2100 to be used for testing at the NCDOT’s discretion.

An undisturbed thin wall Shelby tube sample was obtained at the following location to be used for testing at the NCDOT’s discretion.

Sample	Line	Station (±)	Depth
ST-1	-L-	30+00	7.0-9.0

Miscellaneous

During the site visit, several dump sites containing wooden debris piles, trash and rip rap were observed within the proposed NCDOT Right of Way (ROW). The approximate locations and quantities of each location were field measured, and should be considered approximate.

Line	Station (±)	Offsets	Material	Area (ft^2)	Pile Height (ft)
-L-	19+60 to 19+75	CL to 20’ LT	Rip-Rap	290	4.0
-L-	19+80 to 20+75	85’ LT to 3’ RT	Trees, Trash	4,050	9.0

A well was encountered during the site visit. The area where the well was encountered appeared to have been previously used as a foundation for a residential structure. The approximate location of the well was field measured and should be considered approximate.

Line	Station (±)	Offsets
-L-	15+65	25’ LT

During the site visit, ECS was informed by the property owner of the existence of at least one buried septic tank. The location of the buried septic tank was not readily observable, however, based on conversations with the property owner, the approximate area of the buried septic tank was provided.

Line	Station (±)	Offsets
-L-	13+00	CL

Respectively submitted,

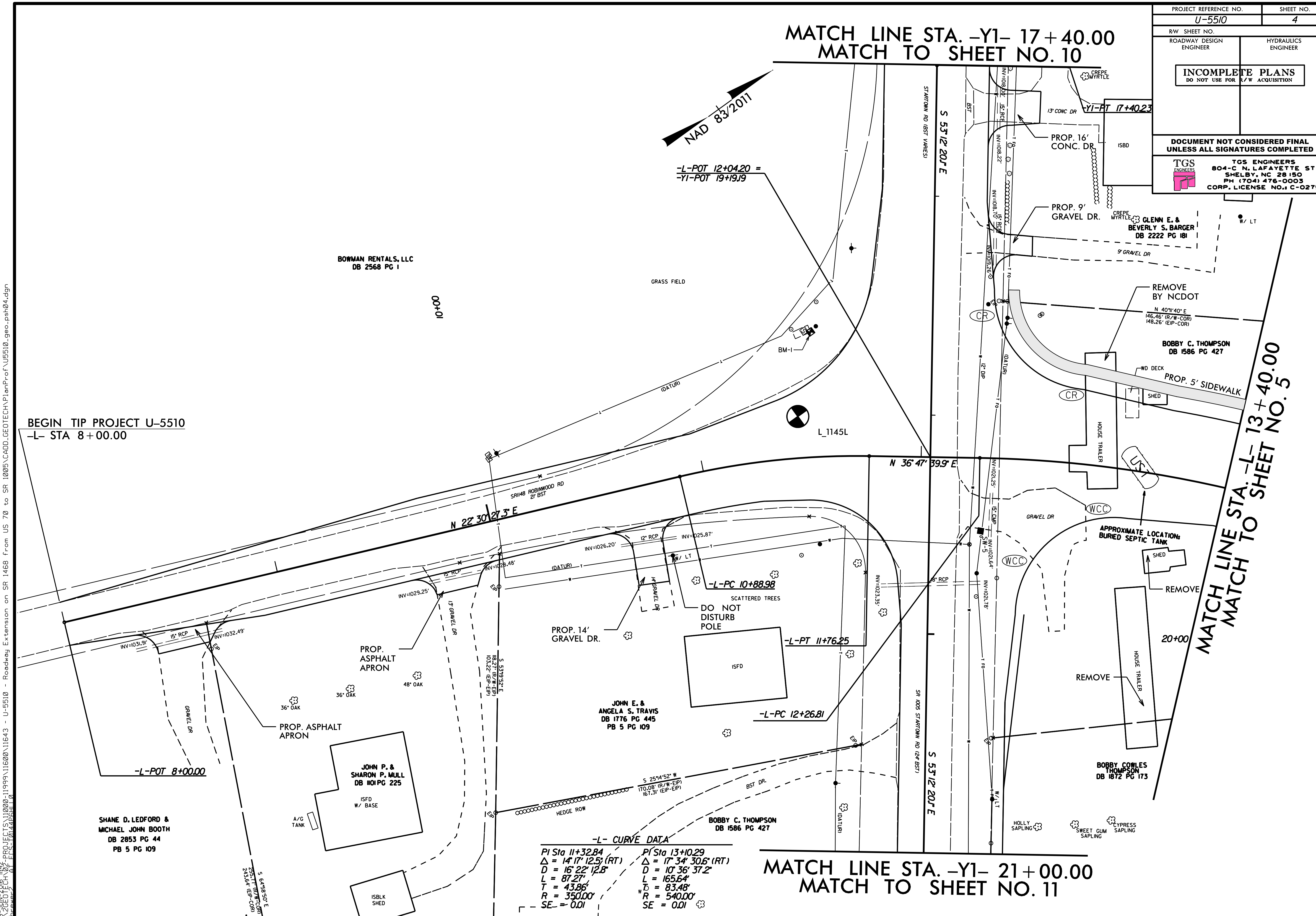
DocuSigned by:
D. Matthew Brewer
EC2ABBEE99DB48C...

D. Matthew Brewer, P.E.
Senior Project Engineer
N.C. Registration No. 041986

NORTH CAROLINA PROFESSIONAL SEAL 041986 ENGINEER D. MATTHEW BREWER

DocuSigned by:
Erik H. Freeburg
C9F264C5186E4B0...

Erik H. Freeburg, P.E.
Principal Engineer / Branch Manager



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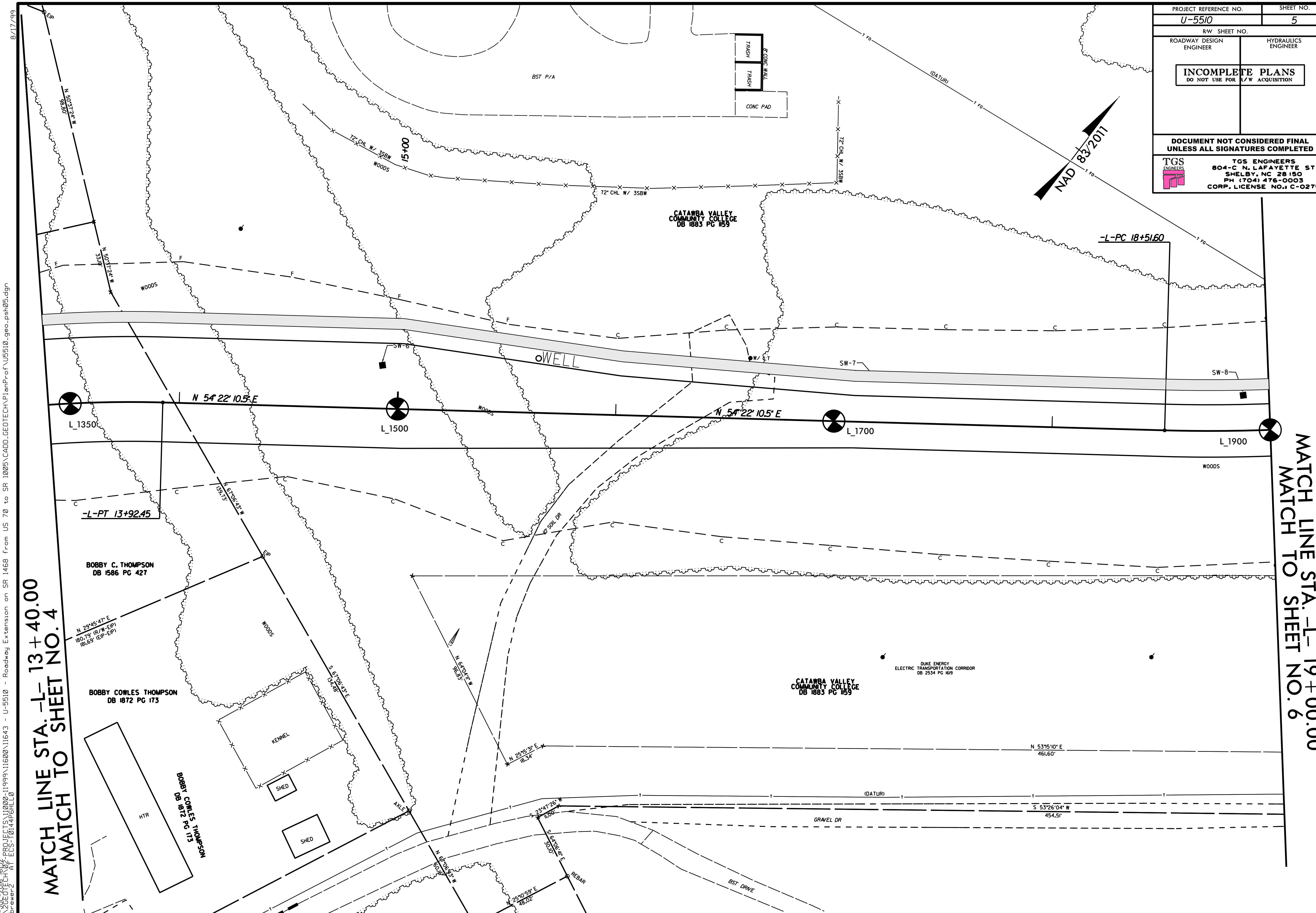

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PROJECT REFERENCE NO.	SHEET NO.
U-5510	6

R/W SHEET NO.

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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TGS ENGINEERS
804-C N. LAFAYETTE ST
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275

-L- CURVE DATA
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L = 606.80'
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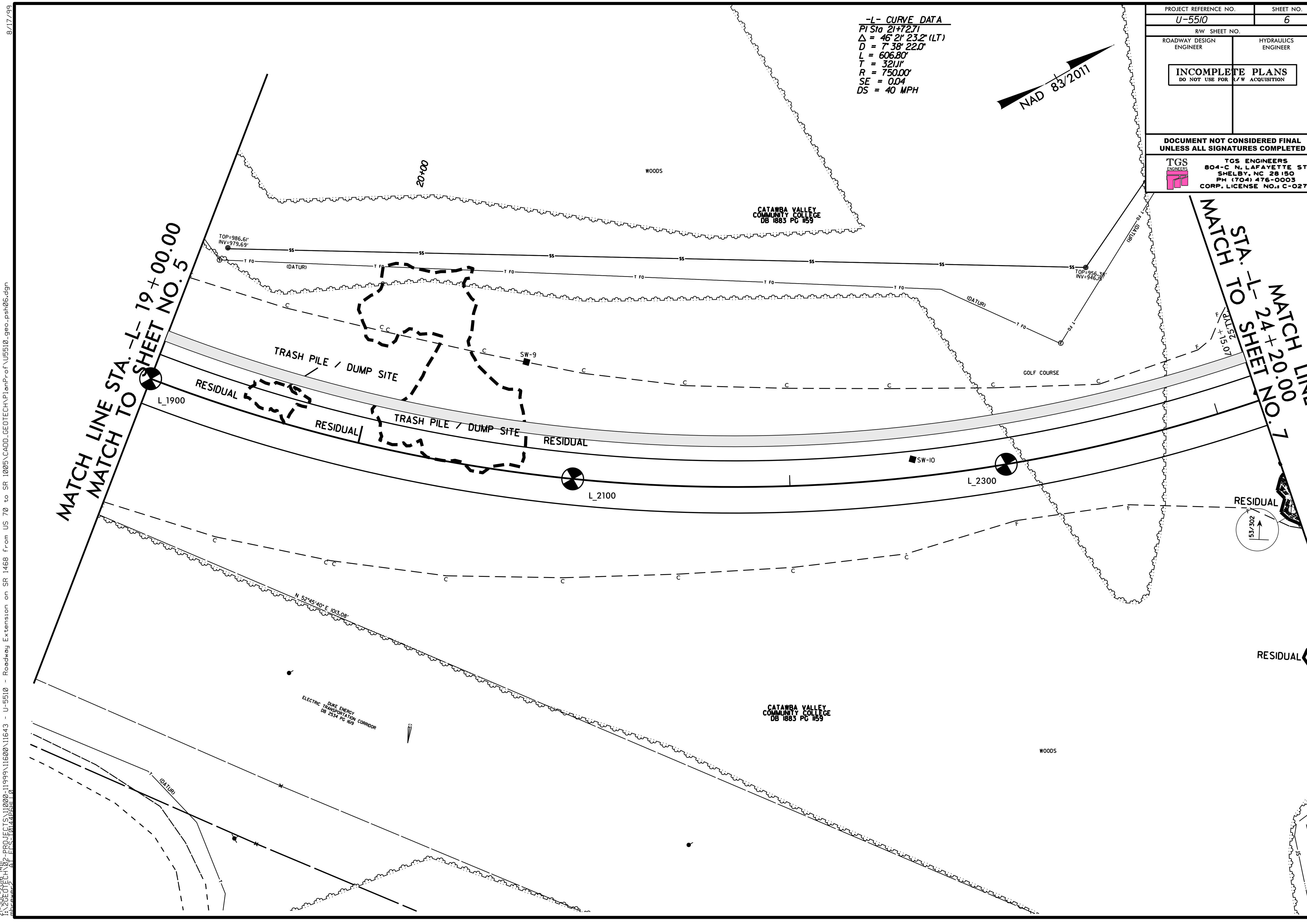

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R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

