STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	W-5114	1	27

TIP: W-5114

WBS: 41877

NOTE: SEE SHEET 2A FOR PLAN SHEET LAYOUT AT TIME OF INVESTIGATION

CONTENTS

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

ROADWAY SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. *41877.1.1 (W-5114)* F.A. PROJ. *STP-0068(10)*

COUNTY *Guilford*

PROJECT DESCRIPTION *NC 68 from south of SR 2111 (East Harrell Road) to SR 4831 (Bartonshire Drive)*

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. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE 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 THIS 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.

PERSONNEL

D. Racey

J. Gilchrist

M. Renza

D. Jenks

INVESTIGATED BY *F&R, Inc.*

CHECKED BY *P. Alton, P.E.*

SUBMITTED BY *F&R, Inc.*

DATE *May 2012*

NORTH CAROLINA PROFESSIONAL SEAL 033758 ENGINEER W. PATRICK ALTON

7/5/12

Patrick Alton

DRAWN BY: *D. Racey*

PROJECT REFERENCE NO.	SHEET NO.
W-5114	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 TO BE THE 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 STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. 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 # 40 # 200	50 MX 30 MX 15 MX	50 MX 25 MX	51 MN 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
LIQUID LIMIT PLASTIC INDEX	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 A 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	<4	N/A
	LOOSE	4 TO 10	
	MEDIUM DENSE	10 TO 30	
	DENSE	30 TO 50	
	VERY DENSE	>50	
GENERALLY SILT-CLAY MATERIAL (COHESIVE)	VERY SOFT	<2	<0.25
	SOFT	2 TO 4	0.25 TO 0.50
	MEDIUM STIFF	4 TO 8	0.5 TO 1.0
	STIFF	8 TO 15	1 TO 2
	VERY STIFF	15 TO 30	2 TO 4
	HARD	>30	>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	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
SL — SHRINKAGE LIMIT		
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
NONPLASTIC	0-5	VERY LOW
LOW PLASTICITY	6-15	SLIGHT
MED. PLASTICITY	16-25	MEDIUM
HIGH PLASTICITY	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.
UNIFORM - INDICATES THAT SOIL PARTICLES ARE ALL APPROXIMATELY THE SAME SIZE. (ALSO POORLY GRADED)
GAP-GRADED - INDICATES A MIXTURE OF UNIFORM PARTICLES 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 WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.

COMPRESSIBILITY

SLIGHTLY COMPRESSIBLE	LIQUID LIMIT LESS THAN 31
MODERATELY COMPRESSIBLE	LIQUID LIMIT EQUAL TO 31-50
HIGHLY COMPRESSIBLE	LIQUID LIMIT GREATER THAN 50

PERCENTAGE OF MATERIAL

ORGANIC MATERIAL	GRANULAR SOILS	SILT - CLAY SOILS
TRACE OF ORGANIC MATTER	2 - 3%	3 - 5%
LITTLE ORGANIC MATTER	3 - 5%	5 - 12%
MODERATELY ORGANIC	5 - 10%	12 - 20%
HIGHLY ORGANIC	>10%	>20%

OTHER MATERIAL	
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
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 W/ CORE
- SPT N-VALUE
- REF — SPT REFUSAL

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
e - VOID RATIO
F - FINE
FIAD-FILLED IMMEDIATELY AFTER DRILLING
FRAC. - FRACTURED, FRACTURES
FRAGS. - FRAGMENTS
HI. - HIGHLY
MED. - MEDIUM
MICA. - MICACEOUS
MOD. - MODERATELY
ND - NOT DETERMINED
NP - NON PLASTIC
NT - NOT TESTED
ORG. - ORGANIC
ROWY. EMBANK. - ROADWAY EMBANKMENT
SAP. - SAPROLITIC
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
w - MOISTURE CONTENT
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:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [X] CME-55
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 6" CONTINUOUS FLIGHT AUGER
- [X] 8" 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_____
- [ ] -N_____
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [X] HAND AUGER/DCP
- [ ] SOUNDING ROD
- [ ] VANE SHEAR TEST
- [ ] _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. 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, YIELDS SPT N VALUES > 100 BPF*
VERY SEVERE (V SEV.)	ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. *IF TESTED, YIELDS 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 FEET
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 THE 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, 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:

TBM 1: BL-10 N: 893,336.8225 E: 1,709,189.5301 ELEV. = 826.73 FT.
TBM 2: BL-9 N: 892,173.9430 E: 1,709,317.6907 ELEV. = 805.89 FT.

NOTES:

REVISED 09/23/09

09/08/99

TIP PROJECT: W-5114

CONTRACT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

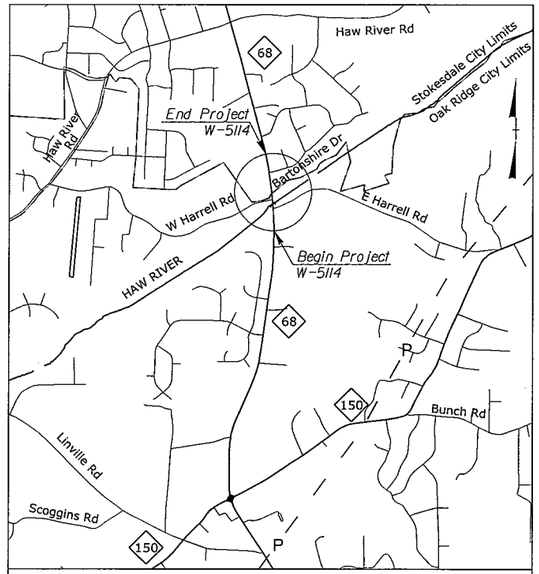
GUILFORD COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	W-5114	2A	27

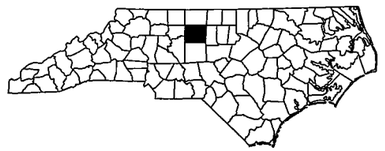
STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
41877.1.1	STP-0068 (10)	PE

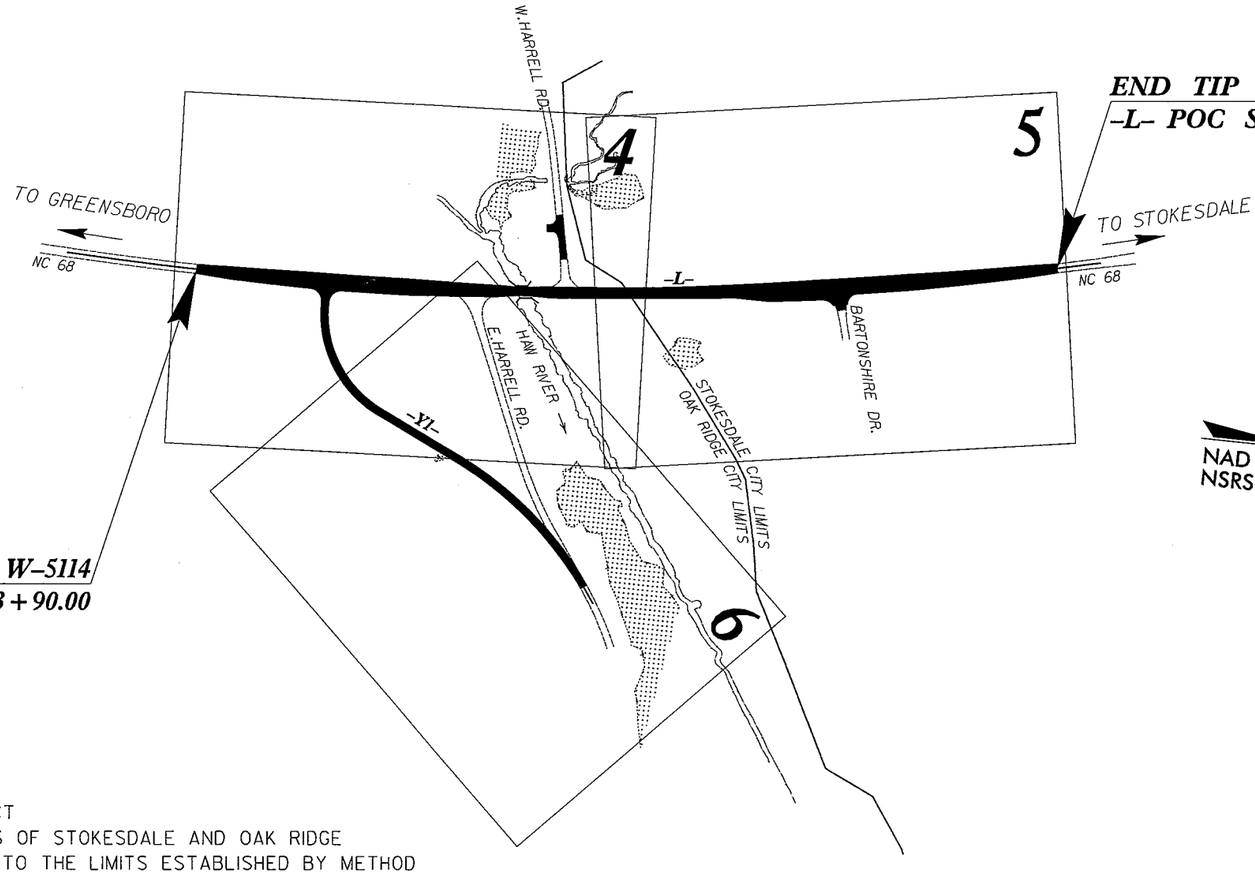
LOCATION: NC 68 FROM SOUTH OF SR 2111 (EAST HARRELL ROAD) TO SR 4831 (BARTONSHIRE DRIVE)

TYPE OF WORK: GRADING, PAVING, AND DRAINAGE



VICINITY MAP SHOWING LOCATION OF W-5114





END TIP PROJECT W-5114
-L- POC STA. 39+50.00

BEGIN TIP PROJECT W-5114
-L- POC STA. 13+90.00

NAD 83/
NSRS 2007

THERE IS NO CONTROL OF ACCESS ON THIS PROJECT
THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF STOKESDALE AND OAK RIDGE
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

5 2.5 0 5 10
PROFILE (VERTICAL)

DESIGN DATA

ADT 2014 = 16,550
ADT 2034 = 17,550
DHV = 11 %
D = 65 %
T = 12 % *
V = 55 MPH
* TTST = 7 DUAL 5
FUNC CLASS =
RURAL MINOR ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT W-5114 = 0.485 MILES
TOTAL LENGTH OF TIP PROJECT W-5114 = 0.485 MILES

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MAY 17, 2013

LETTING DATE:
JUNE 17, 2014

TONY HOUSER, PE
PROJECT ENGINEER

LEE ANN MOORE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER

SIGNATURE: *P.E.*

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE HIGHWAY DESIGN ENGINEER *P.E.*

$$$$USERNAME$$$$
$$$$SYSTIME$$$$
$$$$DGN$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

SINCE 1881

FROEHLING & ROBERTSON, INC.

