CONTRACT: C202228 ID: R-2814A

CONTENTS

LINE	STATION	PLAN	XSECTS
-L-	13+00 - 51+60	4-17	18-50

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

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

METRIC
ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2814A	1	50

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34506.1.1	STP-401(4)	P.E.
34506.2.5	STP-401(144)	R/W & UTIL
34506.3.4	STP-401(157)	CONST.

ROADWAY SUBSURFACE INVESTIGATION

STATE PROJECT 34506.1.1 I.D. NO. R-2814A
F.A. PROJECT STP-401(4)
COUNTY WAKE
PROJECT DESCRIPTION US 401 FROM SR 2044 (LIGON MILL RD.) TO SOUTH OF SR 2226 (JONESVILLE RD.)

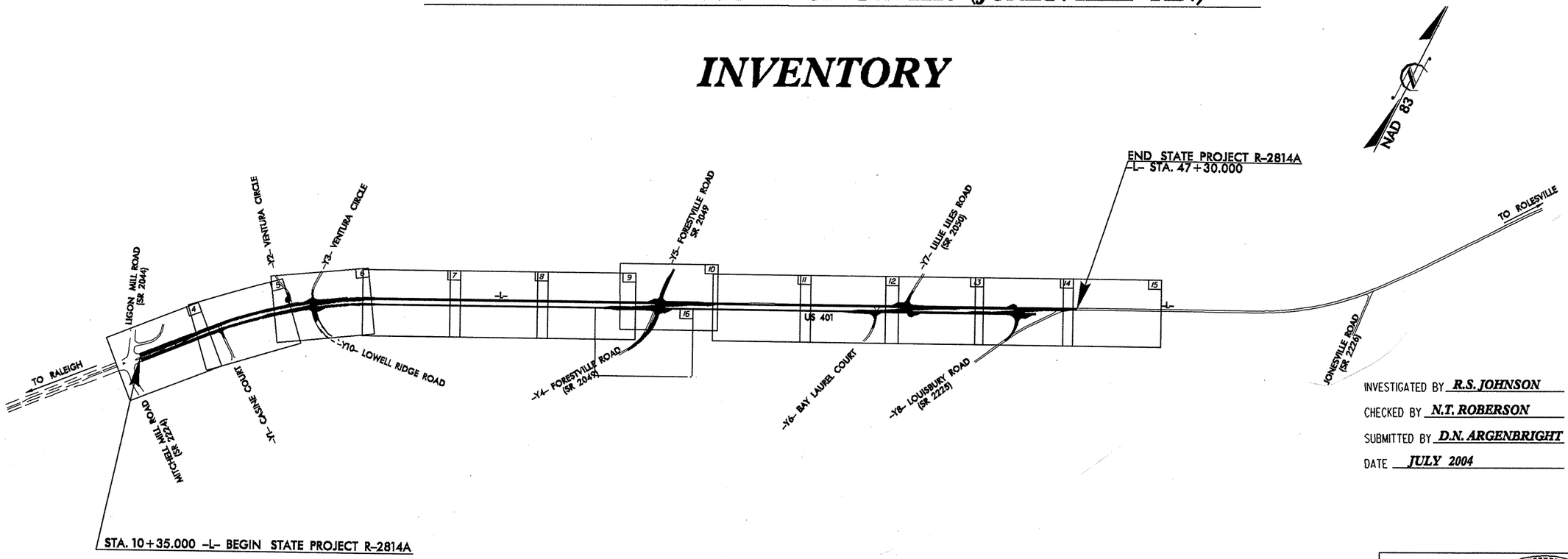
CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS 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 UNIT @ (919) 250-4088. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA IS 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.

INVENTORY



INVESTIGATED BY R.S. JOHNSON
CHECKED BY N.T. ROBERSON
SUBMITTED BY D.N. ARGENBRIGHT
DATE JULY 2004

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NORTH CAROLINA LICENSED SEAL 1912 GEOLOGIST NEIL T. ROBERSON 6-04
SEAL

DRAWN BY: T.T. WALKER, W.D. FIELDS

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NOTE - 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.

ID	STATE PROJECT NO.	SHEET NO.	TOTAL SHEETS
U-2814A	34506.1.1	2	50

METRIC

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL 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 WHICH CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND WHICH YIELDS LESS THAN 100 BLOWS PER 30 cm ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM AND 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

GEN. 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		N.P.	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

P.I. OF A-7-5 ≤ L.L. - 30 : P.I. OF A-7-6 > L.L. - 30

CONSISTENCY OR DENSENESS

PRIMARY SOIL TYPE	COMPACTNESS OR CONSISTENCY	RANGE OF STANDARD PENETRATION RESISTENCE (N-VALUE)	RANGE OF UNCONFINED COMPRESSIVE STRENGTH (kN/m^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	<25
	SOFT	2 TO 4	25 TO 50
	MEDIUM STIFF	4 TO 8	50 TO 100
	STIFF	8 TO 15	100 TO 200
	VERY STIFF	15 TO 30	200 TO 400
	HARD	>30	>400

TEXTURE OR GRAIN SIZE

U.S. STD. SIEVE SIZE	4	10	40	60	200	270
OPENING (MM)	4.76	2.0	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, YEL-BRN, 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 ARE 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 30
MODERATELY COMPRESSIBLE	LIQUID LIMIT 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 SEEPAGE

MISCELLANEOUS SYMBOLS

- ROADWAY EMBANKMENT WITH SOIL DESCRIPTION
- SOIL SYMBOL
- ARTIFICIAL FILL OTHER THAN ROADWAY EMBANKMENTS
- INFERRED SOIL BOUNDARIES
- INFERRED ROCK LINE
- ALLUVIAL SOIL BOUNDARY
- 25/025 — DIP/DIP DIRECTION OF ROCK STRUCTURES
- SOUNDING ROD
- SPT CPT DPT DMT VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF — SPT REFUSAL

SAMPLE DESIGNATIONS

S- BULK SAMPLE

SS- SPLIT SPOON SAMPLE

ST- SHELBY TUBE SAMPLE

RS- ROCK SAMPLE

RT- RECOMPACTED TRIAXIAL SAMPLE

CBR - CBR SAMPLE

ABBREVIATIONS

AR - AUGER REFUSAL
BT - BORING TERMINATED
CL. - CLAY
CPT - CONE PENETRATION TEST
CSE. - COARSE
DMT - DILATOMETER TEST
DPT - DYNAMIC PENETRATION TEST
e - VOID RATIO
F. - FINE
FOSS. - FOSSILIFEROUS
FRAC. - FRACTURED
FRAGS. - FRAGMENTS
MED. - MEDIUM
PMT - PRESSUREMETER TEST
SD. - SAND, SANDY
SL. - SILT, SILTY
SLI. - SLIGHTLY
TCR - TRICONE REFUSAL
γ - UNIT WEIGHT
γ_d - DRY UNIT WEIGHT
W - MOISTURE CONTENT
V. - VERY
VST - VANE SHEAR TEST

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- ☐ MOBILE B-___
- ☐ BK-51
- ☒ CME-45
- ☐ CME-550
- ☐ PORTABLE HOIST
- ☐ OTHER_____
- ☐ OTHER_____

ADVANCING TOOLS:
- ☐ CLAY BITS
- ☒ 152 mm CONTINUOUS FLIGHT AUGER
- ☒ 203 mm HOLLOW AUGERS
- ☐ HARD FACED FINGER BITS
- ☐ TUNG.-CARBIDE INSERTS
- ☐ CASING ☐ W/ ADVANCER
- ☐ TRICONE _____ mm STEEL TEETH
- ☐ TRICONE _____ mm TUNG.-CARB.
- ☐ CORE BIT
- ☐ OTHER _____

HAMMER TYPE:
- ☒ AUTOMATIC ☐ MANUAL

CORE SIZE:
- ☐ -B_____
- ☐ -N_____
- ☐ -H_____

HAND TOOLS:
- ☐ POST HOLE DIGGER
- ☒ HAND AUGER
- ☐ SOUNDING ROD
- ☐ VANE SHEAR TEST
- ☐ OTHER _____

ROCK DESCRIPTION

HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT WHEN 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 2.5 cm PER 50 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 FOLOWS:

WEATHERED ROCK (WR)	NON-COASTAL PLAIN MATERIAL THAT YIELDS SPT N VALUES > 100 BLOWS PER 30 cm.
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 2.5 cm. 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 ROCKS 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 BLOWS PER 30 cm.*
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 BLOWS PER 30 cm.*
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 GEOLOGISTS 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 6 mm DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGISTS PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS.
MEDIUM HARD	CAN BE GROOVED OR GOUGED 1 mm DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 25 mm MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGISTS PICK.
SOFT	CAN BE GROVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL CENTIMETERS 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 25 mm OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 3 m
WIDE	1 TO 3 m
MODERATELY CLOSE	30 TO 100 cm
CLOSE	5 TO 30 cm
VERY CLOSE	LESS THAN 5 cm

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 1 m
THICKLY BEDDED	0.5 - 1 m
THINLY BEDDED	0.05 - 0.5 m
VERY THINLY BEDDED	10 - 50 mm
THICKLY LAMINATED	2.5 - 10 mm
THINLY LAMINATED	< 2.5 mm

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 WHICH 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 IS ENCOUNTERED, BUT WHICH DOES NOT NECESSARILY RISE TO OR ABOVE THE GROUND SURFACE.

CALCAREOUS (CALC.) - SOILS WHICH 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 (F.P.) - 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 SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK.

ROCK QUALITY DESIGNATION (R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE.

SAPROLITE (SAP.) - RESIDUAL SOIL WHICH 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, WHICH 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) OF A 63.5 kg HAMMER FALLING 0.76 METERS REQUIRED TO PRODUCE A PENETRATION OF 30 cm INTO SOIL WITH A 5 cm OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS LESS THAN 2.5 cm PENETRATION WITH 50 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 (S.R.Q.D.) - A MEASURE OF ROCK QUALITY DESCRIBED BY: TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 10 CENTIMETERS DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (T.S.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK:

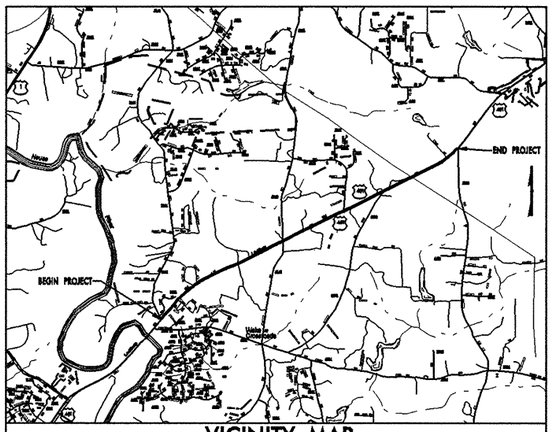
ELEVATION:

NOTES:

REVISED 09/15/00

CONTRACT: TIP PROJECT: R-2814A

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

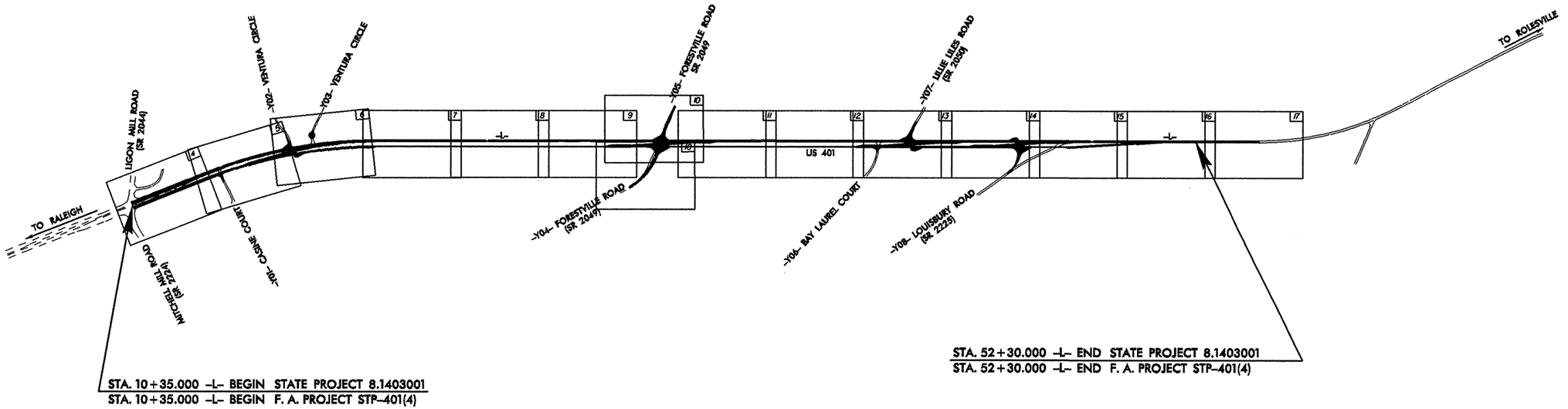
WAKE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2814A	2A	50
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34506.1.1	STP-401(4)	P.E.	

LOCATION: ***US 401 FROM SR 2044 (LIGON MILL ROAD) TO SOUTH OF SR 2226 (JONESVILLE ROAD)***

TYPE OF WORK: ***GRADING, PAVING, RESURFACING, WIDENING, DRAINAGE, SIGNALS, AND SIGNING***

NAD 83



STA. 10+35.000 –L– BEGIN STATE PROJECT 8.1403001
STA. 10+35.000 –L– BEGIN F. A. PROJECT STP–401(4)

STA. 52+30.000 –L– END STATE PROJECT 8.1403001
STA. 52+30.000 –L– END F. A. PROJECT STP–401(4)

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

GRAPHIC SCALES

5 0 10
PLANS

5 0 10
PROFILE (HORIZONTAL)

1 0 2
PROFILE (VERTICAL)

DESIGN DATA

ADT 2002 = 16,200
ADT 2022 = 32,600
DHV = 12 %
D = 60 %
T = 8 % *
V = 100 km/h

* TTST 3 % DUAL 5 %

PROJECT LENGTH

LENGTH ROADWAY F. A. PROJECT STP–401(4) = 4.565km

TOTAL LENGTH STATE PROJECT 8.1403001 = 4.565km

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

1995 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 21, 2001

LETTING DATE: SEPTEMBER 16, 2003

J. S. GOODNIGHT, P.E.
PROJECT ENGINEER

C. B. PERRY, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA

STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR *DATE*

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

Michael F. Easley
GOVERNOR

P.O. BOX 25201, RALEIGH, N.C. 27611-5201

Lyndo Tippett
SECRETARY

July 6, 2004

STATE PROJECT: 34506.1.1 (R-2814A)
FEDERAL PROJECT: STP-401 (4)
COUNTY: Wake

DESCRIPTION: US 401 from SR 2044 (Ligon Mill Rd.) to south of SR 2226 (Jonesville Rd.)

SUBJECT: Geotechnical Report - Inventory

Project Description

This project consists of the widening of US 401 (-L-) from two to four lanes beginning at SR 2044 (Ligon Mill Rd.) to south of SR 2226 (Jonesville Road).

A geotechnical investigation was conducted during April and May 2001. A BK-51 ATV-mounted drill machine with automatic hammer was used during the investigation. Standard Penetration Tests were performed at selected locations and additional borings were advanced using continuous flight augers. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by the Materials and Tests Unit.

Alignment -L- was investigated and selected subsurface soil cross sections are included in this report.

Areas of Special Geotechnical Interest

1) Highly Plastic Clays: Highly plastic clays were encountered on the project at the following intervals:

Line	Stations
-L-	15+30 to 15+50
-L-	16+70 to 17+30
-L-	22+90 to 23+10
-L-	23+50 to 23+70
-L-	25+30 to 26+30
-L-	31+10 to 31+50
-L-	32+30 to 33+10
-L-	36+90 to 37+10
-L-	42+70 to 43+10
-L-	50+10 to 50+50

2) Crystalline Rock: Crystalline rock was encountered at the following intervals:

Line	Stations
-L-	20+80 to 23+80
-L-	24+40 to 24+80
-L-	26+20 to 26+60
-L-	29+40 to 30+20
-L-	41+60 to 41+80
-L-	48+00 to 51+20

3) Groundwater: The following areas exhibit a high water table, seasonal high groundwater or the potential for groundwater related construction problems:

Line	Stations
-L-	31+50 to 34+70
-L-	48+30 to 48+50
-L-	48+90 to 49+10

4) Water Wells: Water wells within or in close proximity to the right of way were noted at the following locations:

Line	Stations	Offset
-L-	20+11	25m RT
-L-	45+32	11m RT

Water levels in the wells could not be determined. Other wells may be present along the project that went undetected.

Physiography and Geology

The project is located in the Piedmont Physiographic Province. Land use along the project corridor consists of a combination of wooded land, homes and businesses. Geologically, the project is located within the Rolesville Batholith. Soils are derived from the weathering of the underlying granitic rock.

Soil Properties

Soils encountered during this investigation are separated into two categories based on origin. They consist of roadway embankment and residual soils.

Roadway Embankment soils were encountered primarily beneath the existing two-lane roadway. These soils are similar to and derived from the residual soils encountered elsewhere on the project.

Residual soils are derived from the in-place weathering of the underlying granite. They consist primarily of tan-brown, medium stiff, dry to moist, sandy and silty clay (AASHTO classification of A-6, A-7), and tan to brown, loose to medium dense, dry to moist, silty sand (A-2-4). Residual soils grade into weathered rock.

Rock Properties

Weathered rock is derived from the underlying granite and was encountered in most borings.

Crystalline rock of the Rolesville Batholith granite underlies the project area. Areas of crystalline rock yielding either SPT or auger refusal are outlined in "Areas of Special Geotechnical Interest."

Culvert at -L- Sta. 18+70

This culvert is to be extended to accommodate the two new lanes (see Plan Sheet No. 6). The Upstream portion of the culvert will lie on alluvial, coarse sand (A-1-b); while the downstream end of the culvert will lie on alluvial, clayey sand (A-2-6).

Respectfully submitted,

Neil T. Roberson
Project Geologist

EARTHWORK BALANCE SHEET

IN CUBIC METERS (CM)

PROJECT R-2814A COUNTY WAKE COMPUTED BY: BCF CHECKED BY: MRH SHEET 1 OF 3

STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EARTH EXCAV.	TOTAL EMB.	ROCK EMB.	EARTH EMB.	EMB. +20 %	BORROW	ROCK WASTE	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
-L- NBL															
10+80.000	21+00.000	8,471	0	0	0	8,471	46,330	0	46,330	55,596	47,125	0	0	0	0
-Y1-															
10+86.500	11+18.610	229	0	0	0	229	0	0	0	0	0	0	229	0	229
-Y10-															
10+14.200	10+60.000	12	0	0	0	12	291	0	291	349	337	0	0	0	0
SUBTOTAL:		8,712	0	0	0	8,712	46,621	0	46,621	55,945	47,462	0	229	0	229
-L- NBL															
21+00.000	31+20.000	27,011	4,650	0	0	22,361	4,222	4,222	0	4,222	0	428	22,361	0	22,789
-DR1-															
10+14.200	10+72.999	2,251	0	0	0	2,251	0	0	0	0	0	0	2,251	0	2,251
-Y4-															
10+51.192	12+51.556	4,694	0	0	0	4,694	73	0	73	88	0	0	4,606	0	4,606
SUBTOTAL:		33,956	4,650	0	0	29,306	4,295	4,222	0	4,310	0	428	29,218	0	29,646
-L- NBL															
31+20.000	41+40.000	24,821	0	0	0	24,821	6,403	0	6,403	7,684	0	0	17,137	0	17,137
-Y6-															
10+60.155	11+20.000	205	0	0	0	205	36	0	36	43	0	0	162	0	162
SUBTOTAL:		25,026	0	0	0	25,026	6,439	0	6,439	7,727	0	0	17,299	0	17,299
-L- NBL															
41+40.000	45+41.300	3,099	0	0	0	3,099	8,556	0	8,556	10,267	7,168	0	0	0	0
-Y8-															
11+42.410	12+57.441	181	0	0	0	181	4,911	0	4,911	5,893	5,712	0	0	0	0
SUBTOTAL:		3,280	0	0	0	3,280	13,467	0	13,467	16,160	12,880	0	0	0	0

GEOTECH REC'S
FABRIC FOR SOIL STABLIZATION = 1,000 sm
COTINGENT UNDERDRAINS = 500 m
SOFT SOIL UNDERCUT = 500 cm
GRADE POINT UNDERCUT = 1,500 cm
SUBGRADE UNDERCUT = 500 cm
SELECT GRANULAR MATERIAL CLASS II AND III = 1,000 cm
CLASS IV SUBGRADE STABLIZATION = 1,000 mtns

"EARTHWORK QUANTITIES ARE CACULATED BY THE ROADWAY DESIGN UNIT. THESE EARTHWORK QUANTITIES ARE BASED IN PART ON SUBSURFACE DATA PROVIDED BY THE GEOTECHNICAL ENGINEERING UNIT."

Note: "Quantities are approximate only. The Resident Engineer will re-cross-section the work accurately when the project is staked out. These cross-section notes will be used in computing the final quantities for which the contractor will be paid."