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SHELBY, NC 28150
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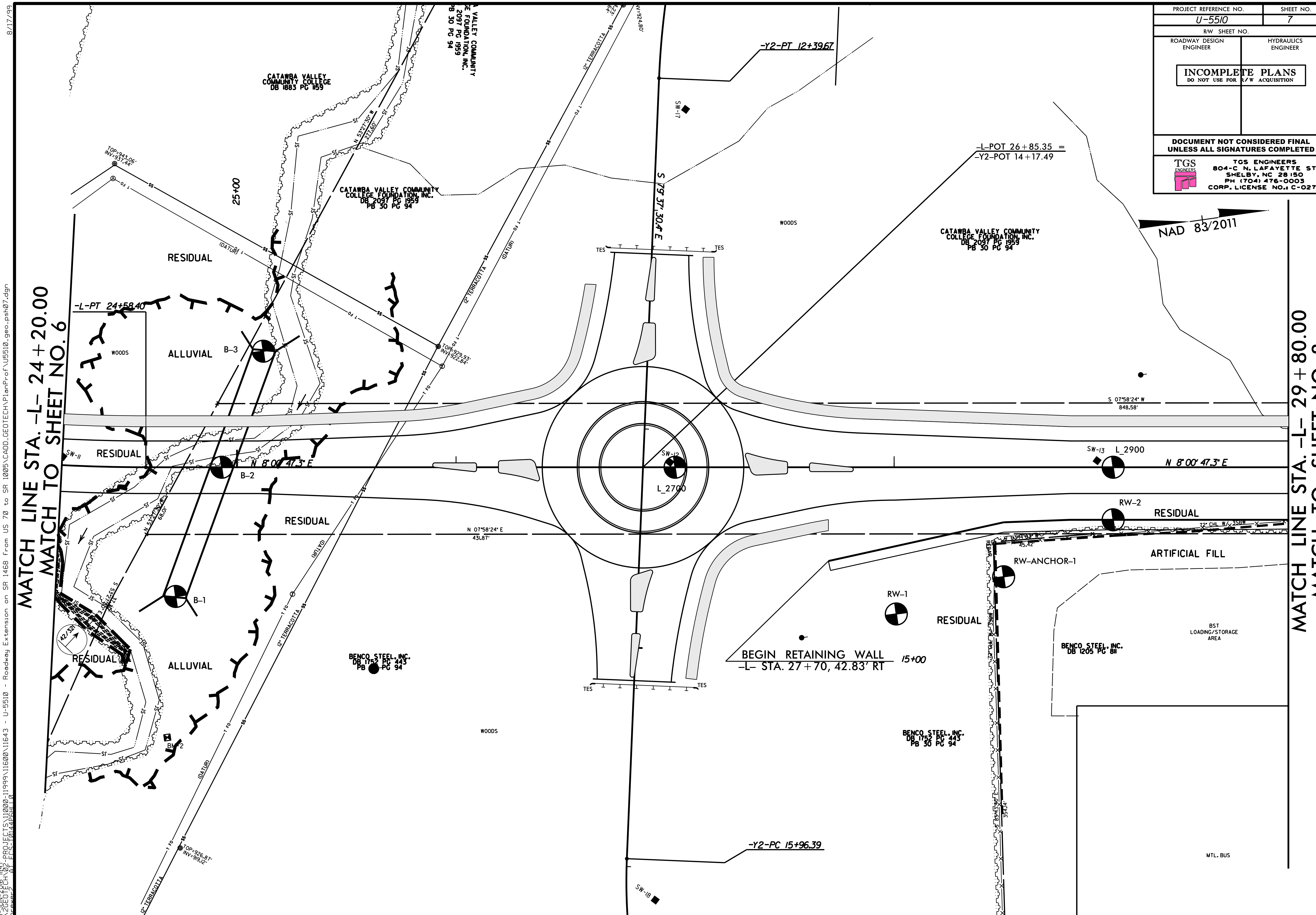
CORP. LICENSE NO.: C-0275



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PROJECT REFERENCE NO.	SHEET NO.
U-5510	8

R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

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PH (704) 476-0003
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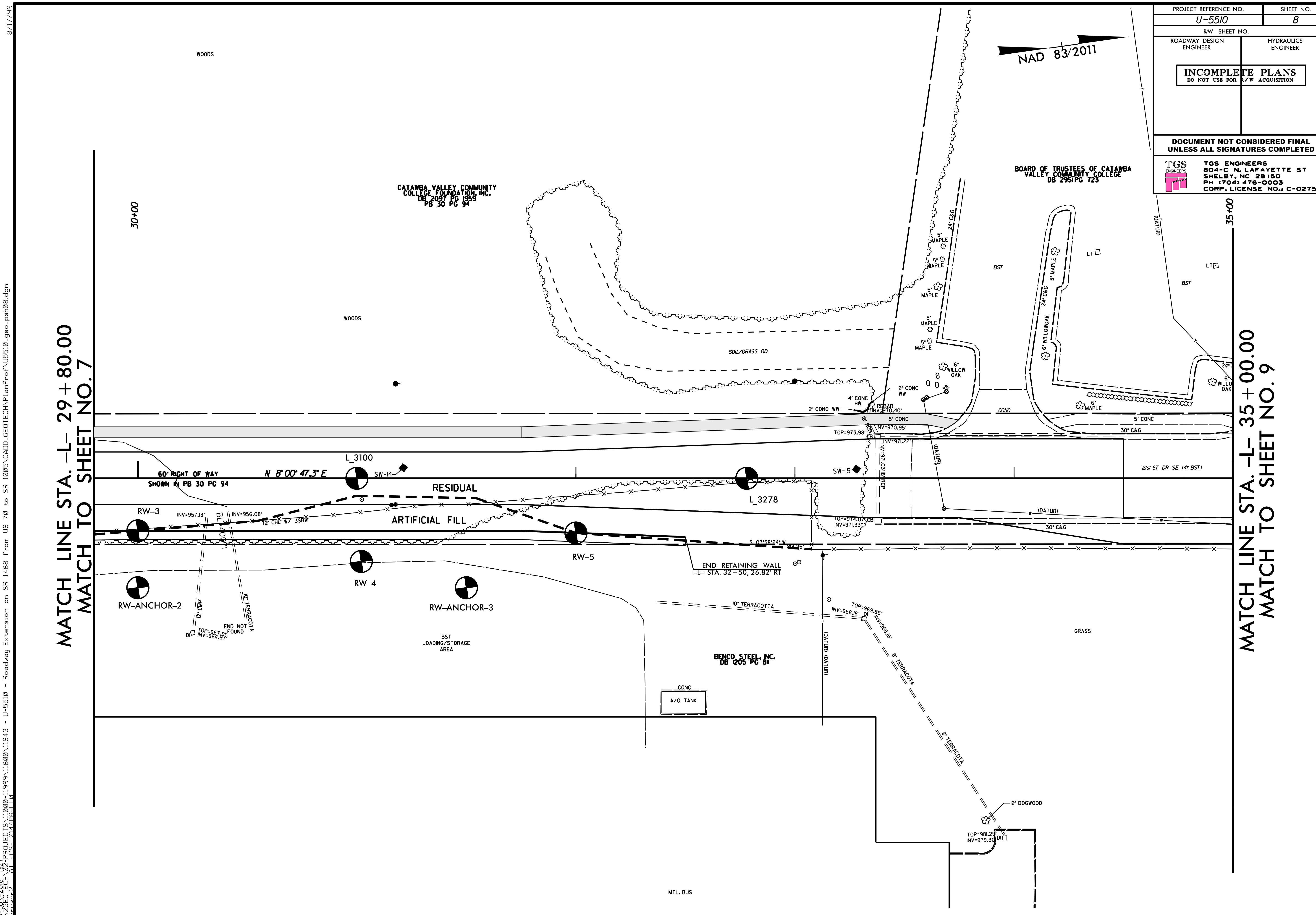

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PROJECT REFERENCE NO.	SHEET NO.
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R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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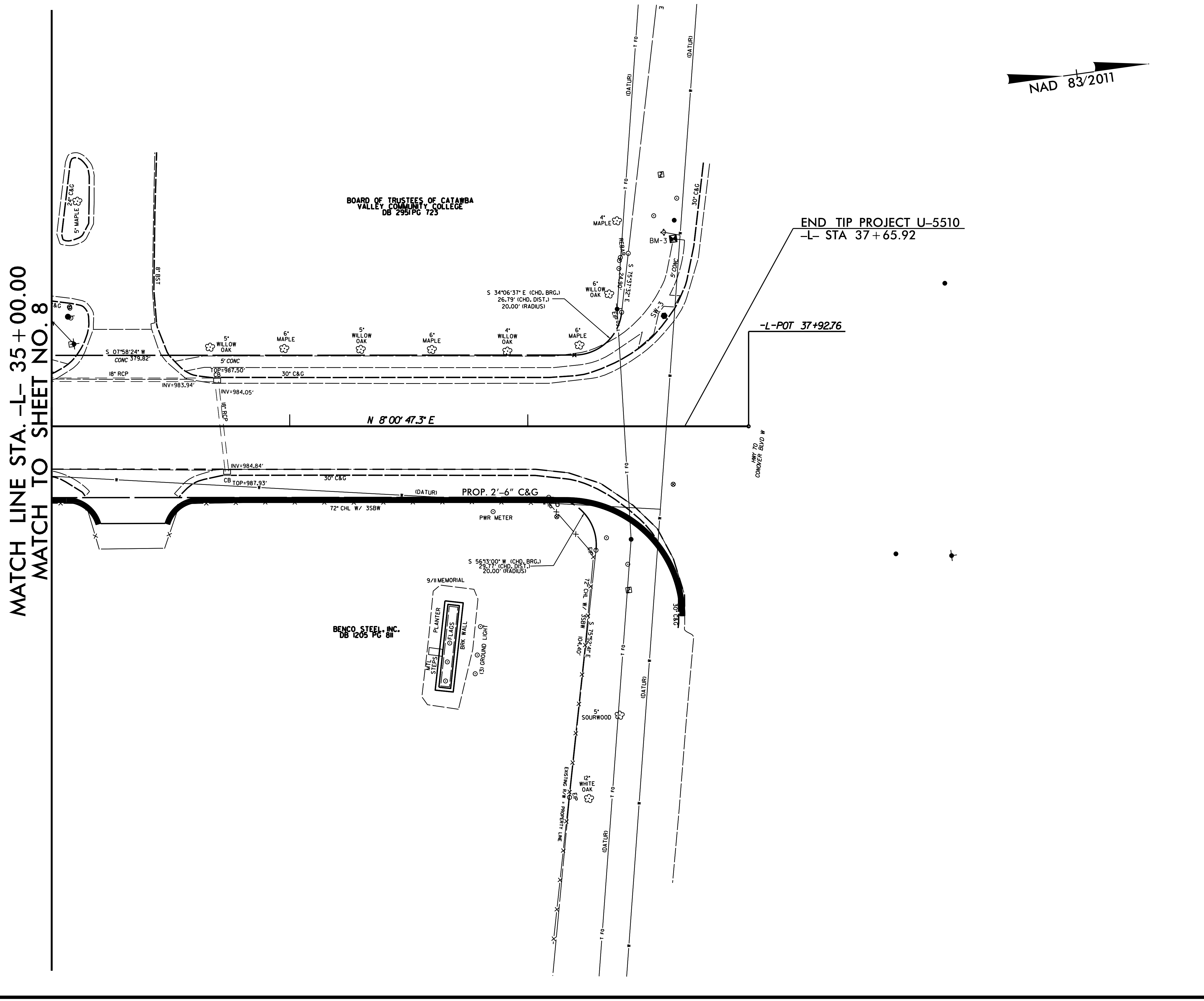
SHELBY, NC 28150
PH (704) 476-0003
CORP. LICENSE NO.: C-0275



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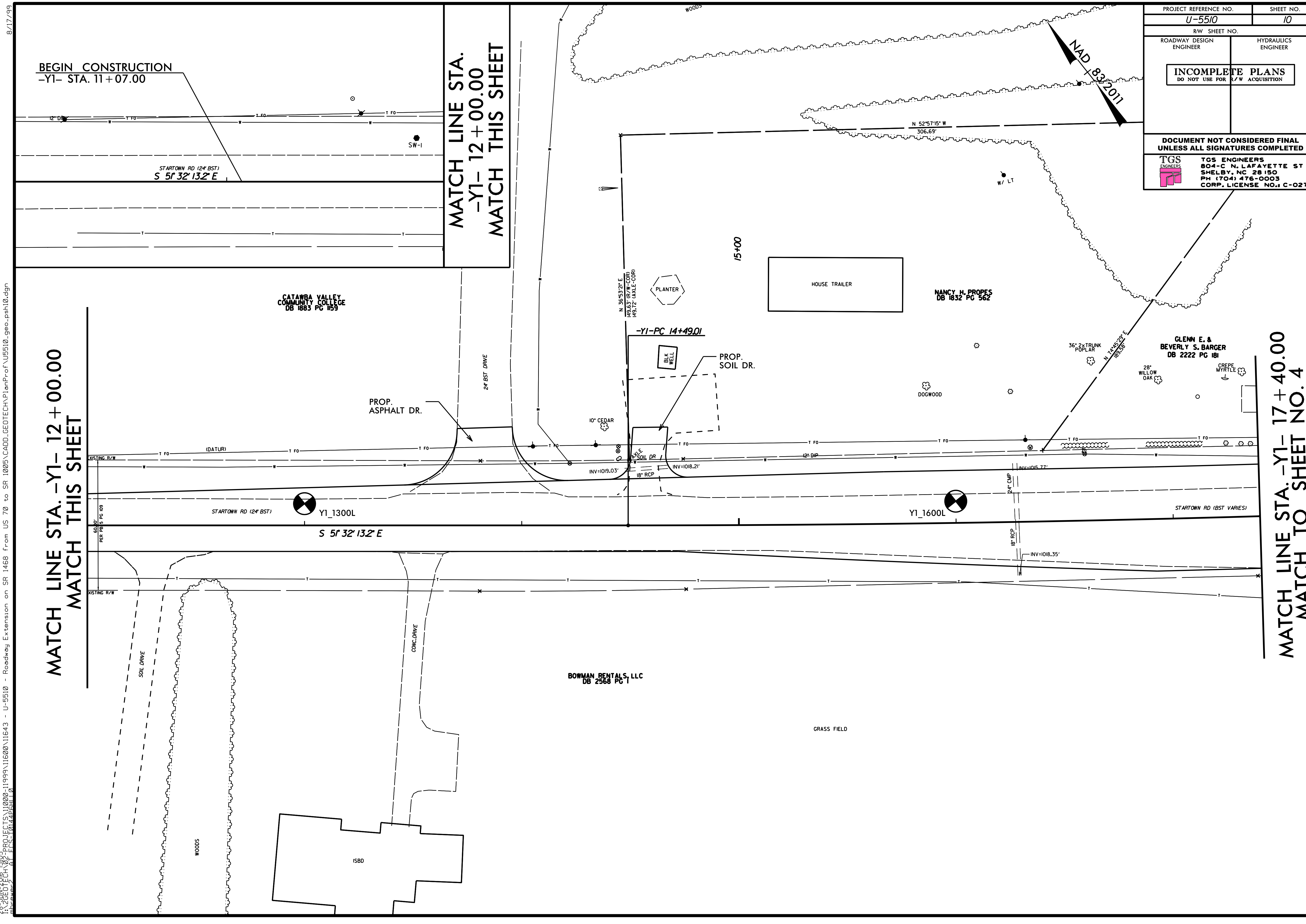

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R/W SHEET NO.

ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

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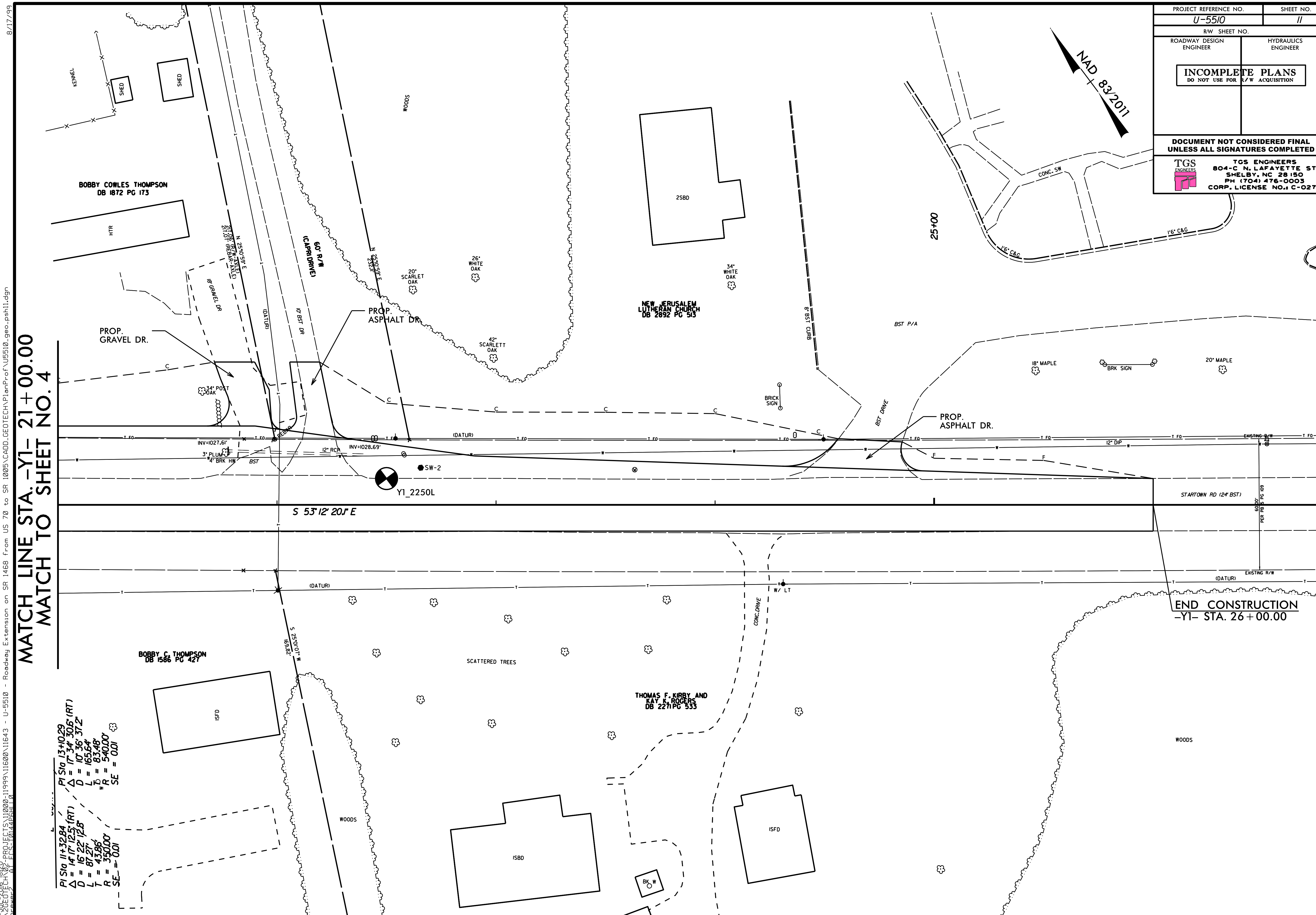

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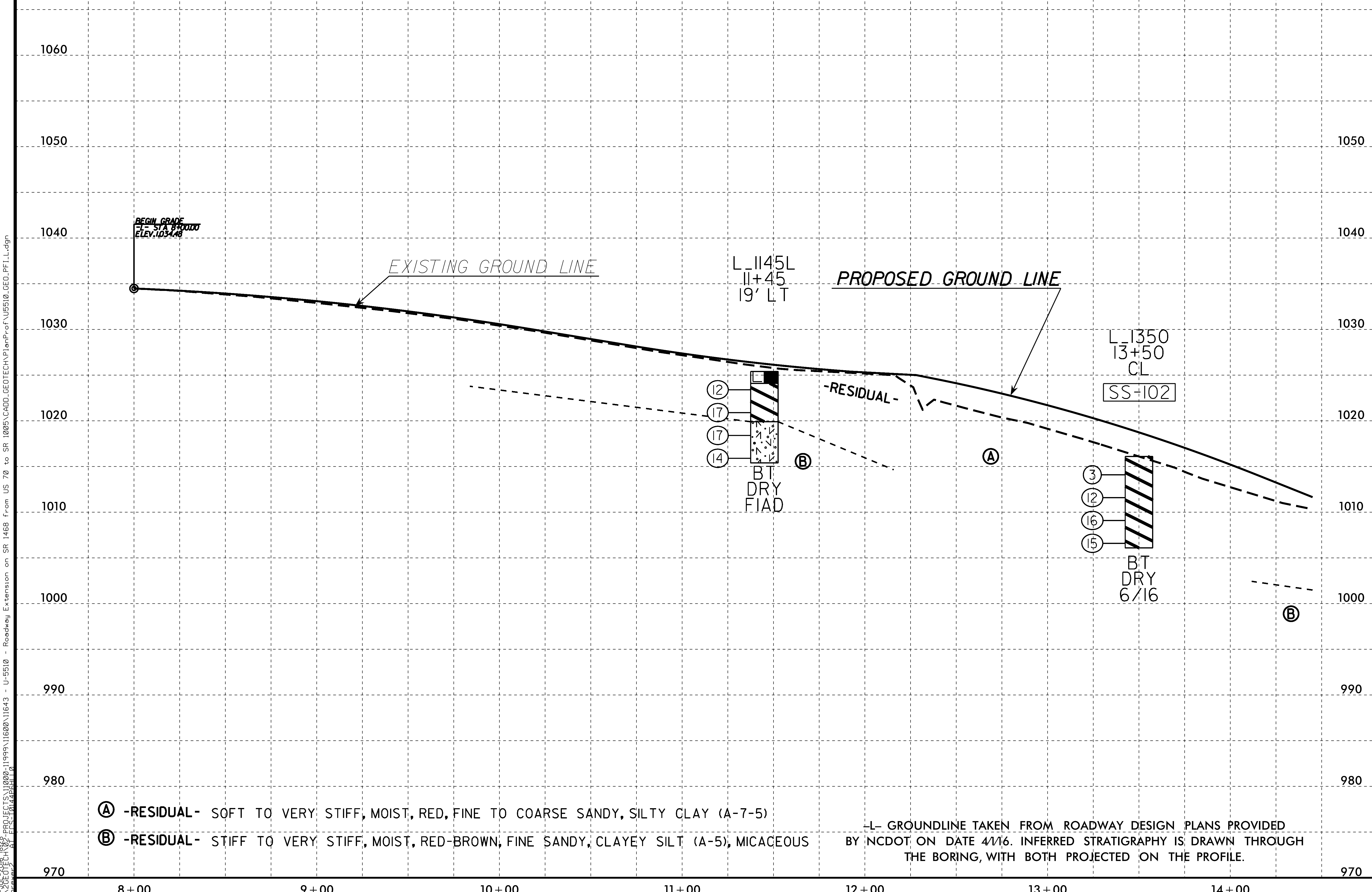
-L- (SWEETWATER ROAD EXTENSION)

PROJECT REFERENCE NO.	SHEET NO.
U-5510	12

PROFILE BORINGS PROJECTED ALONG -L-



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

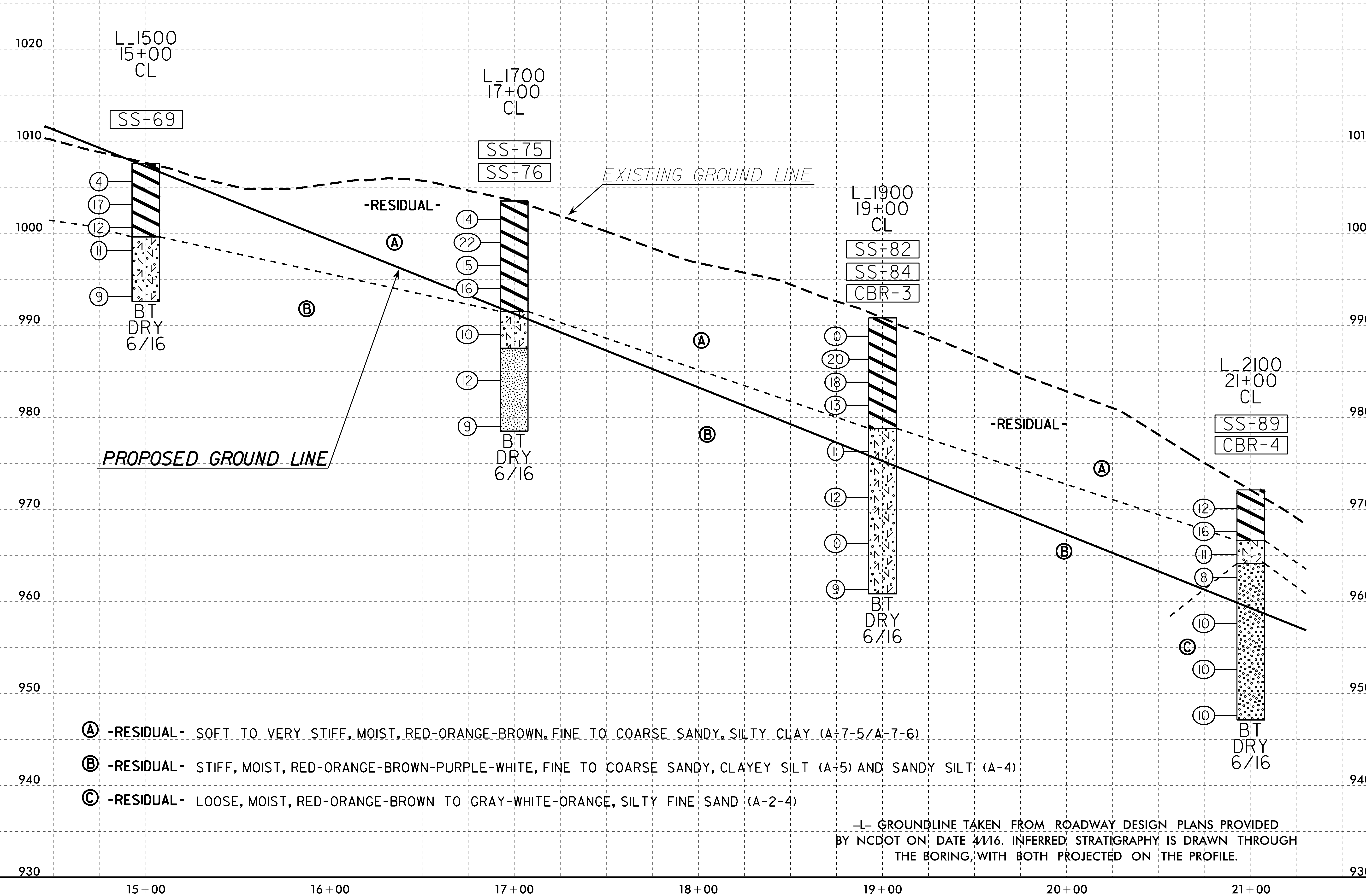
Ⓑ -RESIDUAL- STIFF TO VERY STIFF, MOIST, RED-BROWN, FINE SANDY, CLAYEY SILT (A-5), MICACEOUS

-L- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

-L- (SWEETWATER ROAD EXTENSION)

PROJECT REFERENCE NO.	SHEET NO.
U-5510	13

PROFILE BORINGS PROJECTED ALONG -L-



Ⓐ -RESIDUAL- SOFT TO VERY STIFF, MOIST, RED-ORANGE-BROWN, FINE TO COARSE SANDY, SILTY CLAY (A-7-5/A-7-6)

Ⓑ -RESIDUAL- STIFF, MOIST, RED-ORANGE-BROWN-PURPLE-WHITE, FINE TO COARSE SANDY, CLAYEY SILT (A-5) AND SANDY SILT (A-4)

Ⓒ -RESIDUAL- LOOSE, MOIST, RED-ORANGE-BROWN TO GRAY-WHITE-ORANGE, SILTY FINE SAND (A-2-4)

-L- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

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-L- (SWEETWATER ROAD EXTENSION)