Engineering Stability Since 1881

310 Hubert Street
Raleigh, North Carolina 27603-2302 I USA
T 919.828.3441 I F 919.828.5751
NC Engineering License # F-0266

July 5, 2012

State Project No.: 41877.1.1
TIP No.: W-5114
F.A. Number: STP-0068 (10)
County: Guilford

Description: NC 68 from south of SR 2111 (East Harrell Road) to SR 4831 (Bartonshire Drive) in Oak Ridge and Stokesdale

SUBJECT: **Geotechnical Report – Inventory**

Project Description

This project involves widening existing NC 68 (-L-) for a distance of 0.48 miles and the realignment of East Harrell Road (-Y1-) for a distance of 0.24 miles in the towns of Oak Ridge and Stokesdale, North Carolina. NC 68 is proposed to be widened for safety improvements with the addition of paved shoulders and medians along the existing 2-lane roadway. The widening begins approximately 800 feet south of East Harrell Road and ends approximately 650 feet north of Bartonshire Drive, and extends through an area that contains residences and undeveloped wooded property throughout its entire length. Proposed fills are generally less than 6 or 7 feet in height while proposed cuts are generally less than 4 or 5 feet in height with the exception of the southern end of the project where the maximum cut is approximately 13 feet in height.

The realignment of East Harrell Road begins at NC 68 approximately 450 feet south of the road's current intersection with NC 68 and intersects existing East Harrell Road approximately 1000 feet east of NC 68. Maximum cut and fill heights are approximately 28 feet and 9 feet, respectively.

The geotechnical field investigation was performed between April 16 and 24 of 2012. Eight standard penetration test (SPT) borings were advanced with an ATV-mounted CME-55 drill rig with an automatic hammer. In addition, six shallow hand auger borings were also completed in areas of minimal fill or in areas that were inaccessible to our drill rig. Dynamic cone penetrometer (DCP) testing was performed in all of the hand auger borings in general accordance with ASTM Special Technical Publication No. 399. The number of blows required to drive the 1.375-inch diameter steel cone three consecutive 1.75-inch increments is recorded and the blows of the last two 1.75-inch increments are averaged to obtain the DCP N_c-values, representing the penetration resistance of the soil. Representative soil samples were collected for visual classification in the field and for laboratory analysis by F&R's soil testing laboratory.

The following alignments were investigated:

Line	Station(±)
-L-	13+90 to 39+50
-Y1-	10+00 to 22+60

Areas of Special Geotechnical Interest

1) Crystalline Rock: The following locations were found to contain crystalline rock within 6 feet of the proposed grade:

Line	Station(±)
-Y1-	11+50, 100' right
-Y1-	19+50, 25' right

2) Weathered Rock: The following locations were found to contain weathered rock above or within 6 feet of the proposed grade that have a potential to require ripping or blasting for removal:

Line	Station (±)
-Y1-	11+50
-Y1-	17+50, 25' right
-Y1-	19+42, 14' left
-Y1-	19+50, 25' right

3) Hand Auger Refusal: Hand auger refusal was achieved at the following locations which may be an indication of the presence of very dense or hard soils, but may also be an indication of the presence of weathered rock and/or crystalline rock:

Line	Station (±)
-L-	17+00, 50' left
-L-	17+05, 50' left
-L-	17+77, 22' right
-L-	35+00, 29' right
-L-	35+07, 35' right

4) Groundwater: The following location exhibited groundwater within 6 feet of the proposed grade:

Line	Station (±)
-L-	27+00, 35' right

Although stabilized groundwater was not encountered at the borings located at -L- 23+00 and -L- 24+17, wet and/or saturated soils were encountered and could be an indication of the presence of or potential for shallow groundwater.

5) Highly Plastic Soils: The following location was found to contain highly plastic soils within the upper 3 feet of proposed grade which have the potential for subgrade instability during construction:

Line	Station (±)
-L-	31+00, 28' left

6) Organic Soils: The following location was found to contain loose and moderately organic soils, which have the potential for subgrade instability during construction:

Line	Station (±)
-L-	35+00, 29' right

Physiography and Geology

The project is located in the Piedmont Physiographic Province of North Carolina near the contact between the Charlotte and Milton Belts of western North Carolina. More specifically, it is located in an area mapped as granitic rock and biotite gneiss and schist. Weathered rock recovered from our borings and exposed boulders exhibits the characteristics of biotite gneiss and is generally fine to medium grained. Soils weathered from the parent rock generally consist of silty, fine to coarse sands.

Existing NC 68 generally runs south-north and the elevation along the proposed centerline decreases from an elevation of approximately 837 feet at the beginning of the project to an elevation of approximately 805 feet near the existing culvert between East Harrell Road and West Harrell Road. The elevation then increases to an elevation of approximately 857 feet at the end of the project. Based on review of the cross sections provided, existing cuts appear to be on the order of approximately 10 to almost 30 feet on the south end of the project with the deepest cuts on the right side of the road. Existing embankment fills appear to be on the order of approximately 5 to 15 feet generally beginning near East Harrell Road and continuing northward, although none of the borings performed along NC 68 extended through the existing roadway embankment to verify this observation. It was noted during our preliminary site visit that isolated areas of minimally exposed rock were visible within the roadway shoulders towards the north end of the project. What appeared to be an old road bed located parallel to and on the left/west side of NC 68, also contained boulders, although it appeared that they may have been placed during construction of this road. However, this area appears to be outside of the limits of the proposed construction.

The Haw River traverses the site in a generally east to west direction running beneath NC 68 through a box culvert located at approximate -L- station 23+70. Low-lying areas/flood plain with isolated area of wetlands (none located within the limits of the proposed construction) are present on either side of the river and appear to extend from East Harrell Road towards approximate -L- station 29+00.

The proposed alignment of East Harrell Road generally runs east-west and the elevation along the proposed centerline decreases from an elevation of approximately 822 feet at its intersection with NC 68 to an elevation of approximately 801 feet at its intersection with existing East Harrell Road. The topography along the proposed centerline is composed of three hills that will require cuts of up to approximately 28 feet and two low spots between the hills that will require fills of up to approximately 9 feet.

Soils Properties

Soils within this project area have been divided into three categories: topsoil, alluvial soils, and residual soils.

Topsoil: Topsoil was encountered at the surface of all of our borings and ranged in thickness from 0.1 to 0.3 feet (1 to 3.5 inches).

Alluvial Soil: Alluvial soils were encountered within the low-lying area at -Y1- station 13+50 and within the floodplain of the Haw River. The alluvial soil encountered at -Y1- station 13+50 consist of dark brown, fine sandy silt (A-4) with trace organics and man-made debris and some clay. The alluvial soil encountered within the floodplain of the Haw River typically consisted of silty and clayey, fine to coarse sand (A-2-4 & A-2-6) at -L- station 24+00 and intermixed layers of typically silty fine sand (A-2-4) and fine to coarse sandy and silty clay (A-7-5 & A-7-6) at -L- stations 23+00 and 27+00. The clay sample tested at boring L_2300R had a high plasticity index (LL=59, PI=30). Trace organics were noted in the alluvial deposits. Based on the results of the hand auger borings, the consistency of the alluvial soils appears to be soft to stiff for the clay and very loose to medium dense for the sand. The soil moisture condition was typically moist to a depth of approximately 2 to 3 feet below the existing ground surface becoming wet or saturated at and below this depth.

Residual Soil: The majority of the soils encountered on the project are residual soils, and typically consist of silty fine to coarse sand (A-2-4), except at -L- stations 31+00 left and 35+07 right where surficial sandy and silty clays (A-7-5 & A-7-6) were encountered. The residual soil is generally red, brown and orange in color and contains trace organics near the existing ground surface. The tested sandy and silty soils are

either non-plastic or have low plasticity indices. The tested clay samples exhibit medium to high plasticity indices ranging from 17 to 32 percent and natural moisture contents ranging from 21 to 54 percent. The consistency of the residual soils ranges from very loose to very dense for the sands (most commonly medium dense to dense) and soft to very stiff for the clays (most commonly stiff).

Rock Properties

Both weathered rock and crystalline rock were encountered in the project corridor although crystalline rock was only encountered in two of the borings at -Y1- stations 11+50 and 19+50. The rock consists of brown, orange, white and black biotite gneiss. No rock coring was performed. At -Y1- station 11+50, layers of residual soil consisting of very dense silty, fine to coarse sand (A-2-4) were encountered within and below the weathered rock.

Groundwater Properties

Groundwater measurements were attempted at the time of drilling in all of the borings along -L-, but stabilized groundwater was not encountered with the exception of the boring located at station 27+00 where groundwater was encountered at an elevation of 790.4 feet, which is approximately 3 feet below proposed grade at the boring location or approximately 1.1 feet below proposed grade at the toe of the slope. The recovered soil samples were generally described as moist to wet, except the saturated alluvial soils encountered at Station 24+00 and 27+00.

Groundwater measurements were attempted in a majority of the borings along -Y1-, but stabilized groundwater was not encountered with the exception of the boring located at station 13+50 where groundwater was encountered at an elevation of 802.2 feet, which is approximately 9 feet below proposed grade. The recovered soil samples were generally described as moist.

Geotechnical Descriptive Analysis of the Project

For descriptive purposes, the project has been divided into four segments. The division of the segments is based on the topography and proposed roadway elevations.

-L- Station 13+90 to 22+50 (±):

This beginning of the project extends through an area with existing cut slopes typically ranging in height from approximately 10 to 30 feet. The widening will require additional cut depths up to approximately 13 feet with minimal to no additional cut required at the beginning and end of this segment. The unclassified excavation to be encountered in the additional cuts is anticipated to consist mainly of residual silty sands, weathered rock and crystalline rock.

-L- Station 22+50 to 29+00 (±):

This segment extends through the floodplain area of the Haw River with existing fill slopes typically ranging in height from approximately 5 to 15 feet. The widening will require additional fill depths up to approximately 8 feet or less which will extend into the floodplain (mainly on the right side of the road) where the groundwater elevation could rise to or above the existing ground surface elevation during wet periods.

-L- Station 29+00 to 39+50 (±):

This segment extends through the end of the project where the existing and proposed roadway is generally at or within a few feet of existing or proposed grades. The roadway subgrade is anticipated to consist of loose to medium dense silty and clayey sand (A-2-4 & A-2-6) and/or medium stiff to stiff silty clay (A-7-5 & A-7-6).

-Y1- Station 10+00 to 22+60 (±):

This segment consists of the entire alignment of the new roadway and contains proposed cut depths of up to approximately 28 feet and fill depths up to approximately 9 feet. The unclassified excavation to be encountered in the cuts is anticipated to consist mainly of dense to very dense silty sand (A-2-4) and weathered rock. The subgrade within the areas of proposed fill is anticipated to consist of medium stiff to stiff sandy silt (A-4) and loose to medium dense silty sand (A-2-4).

Sincerely,
FROEHLING & ROBERTSON, INC.