-L- PAVEMENT STRUCTURE VOLUME = 18,043cm
-L- DDE = 2,130cm

EARTHWORK BALANCE SHEET

IN CUBIC METERS (CM)

3C

PROJECT R-2814A COUNTY WAKE COMPUTED BY: BCF CHECKED BY: MRH SHEET 2 OF 3

STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EARTH EXCAV.	TOTAL EMB.	ROCK EMB.	EARTH EMB.	EMB. +20 %	BORROW	ROCK WASTE	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
-L- SBL															
10+80.000	21+00.000	4,111	0	0	0	4,111	27,510	0	27,510	33,012	28,901	0	0	0	0
-Y2-															
10+29.188	10+68.477	11	0	0	0	11	594	0	594	713	702	0	0	0	0
-Y3-															
10+00.000	10+46.046	17	0	0	0	17	177	0	177	212	195	0	0	0	0
SUBTOTAL:		4,139	0	0	0	4,139	28,281	0	28,281	33,937	29,798	0	0	0	0
-L- SBL															
21+00.000	31+20.000	20,438	4,420	0	0	16,018	1,141	1,141	0	1,141	0	3,279	16,018	0	19,297
-DR2-															
10+14.200	10+38.000	465	0	0	0	465	0	0	0	0	0	0	465	0	465
-Y5-															
10+14.701	11+37.578	351	0	0	0	351	324	0	324	389	38	0	0	0	0
SUBTOTAL:		21,254	4,420	0	0	16,834	1,465	1,141	324	1,530	38	3,279	16,483	0	19,762
-L- SBL															
31+20.000	41+40.000	4,987	0	0	0	4,987	3,164	0	3,164	3,797	0	0	1,190	0	1,190
-Y7-															
10+14.808	10+80.000	449	0	0	0	449	0	0	0	0	0	0	449	0	449
SUBTOTAL:		5,436	0	0	0	5,436	3,164	0	3,164	3,797	0	0	1,639	0	1,639
-L- SBL															
41+40.000	45+41.300	2,411	0	0	0	2,411	2,249	0	2,249	2,699	288	0	0	0	0
SUBTOTAL:		2,411	0	0	0	2,411	2,249	0	2,249	2,699	288	0	0	0	0

3D

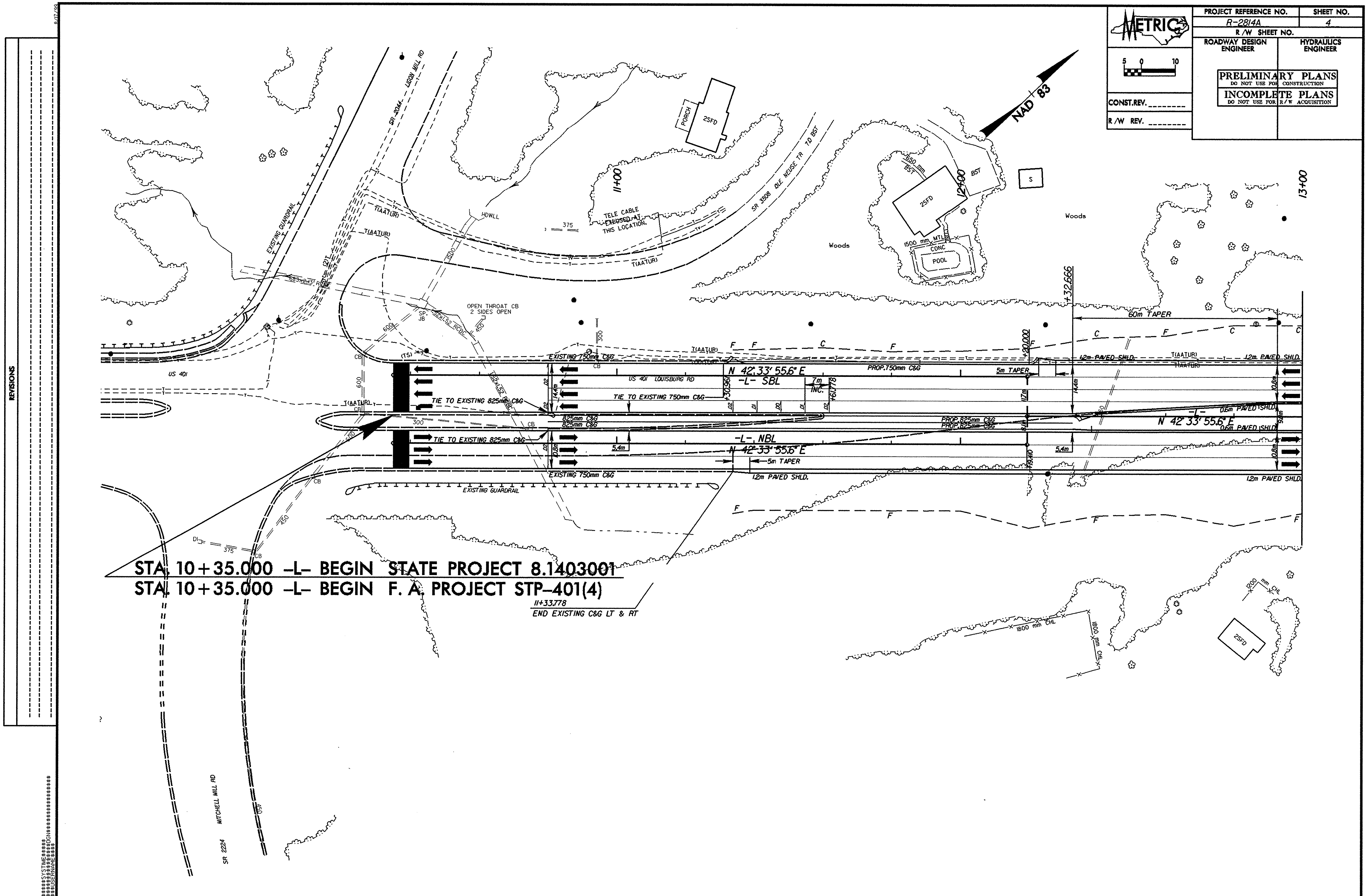
EARTHWORK BALANCE SHEET

IN CUBIC METERS (CM)

PROJECT R-2814A COUNTY WAKE COMPUTED BY: BCF CHECKED BY: MRH SHEET 3 OF 3

STATION	STATION	TOTAL EXCAV. (UNCL.)	ROCK EXCAV.	UNDERCUT EXCAV.	UNSUIT. EXCAV.	SUITABLE EARTH EXCAV.	TOTAL EMB.	ROCK EMB.	EARTH EMB.	EMB. +20 %	BORROW	ROCK WASTE	SUITABLE WASTE	UNSUIT. WASTE	TOTAL WASTE
PROJECT SUBTOTAL:		104,214	9,070	0	0	95,144	105,881	5,363	100,545	126,105	90,466	3,707	64,868	0	68,575
LOSS DUE TO CLEARING & GRUBBING		-2,000	0	0	0	-2,000	0	0	0	0	+2,000	0	0	0	0
ROCK IN LIEU OF BORROW		0	0	0	0	0	0	3,707	0	0	-3,707	-3,707	0	0	-3,707
WASTE IN LIEU OF BORROW		0	0	0	0	0	0	0	0	0	-64,868	0	-64,868	0	-64,868
SHOULDER MATERIAL		0	0	0	0	0	14,425	0	14,425	17,310	17,310	0	0	0	0
PROJECT TOTAL:		102,214	9,070	0	0	93,144	120,306	9,070	114,970	143,415	41,201	0	0	0	0
ESTIMATED 5% TO REPLACE TOPSOIL IN BORROW PIT		0	0	0	0	0	0	0	0	0	2,060	0	0	0	0
GRAND TOTAL:		102,214									43,261				
SAY:		102,500									43,500				
ALT2 (ABC) -L- PAVEMENT STRUCTURE VOLUME = 18,043cm															
EARTHWORK TOTALS FOR ALT. (B25.0C) PAVEMENT DESIGN															
SUMMARY TOTALS (FROM ABOVE)		104,214	9,070	0	0	95,144	105,881	5,363	100,545	126,105	90,466	3,707	64,868	0	68,575
ADJUSTMENT FOR PAVEMENT DESIGN		-4,933	-660	0	0	-4,933	4,730	88	4,615	5,538	+4,597	-748	-5,126	0	-5,874
LOSS DUE TO C&G		-2,000	0	0	0	-2,000	0	0	0	0	2,000	0	0	0	
ROCK IN LIEU OF BORROW		0	0	0	0	0	0	2,959	0	0	-2,959	-2,959	0	0	-2,959
WASTE IN LIEU OF BORROW		0	0	0	0	0	0	0	0	0	-59,742	0	-59,742	0	-59,742
SHOULDER MATERIAL		0	0	0	0	0	11,473	0	11,473	13,768	13,768	0	0	0	0
PROJECT TOTAL:		97,281	8,410	0	0	88,211	122,084	8,410	116,633	145,411	48,130	0	0	0	0
ESTIMATED 5% TO REPLACE TOPSOIL IN BORROW PIT											2,407				
GRAND TOTAL:		97,281									50,537		0		0
SAY:		97,500									50,750				

ALT. (B25.0C) -L- PAVEMENT STRUCTURE VOLUME = 13,109cm

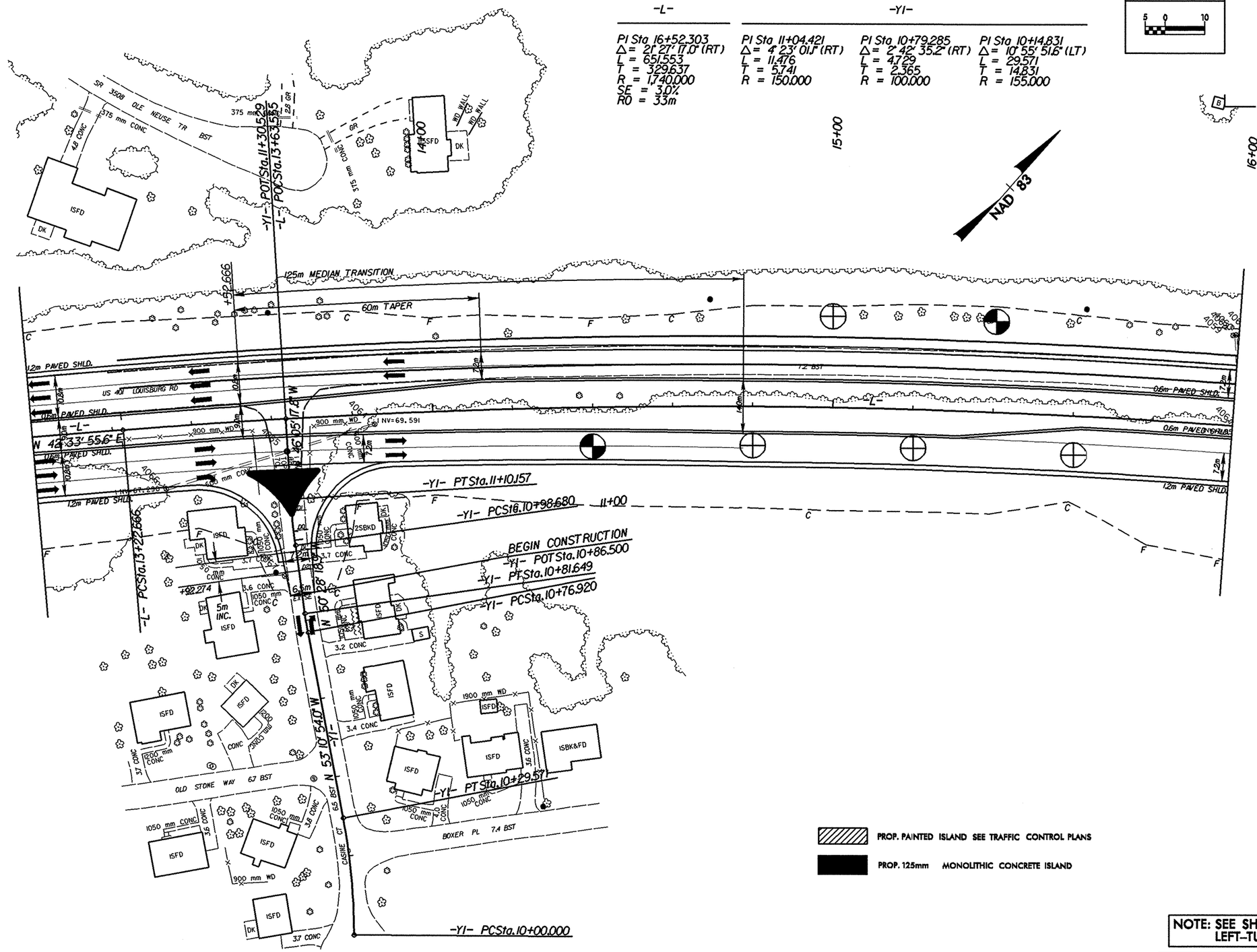

METRIC
PROJECT REFERENCE NO.
SHEET NO.
R-2814A
4
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
CONST.REV.
R/W REV.
NAD 83
REVISIONS
STA. 10+35.000 -L- BEGIN STATE PROJECT 8.1403001
STA. 10+35.000 -L- BEGIN F. A. PROJECT STP-401(4)
11+33.778
END EXISTING C&G LT & RT
US 401 LOUISBURG RD
-L- SBL
-L- NBL
N 42° 33' 55.6" E
SR 2044 LIGON MILL RD
SR 3508 OLE NEUSE TR
SR 2224 MITCHELL MILL RD
US 401
EXISTING GUARDRAIL
EXISTING 750mm C&G
PROP. 750mm C&G
PROP. 825mm C&G
TIE TO EXISTING 825mm C&G
TIE TO EXISTING 750mm C&G
1.2m PAVED SHLD.
0.6m PAVED SHLD.
60m TAPER
5m TAPER
OPEN THROAT CB
2 SIDES OPEN
TELE CABLE
EXPOSED AT
THIS LOCATION.
Woods
2SFD
PORCH
CONC
POOL
1800 mm CHL
1200 mm CHL
11+00
12+00
13+00
+32.666
+20.000
+30.961
+61.778

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	5

METRIC

5 0 10

-L-	-Y1-		
PI Sta 16+52.303	PI Sta 11+04.421	PI Sta 10+79.285	PI Sta 10+14.831
Δ = 21° 27' 17.0" (RT)	Δ = 4° 23' 01.1" (RT)	Δ = 2° 42' 35.2" (RT)	Δ = 10° 55' 51.6" (LT)
L = 651.553	L = 11.476	L = 4.729	L = 29.571
T = 329.637	T = 5.741	T = 2.365	T = 14.831
R = 1,740.000	R = 150.000	R = 100.000	R = 155.000
SE = 3.0%			
RO = 33m			



PROP. PAINTED ISLAND SEE TRAFFIC CONTROL PLANS

PROP. 125mm MONOLITHIC CONCRETE ISLAND

NOTE: SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE

NOTE: SEE SHEET 20 FOR -L- PROFILE
SEE SHEET 26 FOR -Y1- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	6

METRIC

5 0 10

PROP. PAINTED ISLAND SEE TRAFFIC CONTROL PLANS

NAD 83

-Y2- POC Sta.10+90.000

-Y2- POC Sta.16+50.190
-Y2- POT Sta.10+00.000

-L- POC Sta.16+50.190
-Y2- POT Sta.10+00.000

END CONSTRUCTION
-Y2- POC Sta.10+42.054
-Y2- PCS Sta.10+37.301

BEGIN CONSTRUCTION
-Y3- POC Sta.10+00.000

-Y3- POT Sta.10+26.623

-L- POC Sta.10+60.250
-Y3- POT Sta.10+60.250

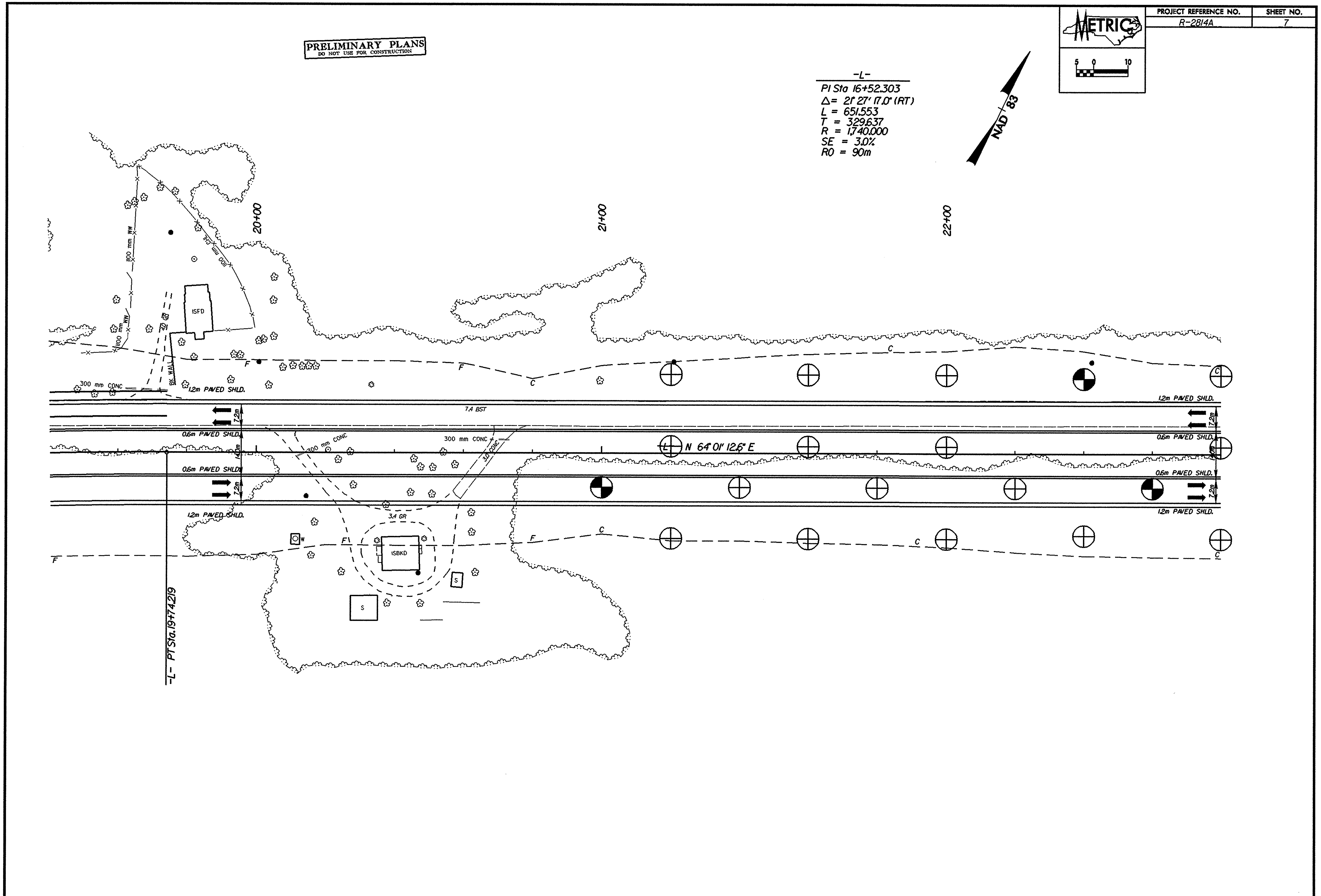
POT Sta.10+60.241

16+00 17+00 18+00 19+00

	NORTH	EAST	ELEV
CUL1	237666.954	653063.239	76.109
CUL2	237667.670	653064.399	76.129
CE1			77.034
HW1			77.523
CUL3	237641.790	653055.956	76.048
CUL4	237642.486	653057.109	76.046
CE2			76.961
HW2			77.446

NOTE: SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE

NOTE: SEE SHEETS 20 & 21 FOR -L- PROFILE
SEE SHEET 26 FOR -Y2- & -Y3- PROFILES


PROJECT REFERENCE NO.
R-2814A
SHEET NO.
7
METRIC
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
-L-
PI Sta 16+52.303
Δ= 21° 27' 17.0" (RT)
L = 651.553
T = 329.637
R = 1,740.000
SE = 3.0%
RO = 90m
NAD 83
20+00
21+00
22+00
ISFD
ISBKD
BK WALL
300 mm CONC
1.2m PAVED SHLD.
0.6m PAVED SHLD.
7.4 BST
7.2m
N 64° 01' 12.6" E
300 mm CONC
3.0 CONC
3.4 GR
-L- PT Sta. 19+74.219

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	8

METRIC

5 0 10

NAD 83

23+00 24+00 25+00 26+00

2.8m GR

GR

1.2m PAVED SHLD.

US 401 7.3 BST

7.2m

0.6m PAVED SHLD.

-L-
64° 01' 12.6" E

C F C F C F C

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	9

METRIC

5 0 10

NAD 83

27+00

28+00

29+00

BL 43
PINC 22+94.115

BL 43
PINC 24+31.593

INV=91.723
450 mm CONC

300 mm CONC

1.2m PAVED SHLD.

7.2m

N 64° 00' 15.6" E

N 64° 00' 17.7" E

0.6m PAVED SHLD.