PROJECT REFERENCE NO.	SHEET NO.
U-5510	14

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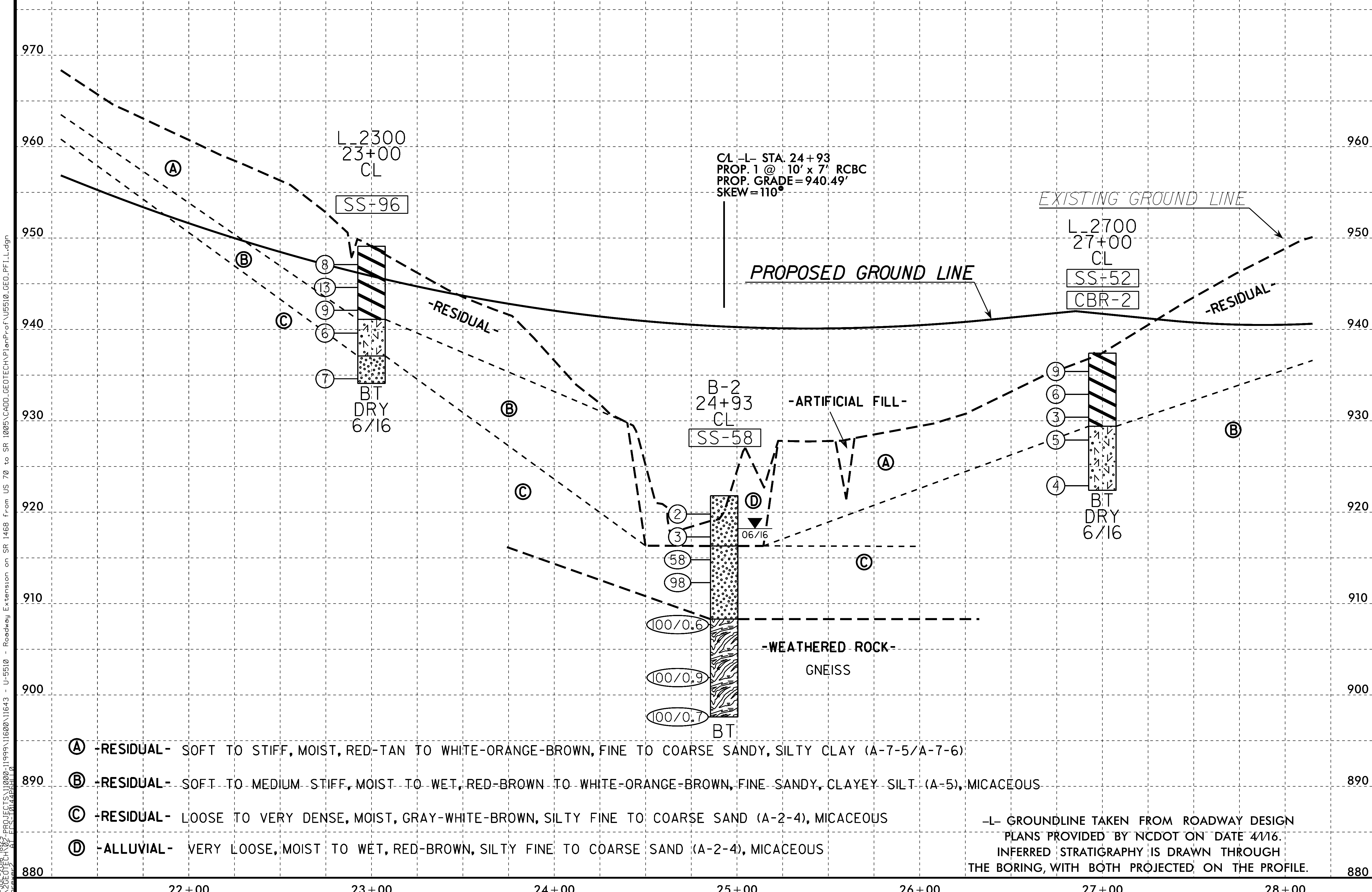


Ⓐ -RESIDUAL- SOFT TO STIFF, MOIST, RED-TAN TO WHITE-ORANGE-BROWN, FINE TO COARSE SANDY, SILTY CLAY (A-7-5/A-7-6)

Ⓑ -RESIDUAL- SOFT TO MEDIUM STIFF, MOIST TO WET, RED-BROWN TO WHITE-ORANGE-BROWN, FINE SANDY, CLAYEY SILT (A-5), MICACEOUS

Ⓒ -RESIDUAL- LOOSE TO VERY DENSE, MOIST, GRAY-WHITE-BROWN, SILTY FINE TO COARSE SAND (A-2-4), MICACEOUS

Ⓓ -ALLUVIAL- VERY LOOSE, MOIST TO WET, RED-BROWN, SILTY FINE TO COARSE SAND (A-2-4), MICACEOUS

-L- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

5/14/99

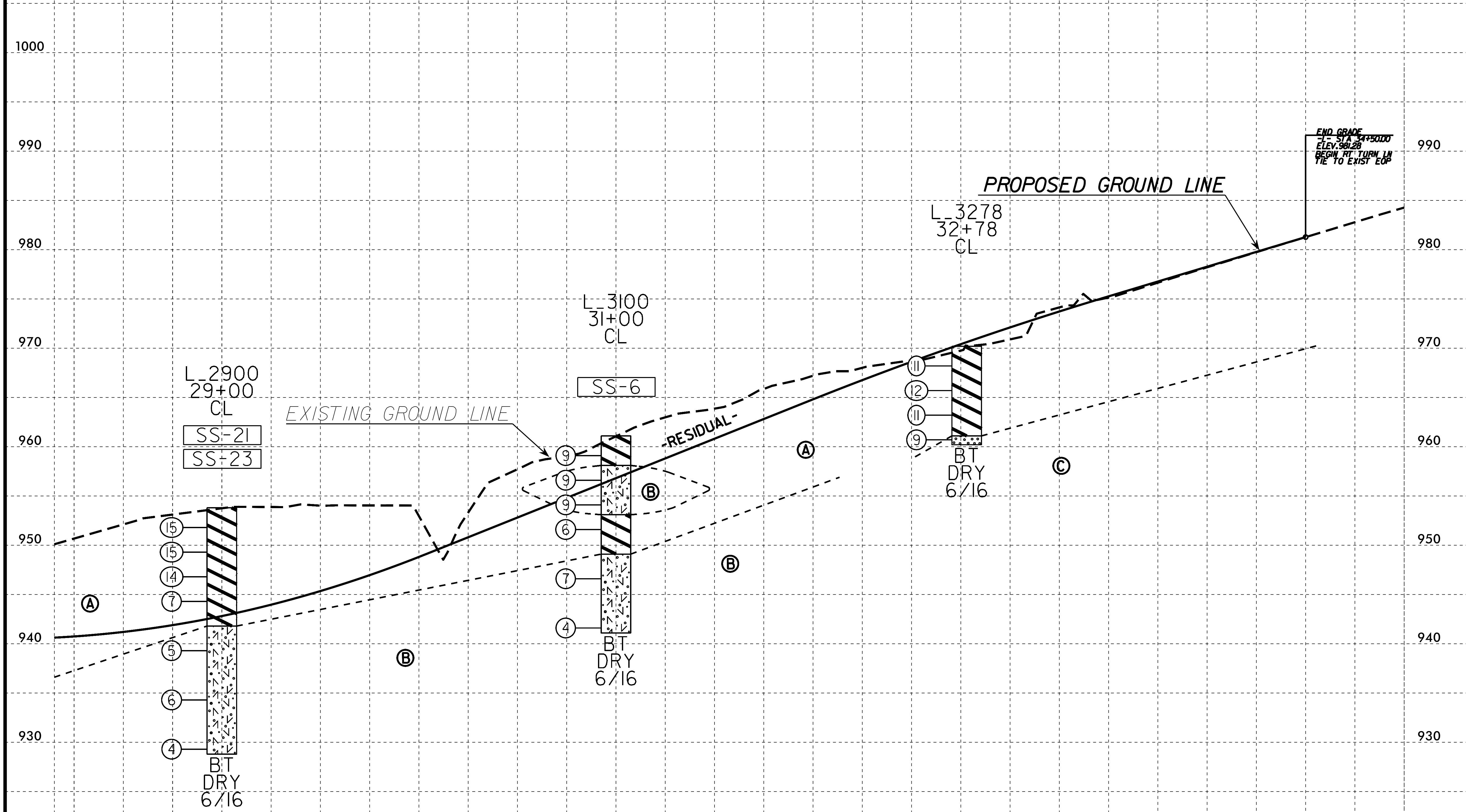
-L- (SWEETWATER ROAD EXTENSION)

PROJECT REFERENCE NO.	SHEET NO.
U-5510	15

PROFILE BORINGS PROJECTED ALONG -L-

0 25 50 FEET

VE=5:1



Ⓐ **-RESIDUAL-** MEDIUM STIFF TO STIFF, MOIST, RED-ORANGE-TAN TO ORANGE-WHITE, FINE TO COARSE SANDY, SILTY CLAY (A-7-5/A-7-6)

Ⓑ **-RESIDUAL-** MEDIUM STIFF TO SOFT, MOIST TO WET, RED-ORANGE-BROWN, FINE SANDY, CLAYEY SILT (A-5), MICACEOUS

Ⓒ **-RESIDUAL-** LOOSE, MOIST, BROWN-WHITE, SILTY FINE SAND (A-2-4)

-L- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

21-JUL-2016 18:30

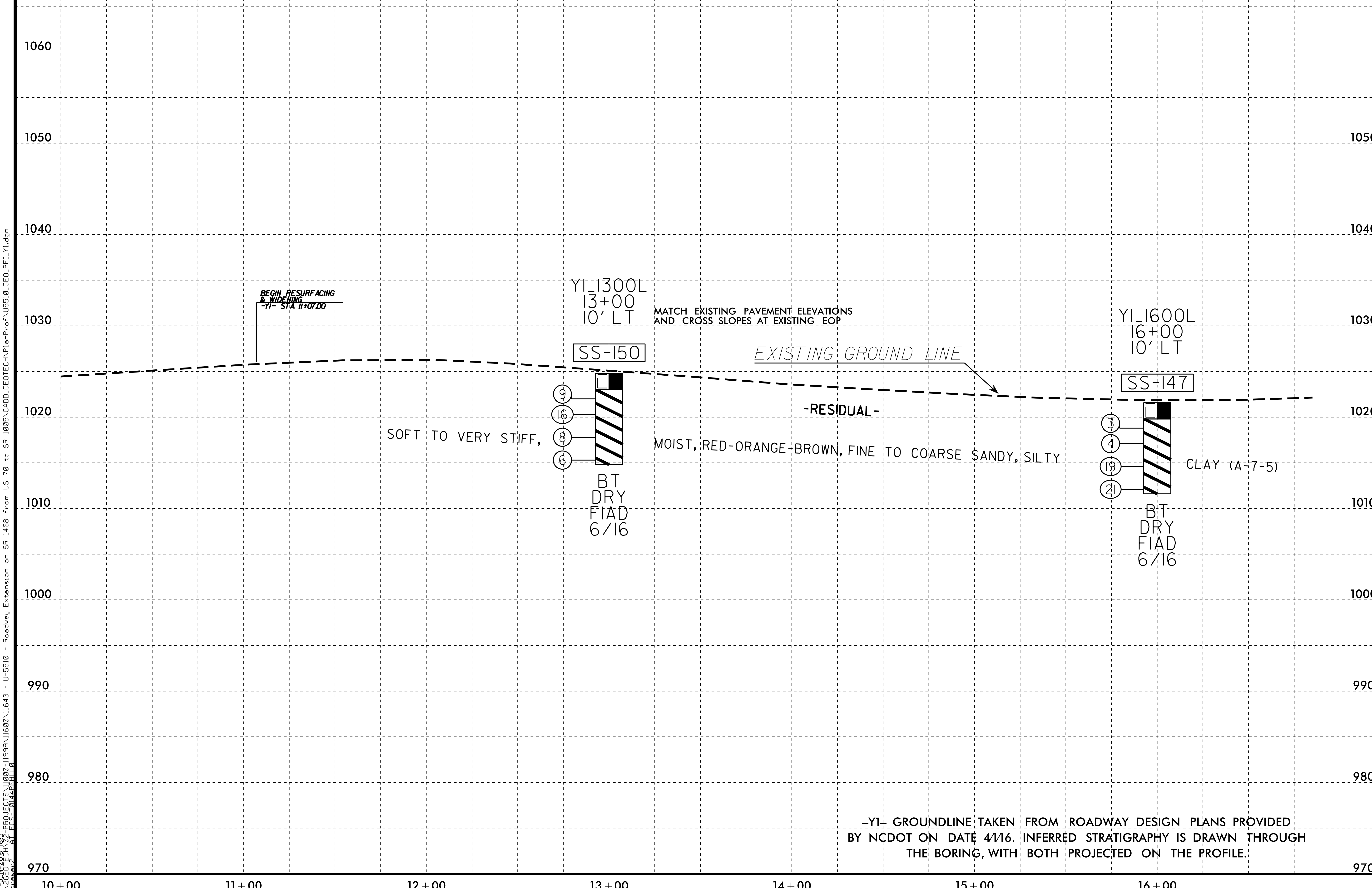
5/14/99

-Y1- (SR 1005 - STARTOWN ROAD)