Patrick Alton

W. Patrick Alton, P.E.
Geotechnical Engineer

NORTH CAROLINA PROFESSIONAL SEAL 033758 7/5/12 ENGINEER W. PATRICK ALTON

Daniel K. Schaefer, P.E.
Raleigh Branch Manager

3C

Earthwork Balance Sheet

Volumes in Cubic Yards

PROJECT: W-5114 COUNTY: Guilford DATE: 1/15/2013 COMPILED BY: JDM SHEET 1 OF 1 SHEET

DATE: 2/25/2013 CHECKED BY: JLT

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. +20%		ROCK	SUITABLE	UNSUIT.	TOTAL
-L- STA. 12+00.00 RT	-L- STA. 23+47.15 RT (CUL)	4,670				4,670	400		400	480	0		4,190		4,190
-L- STA. 13+90.00 LT	-L- STA. 23+47.15 LT (CUL)	1,959				1,959	373		373	448	0		1,511		1,511
	SUBTOTAL	6,629				6,629	773		773	928	0		5,701		5,701
-L- STA. 23+83.21 RT (CUL)	-L- STA. 39+50.00 RT	128				128	3,348		3,348	4,018	3,890		0		0
-L- STA. 23+83.21 LT (CUL)	-L- STA. 39+50.00 LT	749				749	533		533	640	0		109		109
	SUBTOTAL	877				877	3,881		3,881	4,658	3,890		109		109
-Y1- STA. 10+20.00	-Y1- STA. 22+60.00	33,198				33,198	2,092		2,092	2,510	0		30,688		30,688
	SUBTOTAL	33,198				33,198	2,092		2,092	2,510	0		30,688		30,688
TOTAL		40,704				40,704	6,746		6,746	8,096	3,890		36,498		36,498
LOSS DUE TO CLEARING & GRUBBING		-2,200				-2,200							-2,200		-2,200
WASTE IN LIEU OF BORROW											-3,890		-3,890		-3,890
GRAND TOTALS		38,504				38,504	6,746		6,746	8,096	0		30,408		30,408
SAY		39,000													

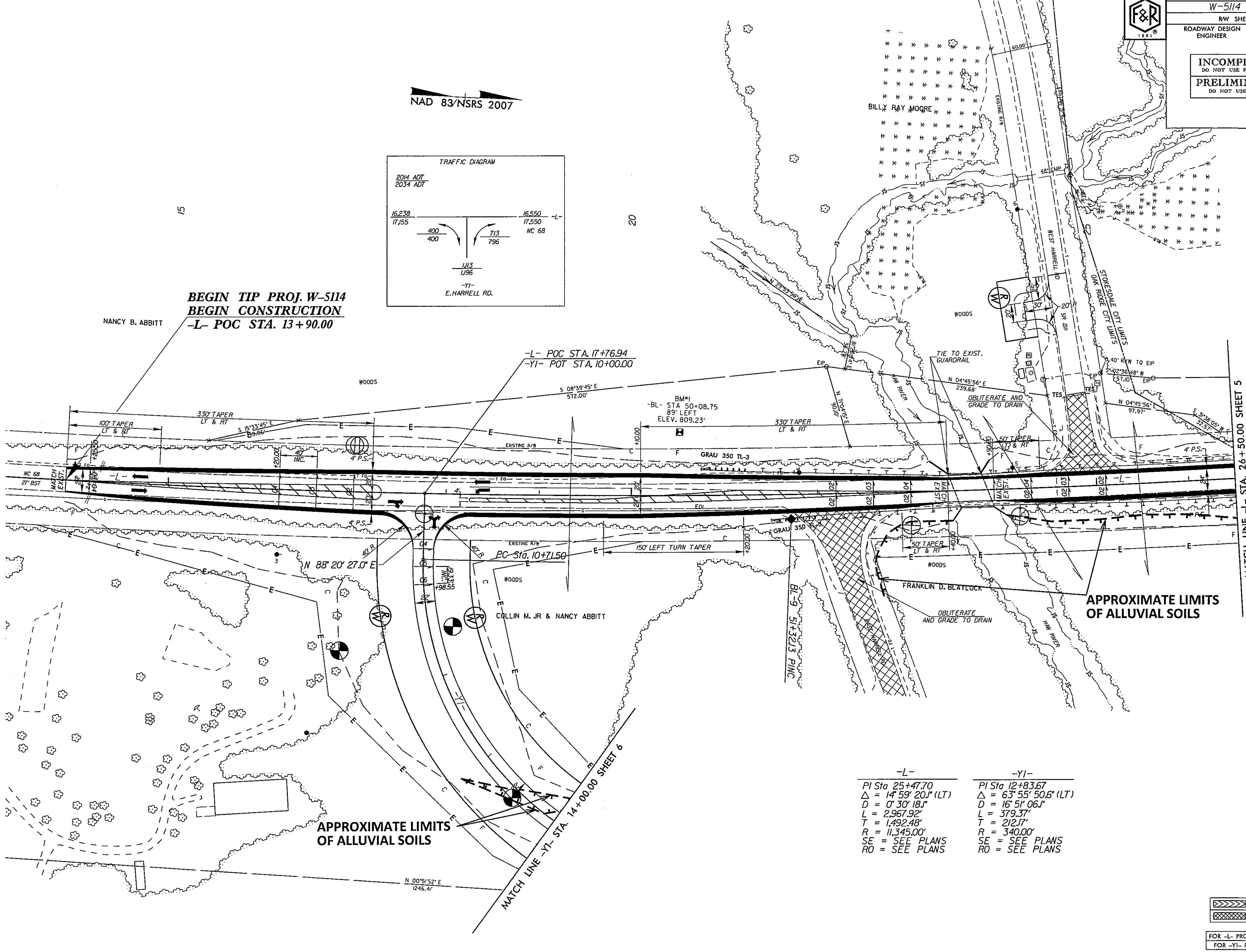
NOTE: EARTHWORK QUANTITIES ARE CALCULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT.

ESTIMATED DDE = 410 C.Y.
ESTIMATED SHOULDER BORROW = 1,160 C.Y.
ESTIMATED UNDERCUT EXCAVATION = 1,300 C.Y.
ESTIMATED SELECT GRANULAR MATERIAL = 1,000 CY
PAVEMENT STRUCTURE VOLUME = 500 C. Y.

PROJECT REFERENCE NO.	SHEET NO.
W-5114	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



NAD 83/NSRS 2007
TRAFFIC DIAGRAM
2014 ADT
2034 ADT
16,238
17,155
16,550
17,550
-L-
NC 68
400
400
713
796
1,113
1,196
-Y1-
E.HARRELL RD.
BEGIN TIP PROJ. W-5114
BEGIN CONSTRUCTION
-L- POC STA. 13+90.00
NANCY B. ABBITT
-L- POC STA. 17+76.94
-Y1- POT STA. 10+00.00
WOODS
S 08°39'45" E
572.00'
BM#1
-BL- STA 50+08.75
89' LEFT
ELEV. 809.23'
330' TAPER
LT & RT
100' TAPER
LT & RT
GRAU 350 TL-3
BILLY RAY MOORE
WEST HARRELL RD
SR 2111
STOKESDALE CITY LIMITS
OAK RIDGE CITY LIMITS
TIE TO EXIST. GUARDRAIL
OBLITERATE AND GRADE TO DRAIN
N 04°45'56" E
239.68'
N 04°45'56" E
97.97'
4' P.S.
N 88° 20' 27.0" E
PC Sta. 10+71.50
150' LEFT TURN TAPER
COLLIN M. JR & NANCY ABBITT
FRANKLIN D. BLAYLOCK
BL-9 51+32.13 PINC
APPROXIMATE LIMITS OF ALLUVIAL SOILS
APPROXIMATE LIMITS OF ALLUVIAL SOILS
MATCH LINE -L- STA. 26+50.00 SHEET 5
MATCH LINE -Y1- STA. 14+00.00 SHEET 6
N 00°51'52" E
1246.41'

-L-	-Y1-
PI Sta 25+47.70	PI Sta 12+83.67
Δ = 14° 59' 20.1" (LT)	Δ = 63° 55' 50.6" (LT)
D = 0° 30' 18.1"	D = 16° 51' 06.1"
L = 2,967.92'	L = 379.37'
T = 1,492.48'	T = 212.17'
R = 11,345.00'	R = 340.00'
SE = SEE PLANS	SE = SEE PLANS
RO = SEE PLANS	RO = SEE PLANS

PROP PAINT STRIPING
PAVEMENT REMOVAL

FOR -L- PROFILE, SEE SHEET NO. 7 & 8
FOR -Y1- PROFILE, SEE SHEET NO. 10

REVISIONS

8/17/99

8/17/99

REVISIONS

SINCE F&R 1881

PROJECT REFERENCE NO.	SHEET NO.
W-5114	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/NSRS 2007

TRAFFIC DIAGRAM

2014 ADT
2034 ADT

16,550
17,550

900
900

1013
1096

15,763
16,846

113
196

-L-
NC 68

-Y1-
BARTONSHIRE DR.

VICTOR J. BIERMAN, JR.
ANNE E. HERSHEY

JOHN EDWARD ACREE

THOMAS E. THOMPSON, JR.

FLOYD R. & LISA W. BAGBY

SESSOMS DEVELOPMENT, INC.

WOODS

LARRY W. MADDOX
JEAN A. MADDOX
(ESTATE OF JIMMY GARY MADDOX, SR.)

FRANKLIN D. BLAYLOCK

BRIAN P. MITCHELL, SR.

ARTHUR V. DEMMING, JR.
CATHY CARTER-CLINE

JEREMY C. HENSON & MARIA E.

MATTHEW E. JANOWSKY

MICHAEL W. & CHERIE A. COBLE

BM#2
-BL- STA 61+74.82
127' LEFT
ELEV. 823.85'

MATCH LINE -L- STA 26+50.00 SHEET 4

STOKESDALE CITY LIMITS
OAK RIDGE CITY LIMITS

APPROXIMATE LIMITS OF ALLUVIAL

APPROXIMATE LIMITS OF ORGANIC SOILS

END TIP PROJ. W-5114
END CONSTRUCTION
-L- POC STA. 39+50.00

-L-
PI Sta 25+47.70
Δ = 14° 59' 20J" (LT)
D = 0° 30' 18J"
L = 2,967.92'
T = 1,492.48'
R = 11,345.00'
SE = SEE PLANS
RO = SEE PLANS