14.4m

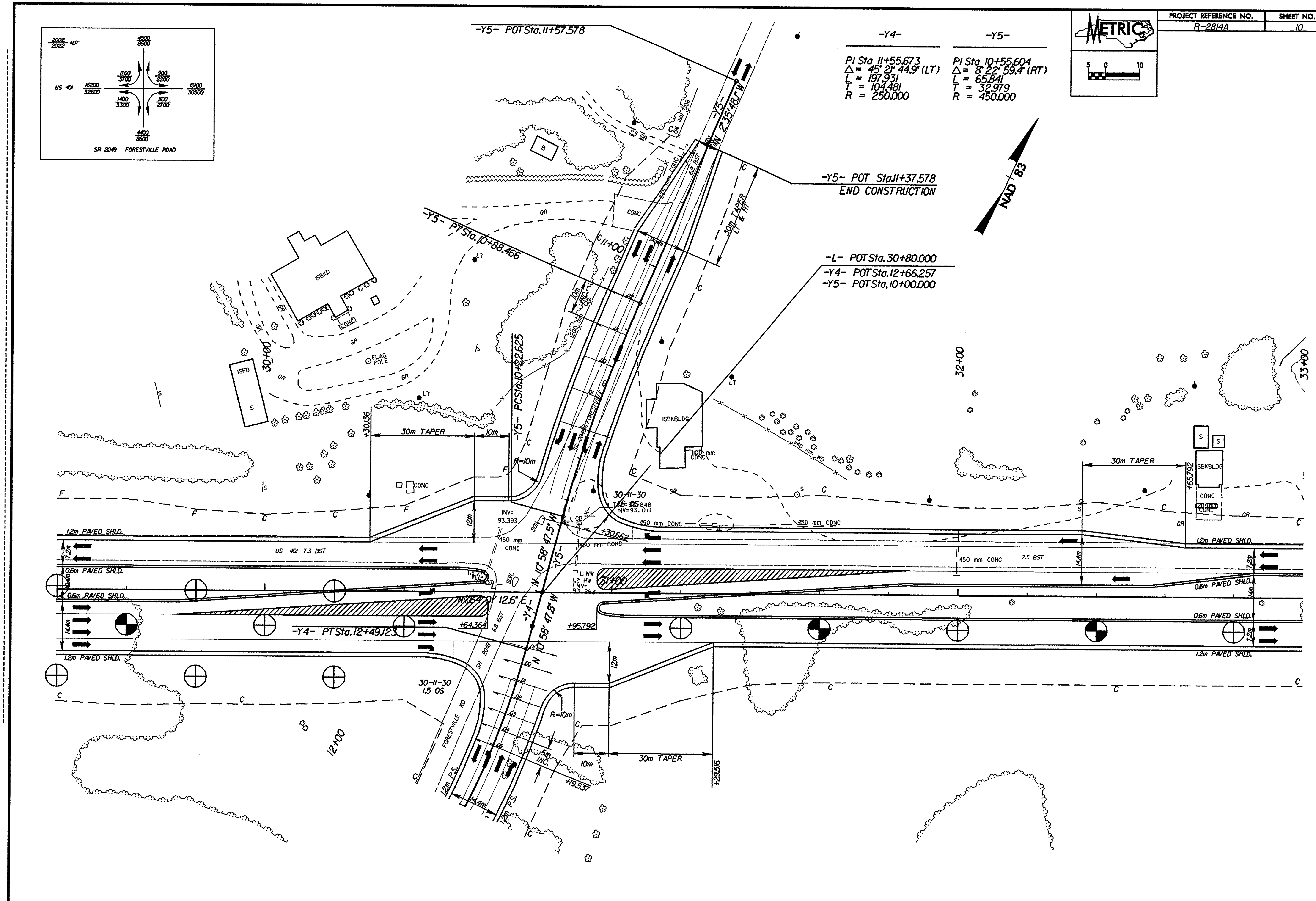
-L-

N 64° 01' 12.6" E

1.4 HW
INV=92.352

194.364

30m TAPER


PROJECT REFERENCE NO.
R-2814A
SHEET NO.
10
METRIC
5 0 10
-Y4-
PI Sta 11+55.673
Δ = 45° 21' 44.9" (LT)
L = 197.931
T = 104.481
R = 250.000
-Y5-
PI Sta 10+55.604
Δ = 8° 22' 59.4" (RT)
L = 65.841
T = 32.979
R = 450.000
NAD 83
-Y5- POT Sta.11+57.578
-Y5- POT Sta.11+37.578
END CONSTRUCTION
-L- POT Sta.30+80.000
-Y4- POT Sta.12+66.257
-Y5- POT Sta.10+00.000
-Y5- PT Sta.10+88.466
-Y5- PC Sta.10+22.625
-Y4- PT Sta.12+49.123
30m TAPER
30m TAPER LT & RT
10m
12m
14.4m
7.2m
R=10m
1.2m PAVED SHLD.
0.6m PAVED SHLD.
US 401 7.3 BST
7.5 BST
450 mm CONC
SR 2049 FORESTVILLE RD
FORESTVILLE RD
30-11-30
1.5 OS
ISBKD
ISFD
ISBKBLDG
FLAG POLE
CONC
GR
US 401
SR 2049 FORESTVILLE ROAD
2002 / 2022 - ADT
4500 / 8500
1700 / 3700
900 / 2200
15200 / 32600
15100 / 30500
1400 / 3300
1100 / 2700
4400 / 8600
30+00
31+00
32+00
33+00
12+00
+30.136
+64.364
+95.792
+65.792
+29.516
+19.537
+30.562
N 10° 58' 47.5" W
N 23° 35' 48.1" W

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	11

METRIC

5 0 10

NAD 83

33+00 34+00 35+00 36+00

POND

2SFD

S

B

B

W

CONC

HTR

U/G TANK

SOIL

SOIL

SOIL

30' SOIL

INV=88.727

375 mm CONC

750 mm CONC

INV=90.974

750 mm CONC

1.2m PAVED SHLD.

0.6m PAVED SHLD.

1.2m

2.3 HW
INV=88.880

-L-

N 64° 01' 12.6" E

0.6m PAVED SHLD.

1.2m PAVED SHLD.

US 401 7.6 BST

1.2m PAVED SHLD.

0.6m PAVED SHLD.

2.3 HW
INV=91.259

0.6m PAVED SHLD.

1.2m PAVED SHLD.

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	12

METRIC

5 0 10

-Y6-

PI Sta 10+55.231
Δ = 35° 35' 52.0" (LT)
L = 106.884
T = 55.230
R = 172.034

NAD 83

PROP. PAINTED ISLAND
SEE TRAFFIC CONTROL PLANS

125mm MONOLITHIC CONCRETE ISLAND

37+00 38+00 39+00

-Y6- POT Sta. 11+35.038

-L- POT Sta. 39+24.023

12m PAVED SHLD.

US 401 7.5 BST

7.2m

0.6m PAVED SHLD.

1.4m

-L-
N 64° 01' 12.6" E

52

10.8m

90m TAPER

3.6m

+93.465

-Y6- 24.8° W

1.0m

5.4m

R=21m

R=0.6m TYP.

-Y6- PT Sta. 11+06.885

+90.155

7.2m

5m

375 mm CONC

3.0 CONC

2SBKD

CONC

BEGIN CONSTRUCTION
-Y6- POC Sta. 10+60.155

6.2m

DK

2SFD

S

1050 mm CONC

1050 mm CONC

375 mm CONC

-Y6-

8.2° W

6.2 BST

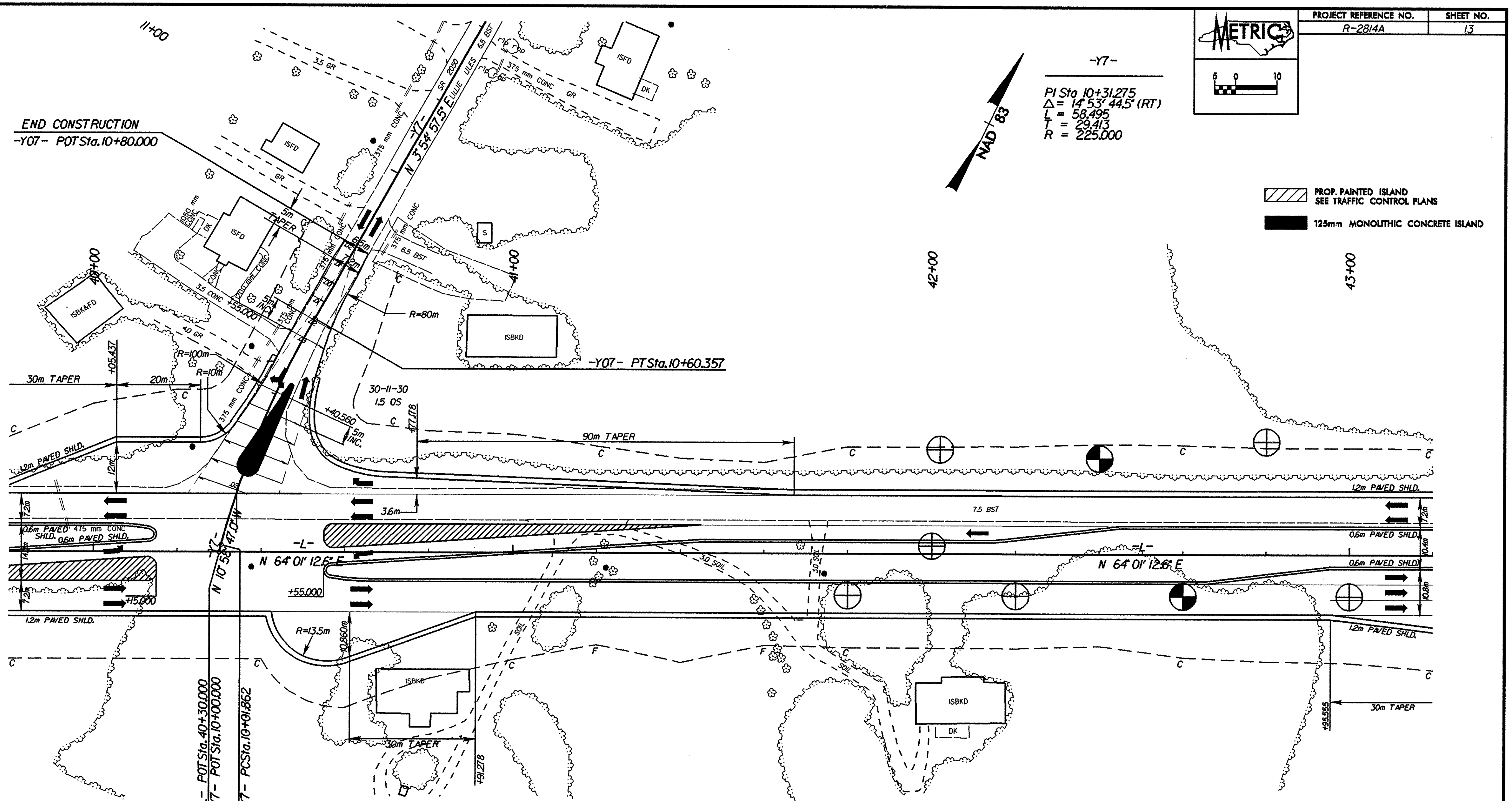
BM LAUREL COURT

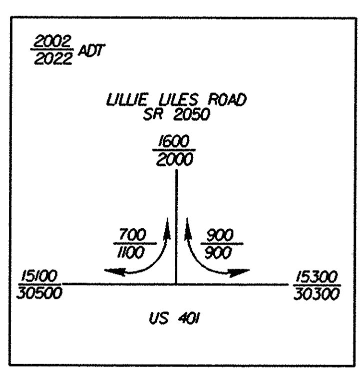
-Y6- PC Sta. 10+00.000

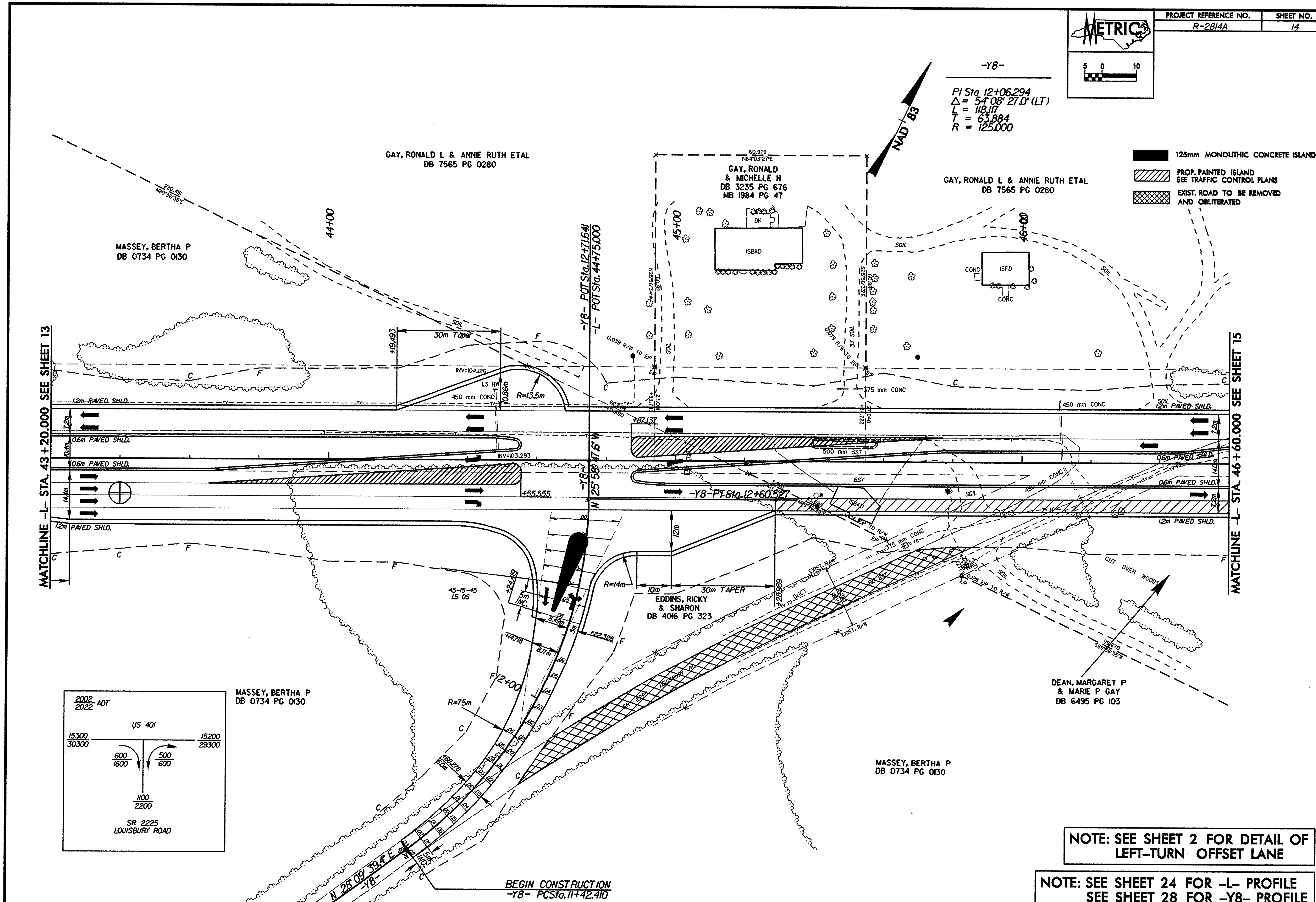
L5SBKD

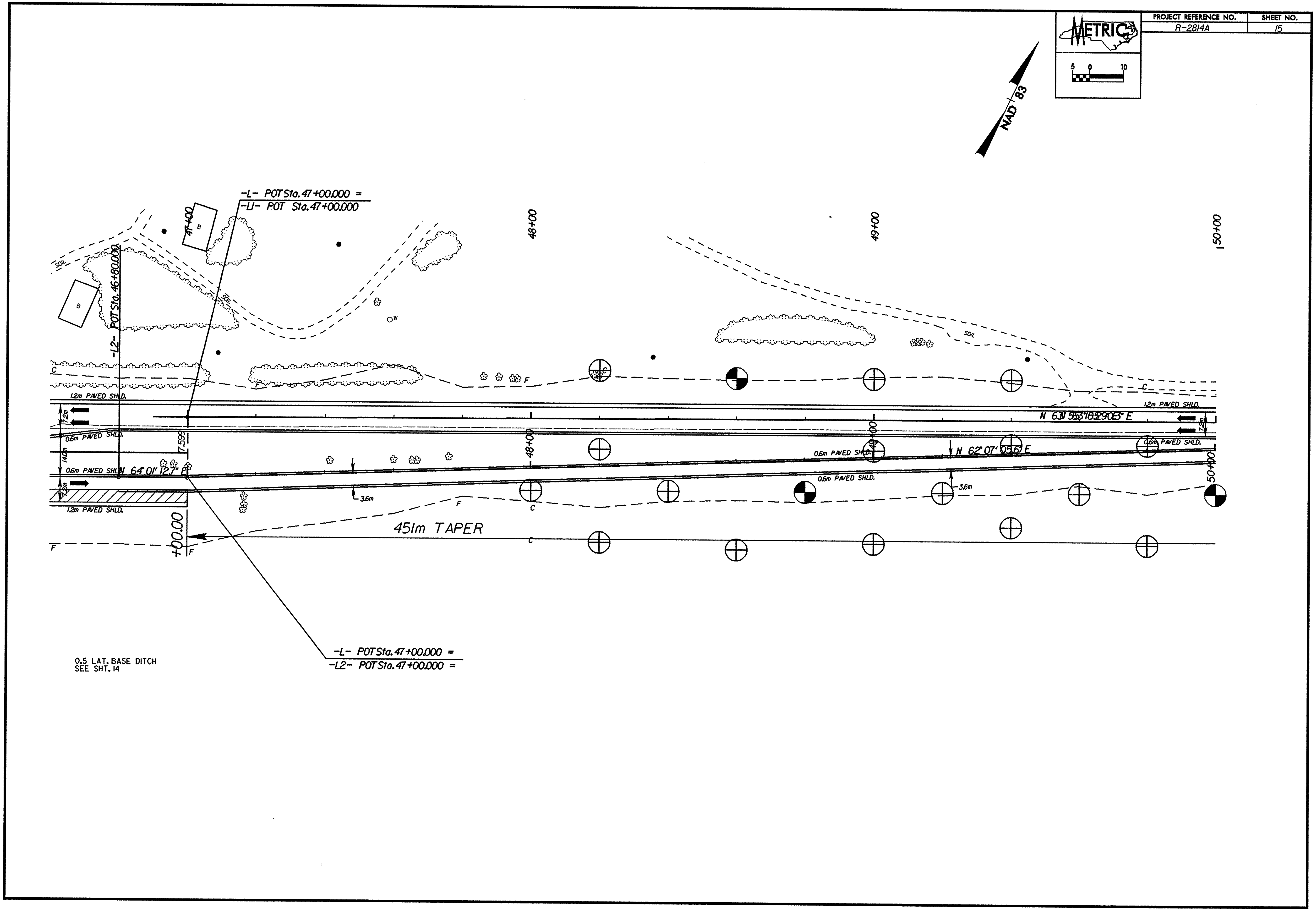
1200 mm WD

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	13






METRIC
PROJECT REFERENCE NO.
R-2814A
SHEET NO.
14
5 0 10
-Y8-
PI Sta 12+06.294
Δ = 54° 08' 27.0" (LT)
L = 118.117
T = 63.884
R = 125.000
NAD 83
125mm MONOLITHIC CONCRETE ISLAND
PROP. PAINTED ISLAND SEE TRAFFIC CONTROL PLANS
EXIST. ROAD TO BE REMOVED AND OBLITERATED
GAY, RONALD L & ANNIE RUTH ETAL
DB 7565 PG 0280
GAY, RONALD & MICHELLE H
DB 3235 PG 676
MB 1984 PG 47
MASSEY, BERTHA P
DB 0734 PG 0130
EDDINS, RICKY & SHARON
DB 4016 PG 323
DEAN, MARGARET P & MARIE P GAY
DB 6495 PG 103
-Y8- POT Sta. 12+71.641
-L- POT Sta. 44+75.000
-Y8- PT Sta. 12+60.527
44+00
45+00
46+00
30m Taper
30m TAPER
R=13.5m
R=14m
R=75m
450 mm CONC
375 mm CONC
500 mm BST
1.2m PAVED SHLD.
0.6m PAVED SHLD.
CUT OVER WOODS
MATCHLINE -L- STA. 43+20.000 SEE SHEET 13
MATCHLINE -L- STA. 46+60.000 SEE SHEET 15
2002 / 2022 ADT
US 401
15300 / 30300
15200 / 29300
600 / 1600
500 / 600
1100 / 2200
SR 2225
LOUISBURY ROAD
N 28° 09' 39.4" E
BEGIN CONSTRUCTION
-Y8- PC Sta. 11+42.410
NOTE: SEE SHEET 2 FOR DETAIL OF LEFT-TURN OFFSET LANE
NOTE: SEE SHEET 24 FOR -L- PROFILE
SEE SHEET 28 FOR -Y8- PROFILE


METRIC
PROJECT REFERENCE NO.
R-2814A
SHEET NO.
15
NAD 83
-L- POT Sta. 47+00.000 =
-L1- POT Sta. 47+00.000
-L2- POT Sta. 46+80.000
47+00
48+00
49+00
50+00
SOIL
1.2m PAVED SHLD.
0.6m PAVED SHLD.
N 64° 01' 12.7" E
N 62° 07' 05.6" E
3.6m
45lm TAPER
-L- POT Sta. 47+00.000 =
-L2- POT Sta. 47+00.000 =
0.5 LAT. BASE DITCH
SEE SHT. 14

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	16

METRIC

5 0 10

NAD 83

50+00

51+00

52+00

-L2- POT Sta. 51+51.22

-L1- POT Sta. 52+29.997

SOIL

SOIL

C

C

F

F

F

12m PAVED SHLD.