PROJECT REFERENCE NO.	SHEET NO.
U-5510	16

PROFILE BORINGS
PROJECTED ALONG -Y1-

0 25 50
FEET
VE=5:1



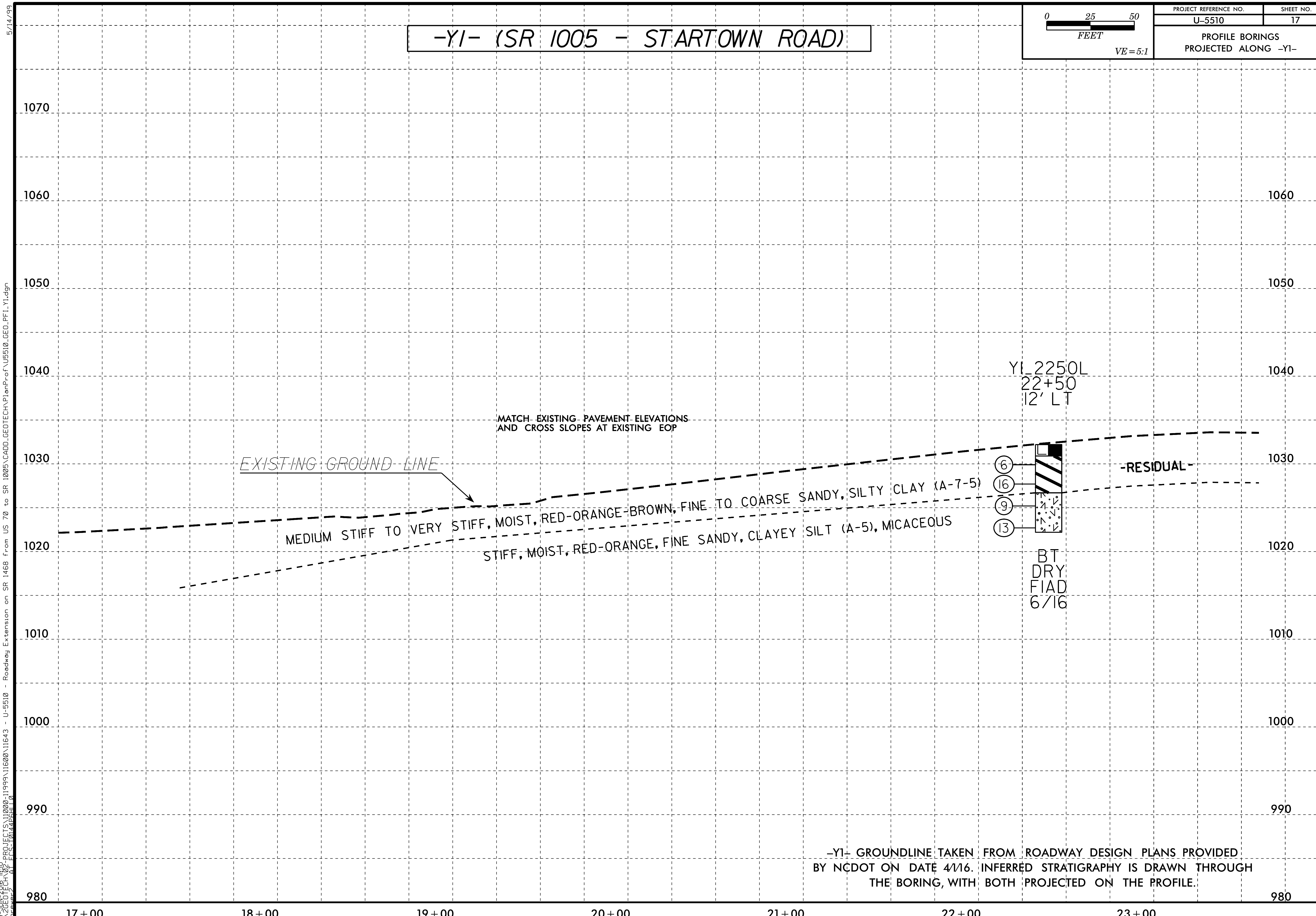
-Y1- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

27-JUN-2016 16:57 I:\2GEOTECH\02-PROJECTS\11000-11999\11600\11643 - U-5510 - Roadway Extension on SR 1468 from US 70 to SR 1005\CADD_GEOTECH\PlanProf\U5510_GEO_PFI_Y1.dgn mbrewer2 AT FCS-T0144P6HLL0

PROJECT REFERENCE NO.	SHEET NO.
U-5510	17

PROFILE BORINGS PROJECTED ALONG -Y1-

-Y1- (SR 1005 - STARTOWN ROAD)



-Y1- GROUNDLINE TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE PROFILE.

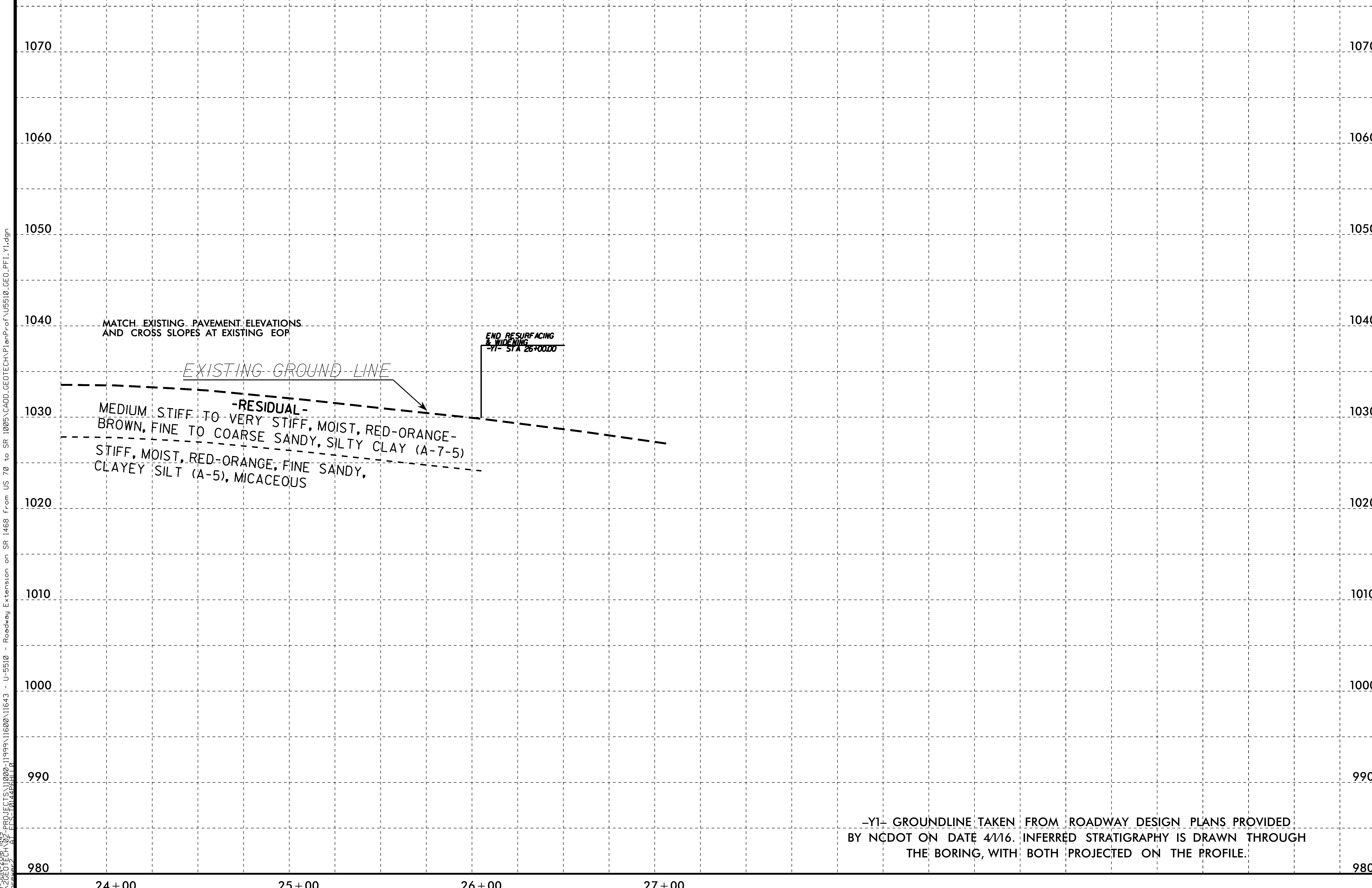
5/14/99

PROJECT REFERENCE NO.	SHEET NO.
U-5510	18

PROFILE BORINGS
PROJECTED ALONG -Y1-

0 25 50
FEET
VE=5:1

-Y1- (SR 1005 - STARTOWN ROAD)



29-JUN-2016 11:49
I:\2GEOTECH\02-PROJECTS\11000-11999\11600\11643 - U-5510 - Roadway Extension on SR 1468 from US 70 to SR 1005\CADD_GEOTECH\PlanProf\U5510_GEO_PF1_Y1.dgn
mbrewer2 AT FCS-T0144P6HL10

PROJ. REFERENCE NO.	SHEET NO.
U-5510	19

CROSS SECTION THROUGH –L–
STATION 13+00
STATION 12+50
STATION 12+00

0 5 10
FEET
VE = 1:1

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

1035 1030 1025 1020 1015 1010

EXISTING GROUND LINE

2:1

2:1

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

13+00.00

EXISTING GROUND LINE

2:1

RADIUS RETURN
–L– & –Y1–

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

12+50.00

PROPOSED INTERSECTION
–Y1– (STARTOWN ROAD)

EXISTING GROUND LINE

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

12+00.00

℄
–L–

–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

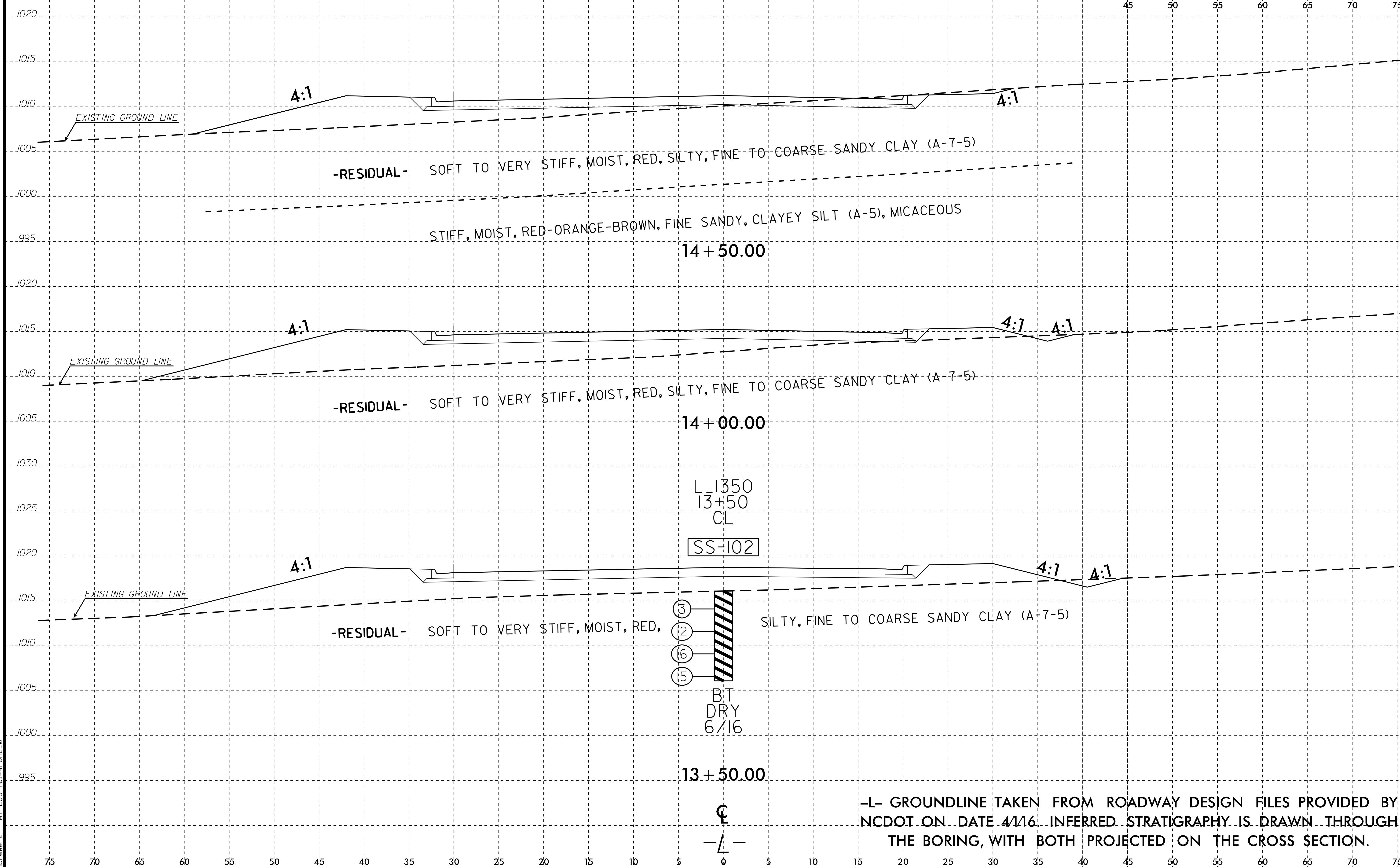
8/23/99

28-JUN-2016 22:33
I:\2GEOTECH\62-PROJECTS\10000-11999\11600\11643 - U-5510 - Roadway Extension on SR 1468 from US 70 to SR 1005\CADD\GEOTECH\xsc\U5510_Geo_xs1_L.dgn
mbrewer2
AT ECS-70144PBHLL0