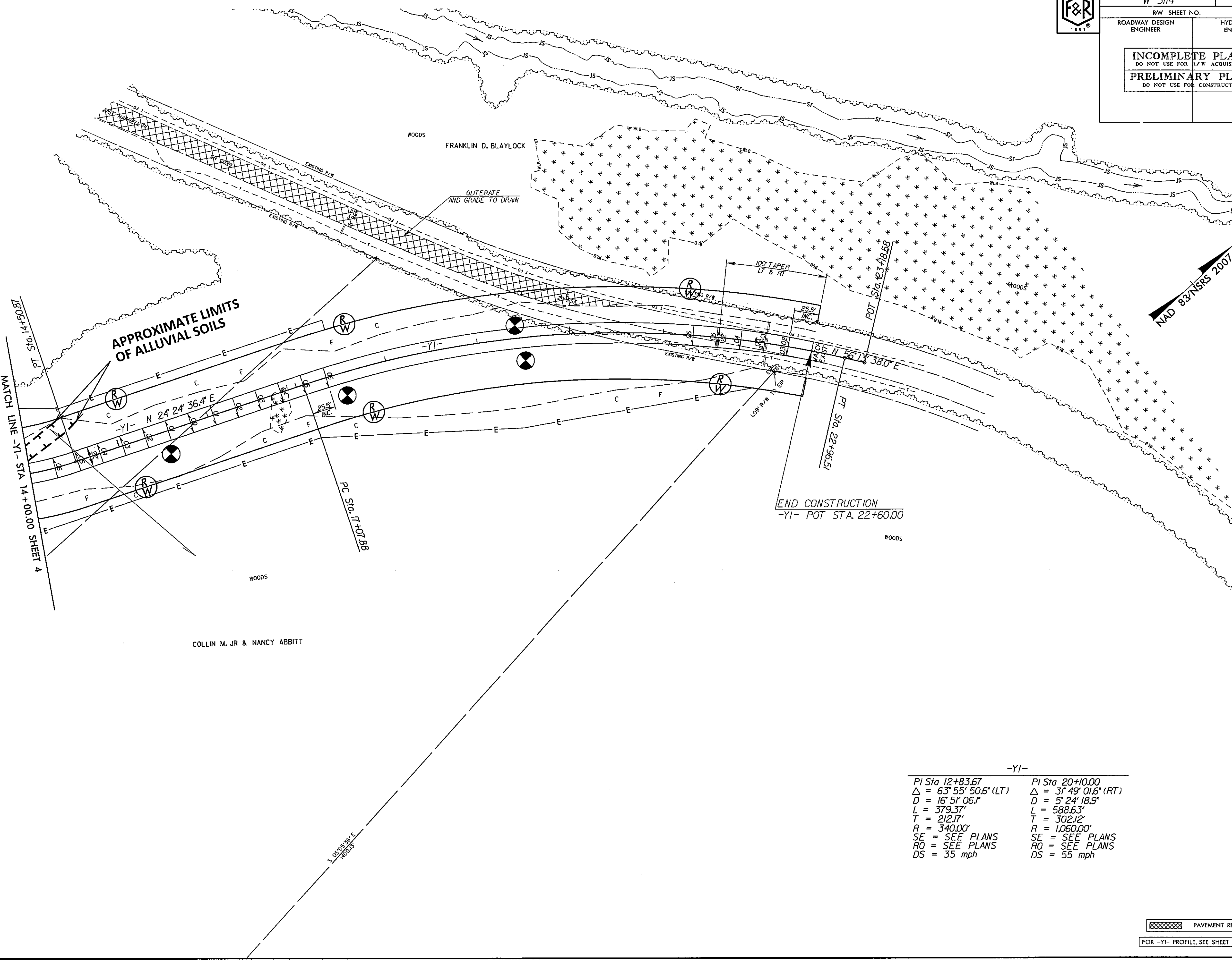
PROP PAINT STRIPING

FOR -L- PROFILE, SEE SHEET NO. 8 & 9

PROJECT REFERENCE NO.	SHEET NO.
W-5114	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



-Y1-

PI Sta 12+83.67	PI Sta 20+10.00
Δ = 63° 55' 50.6" (LT)	Δ = 31° 49' 01.6" (RT)
D = 16° 51' 06.1"	D = 5° 24' 18.9"
L = 379.37'	L = 588.63'
T = 212.17'	T = 302.12'
R = 340.00'	R = 1,060.00'
SE = SEE PLANS	SE = SEE PLANS
RO = SEE PLANS	RO = SEE PLANS
DS = 35 mph	DS = 55 mph

PAVEMENT REMOVAL

FOR -Y1- PROFILE, SEE SHEET NO. 10 & 11

REVISIONS

8/17/99

SINCE 1881 F&R

0 50 100
FEET
VE = 5:1

PROJECT REFERENCE NO.	SHEET
W-5114	7

PROFILE ALONG -L-

870
860
850
840
830
820
810
800
790
780

L_1705L
17+05
50' LT.

BT*
FIAD
4/12

L_1777R
17+77
22' LT.

Moist, brown, silty f. to cse. SAND (A-2-4). -RESIDUAL-

BT*
FIAD
4/12

PROPOSED GRADE

GROUND SURFACE

PI = 21+33.00
EL = 806.37'
VC = 440'
K = 115

(-)4.1472%

(-)0.3086%

* Boring terminated with hand auger refusal

GROUNDLINE PROFILE AT CENTERLINE OF -L- TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE PROFILE.

16+00 17+00 18+00 19+00 20+00 21+00 22+00

SINCE F&R 1881

0 50 100
FEET
VE = 5:1

PROJECT REFERENCE NO.	SHEET
W-5114	8

PROFILE ALONG -L-

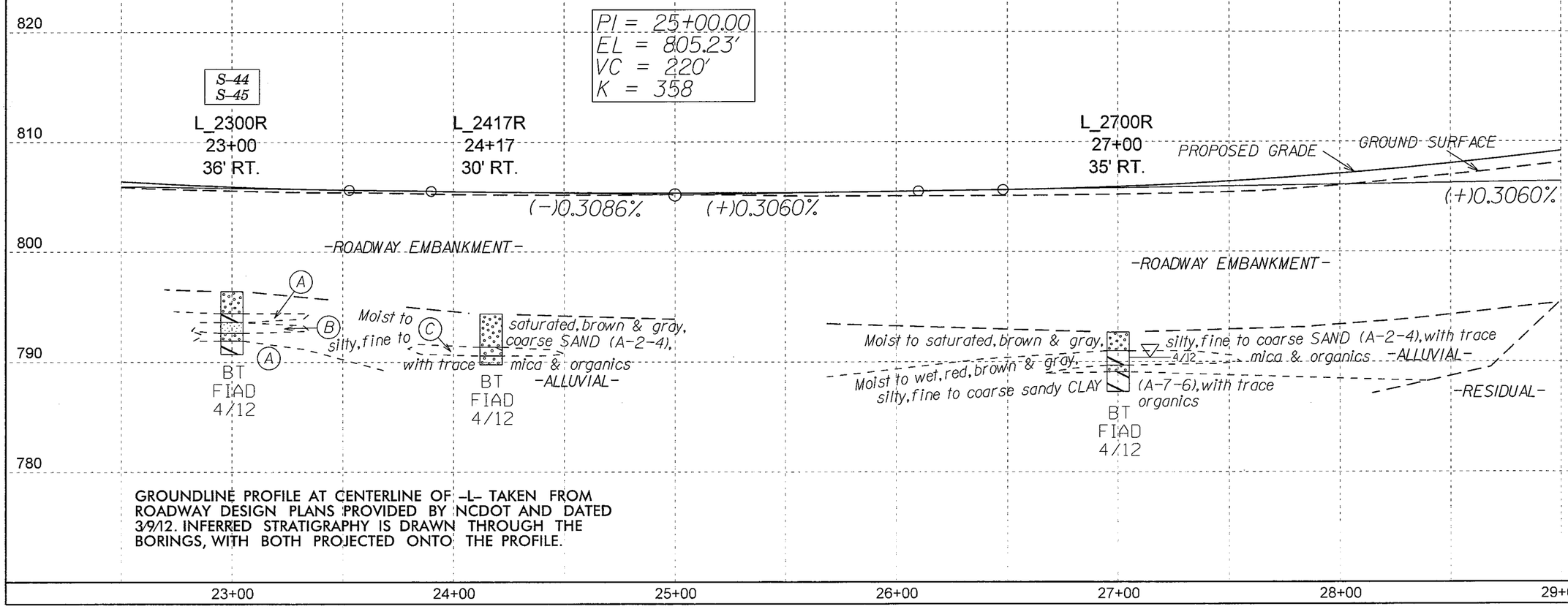
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%
							C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE
S-44	36' RT.	23+00	2.1'-2.5'	A-7-6(15)	59	30	24.8	19.6	11.6	44.0	98.8	83.2	57.1	21.5
S-45	36' RT.	23+00	3.1'-3.5'	A-4(0)	26	6	23.4	36.7	18.0	21.9	96.5	83.3	42.3	14.2

(A) Moist to wet, red, brown & gray, silty, fine to coarse sandy CLAY (A-7-6), with trace organics. -ALLUVIAL-

(B) Moist, gray & red-brown, fine to coarse sandy SILT (A-4), with some clay. -ALLUVIAL-

(C) Wet, brown, clayey fine to coarse SAND (A-2-6), with some silt. -ALLUVIAL-



GROUNDLINE PROFILE AT CENTERLINE OF -L- TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE PROFILE.

PROJECT REFERENCE NO.	SHEET
W-5114	9
PROFILE ALONG -L-	

SINCE 1881

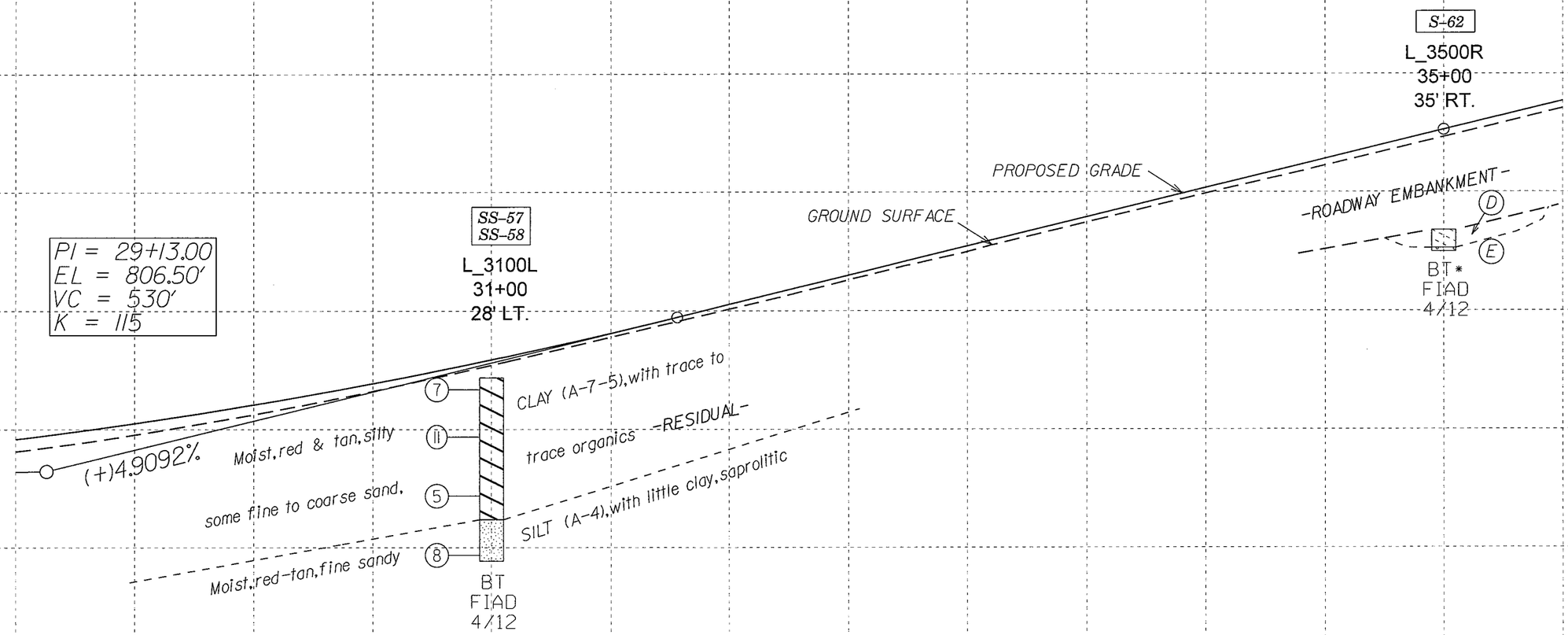
0 50 100
FEET
VE = 5:1

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-57	28' LT.	31+00	0.2'-1.5'	A-7-5(30)	81	32	14.4	9.6	18.3	57.7	98.9	88.7	76.7	34.2	NT
SS-58	28' LT.	31+00	4.0'-5.5'	A-7-5(27)	72	17	1.2	5.0	43.0	50.8	100.0	99.5	94.8	54.3	NT
S-62	35' RT.	35+00	0.1'-0.6'	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	33.7	5.3

(D) Wet, brown, silty fine SAND (A-2-4), with trace gravel-sized rock fragments, moderate organics -RESIDUAL-

(E) Wet, brown, clayey, fine to coarse SAND (A-2-6), with trace organics & gravel-sized rock fragments -RESIDUAL-



* Boring terminated with hand auger refusal

GROUNDLINE PROFILE AT CENTERLINE OF -L- TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE PROFILE.