INV=114.321

450 mm CONC

US 401 7.6 BST

US 401 7.5 BST

0.6m PAVED SHLD.

INV=114.517

-L-

N 64° 01' 12.6" E

3.6m

51+00

1100 mm CHL

45Im TAPER

+51.22

STA. 52+30.000 -L- END STATE PROJECT 8.1403001

STA. 52+30.000 -L- END F. A. PROJECT STP-401(4)

METRIC

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

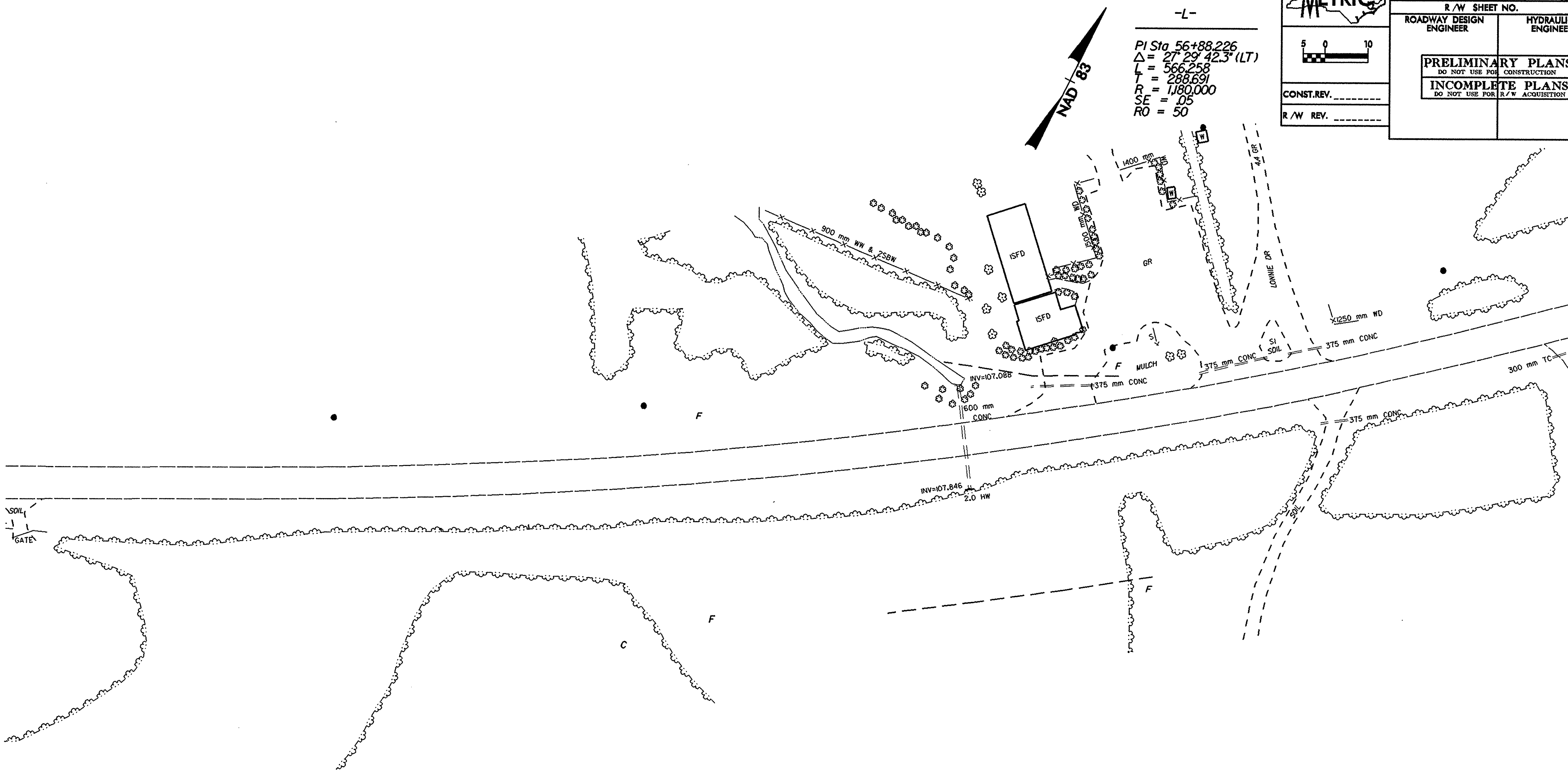
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

CONST.REV. ________

R/W REV. ________

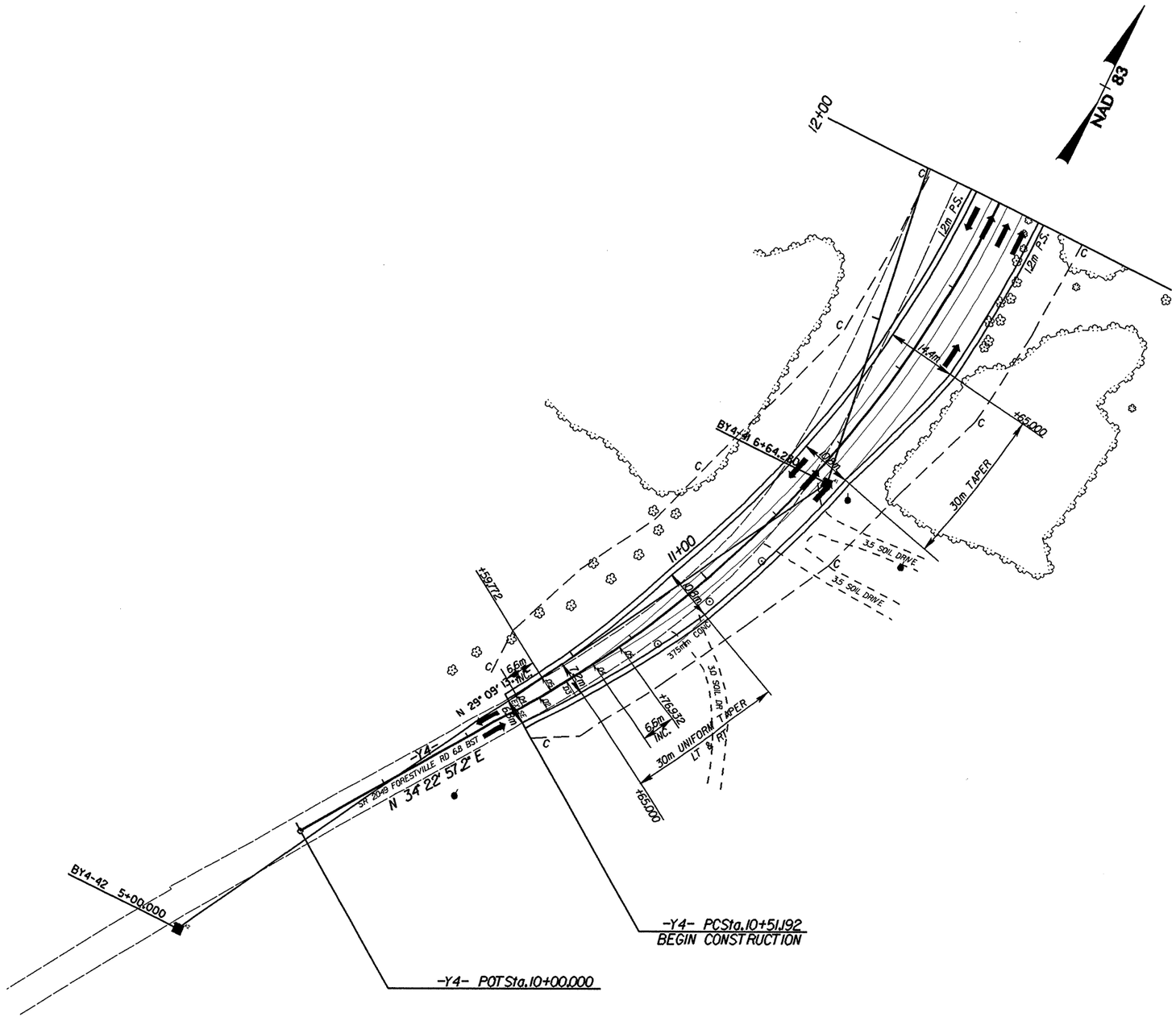
REVISIONS



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

-Y4-

PI Sta 11+55.673
Δ = 45° 21' 44.9" (LT)
L = 197.931
T = 104.481
R = 250.000



NOTE: SEE SHEET 26 FOR -Y4- PROFILE

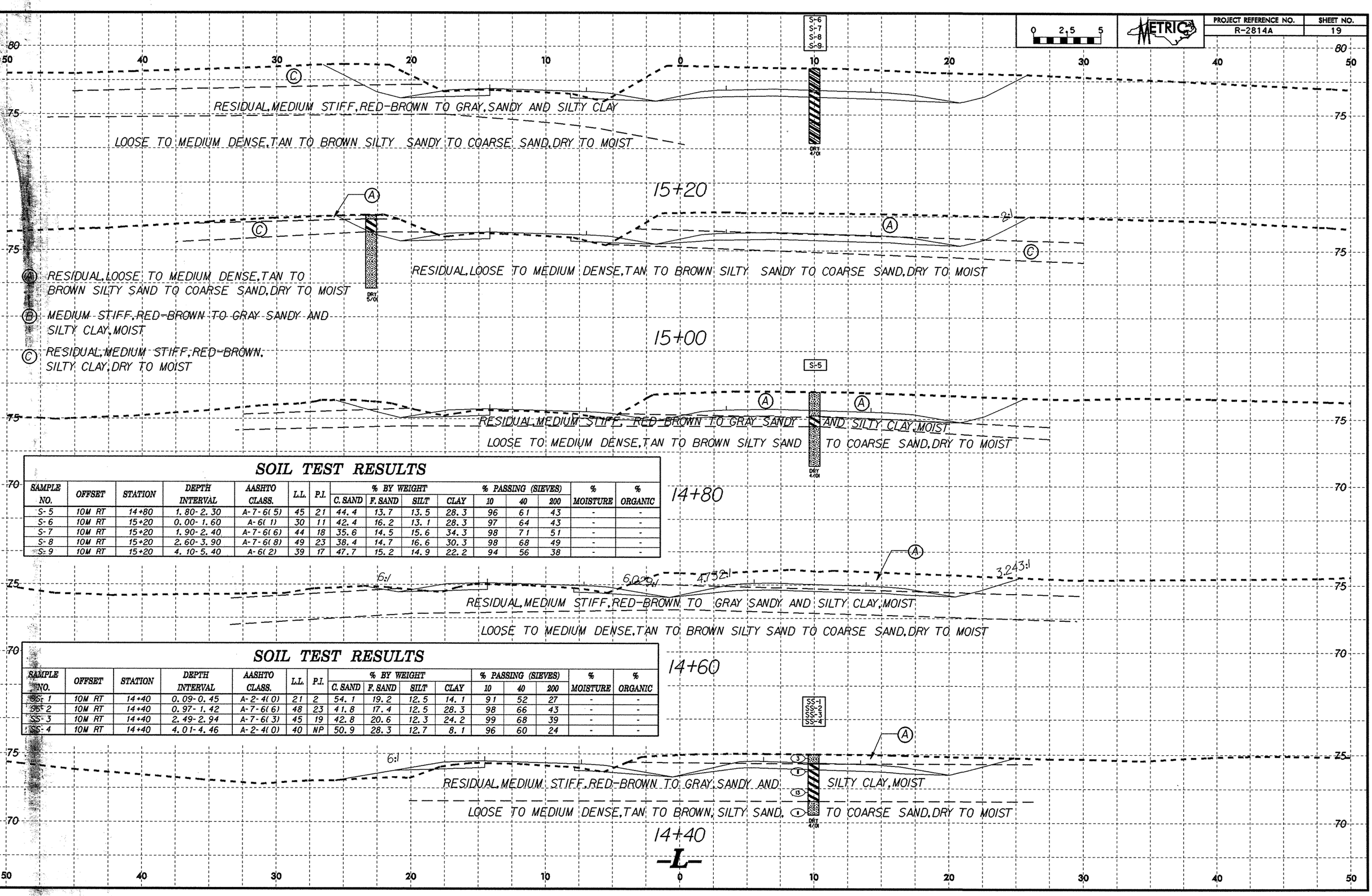
REVISIONS

8/17/20

SYSTIME
USERNAME

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	19

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
S-5	10M RT	14+80	1.80-2.30	A-7-6(5)	45	21	44.4	13.7	13.5	28.3	96	61	43	-	-
S-6	10M RT	15+20	0.00-1.60	A-6(1)	30	11	42.4	16.2	13.1	28.3	97	64	43	-	-
S-7	10M RT	15+20	1.90-2.40	A-7-6(6)	44	18	35.6	14.5	15.6	34.3	98	71	51	-	-
S-8	10M RT	15+20	2.60-3.90	A-7-6(8)	49	23	38.4	14.7	16.6	30.3	98	68	49	-	-
S-9	10M RT	15+20	4.10-5.40	A-6(2)	39	17	47.7	15.2	14.9	22.2	94	56	38	-	-

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-1	10M RT	14+40	0.09-0.45	A-2-4(0)	21	2	54.1	19.2	12.5	14.1	91	52	27	-	-
SS-2	10M RT	14+40	0.97-1.42	A-7-6(6)	48	23	41.8	17.4	12.5	28.3	98	66	43	-	-
SS-3	10M RT	14+40	2.49-2.94	A-7-6(3)	45	19	42.8	20.6	12.3	24.2	99	68	39	-	-
SS-4	10M RT	14+40	4.01-4.46	A-2-4(0)	40	NP	50.9	28.3	12.7	8.1	96	60	24	-	-

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	20

0 2.5 5

50 40 30 20 10 0 10 20 30 40 50

80 75 70

ROADWAY EMBANKMENT

RESIDUAL, MEDIUM STIFF, RED-BROWN TO GRAY SANDY AND SILTY CLAY, MOIST

LOOSE TO MEDIUM DENSE, TAN TO BROWN SILTY SANDY TO COARSE SAND, DRY TO MOIST

16+00

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- 10	10M RT	15+60	0. 10- 2. 40	A-7-6(4)	41	18	41. 4	17. 6	16. 8	24. 2	95	63	42	-	-
SS- 113	22M LT	15+43	0. 00- 0. 45	A-7-6(18)	58	31	27. 8	11. 3	16. 5	44. 4	100	77	63	-	-
SS- 114	22M LT	15+43	1. 11- 1. 56	A-7-6(8)	55	28	44. 8	12. 5	14. 5	28. 2	94	58	45	21. 3	-

ROADWAY EMBANKMENT

RESIDUAL, MEDIUM STIFF, RED-BROWN TO GRAY SANDY AND SILTY CLAY, MOIST

LOOSE TO MEDIUM DENSE, TAN TO BROWN SILTY SAND TO COARSE SAND,

15+80

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- 115	22M LT	15+43	2. 63- 3. 08	A- 2- 4(0)	38	NP	46. 6	24. 2	19. 2	10. 1	94	59	33	-	-
SS- 116	22M LT	15+43	4. 15- 4. 60	A- 2- 4(0)	40	8	51. 2	26. 6	18. 1	4. 0	86	49	24	-	-
SS- 117	22M LT	15+43	5. 67- 6. 12	A- 2- 4(0)	29	NP	45. 6	34. 9	15. 5	4. 0	86	51	21	-	-

S-10

RESIDUAL, MEDIUM STIFF, RED-BROWN TO GRAY, SANDY AND SILTY CLAY, MOIST
LOOSE TO MEDIUM DENSE, TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST

DRY
4/01

Ⓒ RESIDUAL, MEDIUM STIFF, RED-BROWN, SILTY CLAY, DRY TO MOIST

SS-113
SS-114
SS-115
SS-116
SS-117

15+60

3m AHEAD

6
9
8
15
37

DRY
5/01

Ⓒ

RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST

15+40

-L-

50 40 30 20 10 0 10 20 30 40 50

80 75 70

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	21

0 2.5 5

50 40 30 20 10 0 10 20 30 40 50

SP#2

-Y2- Sta. 10+20
El.= 78.825
(See Sheet 76)

85 80 75

Ⓓ

S-11

RESIDUAL, MEDIUM STIFF, TAN, SANDY, SILTY CLAY WITH SOME MICA, MOIST

MEDIUM DENSE, TAN, SILTY SAND. MOIST

4/01

Ⓓ ROADWAY EMBANKMENT

16+60

SP#1

-Y2- Sta. 10+20
El.= 78.645
(See Sheet 76)

85 80 75

Ⓓ

RESIDUAL, MEDIUM STIFF, TAN, SANDY, SILTY CLAY WITH SOME MICA, MOIST

16+40

70 80 75

Ⓓ

RESIDUAL, MEDIUM STIFF, TAN, SANDY, SILTY CLAY WITH SOME MICA, MOIST

16+20

70

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-11	10M RT	16+60	2.80-3.90	A-2-4(0)	36	10	51.7	13.7	14.3	20.2	89	49	33	-	-

-L-

50 40 30 20 10 0 10 20 30 40 50

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	22

0 2.5 5

METRIC

50 40 30 20 10 0 10 20 30 40 50

Ⓐ RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST

Ⓑ RESIDUAL, MEDIUM STIFF, RED-BROWN TO GRAY, SANDY AND SILTY CLAY, MOIST

Ⓒ RESIDUAL, MEDIUM STIFF, RED-BROWN, SILTY CLAY, DRY TO MOIST

80

75

SANDY CLAY

SILTY SAND

RESIDUAL, MEDIUM DENSE TO DENSE, TAN TO BROWN SILTY AND CLAYEY SAND TO COARSE SAND WITH SOME MICA, MOIST TO WET

WIDENED SHOULDER

SANDY CLAY

17+60

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-12	10M RT	17+00	0.06-0.45	A-6(3)	35	13	38.2	15.8	9.7	36.4	94	65	46	-	-
SS-13	10M RT	17+00	0.92-1.37	A-7-6(6)	50	25	38.4	17.8	9.5	34.3	92	64	43	-	-
SS-14	10M RT	17+00	2.44-2.89	A-2-4(0)	33	NP	52.5	24.2	11.1	12.1	91	54	25	-	-
SS-107	22M LT	17+20	0.00-0.30	A-2-4(0)	21	5	48.0	20.2	15.7	16.1	92	55	32	-	-
SS-108	22M LT	17+20	0.30-0.45	A-7-6(12)	59	34	37.3	12.9	11.5	38.3	95	65	49	-	-
SS-109	22M LT	17+20	1.00-1.45	A-7-6(5)	51	24	44.8	20.6	14.5	20.2	95	61	40	20.5	-

80

75

WIDENED SHOULDER

RESIDUAL, MEDIUM STIFF, TAN, FINE TO COARSE SANDY CLAY, MOIST

MEDIUM DENSE TO DENSE, TAN TO BROWN SILTY AND CLAYEY SAND TO COARSE SAND WITH SOME MICA, MOIST TO WET

4/01

17+40

SS-107
SS-108
SS-109
SS-110
SS-111
SS-112

Ⓐ Ⓒ Ⓑ

14 9 10 27 86

5/01

RESIDUAL, MEDIUM DENSE TO DENSE, TAN TO BROWN SILTY AND CLAYEY SAND TO COARSE SAND WITH SOME MICA, MOIST TO WET

RESIDUAL, MEDIUM STIFF, RED-BROWN TO GRAY SANDY AND SILTY CLAY, MOIST

17+20

SS-12
SS-13
SS-14

Ⓒ Ⓐ Ⓑ

4 8 16 36 76

DRY 4/01

RESIDUAL, MEDIUM STIFF, RED-BROWN TO GRAY SANDY AND SILTY CLAY, MOIST

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-110	22M LT	17+20	2.52-2.97	A-2-6(0)	37	12	59.5	20.2	14.3	6.0	86	42	20	-	-
SS-111	22M LT	17+20	4.04-4.49	A-4(9)	31	NP	54.8	26.0	13.1	6.0	99	56	23	-	-
SS-112	22M LT	17+20	5.56-6.01	A-1-b(0)	27	NP	61.3	24.8	11.9	2.0	85	45	15	-	-