PROJ. REFERENCE NO.	SHEET NO.
U-5510	20

CROSS SECTION THROUGH -L-
STATION 14+50
STATION 14+00
STATION 13+50

0 5 10 FEET VE=1:1

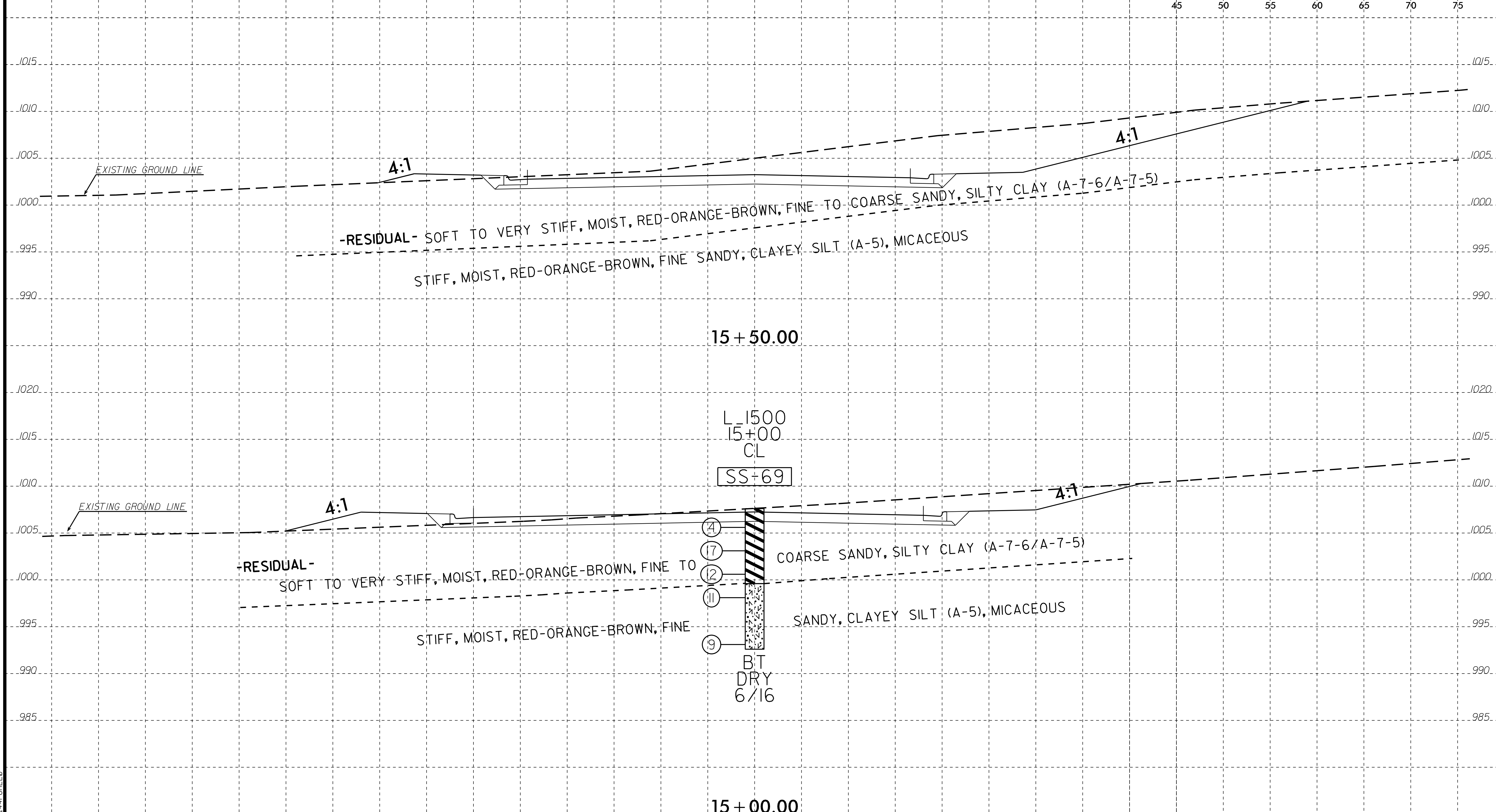


-L- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

PROJ. REFERENCE NO.	SHEET NO.
U-5510	21

CROSS SECTION THROUGH -L-
STATION 15+50
STATION 15+00

0 5 10 FEET
VE=1:1

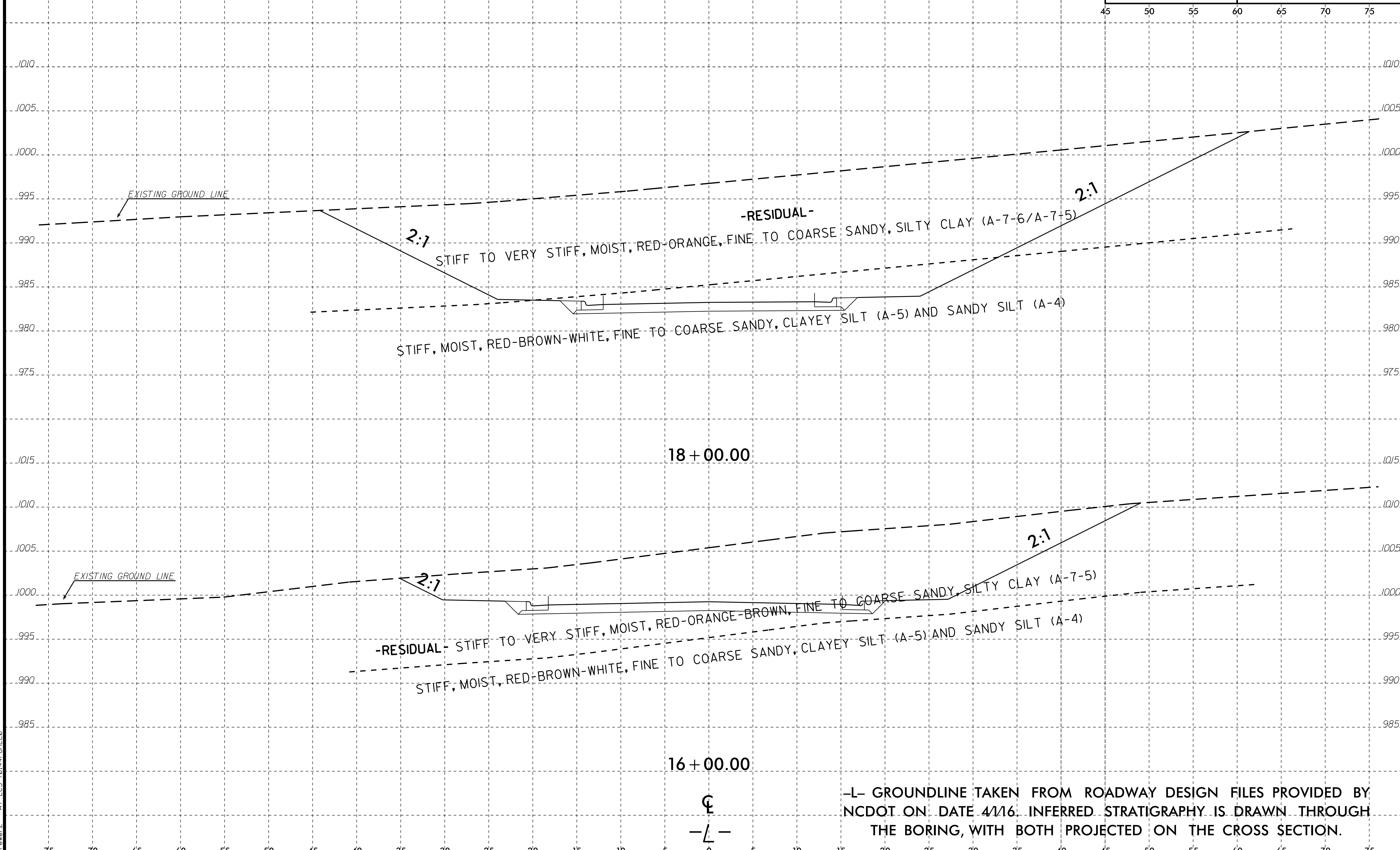


-L- GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

PROJ. REFERENCE NO.	SHEET NO.
U-5510	22

CROSS SECTION THROUGH –L–
STATION 18+00
STATION 16+00

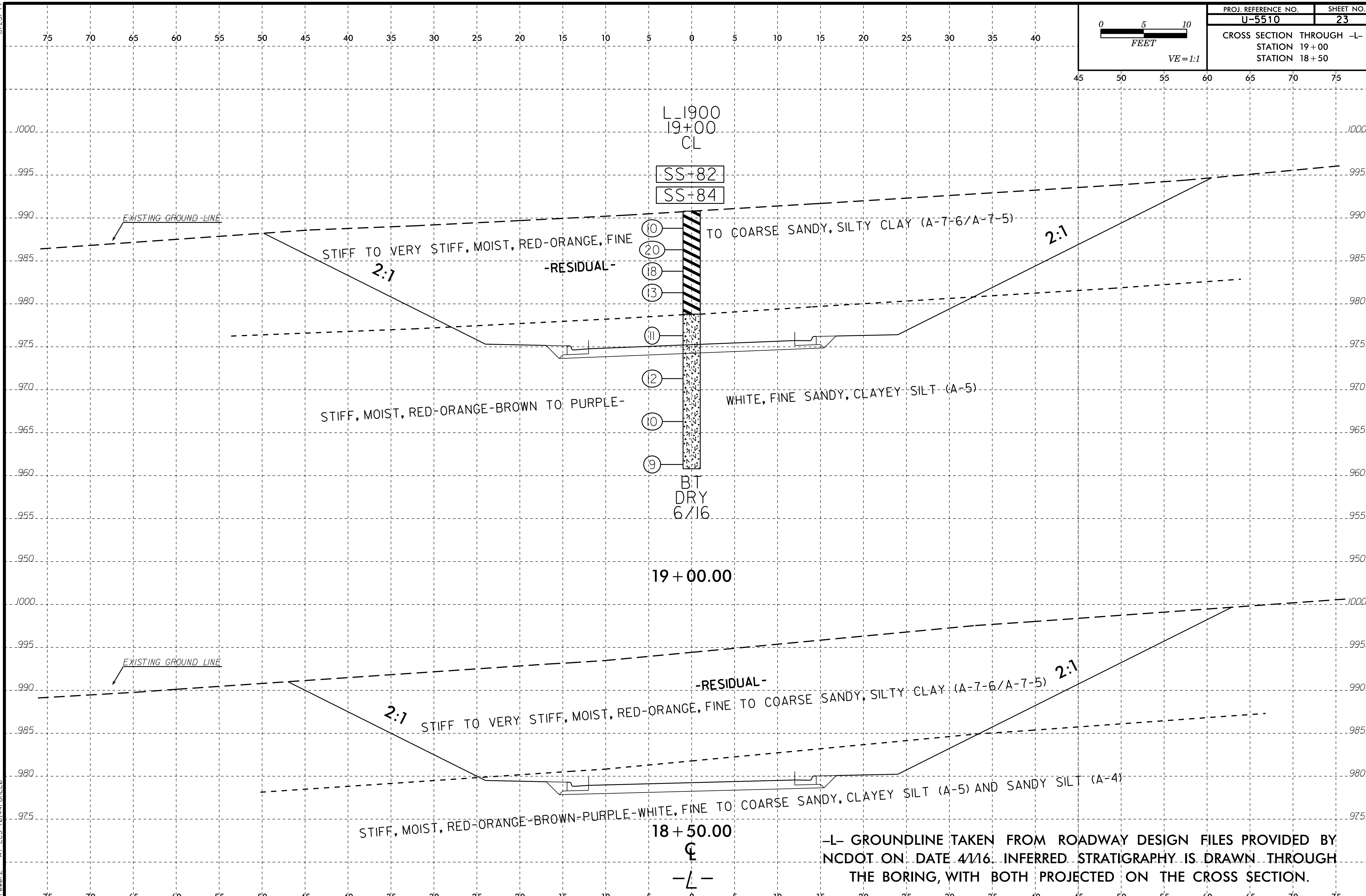
0 5 10 FEET VE=1:1



–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

PROJ. REFERENCE NO.	SHEET NO.
U-5510	23

CROSS SECTION THROUGH –L–
STATION 19+00
STATION 18+50



–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

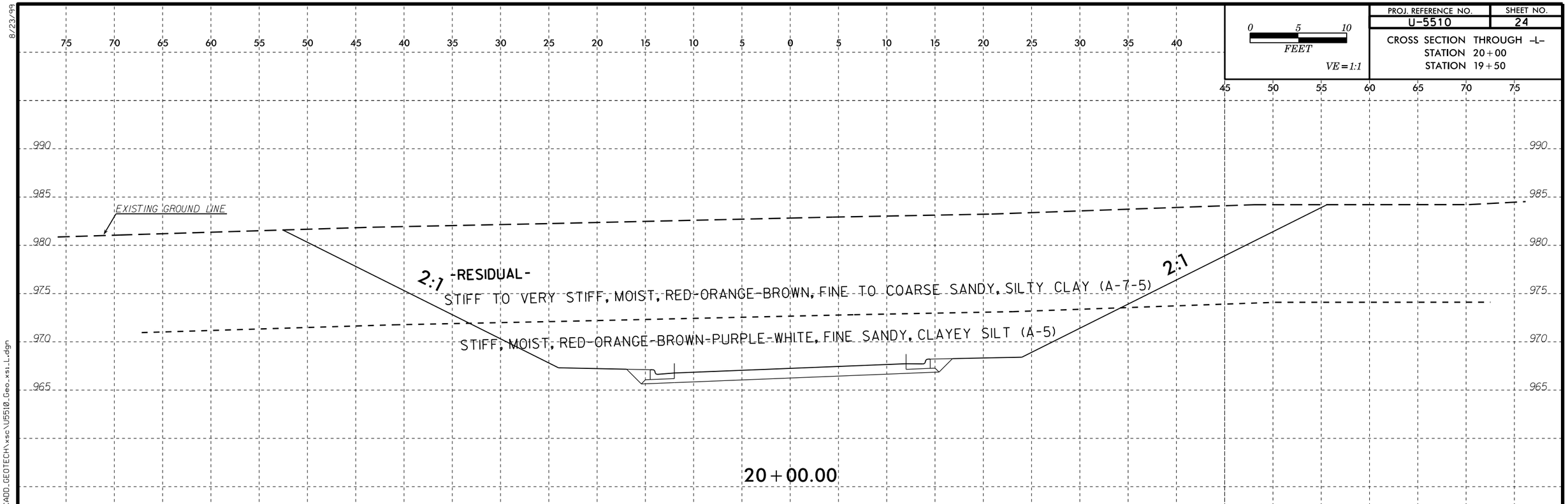
8/23/99

22-JUL-2016 10:40
I:\2GEOTECH\02-PROJECTS\11000-11999\11600\11643 - U-5510 - Roadway Extension on SR 1468 from US 70 to SR 1005\CADD_GEOTECH\xsc\U5510_Geo_xsi_L.dgn
mbrewer2 AT ECS-T0144P6HLL0

PROJ. REFERENCE NO.	SHEET NO.
U-5510	24

CROSS SECTION THROUGH –L–
STATION 20+00
STATION 19+50

0 5 10
FEET
VE = 1:1



–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

PROJ. REFERENCE NO.	SHEET NO.
U-5510	25

0 5 10 FEET

VE = 1:1

CROSS SECTION THROUGH –L–
STATION 21+00
STATION 20+50

L_2100
21+00
CL

SS-89

EXISTING GROUND LINE

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

2:1

STIFF, MOIST, RED-BROWN, FINE SANDY, CLAYEY SILT (A-5), MICACEOUS

2:1

12
16
11
8
10
10
10

LOOSE, MOIST, RED-ORANGE-BROWN TO GRAY-WHITE-ORANGE, SILTY FINE SAND (A-2-4), MICACEOUS.