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%
							C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE
SS-27	25' LT.	11+50	0.2'-1.5'	A-4(0)	25	7	39.6	23.0	14.0	23.4	90.3	65.2	36.0	13.3
SS-17	25' RT.	15+50	4.0'-5.5'	A-4(0)	35	NP	22.5	39.7	22.6	15.2	97.1	87.2	41.4	17.1

SINCE F&R 1881

0 50 100
FEET
VE = 5:1

PROJECT REFERENCE NO.	SHEET
W-5114	10

PROFILE ALONG -Y1-

870 860 850 840 830 820 810 800 790 780

BEGIN GRADE
-Y1- STA. 10+20.00
EL = 821.53

SS-27
Y1_1150L
11+50
25' LT.

PI = 12+80.00
EL = 822.83'
VC = 520'
K = 151
DS = 60 mph

GROUND SURFACE

2 (F)
100/0.7
(G)
93
100/0.3
100/0.8
90
97
BT
DRY
4/12

Tan, orange & white,
(BIOTITE GNEISS)
-WEATHERED ROCK-

(+)0.5000%
(-)2.9462%

PROPOSED GRADE

Moist, tan, gray, white & red, silty, fine to coarse SAND (A-2-4), with trace gravel-sized rock fragments, mica & organics
-RESIDUAL-

Y1_1350R
13+50
10' RT.

(H)
4
5
12
27
4/12
BT

Moist, tan, black & red, with trace clay & mica, fine sandy SILT (A-4), saprolitic

SS-17
Y1_1550R
15+50
25' RT.

5
20 (I)
36
51
29 (J)
BT
DRY
4/12

(F) Moist, tan, orange & gray, highly sandy SILT (A-4), with some clay, trace organics & gravel-sized rock fragments. -RESIDUAL-

(G) Moist, tan, gray, white & red, silty fine to coarse SAND (A-2-4), with trace gravel-sized rock fragments, mica & organics. -RESIDUAL-

(H) Moist, dark brown, fine sandy SILT (A-4), with trace organics & trash, some clay. -ALLUVIAL-

(I) Moist, red-tan, fine to coarse sandy SILT (A-4), with little clay, trace mica. -RESIDUAL-

(J) Moist, brown, pink & maroon, fine sandy CLAY (A-6). -RESIDUAL-

GROUNDLINE PROFILE AT CENTERLINE OF -L- TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE PROFILE.

10+00 11+00 12+00 13+00 14+00 15+00 16+00

PROJECT REFERENCE NO.	SHEET
W-5114	11

0 50 100
FEET
VE = 5:1

PROFILE ALONG -Y1-

PI = 19+70.00
EL = 802.50'
VC = 360'
K = 139
DS = 60 mph

END GRADE
-Y1- STA. 22+60.00
EL = 801.49

Y1_1750R
17+50
25' RT.

Y1_1942L
19+42
14' LT.

4
47
100/0.9
100/0.9
100/0.9
BT
DRY
4/12

6
20
100/0.4
100/0.4
BT
DRY
4/12

Moist, tan & gray, silty fine to coarse SAND (A-2-4), with trace clay & organics

-RESIDUAL-

Tan, white & gray, (BIOTITE GNEISS)

-WEATHERED ROCK-

GROUND SURFACE

PROPOSED GRADE

(-)12.9462%

(-)0.3500%

870
860
850
840
830
820
810
800
790
780

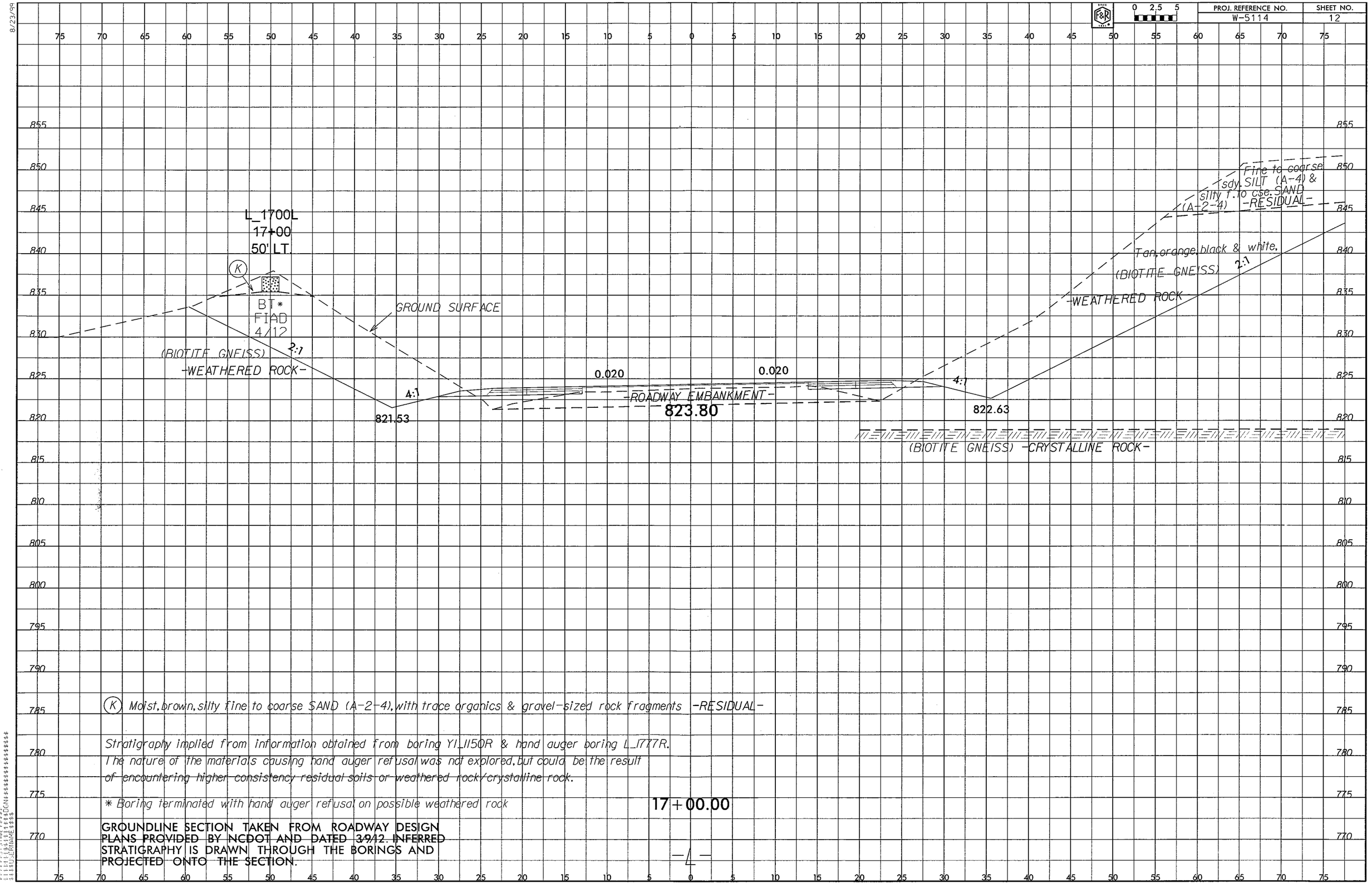
17+00 18+00 19+00 20+00 21+00 22+00 23+00

GROUNDLINE PROFILE AT CENTERLINE OF -L- TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE PROFILE.

8/23/96

PROJ. REFERENCE NO.	SHEET NO.
W-5114	12

0 2.5 5



(K) Moist, brown, silty fine to coarse SAND (A-2-4), with trace organics & gravel-sized rock fragments -RESIDUAL-

Stratigraphy implied from information obtained from boring YI_1150R & hand auger boring L_1777R. The nature of the materials causing hand auger refusal was not explored, but could be the result of encountering higher consistency residual soils or weathered rock/crystalline rock.

* Boring terminated with hand auger refusal on possible weathered rock

17+00.00

—L—

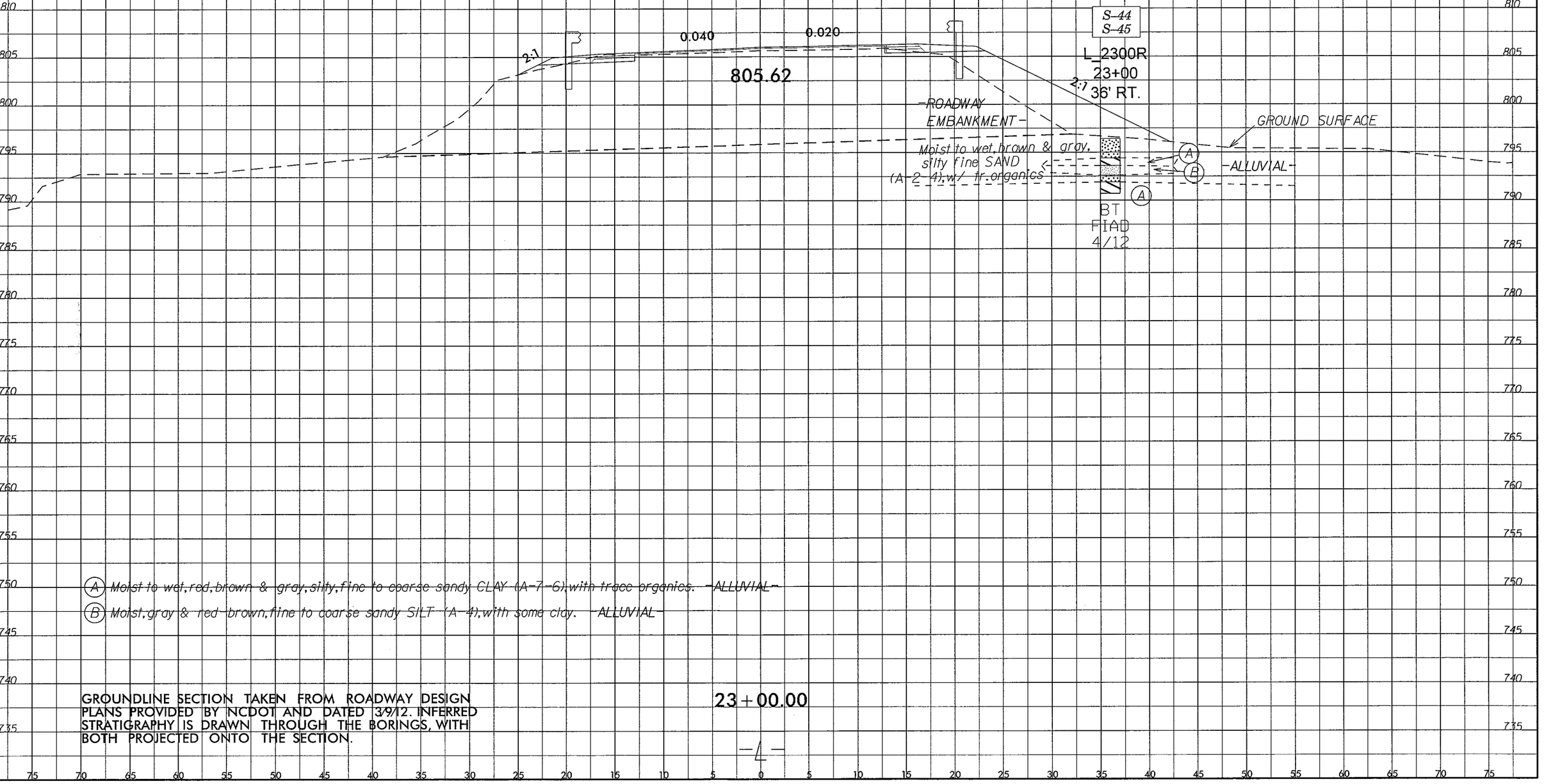
GROUNDLINE SECTION TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS AND PROJECTED ONTO THE SECTION.