17+00

Ⓒ Ⓐ Ⓐ Ⓒ

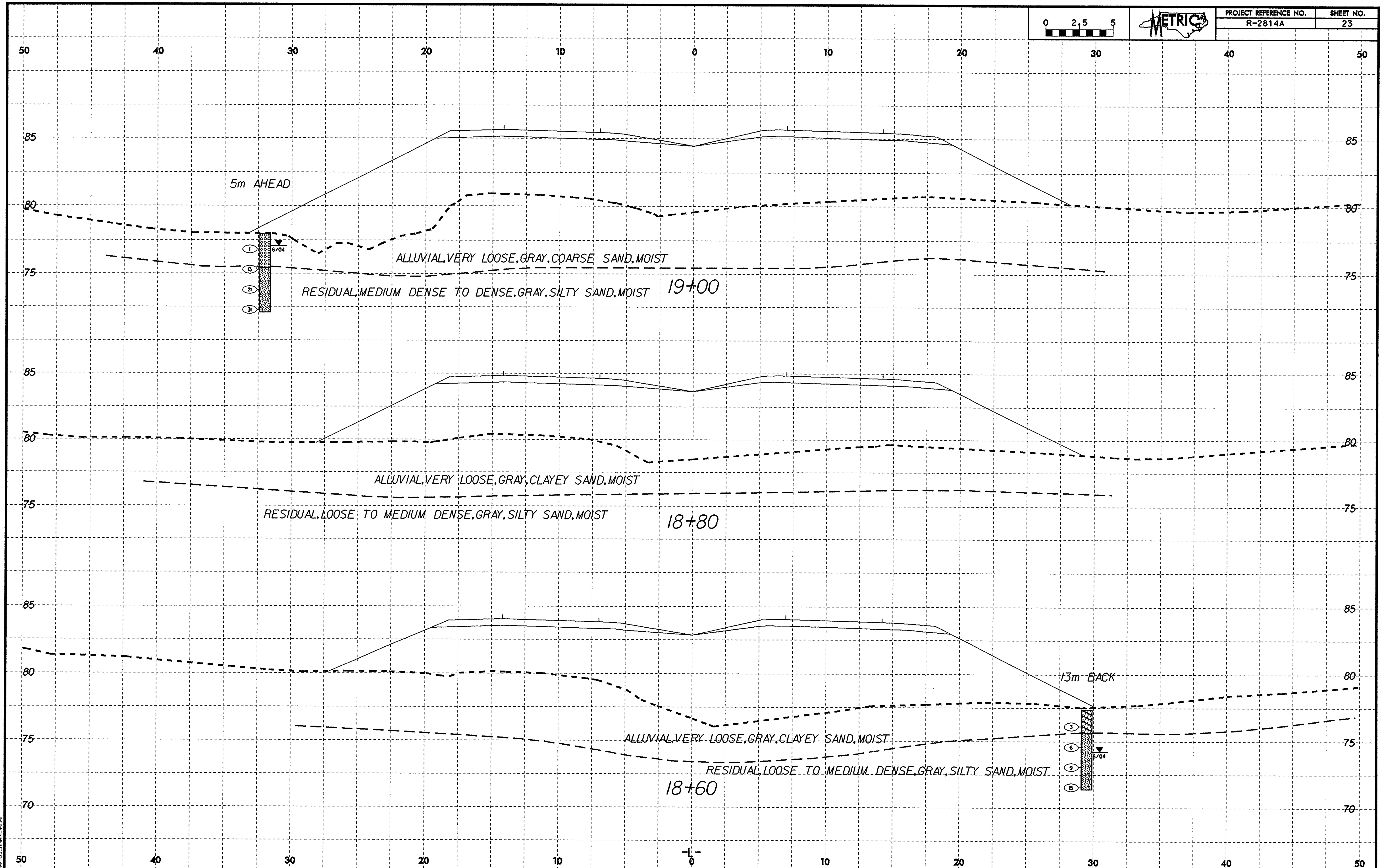
RESIDUAL, MEDIUM STIFF, RED-BROWN TO GRAY, SANDY AND SILTY CLAY, MOIST

MEDIUM DENSE TO DENSE, TAN TO BROWN, SILTY AND CLAYEY SAND TO COARSE WITH SOME MICA, MOIST TO WET

5/01

16+80

-L-



PROJECT REFERENCE NO.
R-2814A
SHEET NO.
23
METRIC
0 2.5 5
5m AHEAD
ALLUVIAL,VERY LOOSE,GRAY,COARSE SAND,MOIST
RESIDUAL,MEDIUM DENSE TO DENSE,GRAY,SILTY SAND,MOIST
19+00
ALLUVIAL,VERY LOOSE,GRAY,CLAYEY SAND,MOIST
RESIDUAL,LOOSE TO MEDIUM DENSE,GRAY,SILTY SAND,MOIST
18+80
13m BACK
ALLUVIAL,VERY LOOSE,GRAY,CLAYEY SAND,MOIST
RESIDUAL,LOOSE TO MEDIUM DENSE,GRAY,SILTY SAND,MOIST
18+60
-L-

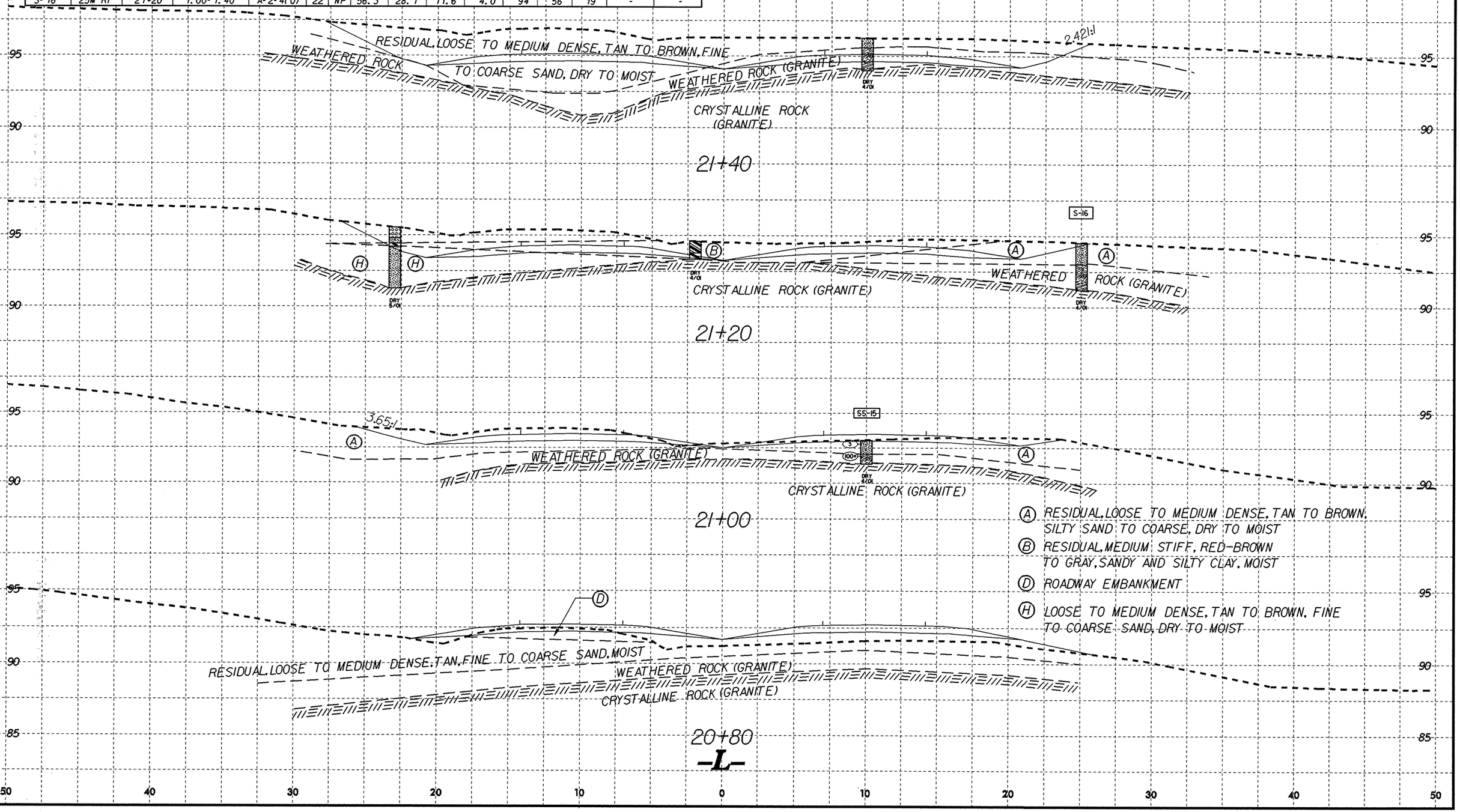
PROJECT REFERENCE NO.	SHEET NO.
R-2814A	24

0 2.5 5

METRIC

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-15	10M RT	21+00	0.06-0.45	A-2-4(0)	20	NP	49.9	24.4	11.5	14.1	93	59	27	-	-
S-16	25M RT	21+20	1.00-1.40	A-2-4(0)	22	NP	56.3	28.1	11.6	4.0	94	56	19	-	-



PROJECT REFERENCE NO.	SHEET NO.
R-2814A	25

0 2.5 5

METRIC

Ⓐ RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST

Ⓒ RESIDUAL, MEDIUM STIFF, TAN TO BROWN, SILTY TO SANDY CLAY, DRY TO MOIST

Ⓔ WEATHERED ROCK (GRANITE)

Ⓘ MEDIUM STIFF, TAN TO BROWN, SILTY TO SANDY CLAY, DRY TO MOIST

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
S-17	25M RT	22+00	0.00-1.00	A-7-6(6)	44	22	39.4	14.5	7.7	38.4	94	65	45
S-18	25M RT	22+00	1.30-2.00	A-7-6(6)	44	18	37.0	18.2	12.5	32.3	100	71	48

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
S-19	10M RT	22+00	2.50-4.30	A-4(1)	39	9	41.8	22.8	17.2	18.2	98	67	39

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
S-20	25M RT	22+00	4.60-5.30	A-1-b(0)	26	NP	59.6	22.1	11.2	7.1	85	44	19

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
SS-106	22M LT	22+40	0.10-0.37	A-2-4(0)	29	NP	53.6	24.6	13.7	8.1	89	53	25

S-17
S-18
S-19
S-20

22+40 · 22+20 · 22+00 · 21+80 · 21+60

SS-106 · WEATHERED ROCK (GRANITE) · CRYSTALLINE ROCK (GRANITE) · RESIDUAL, LOOSE, TAN, COARSE SAND, MOIST · WEATHERED ROCK (GRANITE) · CRYSTALLINE ROCK (GRANITE) · MEDIUM STIFF, TAN TO BROWN, SILTY TO SANDY CLAY, DRY TO MOIST · BROWN TO RED-BROWN, SILTY TO SANDY CLAY AND SANDY SILT, DRY TO MOIST · RESIDUAL, LOOSE, TAN, SILTY SAND, MOIST · WEATHERED ROCK (GRANITE) · CRYSTALLINE ROCK (GRANITE) · CRYSTALLINE ROCK (GRANITE) · MEDIUM STIFF, TAN TO RED-BROWN, SILTY TO SANDY CLAY, MOIST · CRYSTALLINE ROCK (GRANITE) · CRYSTALLINE ROCK (GRANITE)

DRY 6/01 · DRY 4/01

-L-

50 40 30 20 10 0 10 20 30 40 50

100 95

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	26

0 2.5 5

METRIC

50 40 30 20 10 0 10 20 30 40 50

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	38
SS-21	10M RT	22+60	0. 12- 0. 45	A- 1- b(0)	25	NP	57. 4	25. 2	9. 3	8. 1	81	47	17
S- 22	10M RT	23+00	0. 90- 1. 10	A- 7- 6(11)	51	26	30. 4	16. 4	16. 6	36. 5	95	73	53

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	38
S- 23	10M RT	23+00	3. 70- 3. 80	A- 6(2)	37	13	38. 1	24. 7	16. 8	20. 3	96	68	40
S- 24	10M RT	23+00	4. 67- 5. 81	A- 2- 4(0)	34	7	48. 1	21. 3	16. 4	14. 2	96	60	33

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	38
S- 25	25M RT	23+20	0. 90- 1. 40	A- 7- 6(5)	43	20	34. 1	23. 1	18. 5	24. 3	97	71	46
S- 26	25M RT	23+20	1. 90- 3. 50	A- 2- 4(0)	27	NP	48. 3	27. 6	14. 0	10. 1	95	64	26

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	38
S- 27	10M RT	23+40	0. 10- 0. 50	A- 5(4)	36	16	34. 9	16. 6	16. 0	32. 5	97	70	50

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	38
S- 28	10M RT	23+40	0. 70- 0. 80	A- 7- 5(18)	58	25	22. 1	9. 7	13. 4	54. 8	100	82	70
S- 105	23M LT	22+80	3. 70- 3. 95	A- 2- 4(0)	38	8	46. 8	21. 6	17. 5	14. 1	99	63	35

23+40

S-27 S-28

RESIDUAL, MEDIUM STIFF, TAN TO RED-BROWN, SANDY TO SILTY CLAY, MOIST

DENSE TO VERY DENSE, TAN, SILTY COARSE SAND WITH SOME MICA, MOIST

WEATHERED ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

DRY 4/01

23+20

S-25 S-26

RESIDUAL, MEDIUM STIFF, TAN TO BROWN, SILTY AND SANDY CLAY, MOIST

DENSE TO VERY DENSE TAN, SILTY COARSE SAND WITH SOME MICA AND WEATHERED ROCK ZONES, MOIST

CRYSTALLINE ROCK (GRANITE)

WR ZONE AT 3.73-3.88M

DRY 4/01

23+00

S-22 S-23 S-24

WEATHERED ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

DRY 4/01

22+80

S-105

RESIDUAL, MEDIUM DENSE, TAN TO BROWN, SILTY SAND TO COARSE SAND, MOIST

CRYSTALLINE ROCK (GRANITE)

DRY 5/01

RESIDUAL, MEDIUM STIFF, TAN, SANDY SILTY CLAY, MOIST

CRYSTALLINE ROCK (GRANITE)

DRY 4/01

22+60

SS-21

RESIDUAL, MEDIUM DENSE, BROWN, COARSE SAND, MOIST

CRYSTALLINE ROCK (GRANITE)

W/ WEATHERED ROCK ZONES

H 100+ REF REF

DRY 4/01

-L-

(A) RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST

(B) MEDIUM STIFF, RED-BROWN TO GRAY, SANDY AND SILTY CLAY, MOIST

(C) MEDIUM STIFF, RED-BROWN, SILTY CLAY, DRY TO MOIST

(D) ROADWAY EMBANKMENT

(E) WEATHERED ROCK (GRANITE)

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	27

0 2.5 5

METRIC

50 40 30 20 10 0 10 20 30 40 50

100

95

Ⓐ RESIDUAL, LOOSE TO MEDIUM DENSE TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST

Ⓒ MEDIUM STIFF, RED-BROWN, SILTY CLAY, DRY TO MOIST

Ⓔ WEATHERED ROCK (GRANITE)

RESIDUAL, MEDIUM STIFF, BROWN, SANDY SILTY CLAY, WITH SOME MICA, MOIST

24+20

RESIDUAL, MEDIUM STIFF, BROWN, SANDY SILTY CLAY, WITH SOME MICA, MOIST

24+00

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-31	10M RT	23+80	1.11-1.56	A-7-5(8)	57	23	32.0	22.7	14.8	30.4	97	74	48	-	-
S-104	23M LT	23+60	0.70-0.90	A-7-5(21)	64	33	25.4	12.1	12.1	50.4	100	81	64	-	-

SS-31

RESIDUAL, MEDIUM STIFF, BROWN, SANDY SILTY CLAY, WITH SOME MICA, MOIST

Ⓔ

CRYSTALLINE ROCK (GRANITE)

Ⓔ

DRY 4/01

23+80

S-104

Ⓐ

Ⓒ

WEATHERED ROCK (GRANITE)

Ⓔ

DRY 5/01

CRYSTALLINE ROCK (GRANITE)

23+60

-L-

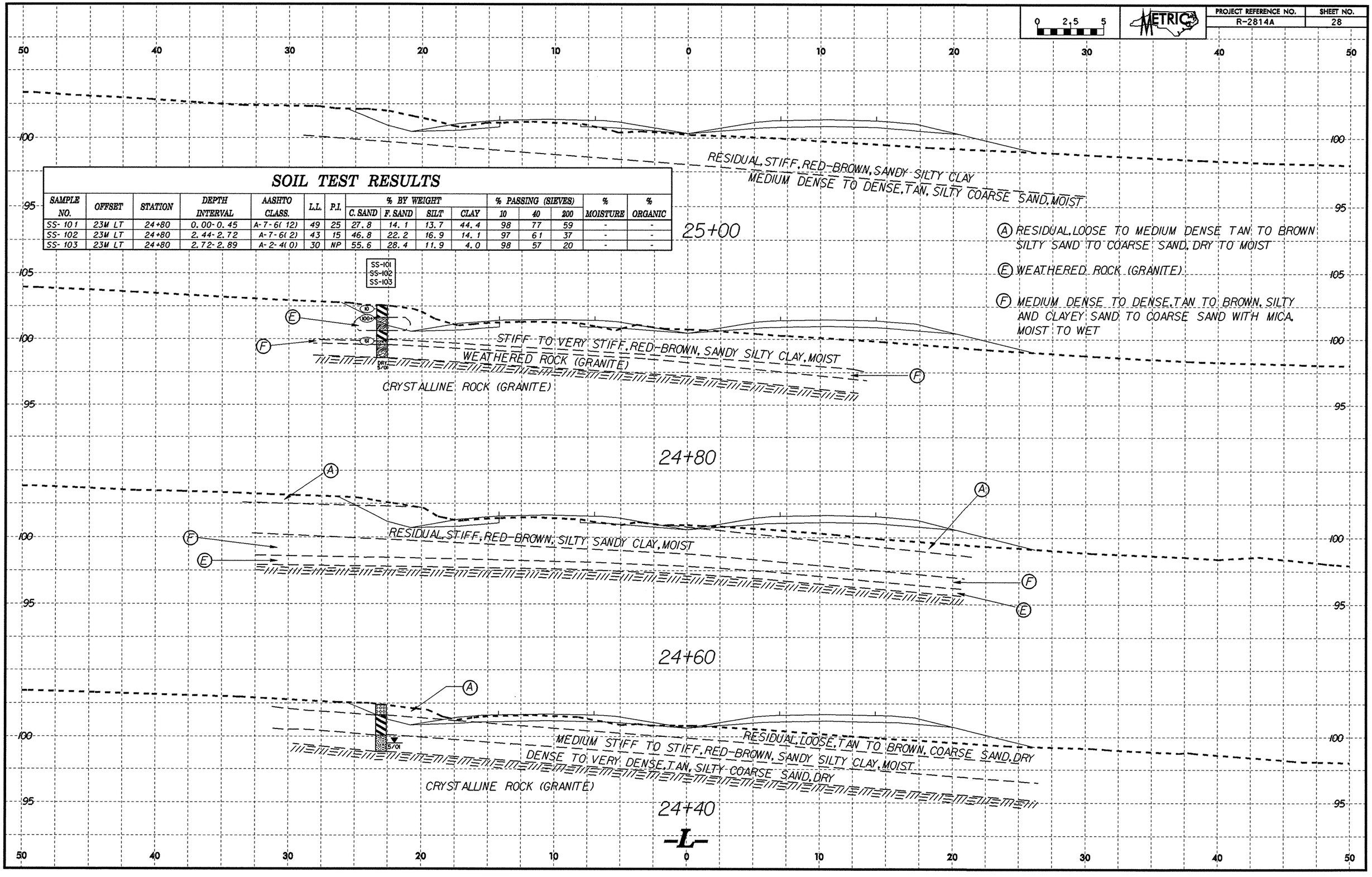
PROJECT REFERENCE NO.	SHEET NO.
R-2814A	28

0 2.5 5

METRIC

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-101	23M LT	24+80	0.00-0.45	A-7-6(12)	49	25	27.8	14.1	13.7	44.4	98	77	59	-	-
SS-102	23M LT	24+80	2.44-2.72	A-7-6(2)	43	15	46.8	22.2	16.9	14.1	97	61	37	-	-
SS-103	23M LT	24+80	2.72-2.89	A-2-4(0)	30	NP	55.6	28.4	11.9	4.0	98	57	20	-	-



PROJECT REFERENCE NO.	SHEET NO.
R-2814A	29

0 2,5 5

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-32	10M RT	25+60	0.10-0.50	A-2-6(0)	27	11	48.1	19.5	14.2	18.3	96	62	33	-	-
S-33	10M RT	25+60	0.70-1.60	A-7-6(20)	61	33	24.5	13.6	13.2	48.7	100	82	64	-	-
S-34	10M RT	25+60	1.80-2.40	A-7-6(7)	48	22	36.5	19.5	15.6	28.4	99	73	47	-	-
S-35	10M RT	25+60	2.90-3.50	A-4(0)	37	9	45.4	21.1	15.2	18.3	99	66	37	-	-
S-100	23M LT	25+80	2.00-4.60	A-6(2)	34	14	41.9	17.3	18.5	22.2	98	65	43	-	-

50 40 30 20 10 0 10 20 30 40 50

S-100

Ⓐ Ⓒ

DRY 5/01

RESIDUAL, MEDIUM STIFF TO HARD BROWN TO GRAY-BROWN, SANDY CLAY, MOIST

100

95

25+80

Ⓐ

S-32
S-33
S-34
S-35

RESIDUAL, LOOSE TAN, CLAYEY COARSE SAND, MOIST
STIFF, TAN, SANDY SILTY CLAY WITH SOME MICA, MOIST
VERY STIFF, TAN, SANDY SILT WITH SOME MICA, MOIST