BT
DRY
6/16

21+00.00

EXISTING GROUND LINE

2:1 -RESIDUAL-
STIFF TO VERY STIFF, MOIST, RED-ORANGE-BROWN, FINE TO COARSE SANDY, SILTY CLAY (A-7-5) 2:1

STIFF, MOIST, RED-ORANGE-BROWN-PURPLE-WHITE, FINE SANDY, CLAYEY SILT (A-5)

20+50.00

℄
–L–

–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

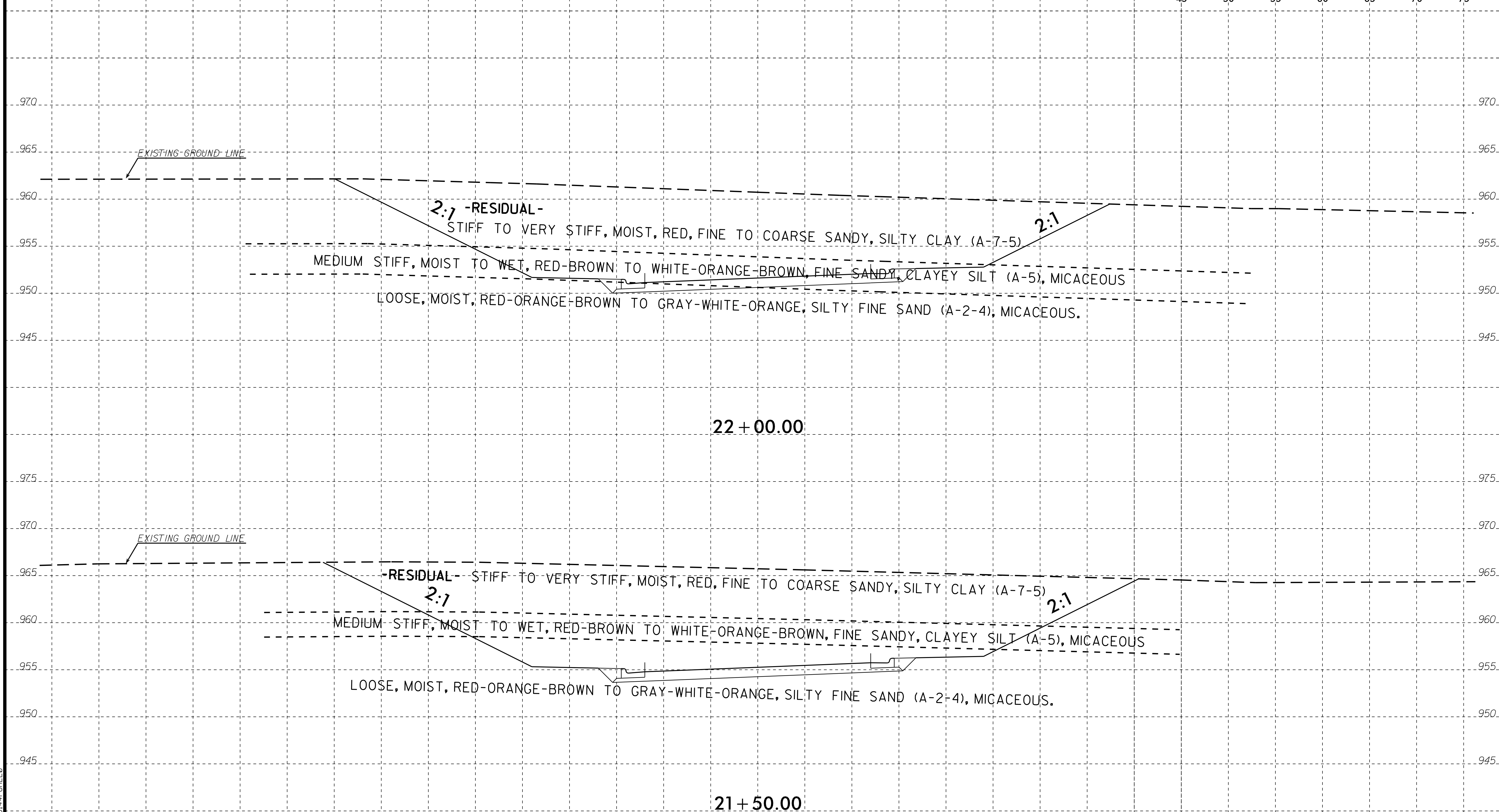
8/23/99

29-JUN-2016 11:58
I:\2GEOTECH\22-PROJECTS\11000-11999\11600\11643 - U-5510 - Roadway Extension on SR 1468 from US 70 to SR 1005\CADD_GEOTECH\xsc\U5510_Geo_xs1_L.dgn
mbrewer2
AT ECS-T0144P6HLL0

PROJ. REFERENCE NO.	SHEET NO.
U-5510	26

CROSS SECTION THROUGH –L–
STATION 22+00
STATION 21+50

0 5 10 FEET
VE=1:1



–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

8/23/99

29-JUN-2016 11:58 I:\2GEOTECH\02-PROJECTS\10000_11999\11600\11643 - U-5510 - Roadway Extension on SR 1468 from US 70 to SR 1005\CADD_GEOTECH\xsc\U5510_Geo_xsl_L.dgn
mbrewer2 AT ECS-T01449GHLL0

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
U-5510	27

0 5 10
FEET
VE = 1:1

CROSS SECTION THROUGH –L–
STATION 24 + 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

950 945 940 935 930 925 920 915 910 905 900

2:1

2:1

EXISTING GROUND LINE

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

-RESIDUAL-

-ALLUVIAL-
LOOSE TO VERY LOOSE, MOIST TO WET, BROWN-WHITE-ORANGE, SILTY FINE TO COARSE SAND (A-2-4)

MEDIUM DENSE TO VERY DENSE, MOIST TO WET, GRAY-WHITE-BROWN, SILTY FINE TO COARSE SAND (A-2-4), MICACEOUS

-WEATHERED ROCK-
GNEISS

24 + 50.00

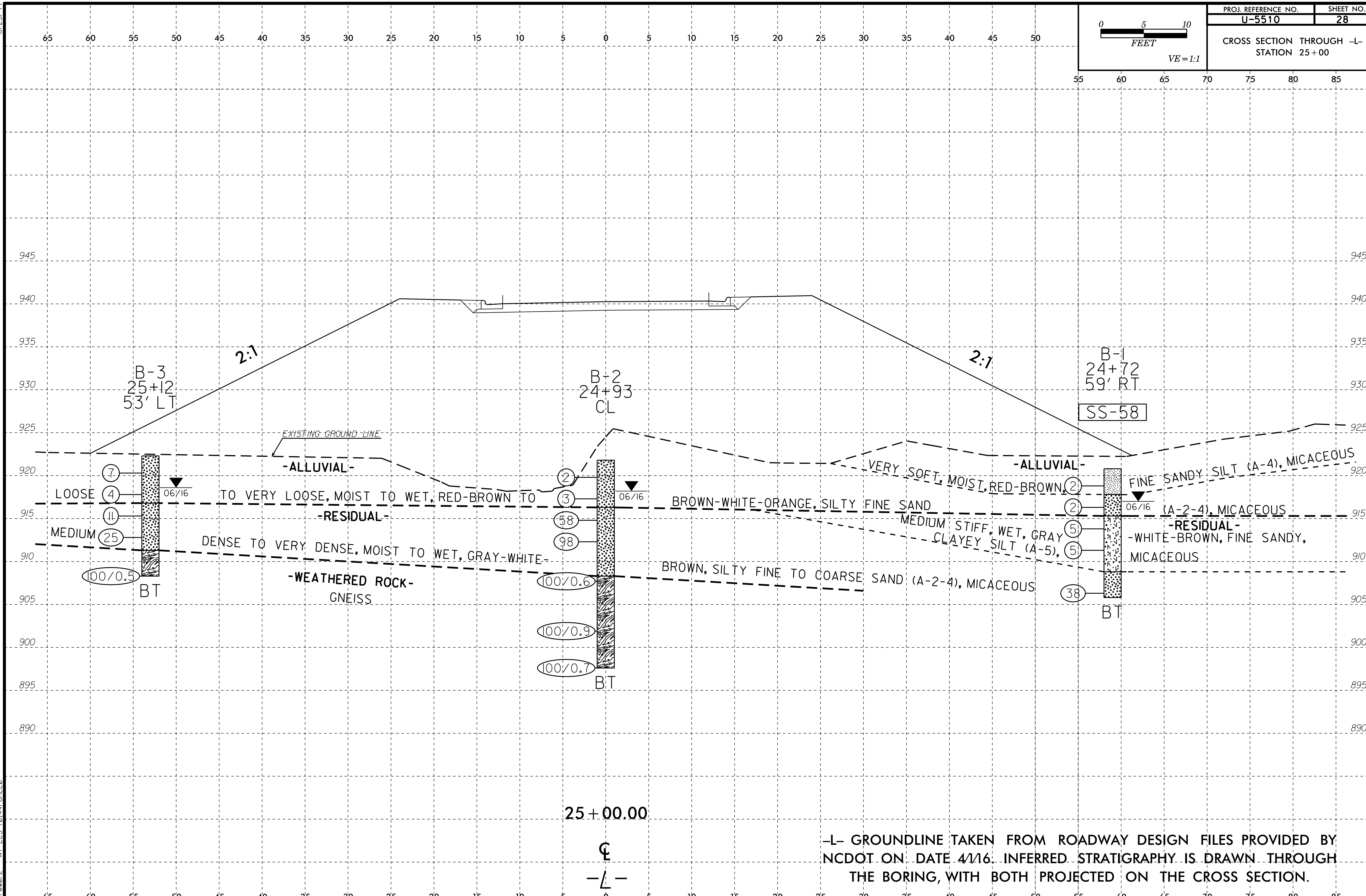
℄
–L–

–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

28-JUN-2016 22:19
I:\2GEOTECH\62-PROJECTS\11000-11999\11600\11643 - U-5510 - Roadway Extension on SR 1468 from US 70 to SR 1005\CADD_GEOTECH\xsc\U5510_Geo_xs1_L.dgn
mbrewer2
AT ECS-10144PBHLL0

PROJ. REFERENCE NO.	SHEET NO.
U-5510	28

CROSS SECTION THROUGH –L–
STATION 25+00



–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

PROJ. REFERENCE NO.	SHEET NO.
U-5510	29

0 5 10
FEET
VE = 1:1

CROSS SECTION THROUGH –L–
STATION 25 + 50

85 80 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

950 945 940 935 930 925 920 915

2:1

2:1

EXISTING GROUND LINE

-RESIDUAL-

-ALLUVIAL-

LOOSE TO VERY LOOSE, MOIST TO WET, RED-BROWN, SILTY FINE SAND (A-2-4), MICACEOUS

25 + 50.00

℄

–L–

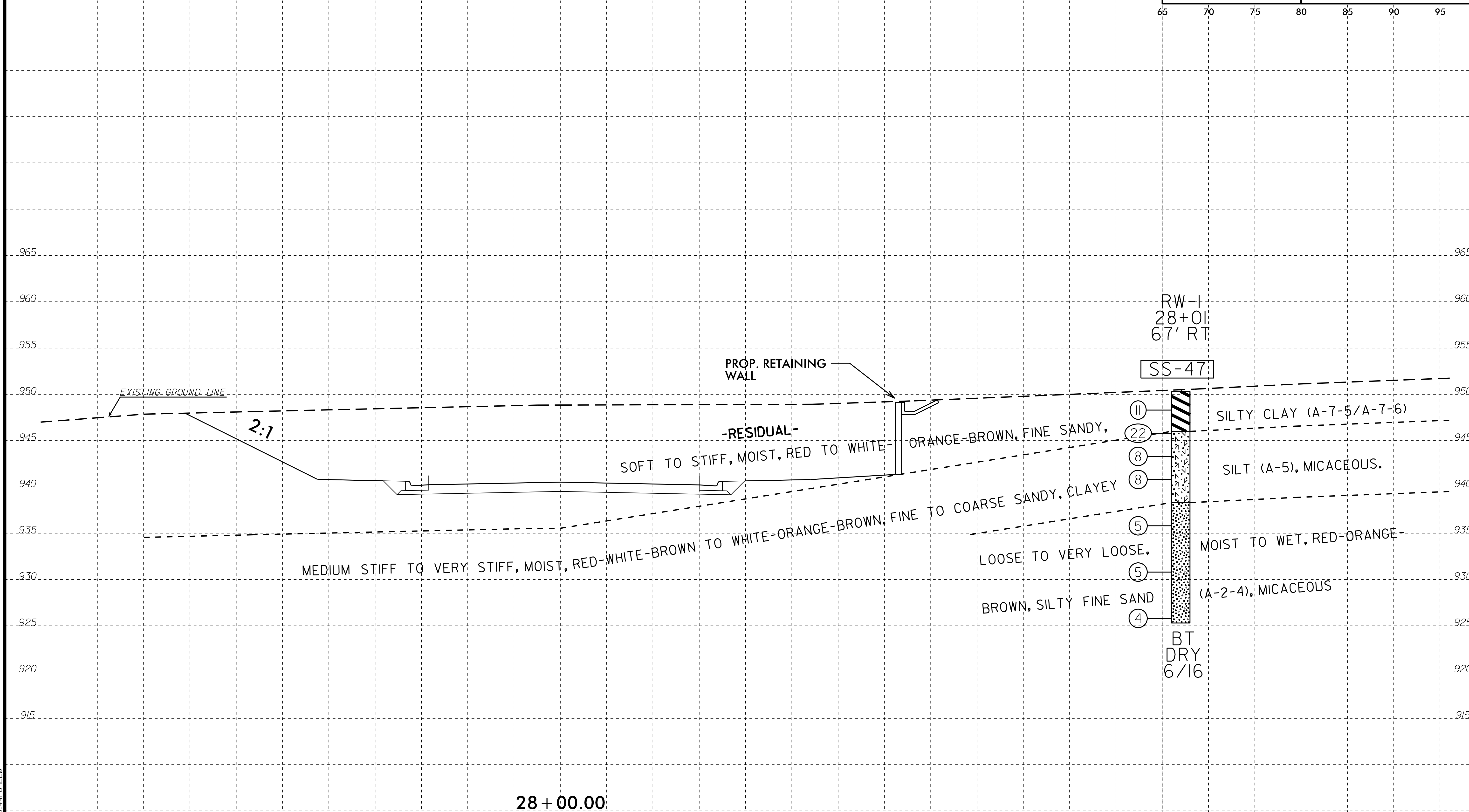
–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