8/23/99

PROJ. REFERENCE NO. W-5114 | SHEET NO. 13

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE
							C. SAND	F. SAND	SILT	CLAY	10	40	200	
S-44	36' RT.	23+00	2.1'-2.5'	A-7-6(15)	59	30	24.8	19.6	11.6	44.0	98.8	83.2	57.1	21.5
S-45	36' RT.	23+00	3.1'-3.5'	A-4(0)	26	6	23.4	36.7	18.0	21.9	96.5	83.3	42.3	14.2



(A) Moist to wet, red, brown & gray, silty, fine to coarse sandy CLAY (A-7-6), with trace organics. -ALLUVIAL-

(B) Moist, gray & red-brown, fine to coarse sandy SILT (A-4), with some clay. -ALLUVIAL-

GROUNDLINE SECTION TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE SECTION.

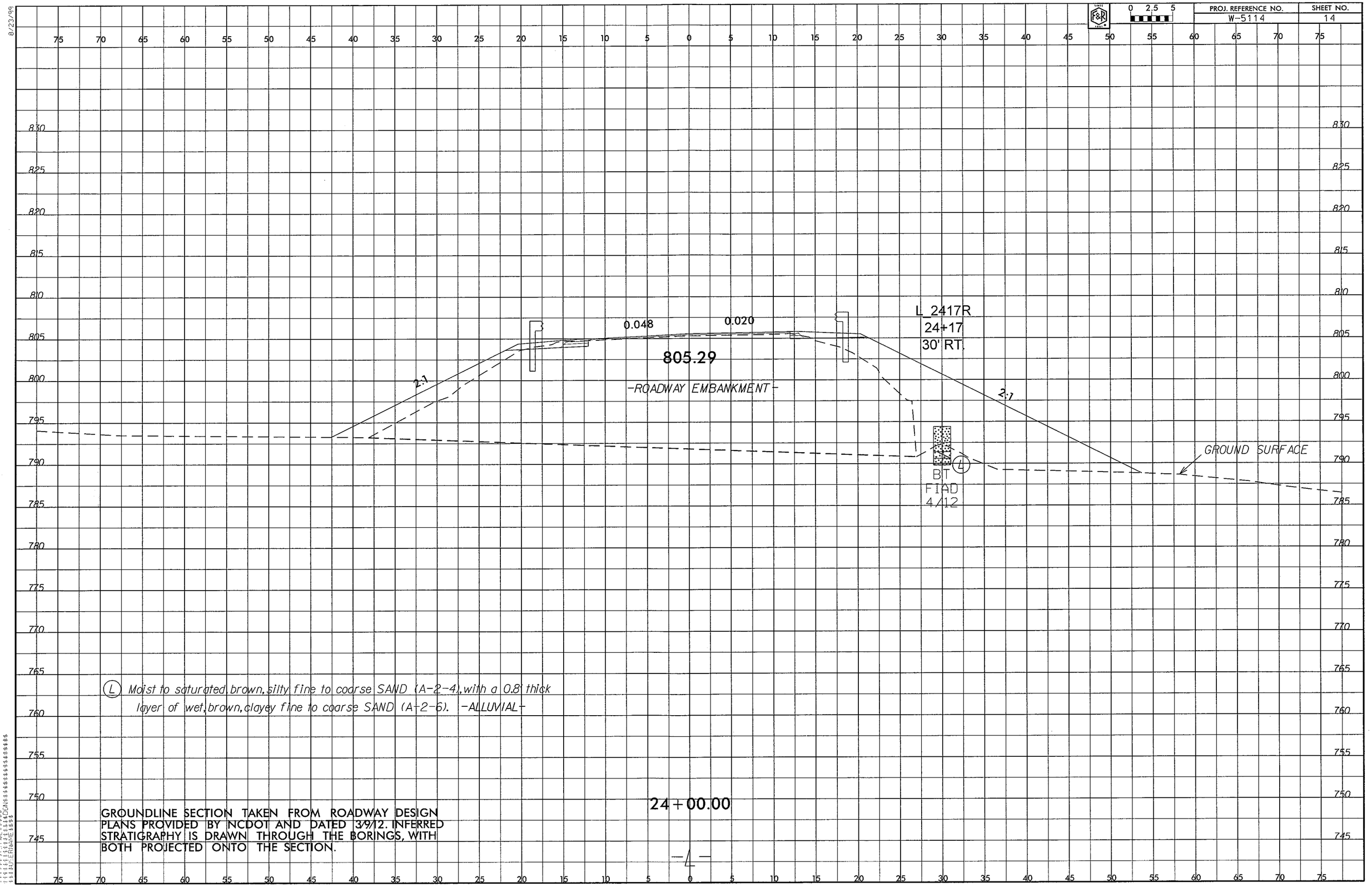
23+00.00

-L-

8/23/99

0 2.5 5

PROJ. REFERENCE NO.	SHEET NO.
W-5114	14

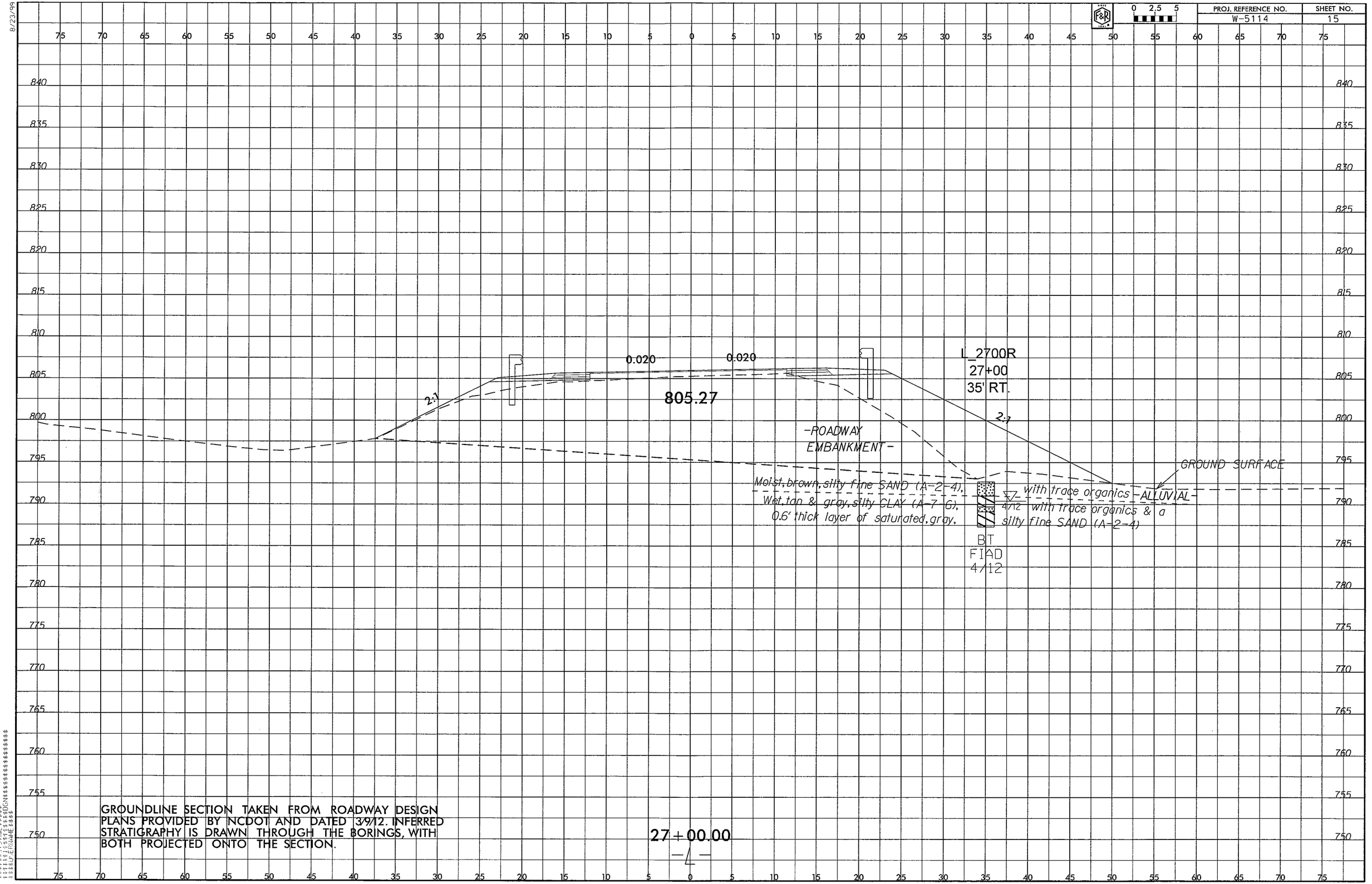


GROUNDLINE SECTION TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE SECTION.

8/23/99

PROJ. REFERENCE NO. W-5114 | SHEET NO. 15

0 2.5 5



GROUNDLINE SECTION TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE SECTION.