DRY 4/01

25+60

Ⓓ

RESIDUAL, STIFF, TAN, SANDY SILTY CLAY, MOIST
STIFF, TAN, SANDY SILTY CLAY, MOIST
DENSE, TAN, SILTY SAND, MOIST

25+40

Ⓐ

RESIDUAL, STIFF, RED-BROWN TO TAN, SANDY SILTY CLAY WITH SOME MICA, MOIST
DENSE, TAN, SILTY SAND, MOIST

25+20

-L-

Ⓐ RESIDUAL, LOOSE TO MEDIUM DENSE TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST

Ⓒ RESIDUAL, MEDIUM STIFF, RED-BROWN TO GRAY, SANDY, DRY TO MOIST

Ⓓ ROADWAY EMBANKMENT

100.60

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	38
SS-36	10M RT	26+40	0.20-0.45	A-7-6(13)	51	25	25.4	17.6	12.4	44.6	100	83	60
SS-37	10M RT	26+40	1.07-1.52	A-7-6(4)	47	19	36.5	23.5	13.6	26.4	98	72	43

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	38
S-38	10M RT	26+80	0.70-1.40	A-7-6(3)	43	21	48.3	16.0	9.3	26.4	96	58	37
S-39	10M RT	26+80	1.60-3.90	A-2-4(0)	37	NP	54.2	26.0	9.7	10.1	95	55	23

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	38
S-42	25M RT	26+20	2.20-2.70	A-1-b(0)	25	NP	63.3	20.5	8.1	8.1	92	43	18
S-43	25M RT	26+20	2.85-3.61	A-7-5(23)	63	33	22.9	8.7	3.4	64.9	99	81	69

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	38
SS-96A	23M LT	26+60	1.18-1.63	A-1-b(0)	20	NP	52.0	24.0	15.9	8.1	81	47	23
S-96B	23M LT	26+20	0.10-0.30	A-1-b(0)	21	NP	57.1	18.5	14.3	10.1	92	49	25

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	38
S-97	23M LT	26+20	0.50-1.90	A-7-6(11)	48	24	30.8	14.1	16.7	38.3	99	75	57
S-98	23M LT	26+20	2.10-2.60	A-6(3)	40	13	38.3	20.6	19.0	22.2	97	68	47
S-99	23M LT	26+20	2.80-3.00	A-4(0)	26	9	39.1	22.8	17.9	20.2	94	63	40

RESIDUAL, MEDIUM STIFF, TAN, SANDY SILTY CLAY, MOIST

RESIDUAL, MEDIUM DENSE TO DENSE, TAN, SILTY COARSE SAND, MOIST

S-38 S-39

26+80

26+60, 23 LT
102.80
SS-96A

WEATHERED ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

RESIDUAL, MEDIUM STIFF, TO STIFF TAN, TO RED- BROWN, SILTY CLAY, MOIST

CRYSTALLINE ROCK (GRANITE)

26+60

SS-36 SS-37

RESIDUAL, MEDIUM STIFF TO STIFF, TAN TO RED-BROWN SANDY SILTY CLAY TO SANDY SILT, MOIST

WEATHERED ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

26+40

S-96B
S-97
RT-2
ST-2
S-98
S-99

RESIDUAL, MEDIUM STIFF, RED-BROWN TO TAN, SILTY TO SANDY CLAY AND SANDY SILT, DRY TO MOIST

DENSE,

RESIDUAL, MEDIUM DENSE TO TAN, CLAYEY COARSE SAND AND COARSE SAND, DRY TO MOIST

CRYSTALLINE ROCK (GRANITE)

S-42 S-43

RESIDUAL, STIFF, TAN, SANDY SILTY CLAY, MOIST

26+20

RESIDUAL, STIFF, TAN, SANDY SILT WITH TRACE TO SOME MICA

26+00

-L-

(B) RESIDUAL, MEDIUM STIFF, RED-BROWN TO GRAY, SANDY AND SILTY CLAY, MOIST

(C) MEDIUM STIFF, RED-BROWN, SILTY CLAY, DRY TO MOIST

(D) ROADWAY EMBANMENT

(G) RESIDUAL, LOOSE TO DENSE, TAN, CLAYEY SAND AND COARSE SAND, DRY TO MOIST

(J) RESIDUAL, MEDIUM STIFF, RED-BROWN TO TAN, SILTY TO SANDY CLAY AND SANDY SILT, DRY TO MOIST

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
S-40	10M RT	27+20	0.10-0.80	A-7-6(4)	49	25	43.4	17.2	11.0	28.4	89	59	37	-	-
S-41	10M RT	27+20	3.19-3.95	A-2-4(0)	40	NP	53.5	25.6	10.8	10.1	95	59	23	-	-

50 40 30 20 10 0 10 20 30 40 50

100
95

RESIDUAL, MEDIUM STIFF TO STIFF, TAN TO RED-BROWN, SANDY SILTY CLAY WITH SOME TO TRACE MICA, MOIST

27+60

RESIDUAL, MEDIUM STIFF TO STIFF, TAN TO RED-BROWN, SANDY SILTY CLAY WITH SOME TO TRACE MICA, MOIST

27+40

S-40
S-41

RESIDUAL, MEDIUM STIFF TO STIFF, TAN TO RED-BROWN, SANDY SILTY CLAY WITH SOME TO TRACE MICA, MOIST

DENSE BROWN SILTY COARSE SAND, HIGHLY MICACEOUS, MOIST

DRY 4/01

27+20

RESIDUAL, MEDIUM STIFF TO STIFF, TAN TO RED-BROWN, SANDY SILTY CLAY WITH SOME TO TRACE MICA, MOIST

27+00

-L-

50 40 30 20 10 0 10 20 30 40 50

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	32

0 2.5 5

METRIC

29+20

Ⓓ RESIDUAL, MEDIUM STIFF TO STIFF, TAN, SANDY SILTY CLAY, SOME MICA TO HIGHLY MICACEOUS, MICA CONTENT INCREASES WITH DEPTH, MOIST

DRY 4/01

29+00

Ⓓ RESIDUAL, MEDIUM STIFF TO STIFF, TAN, SANDY SILTY CLAY, SOME MICA TO HIGHLY MICACEOUS, MICA CONTENT INCREASE WITH DEPTH, MOIST

28+80

Ⓓ RESIDUAL, MEDIUM STIFF TO STIFF, TAN, SANDY SILTY CLAY, SOME MICA TO HIGHLY MICACEOUS, MICA CONTENT INCREASE WITH DEPTH, MOIST

28+60

Ⓓ RESIDUAL, MEDIUM STIFF TO STIFF, TAN, SANDY SILTY CLAY, SOME MICA TO HIGHLY MICACEOUS, MICA CONTENT INCREASE WITH DEPTH, MOIST

-L-

Ⓓ ROADWAY EMBANKMENT

100 95 90

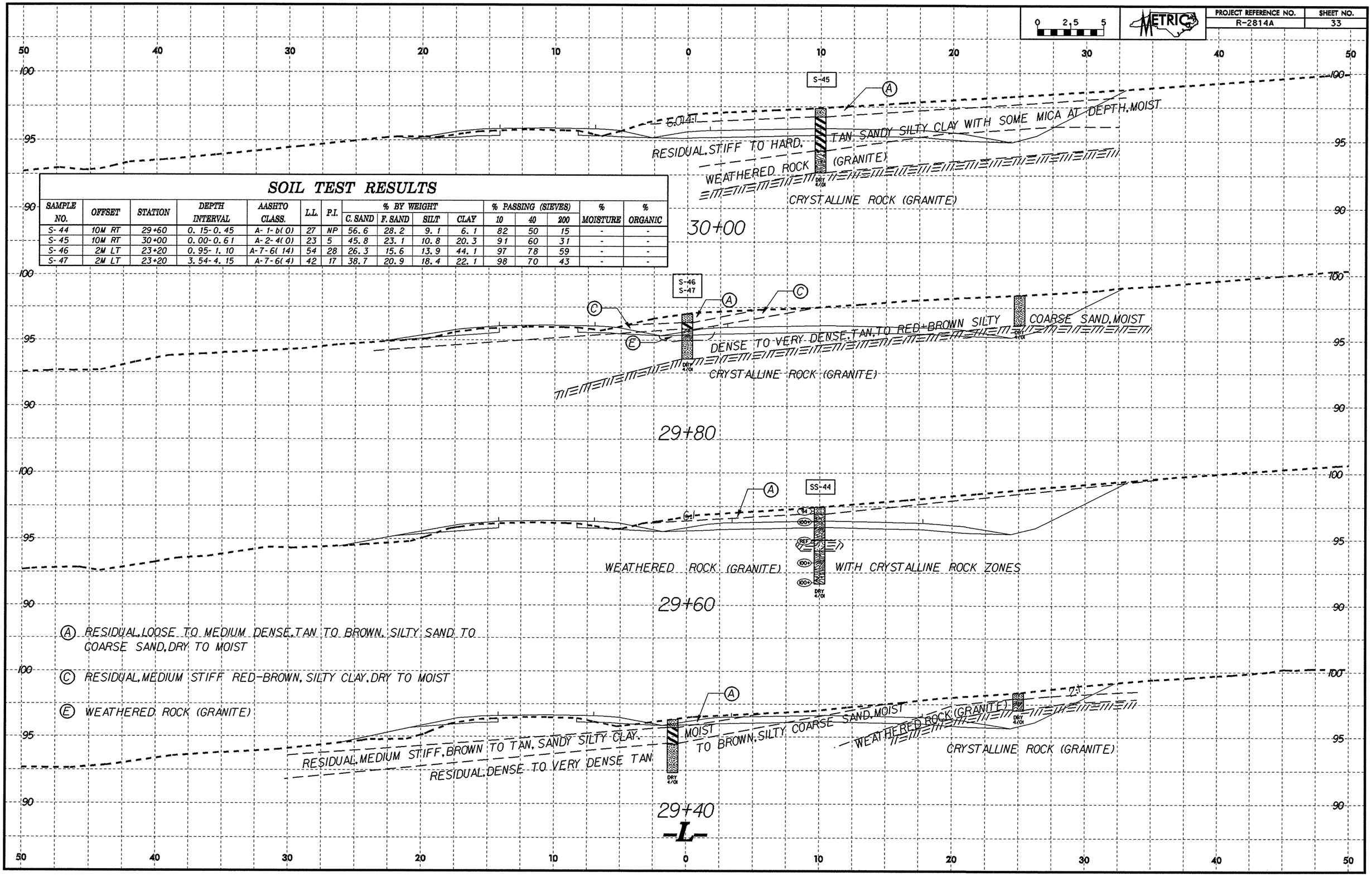
50 40 30 20 10 0 10 20 30 40 50

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	33

0 2.5 5

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	ORGANIC
S-44	10M RT	29+60	0.15-0.45	A-1-b(0)	27	NP	56.6	28.2	9.1	6.1	82	50	15	-	-
S-45	10M RT	30+00	0.00-0.61	A-2-4(0)	23	5	45.8	23.1	10.8	20.3	91	60	31	-	-
S-46	2M LT	23+20	0.95-1.10	A-7-6(14)	54	28	26.3	15.6	13.9	44.1	97	78	59	-	-
S-47	2M LT	23+20	3.54-4.15	A-7-6(4)	42	17	38.7	20.9	18.4	22.1	98	70	43	-	-



PROJECT REFERENCE NO.	SHEET NO.
R-2814A	34

0 2.5 5

50 40 30 20 10 0 10 20 30 40 50

100 95 90

SP#4

-Y5- Sta.10+20
El. = 94.74'
(See Sheet 242)

SP#3

-Y4- Sta.12+40
El. = 94.84'
(See Sheet 241)

RESIDUAL, MEDIUM DENSE, TAN TO RED-BROWN, COARSE SAND, MOIST

STIFF TO HARD, TAN, SANDY SILTY CLAY, MOIST

DENSE TO VERY DENSE, TAN TO RED-BROWN, SILTY COARSE SAND, MOIST

30+60

RESIDUAL, MEDIUM DENSE TO DENSE, TAN TO RED-BROWN, COARSE SAND, MOIST

DENSE, TAN TO RED-BROWN SILTY COARSE SAND, WITH SOME MICA, MOIST

DRY 4/01

Ⓑ RESIDUAL, MEDIUM STIFF, RED-BROWN TO GRAY, SANDY AND SILTY CLAY, MOIST

30+40

RESIDUAL, DENSE, TAN TO BROWN SILTY COARSE SAND, MOIST

WEATHERED ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

30+20

-L-

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	35

0 2.5 5

50 40 30 20 10 0 10 20 30 40 50

S-48
S-49

95 90

6:1 6:1 8.5+:1

RESIDUAL, MEDIUM STIFF, RED-BROWN, SANDY, SILTY CLAY, DRY TO MOIST

STIFF, TAN TO GRAY SANDY SILTY CLAY, MOIST

DRY 4.00'

31+20

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-48	10M RT	31+20	0.10-3.20	A-7-5(13)	58	28	28.7	16.0	17.2	38.1	97	77	56	-	-
S-49	10M RT	31+20	3.70-4.40	A-7-6(11)	41	13	42.3	19.5	16.1	22.1	90	60	37	-	-

100

Ⓐ RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO BROWN SILTY SAND TO COARSE, DRY TO MOIST

SP#5

-Y5- Sta. 10+20
El. = 94.400
(See Sheet 242)

Ⓐ

STIFF, TAN, SANDY SILTY CLAY, MOIST

31+00

-Y5- -Y4-

RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO RED-BROWN, COARSE SAND, MOIST

STIFF TO HARD, TAN, SANDY SILTY CLAY, MOIST

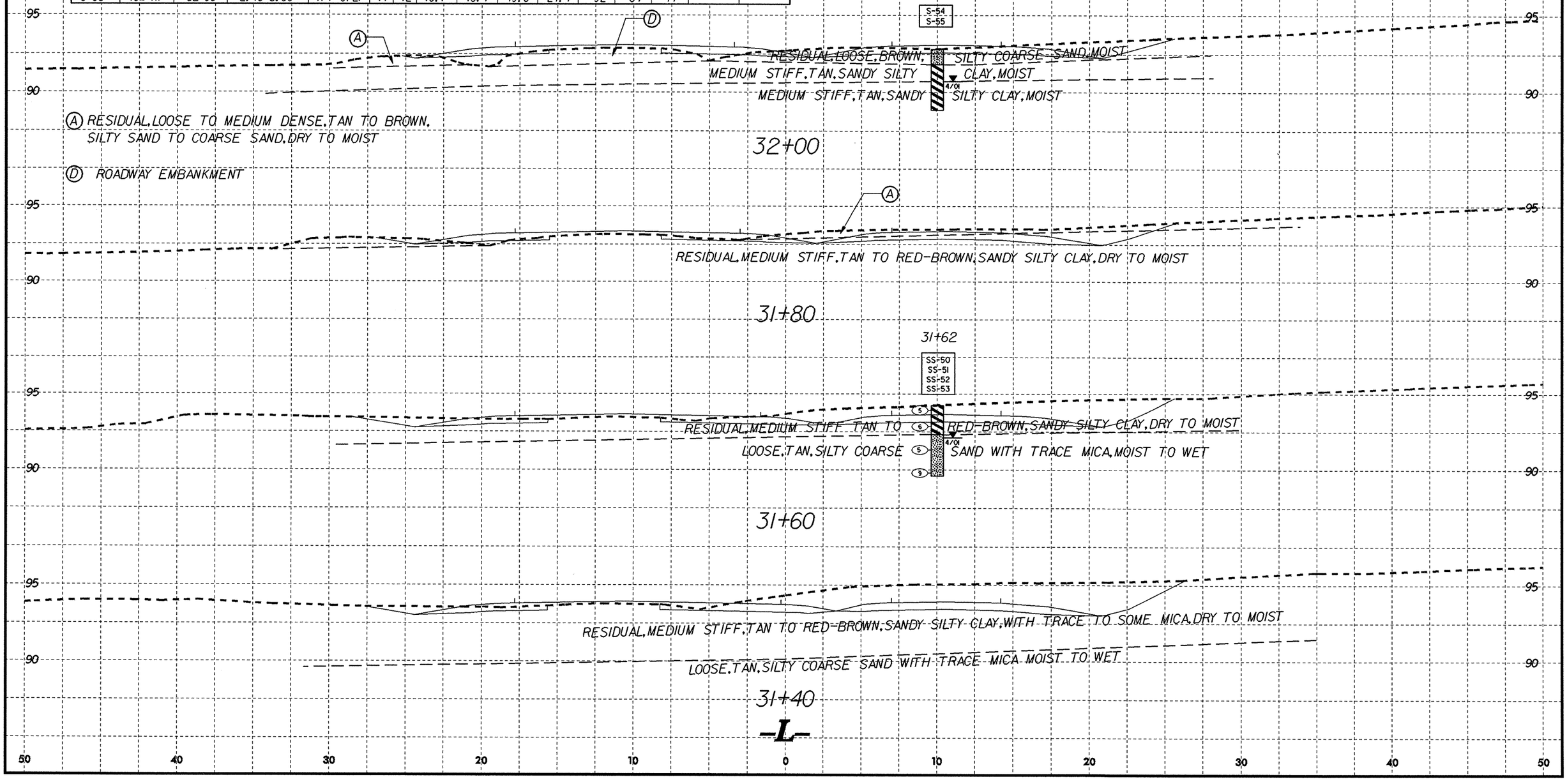
LOOSE TO MEDIUM DENSE, TAN TO RED-BROWN, COARSE SAND, MOIST

30+80

-L-

SOIL TEST RESULTS

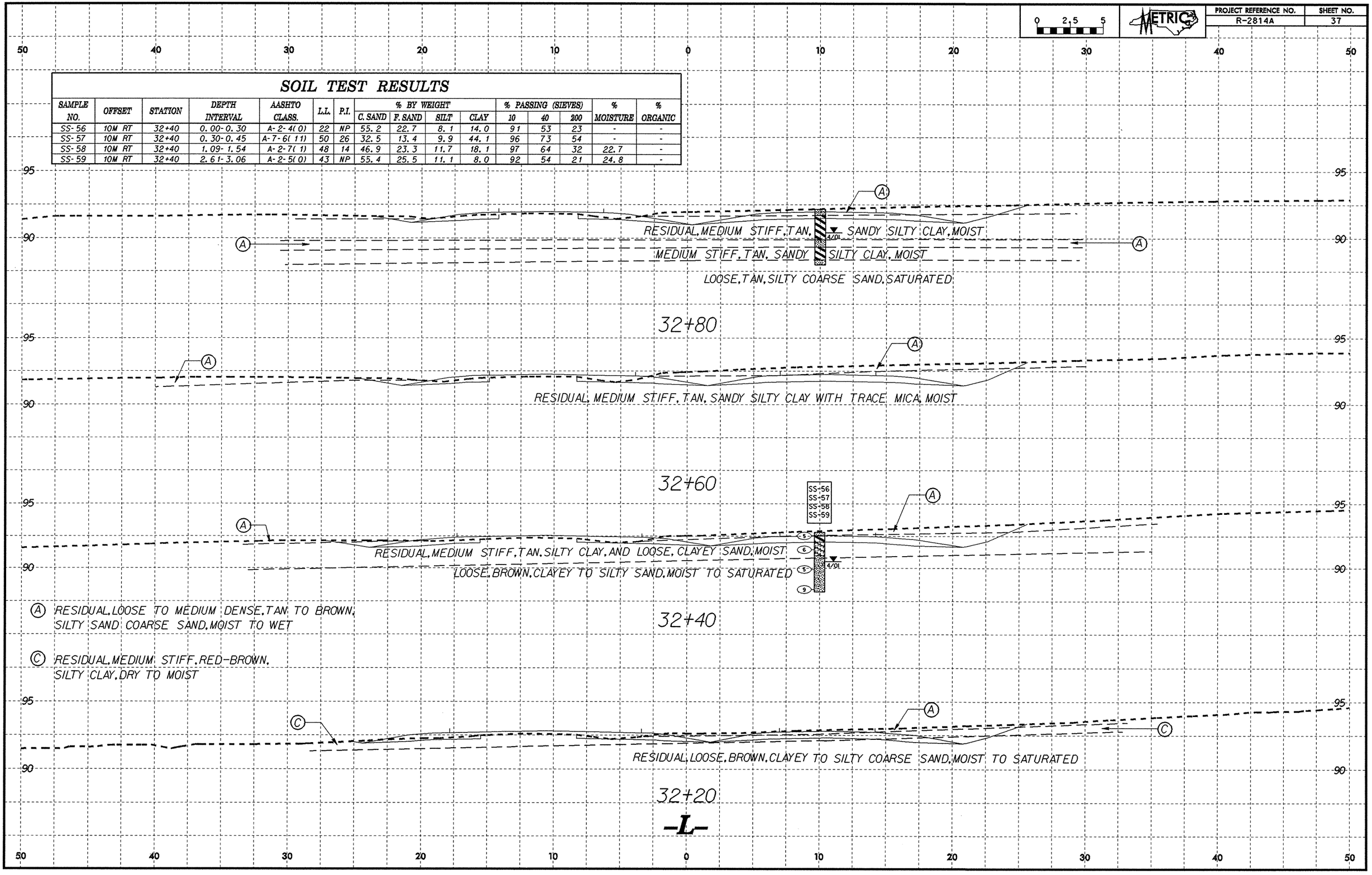
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	200	% MOISTURE	% ORGANIC
SS-50	10M RT	31+62	0.00-0.45	A-7-5(23)	64	32	18.3	15.4	16.1	50.2	100	87	70	-	-
SS-51	10M RT	31+62	1.13-1.58	A-7-5(2)	51	19	41.3	25.1	13.5	20.1	96	66	37	-	-
SS-52	10M RT	31+62	2.65-3.10	A-2-4(0)	36	NP	53.4	23.7	14.9	8.0	95	55	25	-	-
SS-53	10M RT	31+62	4.17-4.62	A-2-4(0)	39	NP	56.6	20.7	12.7	10.0	92	52	25	-	-
S-54	10M RT	32+00	0.10-0.90	A-2-4(0)	21	6	57.2	19.7	7.1	16.0	94	51	24	-	-
S-55	10M RT	32+00	2.40-3.60	A-7-6(2)	41	12	40.7	15.4	19.8	24.1	92	61	44	-	-