8/23/99

28-JUN-2016 22:49
I:\2GEOTECH\22-PROJECTS\11000-11999\11600\11643 - U-5510 - Roadway Extension on SR 1468 from US 70 to SR 1005\CADD_GEOTECH\xsc\U5510_Geo_xs1_L.dgn
mbrewer
AT ECS-T0144P6HL0

PROJ. REFERENCE NO.	SHEET NO.
U-5510	30

CROSS SECTION THROUGH –L–
STATION 28+00



–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

8/23/99

21-JUL-2016 18:41
I:\2GEOTECH\02-PROJECTS\11000-11999\11600\11643 - U-5510 - Roadway Extension on SR 1468 from US 70 to SR 1005\CADD_GEOTECH\xsc\U5510_Geo_xs1_L.dgn
mbrewer2 AT ECS-T0144P6HLL0

PROJ. REFERENCE NO.	SHEET NO.
U-5510	31

CROSS SECTION THROUGH –L–
STATION 28+50

0 5 10
FEET
VE = 1:1

RW-ANCHOR-I
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

17
13
9
17
6
4
4

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

SILT (A-5), MICACEOUS

BT
DRY
6/16

28+50.00
℄
–L–

–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

8/23/99

2: JUL 2016 18:41
I:\2DEOTECH\02-PROJECTS\10000-11999\11600\11643 - U-5510 - Roadway Extension on SR 1468 from US 70 to SR 1005\CADD_GEOTECH\xsc\U5510_Geo_xs1_L.dgn
mbrewer2
XF ECS-T0144P6HLL0

PROJ. REFERENCE NO.	SHEET NO.
U-5510	32

0 5 10
FEET
VE = 1:1

CROSS SECTION THROUGH –L–
STATION 29+50
STATION 29+00

EXISTING GROUND LINE

PROP. RETAINING WALL

-ARTIFICIAL FILL-
STIFF, RED-BROWN TO DARK BROWN, FINE TO COARSE SANDY, SILTY CLAY (A-7-5)

2:1

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

SOFT TO MEDIUM STIFF, MOIST TO WET, RED-ORANGE-BROWN TO PURPLE-BLACK, FINE SANDY, CLAYEY SILT (A-5), MICACEOUS

29+50.00

L_2900
29+00
CL

SS-21
SS-23

(15) (15) (14) (7) (5) (6) (4)

BT
DRY
6/16

29+00.00

℄
–L–

RW-2
29+00
24' RT

(6) (12) (8) (8) (5) (4) (3) (4) (5)

06/16

BT

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

–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

8/23/99

22-JUL-2016 10:58
I:\...\GEOTECH\xsc\U5510_Geo_xs1_L.dgn
mbrewer
AT ECS-T0144PGHL10

8/23/99
22-JUL-2016 10:59
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mbrewer
AT ECS-T0144P6HL_0

PROJ. REFERENCE NO.	SHEET NO.
U-5510	33

0 5 10 FEET
VE = 1:1

CROSS SECTION THROUGH –L–
STATION 30+00

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 80 85

975 970 965 960 955 950 945 940 935 930 925 920

RW-3
30+00
24' RT
SS-13
ST-1
CBR-1

RW-ANCHOR-2
30+00
50' RT

PROP. RETAINING WALL

-ARTIFICIAL FILL-

EXISTING GROUND LINE

2:1

-RESIDUAL- SOFT TO STIFF, MOIST, RED-ORANGE-TAN, FINE TO COARSE SANDY, SILTY CLAY (A-7-6/A-7-5)

-RESIDUAL- SOFT TO STIFF, (A-7-6/A-7-5),

MOIST, RED-ORANGE-TAN, FINE TO COARSE SANDY, SILTY CLAY

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

SILT (A-5), MICACEOUS

FINE SANDY, CLAYEY

06/16

SOFT TO MEDIUM STIFF, MOIST TO WET, RED-TAN TO GRAY-BROWN-ORANGE,

Ⓐ -RESIDUAL- LOOSE, WET, GRAY-WHITE, SILTY FINE (A-2-4), MICACEOUS

BT

BT
DRY
6/16

30+00.00
℄
–L–

–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
U-5510	34

CROSS SECTION THROUGH –L–
STATION 31+00
STATION 30+50

0 5 10 FEET
VE = 1:1

RW-4
31+02
38' RT

L_3100
31+00
CL

SS-6

PROP. RETAINING WALL

EXISTING GROUND LINE

2:1

-RESIDUAL- Ⓐ

-ARTIFICIAL FILL-
SOFT TO HARD, MOIST, RED-BROWN TO WHITE-DARK BROWN, FINE TO COARSE SANDY, CLAYEY SILT (A-5) AND SANDY SILT (A-4)

MEDIUM STIFF TO SOFT, MOIST, ORANGE-WHITE-BROWN-GRAY, FINE SANDY, CLAYEY SILT (A-5) AND SANDY SILT (A-4), MICACEOUS

BT
DRY
6/16

BT
DRY
6/16

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

31+00.00

EXISTING GROUND LINE

PROP. RETAINING WALL

-ARTIFICIAL FILL-
STIFF, RED-BROWN TO DARK BROWN, FINE TO COARSE SANDY, SILTY CLAY (A-7-5)

2:1

-RESIDUAL- MEDIUM STIFF TO STIFF, MOIST, RED-ORANGE-TAN, FINE TO COARSE SANDY, SILTY CLAY (A-7-6/A-7-5)

SOFT TO MEDIUM STIFF, MOIST TO WET, RED-TAN TO GRAY-BROWN-ORANGE, FINE SANDY, CLAYEY SILT (A-5), MICACEOUS

30+50.00

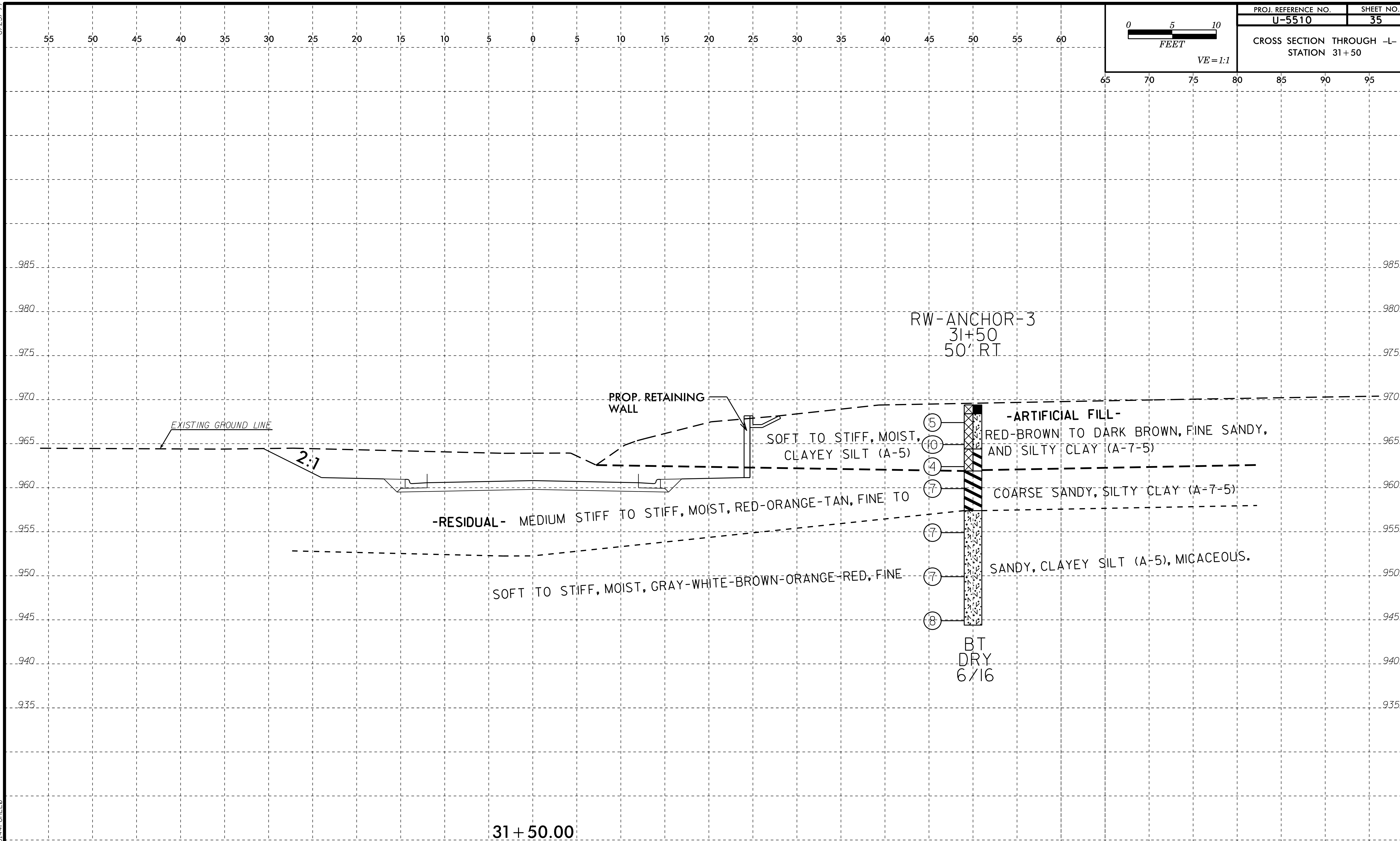
℄
–L–

–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

22-JUL-2016 10:59
I:\2GEOTECH\23_PROJECTS\10000-11999\11600\11643 - U-5510 - Roadway Extension on SR 1468 from US 70 to SR 1005\CADD_GEOTECH\xsc\U5510_Geo_xs1_L.dgn
mbrewer2
AT ECS-70144PBHLL0

PROJ. REFERENCE NO.	SHEET NO.
U-5510	35

CROSS SECTION THROUGH –L–
STATION 31+50



–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
U-5510	36

CROSS SECTION THROUGH –L–
STATION 33+00
STATION 32+50
STATION 32+00

0 5 10
FEET
VE = 1:1

L_3278
32+78
CL

EXISTING GROUND LINE

17.7:1

2:1

-RESIDUAL-

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

11
12
11
9

Ⓐ

BT
DRY
6/16

33+00.00

Ⓐ -RESIDUAL- LOOSE, MOIST, BROWN-WHITE, SILTY FINE SAND (A-2-4)

EXISTING GROUND LINE

2:1

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

EXISTING GROUND LINE

2:1

-RESIDUAL-

-ARTIFICIAL FILL-

13
10
12
10
7

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

TO COARSE SANDY,

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

CLAYEY SILT (A-5)

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

BT
DRY
6/16

32+00.00

℄
–L–

–L– GROUNDLINE TAKEN FROM ROADWAY DESIGN FILES PROVIDED BY NCDOT ON DATE 4/1/16. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORING, WITH BOTH PROJECTED ON THE CROSS SECTION.

8/23/99

29-JUN-2016 12:00
I:\2GEOTECH\27-PROJECTS\U1000-1999\U1600\U1643 - U-5510 - Roadway Extension on SR 1468 from US 70 to SR 1005\CADD_GEOTECH\xsc\U5510_Geo_xs_L.dgn
mbrewer2
AT ECS-10144P6HL10

PROJECT REFERENCE NO.	SHEET NO.
U–5510	37

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

APPENDIX A
SOIL TEST RESULTS

REFERENCE: U–5510

PROJECT: 45532

DS DMB

DMB 8–18–16
INITIALS DATE

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-102	L_1350	CL	13+50	3.5-5.0	A-7-5(19)	62	30	19.2	17.0	8.4	55.4	97.0	86.0	65.0	25.3	-
SS-69	L-1500	CL	15+00	1.0-2.5	A-7-6(10)	48	22	27.3	17.6	10.1	45.0	95.0	77.0	55.0	23.9	-
SS-75	L_1700	CL	17+00	3.5-5.0	A-7-5(15)	61	19	19.8	15.6	16.5	48.1	99.0	86.0	68.0	24.8	-
SS-76	L_1700	CL	17+00	6.0-7.5	A-7-5(17)	60	15	6.9	15.6	36.0	41.4	100.0	97.0	81.0	29.7	-
SS-82	L_1900	CL	19+00	3.5-5.0	A-7-5(18)	61	20	14.1	14.7	20.6	50.6	100.0	91.0	75.0	27.0	-
SS-84	L_1900	CL	19+00	8.5-10.0	A-7-6(31)	72	53	15.9	27.3	25.8	30.9	100.0	89.0	63.0	27.0	-
SS-89	L_2100	CL	21+00	1.0-2.5	A-7-5(16)	56	25	20.8	16.6	9.5	53.1	99.0	86.0	65.0	23.0	-
SS-96	L_2300	CL	23+00	1.0-2.5	A-7-6(13)	50	23	22.3	17.9	12.5	47.3	99.0	85.0	62.0	21.9	-
SS-52	L_2700	CL	27+00	1.0-2.5	A-7-5(8)	52	20	29.0	22.0	22.5	26.4	99.0	80.0	52.0	22.9	-
SS-21	L_2900	CL	29+00	1.0-2.5	A-7-5(19)	61	29	18.2	19.2	10.0	52.5	100.0	89.0	65.0	28.1	-
SS-23	L_2900	CL	29+00	6.0-7.5	A-7-5(21)	71	20	12.3	14.7	19.5	53.5	99.0	91.0	76.0	35.7	-
SS-6	L_3100	CL	31+00	1.0-2.5	A-7-5(31)	76	29	9.3	10.8	18.8	61.1	100.0	94.0	82.0	31.2	-
SS-150	Y1_1300	15' LT	13+00	3.5-5.0	A-7-5(20)	64	22	13.1	17	20.2	49.7	100.0	92.0	74.0	23.8	-
SS-147	Y1_1600	15' LT	16+00	6.0-7.5	A-7-5(27)	74	34	15.7	13.9	8.8	61.6	99.0	89.0	72.0	27.5	-
SS-58	B-1	59' RT	27+72	3.5-5.0	A-2-4(0)	39	NP	39.7	37.6	15.7	7.0	98.0	59.0	29.0	41.9	-
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	-
CBR-2	L_2700	CL	27+00	3.0-15.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	-
CBR-3	L_1900	CL	19+00	0.0-15.0	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	NT	-
CBR-4	L_2100	CL	21+00	0.0-15.0	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= Shebly 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: _____