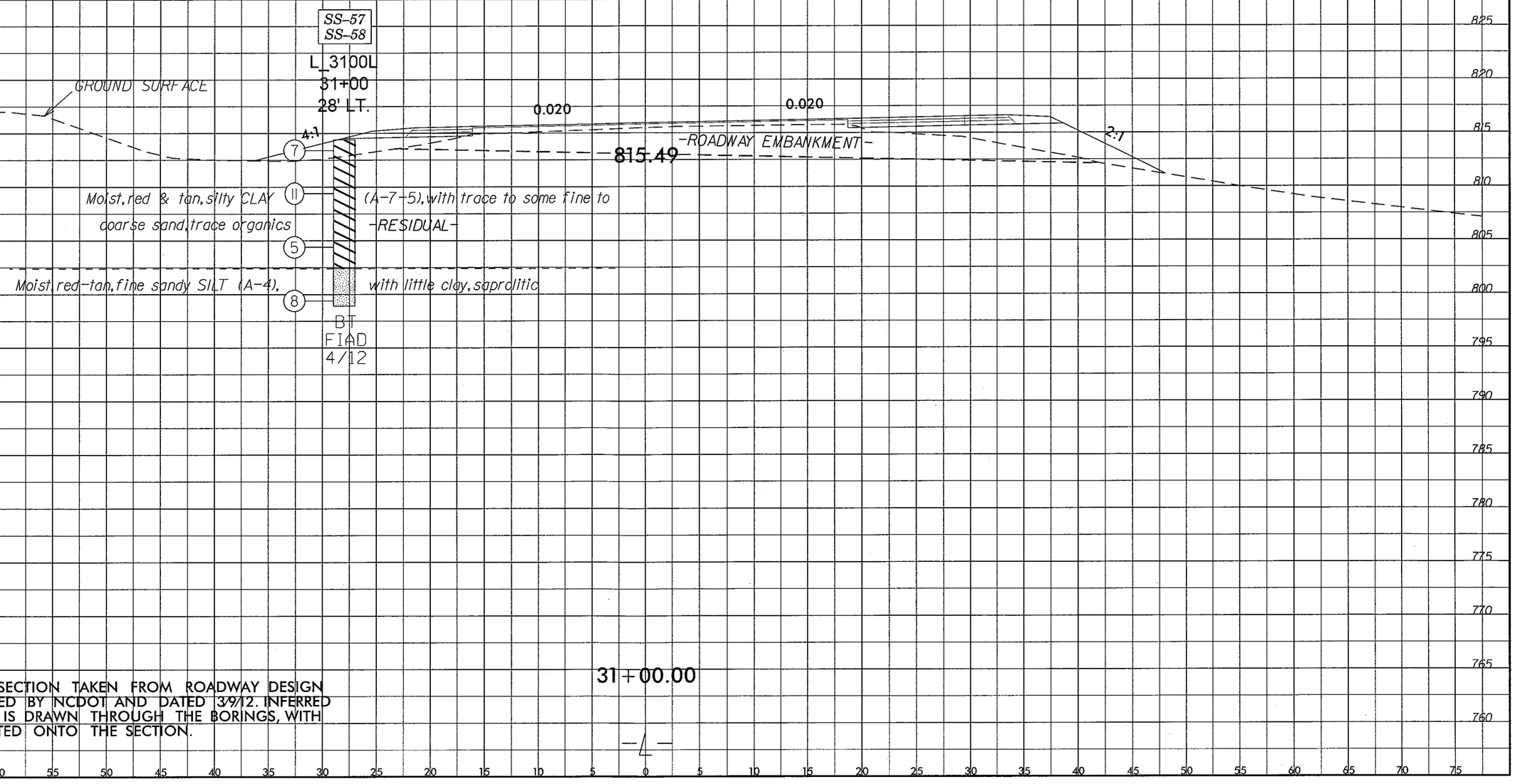
8/23/99

PROJ. REFERENCE NO. W-5114 | SHEET NO. 16

0 2.5 5

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-57	28' LT.	31+00	0.2'-1.5'	A-7-5(30)	81	32	14.4	9.6	18.3	57.7	98.9	88.7	76.7	34.2	NT
SS-58	28' LT.	31+00	4.0'-5.5'	A-7-5(27)	72	17	1.2	5.0	43.0	50.8	100.0	99.5	94.8	54.3	NT



GROUNDLINE SECTION TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE SECTION.

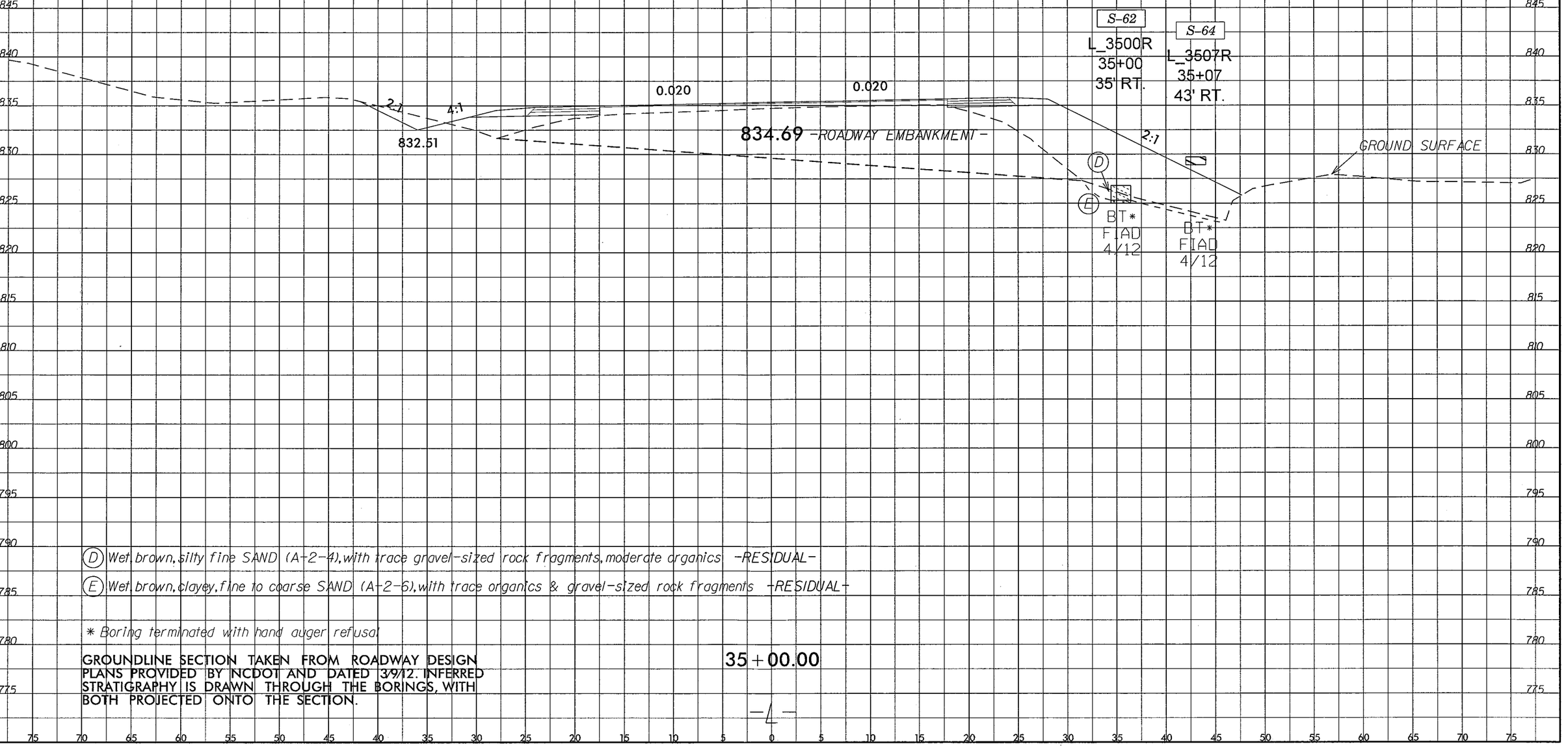
31+00.00

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
W-5114	17

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-62	35' RT.	35+00	0.1'-0.6'	ND	NT	NT	NT	NT	NT	NT	NT	NT	NT	33.7	5.3
S-64	43' RT.	35+07	0.2'-1.8'	A-7-6(10)	50	22	22.3	23.6	10.3	43.8	96.9	84.3	54.8	20.7	NT



(D) Wet, brown, silty fine SAND (A-2-4), with trace gravel-sized rock fragments, moderate organics -RESIDUAL-

(E) Wet, brown, clayey, fine to coarse SAND (A-2-6), with trace organics & gravel-sized rock fragments -RESIDUAL-

* Boring terminated with hand auger refusal

GROUNDLINE SECTION TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE SECTION.

35+00.00

-L-

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
W-5114	18

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%
							C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE
SS-27	25' LT.	11+50	0.2'-1.5'	A-4(0)	25	7	39.6	23.0	14.0	23.4	90.3	65.2	36.0	13.3

GROUNDLINE SECTION TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE SECTION.

Y1_1150R
11+50
100' RT.

GROUND SURFACE

Moist, tan & white, silty fine to coarse SAND (A-2-4), with trace organics & clay -RESIDUAL-

Moist, tan, orange & gray, highly sandy SILT (A-4), with some clay, trace organics & gravel-sized rock fragments -RESIDUAL-

Tan, orange, black & white, (BIOTITE GNEISS) -WEATHERED ROCK-

Tan, orange, black & white, (BIOTITE GNEISS) -WEATHERED ROCK-

(BIOTITE GNEISS) -CR-

REF
DRY
4/12

100/0.7 | 100/0.8 | 100/0.9 | 100/0.9 | 100/0.6 | 92 | 100/0.4 | 60/0.0 | 60/0.0

7

SS-27
Y1_1150L
11+50
25' LT

2

Moist, tan, gray, black & white, silty fine to coarse SAND (A-2-4)

93 | 100/0.3 | 100/0.8 | 90 | 97

845.35

2:1

4:1

0.060 | 0.060

816.48

820.28

Moist, tan, gray, black & white, silty fine to coarse SAND (A-2-4)

BT
DRY
4/12

11+50.00
-Y1-

865 860 855 850 845 840 835 830 825 820 815 810 805

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 90 95 100

8/23/99

PROJ. REFERENCE NO. W-5114 | SHEET NO. 19

0 2.5 5

Y1_1350R
13+50
10' RT.