PROJECT REFERENCE NO.	SHEET NO.
R-2814A	37

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-56	10M RT	32+40	0.00-0.30	A-2-4(0)	22	NP	55.2	22.7	8.1	14.0	91	53	23	-	-
SS-57	10M RT	32+40	0.30-0.45	A-7-6(11)	50	26	32.5	13.4	9.9	44.1	96	73	54	-	-
SS-58	10M RT	32+40	1.09-1.54	A-2-7(1)	48	14	46.9	23.3	11.7	18.1	97	64	32	22.7	-
SS-59	10M RT	32+40	2.61-3.06	A-2-5(0)	43	NP	55.4	25.5	11.1	8.0	92	54	21	24.8	-



(A) RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO BROWN, SILTY SAND COARSE SAND, MOIST TO WET

(C) RESIDUAL, MEDIUM STIFF, RED-BROWN, SILTY CLAY, DRY TO MOIST

50 40 30 20 10 0 10 20 30 40 50

90
85

Ⓐ
RESIDUAL, MEDIUM STIFF, TAN, SANDY SILTY CLAY, MOIST
LOOSE, GRAY TO TAN, SILTY COARSE SAND WITH TRACE MICA, MOIST
4.0ft
33+60

Ⓐ
Ⓓ
Ⓗ
RESIDUAL, MEDIUM STIFF, TAN, SILTY SANDY CLAY, MOIST
LOOSE, GRAY TO TAN, SILTY COARSE SAND WITH TRACE MICA, MOIST
33+40

Ⓓ
Ⓐ
RESIDUAL, MEDIUM STIFF, TAN, SANDY SILTY CLAY, MOIST
LOOSE, TAN, SILTY COARSE SAND, WET
33+20

Ⓐ RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST

Ⓓ ROADWAY EMBANKMENT

Ⓗ RESIDUAL, LOOSE TO MEDIUM DENSE, TAN-BROWN, FINE TO COARSE SAND, DRY TO MOIST

Ⓐ
Ⓐ
RESIDUAL, MEDIUM STIFF, TAN, SANDY SILTY CLAY, MOIST
LOOSE, TAN, SILTY COARSE SAND, WET
33+00

-L-

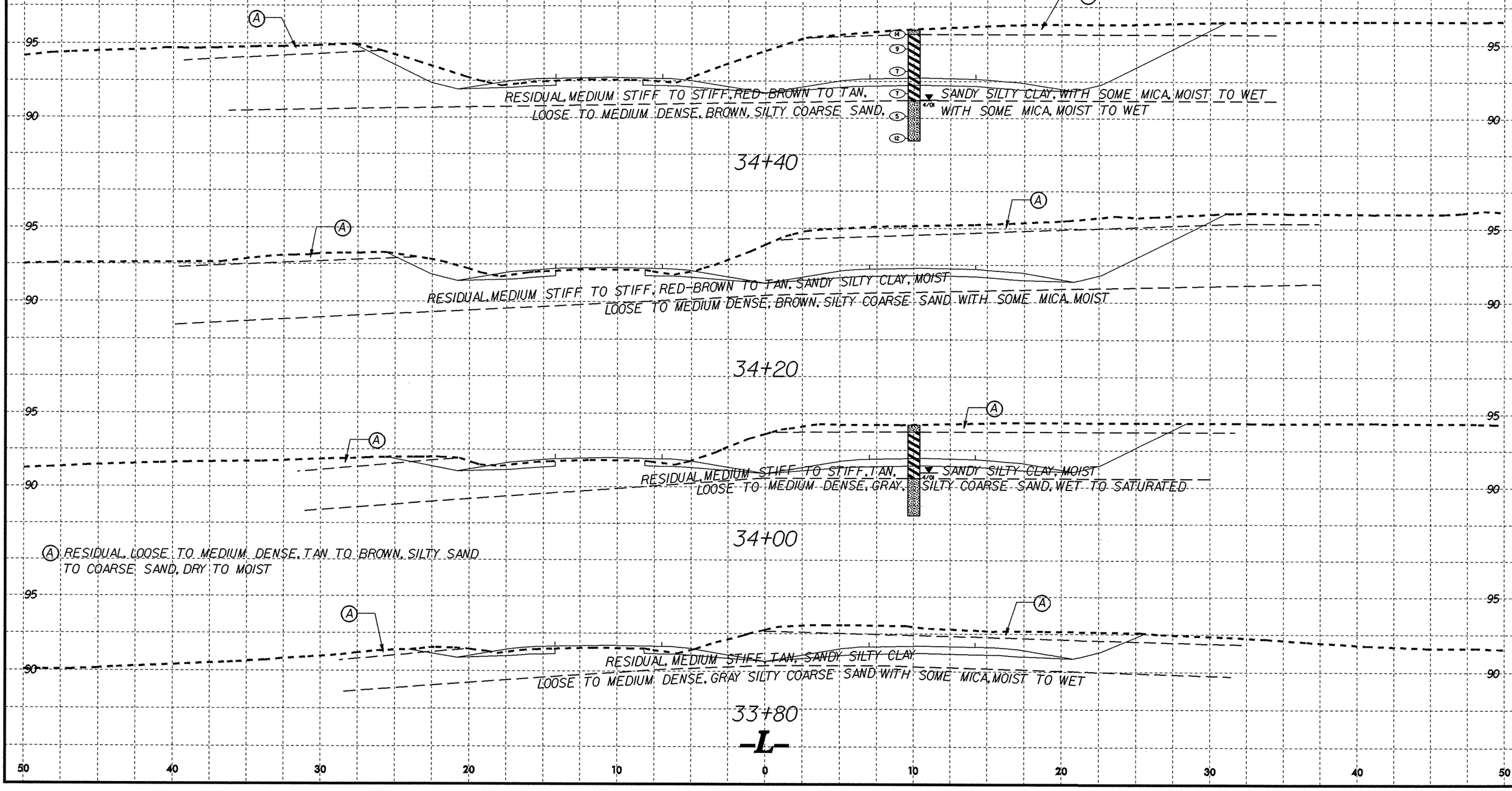
PROJECT REFERENCE NO.	SHEET NO.
R-2814A	39

0 2.5 5

METRIC

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	ORGANIC
SS-60	10M RT	34+40	0.30-0.45	A-7-6(12)	50	24	25.7	10.8	13.3	50.2	91	72	59	-	-
SS-61	10M RT	34+40	0.98-1.43	A-7-5(2)	45	13	37.1	20.3	18.6	24.1	89	64	41	-	-
SS-62	10M RT	34+40	7.06-7.51	A-2-5(0)	45	10	47.3	20.3	14.3	18.1	96	60	34	32	-



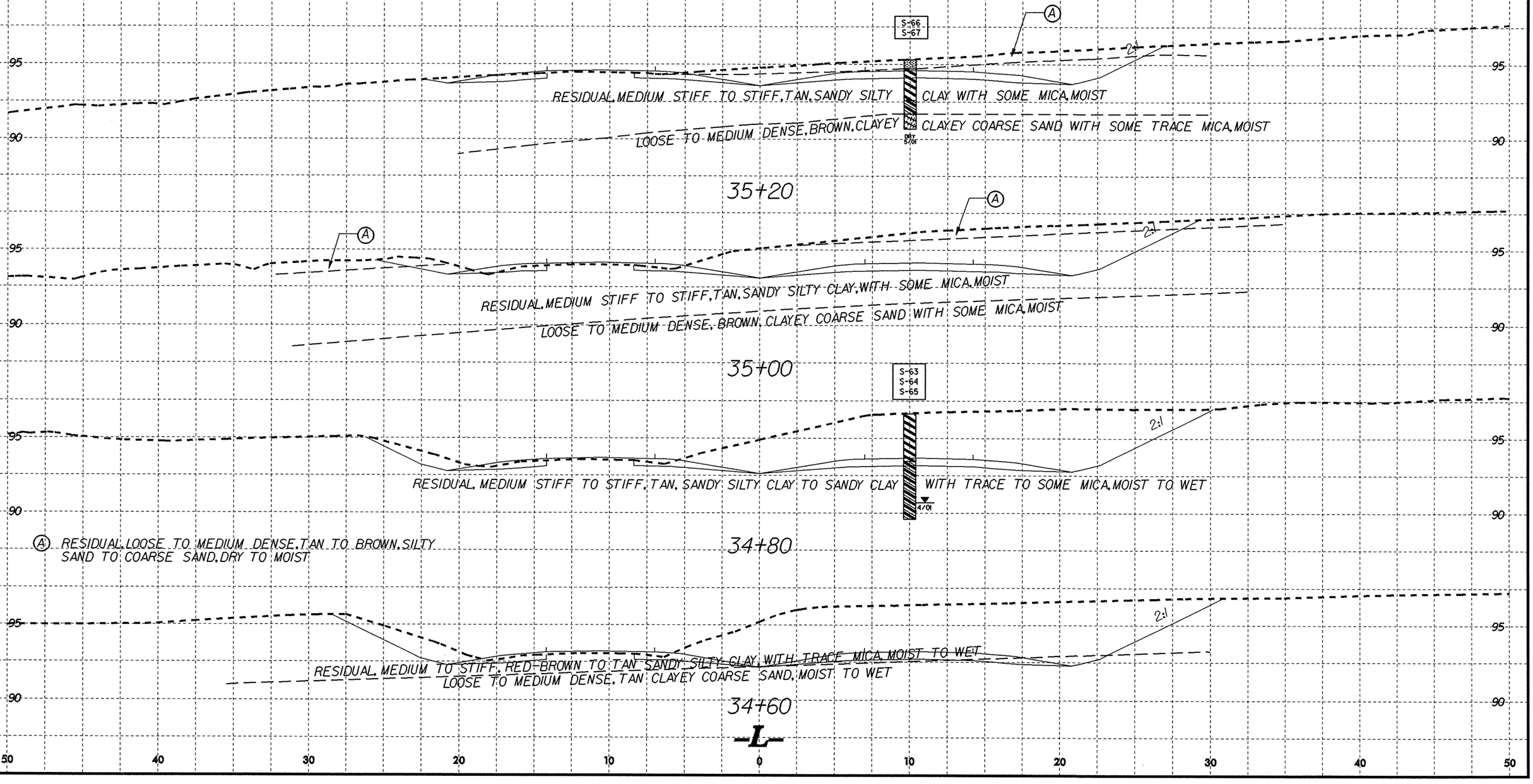
PROJECT REFERENCE NO.	SHEET NO.
R-2814A	40

0 2.5 5

METRIC

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-63	10M RT	34+80	0.30-2.00	A-7-6(9)	52	25	32.5	15.9	15.5	36.1	91	68	50	-	-
S-64	10M RT	34+80	4.00-4.50	A-6(1)	39	11	42.4	15.9	17.7	24.1	87	57	39	-	-
S-65	10M RT	34+80	5.20-6.00	A-6(1)	38	14	46.8	14.7	18.5	20.1	88	54	37	-	-
S-66	10M RT	35+20	0.70-2.00	A-7-6(3)	45	20	42.8	16.1	15.1	26.1	86	56	38	-	-
S-67	10M RT	35+20	3.80-4.50	A-2-6(0)	39	11	52.8	18.9	14.3	14.1	71	39	23	-	-



PROJECT REFERENCE NO.	SHEET NO.
R-2814A	41

0 2.5 5

METRIC

50 40 30 20 10 0 10 20 30 40 50

95
90

Ⓓ

RESIDUAL, MEDIUM STIFF, TAN, SANDY SILTY CLAY WITH TRACE MICA, MOIST TO WET

36+00

Ⓐ RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST

Ⓓ ROADWAY EMBANKMENT

95
90

Ⓓ

RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST

RESIDUAL, MEDIUM STIFF, TAN, SANDY SILTY CLAY WITH TRACE MICA, MOIST TO WET

35+80

95
90

Ⓐ

Ⓓ

RESIDUAL, MEDIUM STIFF, TAN, SANDY SILTY CLAY WITH TRACE MICA, MOIST TO WET

35+60

95
90

Ⓓ

Ⓐ

RESIDUAL, MEDIUM STIFF, TAN, SANDY, CLAY WITH TRACE MICA, MOIST TO WET

35+40

-L-

50 40 30 20 10 0 10 20 30 40 50

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	42

0 2.5 5

METRIC

50 40 30 20 10 0 10 20 30 40 50

100
95
90

Ⓒ

RESIDUAL, STIFF, RED-BROWN TO TAN, SANDY SILTY CLAY, WITH SOME MICA, MOIST

LOOSE TO MEDIUM DENSE, TAN, SILTY SAND WITH SOME, MOIST TO WET

36+80

RESIDUAL, MEDIUM STIFF TO STIFF, RED-BROWN TO TAN, SANDY SILTY CLAY WITH SOME MICA, MOIST

36+60

Ⓓ

RESIDUAL, MEDIUM STIFF TO STIFF, RED-BROWN TO TAN, SANDY SILTY CLAY WITH SOME MICA, MOIST

36+40

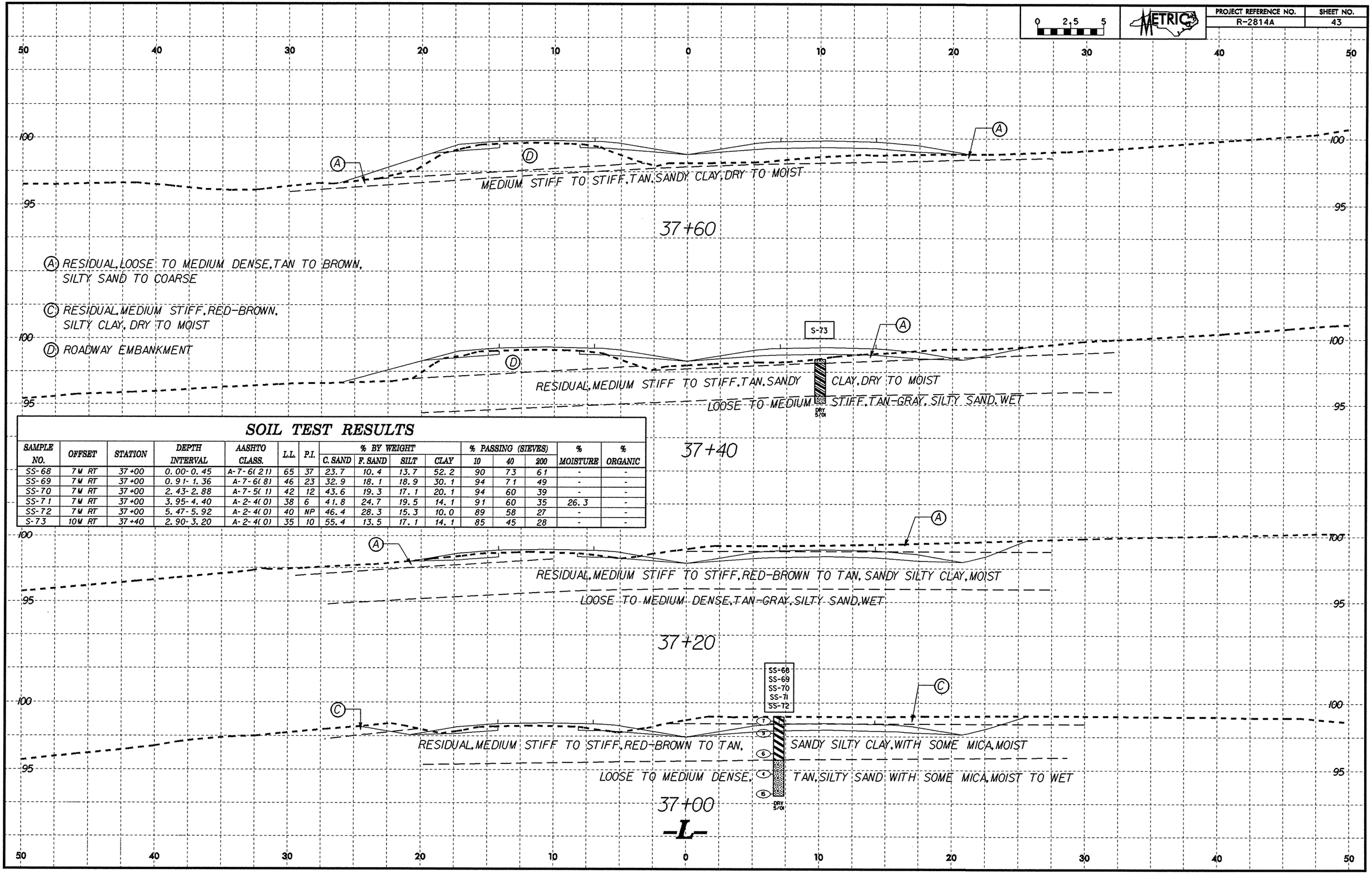
Ⓒ RESIDUAL, MEDIUM STIFF, RED-BROWN, SILTY CLAY, DRY TO MOIST

Ⓓ ROADWAY EMBANKMENT

RESIDUAL, MEDIUM STIFF TO STIFF, RED-BROWN TO TAN, SANDY SILTY CLAY WITH SOME MICA, MOIST

36+20

-L-



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-68	7M RT	37+00	0.00-0.45	A-7-6(21)	65	37	23.7	10.4	13.7	52.2	90	73	61	-	-
SS-69	7M RT	37+00	0.91-1.36	A-7-6(8)	46	23	32.9	18.1	18.9	30.1	94	71	49	-	-
SS-70	7M RT	37+00	2.43-2.88	A-7-5(1)	42	12	43.6	19.3	17.1	20.1	94	60	39	-	-
SS-71	7M RT	37+00	3.95-4.40	A-2-4(0)	38	6	41.8	24.7	19.5	14.1	91	60	35	26.3	-
SS-72	7M RT	37+00	5.47-5.92	A-2-4(0)	40	NP	46.4	28.3	15.3	10.0	89	58	27	-	-
S-73	10M RT	37+40	2.90-3.20	A-2-4(0)	35	10	55.4	13.5	17.1	14.1	85	45	28	-	-

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	44

0 2.5 5

METRIC

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	38		
SS-94	23M LT	42+40	0.00-0.38	A-2-4(0)	21	4	46.8	18.3	18.8	16.1	90	57	34	-	-
SS-95	23M LT	42+40	1.05-1.50	A-7-5(5)	52	20	41.5	20.8	15.5	22.2	100	66	42	-	-
SS-96	23M LT	42+40	2.57-3.02	A-2-4(0)	38	NP	55.4	23.8	16.7	4.0	87	47	27	-	-

50 40 30 20 10 0 10 20 30 40 50

42+40, 23 LT
109.40

SS-94
SS-95
SS-96

110
105

Ⓐ
Ⓑ

8
15
7
10
14

DRY
5/01

RESIDUAL, LOOSE TO MEDIUM DENSE, TAN, SILTY SAND WITH TRACE TO SOME MICA, DRY TO MOIST

42+40

RESIDUAL, MEDIUM STIFF TO STIFF, RED-BROWN TO TAN, SANDY SILTY AND SANDY CLAY, DRY TO MOIST

RESIDUAL, LOOSE TO MEDIUM DENSE, TAN, SILTY AND CLAYEY SAND, WITH SOME MICA, DRY

DRY
5/01

42+20

2m AHEAD

RESIDUAL, MEDIUM STIFF TO STIFF, RED-BROWN TO TAN, SANDY SILTY AND SANDY CLAY, DRY TO MOIST

SAND

DRY
5/01

42+00, 2 LT
108.10

LOOSE TO MEDIUM DENSE TAN, SILTY AND CLAYEY SAND WITH TRACE MICA, DRY TO MOIST

DRY
5/01

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-74	10M RT	41+80	0.10-0.40	A-1-b(0)	25	NP	54.3	26.6	11.0	8.0	76	45	17	-	-

42+00

41+80, 10 RT
107.80

S-74

DRY
5/01

Ⓐ RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST

Ⓑ RESIDUAL, MEDIUM STIFF, RED-BROWN TO GRAY, SANDY AND SILTY CLAY, MOIST

WEATHERED ROCK (GRANITE)

41+80

CRYSTALLINE ROCK (GRANITE)