GROUND SURFACE

0.060 0.060

4:1 4:1

811.18

(H) Moist, dark brown, fine sandy SILT (A-4), with trace organics & trash, some clay -ALLUVIAL-

(4) (5) Moist, tan, white & red, clayey, silty fine SAND (A-2-4), with trace gravel-sized rock fragments -RESIDUAL-

4/12

(12) (27) Moist, tan, black & red, fine sandy SILT (A-4), with trace clay & mica, saprolitic

BT
4/12

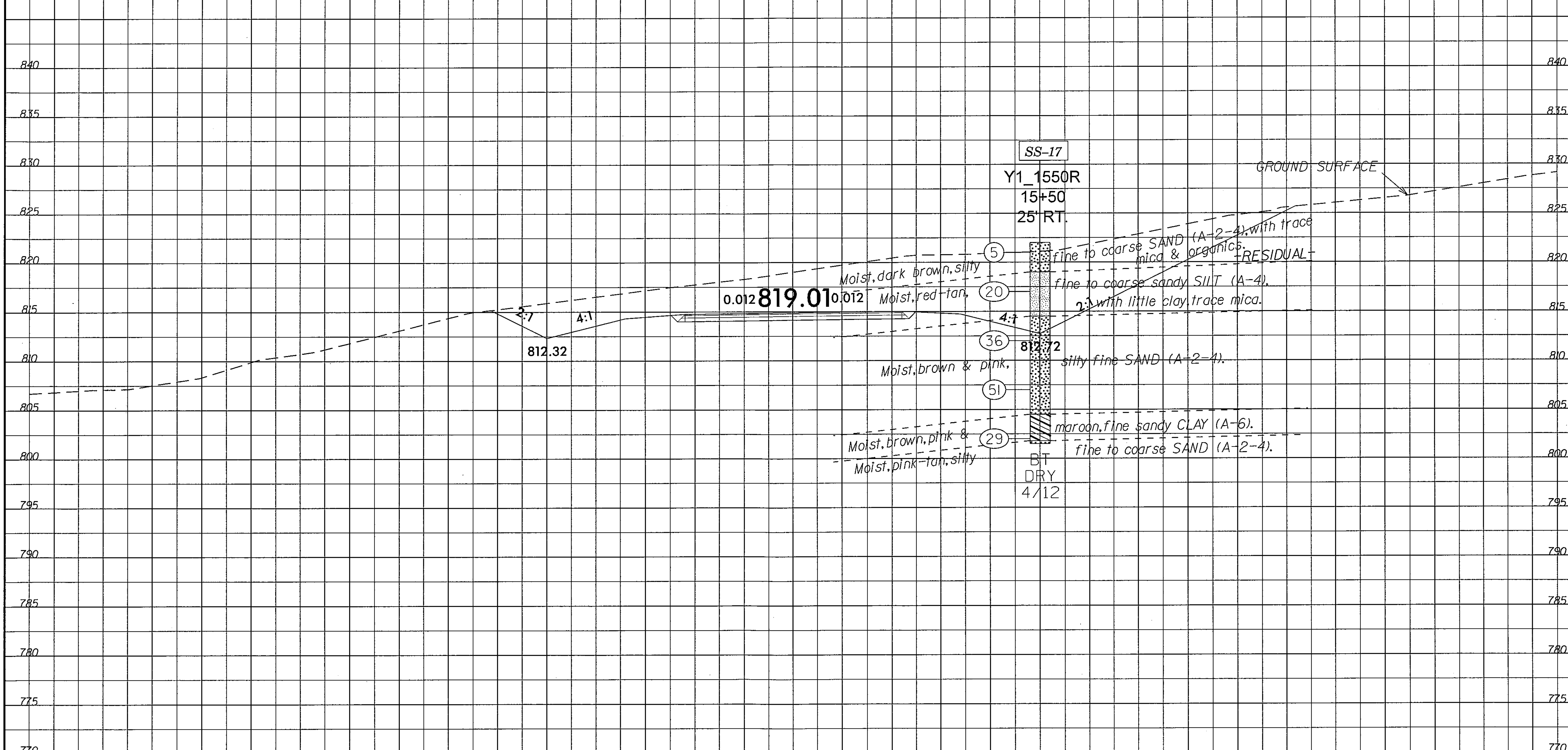
GROUNDLINE SECTION TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE SECTION.

13+50.00
-Y1-

$$$$SYSTIME$$$$
$$$$DGN$$$$
$$$$CELLNAME$$$$

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE
							C. SAND	F. SAND	SILT	CLAY	10	40	200	
SS-17	25' RT.	15+50	4.0'-5.5'	A-4(0)	35	NP	22.5	39.7	22.6	15.2	97.1	87.2	41.4	17.1



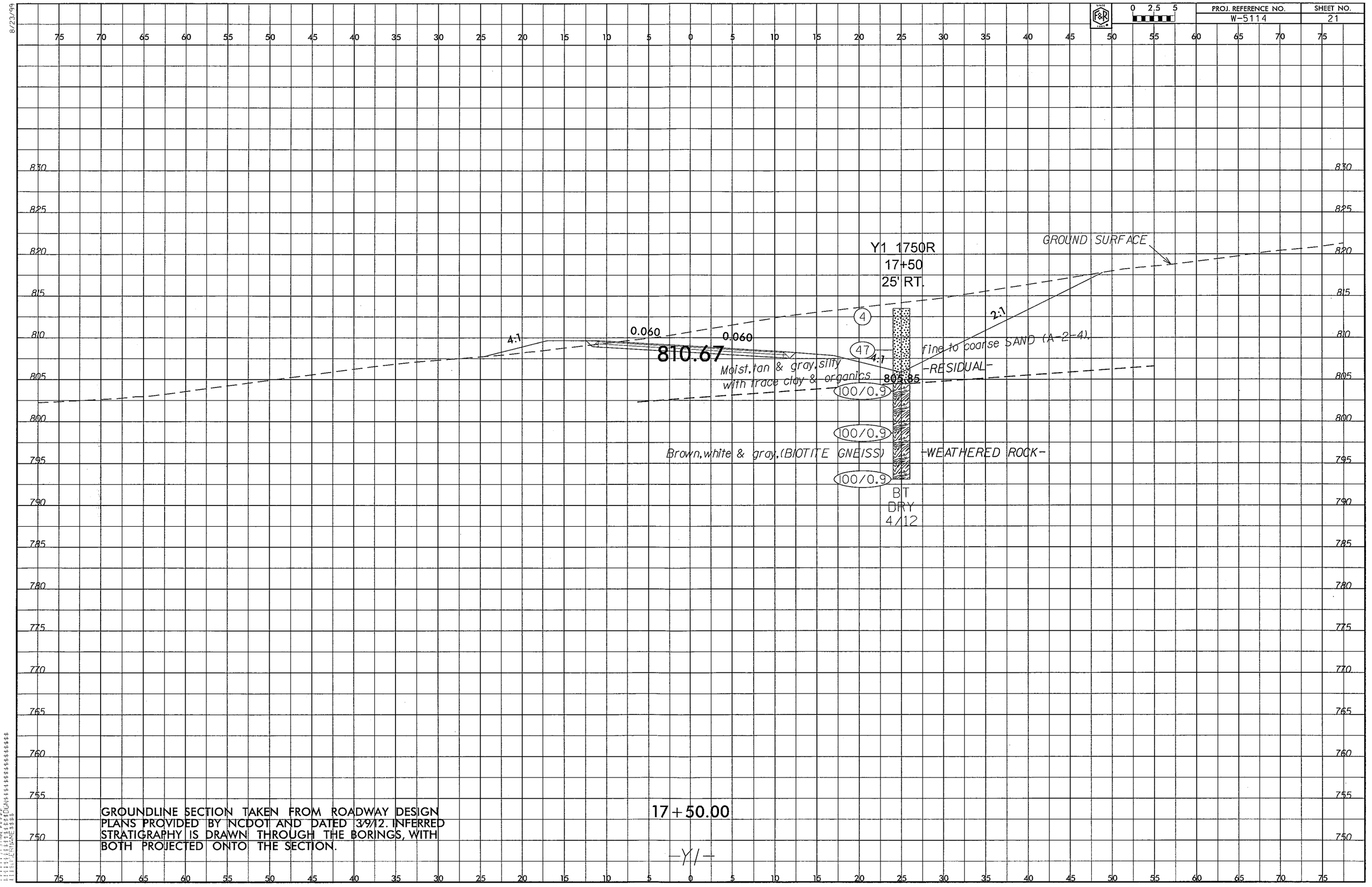
GROUNDLINE SECTION TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE SECTION.

15+50.00
-Y1-

8/23/99

PROJ. REFERENCE NO. W-5114 | SHEET NO. 21

0 2.5 5



GROUNDLINE SECTION TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE SECTION.

17+50.00

-Y1-

8/23/99

PROJ. REFERENCE NO.	SHEET NO.
W-5114	22

SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			%
							C. SAND	F. SAND	SILT	CLAY	10	40	200	MOISTURE
SS-3	25' RT.	19+50	9.0'-10.5'	A-2-4(0)	22	NP	32.1	39.6	18.2	10.1	100.0	84.6	32.7	10.4

SS-3
Y1_1950R
19+50
25' RT.

Y1_1942L
19+42
14' LT.

GROUND SURFACE

5
19
74
43
100/0.1

6
20
100/0.4
100/0.4

813.00

Moist, tan, white, black & gray, silty fine to coarse SAND (A-2-4), with trace to little clay, trace organics
-RESIDUAL-

0.060
0.060

4:1
4:1
2:1

Gray, brown & white, (BIOTITE GNEISS)

800.88
-WEATHERED ROCK-

60/0.5

Gray-brown, (BIOTITE GNEISS)
-CRYSTALLINE ROCK-

BT
DRY
4/12

REF
DRY
4/12

GROUNDLINE SECTION TAKEN FROM ROADWAY DESIGN PLANS PROVIDED BY NCDOT AND DATED 3/9/12. INFERRED STRATIGRAPHY IS DRAWN THROUGH THE BORINGS, WITH BOTH PROJECTED ONTO THE SECTION.

19+50.00
-Y1-

$$$$SYSTIME$$$$
$$$$USERNAME$$$$

Dynamic Cone Penetrometer (DCP) Test Results Summary Table

PROJECT NO.: 41877.1.1
TIP NO.: W-5114
COUNTY: Guilford
DESCRIPTION: NC 68 from south of SR 2111 (East Harrell Road) to SR 4831 (Bartonshire Drive) in Oak Ridge and Stokesdale

Boring No.	Alignment	Station	Offset	Ground Surface Elevation (ft)	Test Depth* (ft)	Sample Blows (1.75" increments)			N_c	Termination
L_1700L	-L-	17+00	50' LT	837.2	0	4	5	5	**5**	HAR @ 1.8'
					1.0	7	12	12	**12**	
					1.8	25/0	-	-	**25/0**	
L_1705L	-L-	17+05	50' LT	837.2	2.2	11	18	17	**17.5**	HAR @ 4.0'
					3.0	14	18	22	**20**	
					4.0	25/0	-	-	**25/0**	
L_1777R	-L-	17+77	22' RT	820.5	0	3	4	6	**5**	HAR @ 1.6'
					1.0	16	20/0	-	**20/0**	
L_2300R	-L-	23+00	36' RT	796.4	0	3	3	6	**4.5**	HAT @ 5.7'
					1.0	8	8	11	**9.5**	
					2.1	7	11	11	**11**	
					3.1	8	10	10	**10**	
					4.1	10	14	12	**13**	
					5.3	5	7	8	**7.5**	
L_2417R	-L-	24+17	30' RT	794.4	0	2	2	3	**2.5**	HAT @ 4.6'
					1.0	2	2	2	**2**	
					2.0	3	3	3	**3**	
					3.2	2	2	3	**2.5**	
					4.1	3	3	3	**3**	
L_2700R	-L-	27+00	35' RT	792.7	0	4	5	4	**4.5**	HAT @ 5.4'
					1.0	4	5	5	**5**	
					2.0	4	4	3	**3.5**	
					3.5	3	4	5	**4.5**	
					4.0	10	10	12	**11**	
					5.0	7	8	10	**9**	
L_3500R	-L-	35+00	35' RT	826.8	0	2	3	4	**3.5**	HAR @ 1.8'
					1.0	7	12	8	**10**	
					1.8	20/0	-	-	**20/0**	
L_3507R	-L-	35+07	43' RT	829.7	-	-	-	-	-	HAR @ 0.8'

DCP Testing was performed in accordance with ASTM Special Technical Publication No. 399

*Test depth referenced from existing ground surface

HAT = Hand Auger Terminated
HAR = Hand Auger Refusal