RESIDUAL, LOOSE, BROWN, SILTY SAND, DRY

WEATHERED ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

41+60

-L-

100
105
110

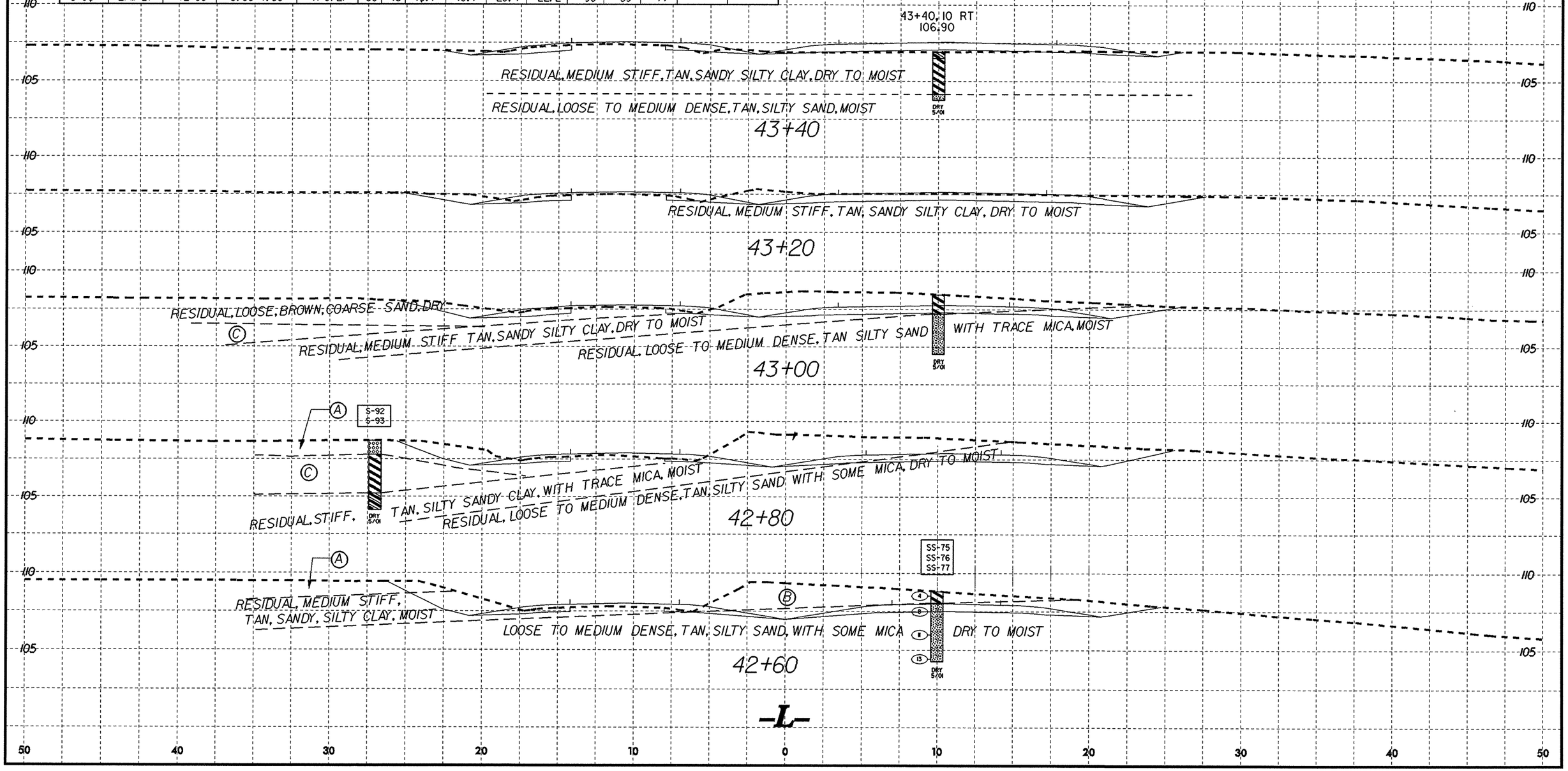
SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C. SAND	F. SAND	SILT	CLAY	% PASSING (SIEVES) 10	40	38	% MOISTURE	% ORGANIC
SS-75	10M RT	42+60	0.50-0.45	A-7-6(11)	49	25	29.7	14.3	13.9	42.2	94	73	55	-	-
SS-76	10M RT	42+60	1.04-1.49	A-2-5(0)	41	9	44.7	21.6	13.4	20.2	91	60	35	-	-
SS-77	10M RT	42+60	4.08-4.53	A-2-4(0)	36	NP	50.6	29.1	12.2	8.1	99	60	26	-	-
S-92	27M LT	42+80	1.00-3.20	A-7-6(17)	62	36	31.3	11.7	18.8	38.3	91	67	56	-	-
S-93	27M LT	42+80	3.60-4.50	A-6(2)	38	13	40.7	16.7	20.4	22.2	90	59	41	-	-

(A) RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST

(B) RESIDUAL, MEDIUM STIFF, TAN SANDY AND SILTY CLAY, MOIST

(C) RESIDUAL, MEDIUM STIFF, TAN, SILTY CLAY, DRY TO MOIST

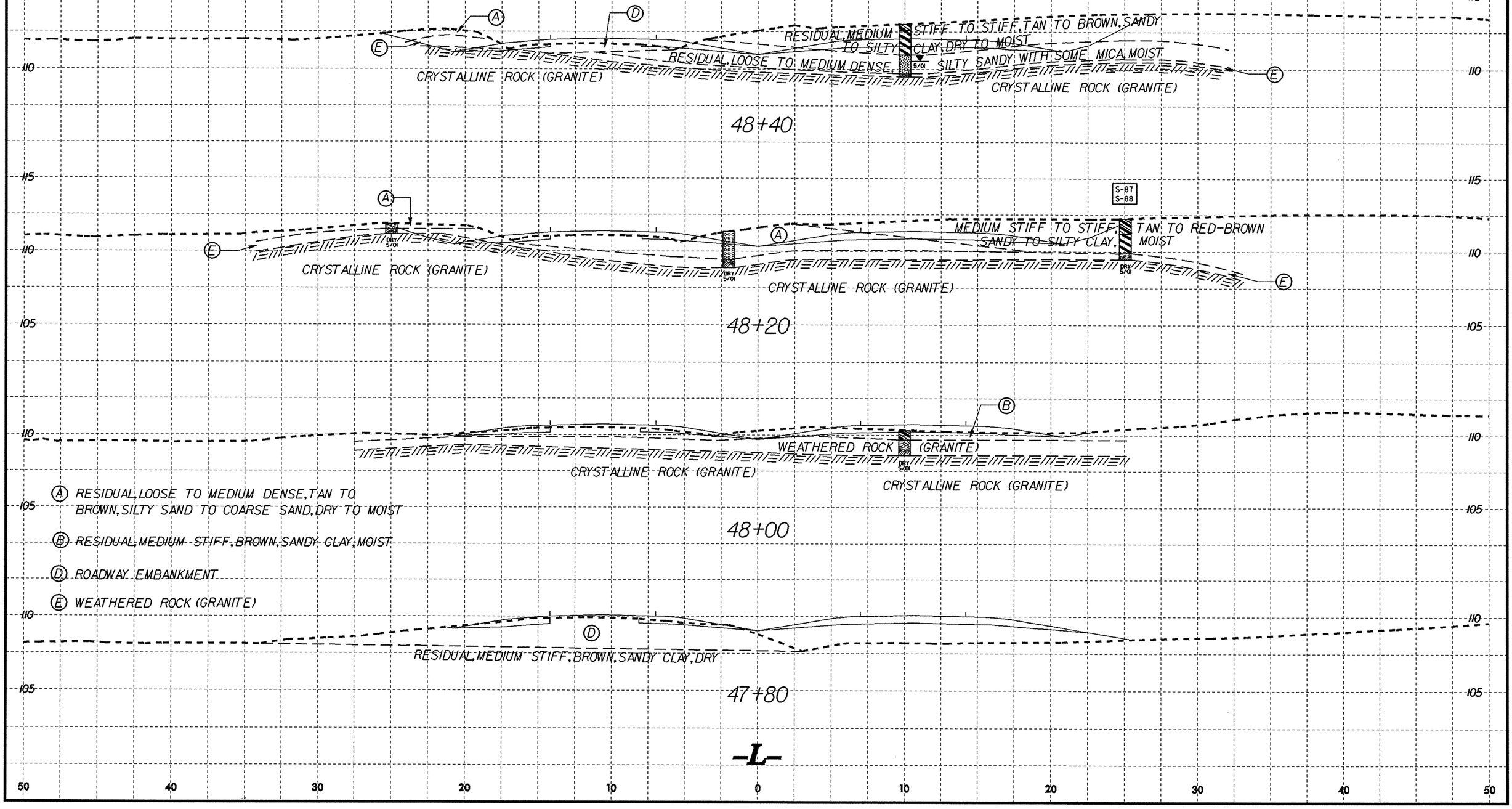


0 2.5 5

METRIC

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	ORGANIC
S-87	25M RT	48+20	0.00-0.90	A-6(2)	36	14	39.5	17.7	18.5	24.2	89	62	39	-	-
S-88	25M RT	48+20	1.60-2.20	A-7-6(7)	44	21	32.1	18.1	19.6	30.2	94	70	51	-	-



(A) RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST

(B) RESIDUAL, MEDIUM STIFF, BROWN, SANDY CLAY, MOIST

(D) ROADWAY EMBANKMENT

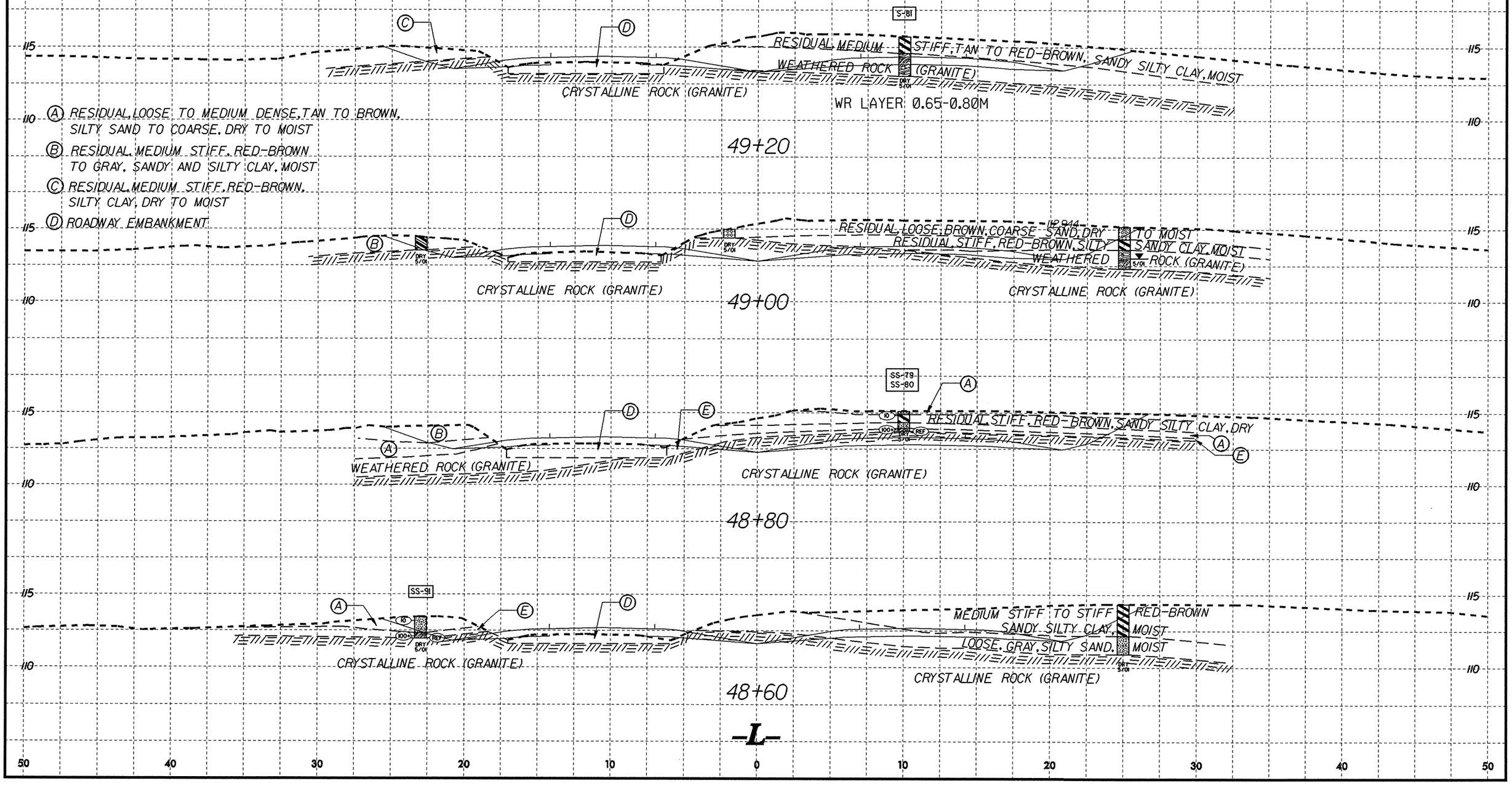
(E) WEATHERED ROCK (GRANITE)

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	47

0 2.5 5

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	ORGANIC
SS-79	10M RT	48+80	0.17-0.45	A-7-6(5)	42	16	33.0	21.2	9.4	36.4	97	74	48	-	-
SS-80	10M RT	48+80	0.87-1.17	A-2-4(0)	32	NP	51.6	26.1	8.2	14.2	93	59	24	-	-
S-81	10M RT	49+20	0.30-0.50	A-7-6(12)	51	26	26.9	19.6	15.1	38.4	97	77	56	-	-
SS-91	23M LT	48+60	0.00-0.45	A-1-b(0)	22	NP	58.5	21.8	11.7	8.1	80	43	18	-	-

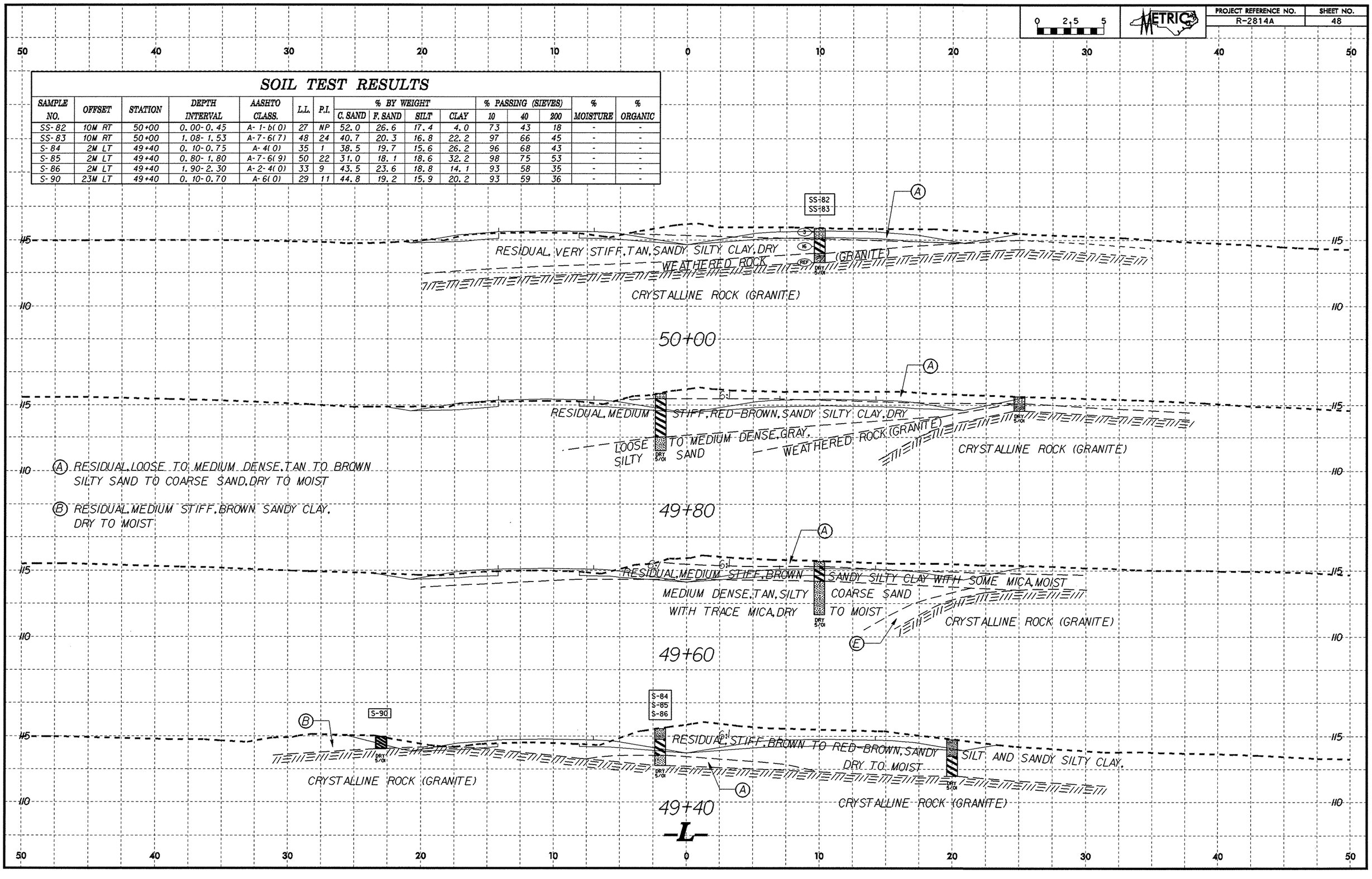


PROJECT REFERENCE NO.	SHEET NO.
R-2814A	48

0 2.5 5

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-82	10M RT	50+00	0.00-0.45	A-1-b(0)	27	NP	52.0	26.6	17.4	4.0	73	43	18	-	-
SS-83	10M RT	50+00	1.08-1.53	A-7-6(7)	48	24	40.7	20.3	16.8	22.2	97	66	45	-	-
S-84	2M LT	49+40	0.10-0.75	A-4(0)	35	1	38.5	19.7	15.6	26.2	96	68	43	-	-
S-85	2M LT	49+40	0.80-1.80	A-7-6(9)	50	22	31.0	18.1	18.6	32.2	98	75	53	-	-
S-86	2M LT	49+40	1.90-2.30	A-2-4(0)	33	9	43.5	23.6	18.8	14.1	93	58	35	-	-
S-90	23M LT	49+40	0.10-0.70	A-6(0)	29	11	44.8	19.2	15.9	20.2	93	59	36	-	-



PROJECT REFERENCE NO.	SHEET NO.
R-2814A	49

0 2.5 5

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-89	2M RT	50+40	1.40- 1.70	A-7-6(24)	62	34	22.6	13.9	15.1	48.4	100	83	69	-	-

50 40 30 20 10 0 10 20 30 40 50

115 RESIDUAL, LOOSE TO MEDIUM DENSE, BROWN, COARSE SAND, DRY TO MOIST
WEATHERED ROCK (GRANITE)
110 CRYSTALLINE ROCK (GRANITE)
50+80

115 RESIDUAL, LOOSE TO MEDIUM DENSE, TAN TO BROWN, SILTY SAND TO COARSE SAND, DRY TO MOIST
WEATHERED ROCK (GRANITE)
110 CRYSTALLINE ROCK (GRANITE)
50+60

Ⓐ RESIDUAL, LOOSE BROWN, COARSE SAND, DRY
Ⓔ WEATHERED ROCK (GRANITE)

S-89
115 RESIDUAL, MEDIUM STIFF, RED-BROWN, SANDY SILTY CLAY, MOIST
DRY 5/01
Ⓔ Ⓔ
110 CRYSTALLINE ROCK (GRANITE)
WR LAYER AT 1.19-1.29M
50+40

50+20, 25 RT
Ⓐ
115 DRY 5/01 DRY 5/01
Ⓔ Ⓔ
110 CRYSTALLINE ROCK (GRANITE)
50+20

-L-

50 40 30 20 10 0 10 20 30 40 50

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	50

0 2.5 5

50 40 30 20 10 0 10 20 30 40 50

115
110

Ⓓ

RESIDUAL, LOOSE, TAN COARSE SAND, DRY

WEATHERED ROCK (GRANITE)

51+60

Ⓐ

Ⓓ

WEATHERED ROCK (GRANITE)

51+40

Ⓐ RESIDUAL, LOOSE, TAN, COARSE SAND, DRY

Ⓑ ROADWAY EMBANKMENT

Ⓐ

Ⓓ

Ⓐ

WEATHERED ROCK (GRANITE)

CRYSTALLINE ROCK (GRANITE)

51+20

Ⓐ

Ⓓ

Ⓐ

WEATHERED ROCK (GRANITE)

WEATHERED ROCK

CRYSTALLINE ROCK (GRANITE)

51+00

-L-

50 40 30 20 10 0 10 20 30 40 50

PROJECT: C202228

ID: R-2814A

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

STRUCTURE SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34506.1.1 F.A. PROJ. STP-401(4)

COUNTY Wake

PROJECT DESCRIPTION US 401 from SR 2044 (Ligon Mill Rd.) to South of SR 2226 (Jonesville Rd.)

SITE DESCRIPTION Noise Wall Investigation

METRIC

ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2814A	1	8

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34506.1.1	STP-401(4)	P.E.
34506.2.5	STP-401(144)	R/W & UTIL
34506.3.4	STP-401(157)	CONST.

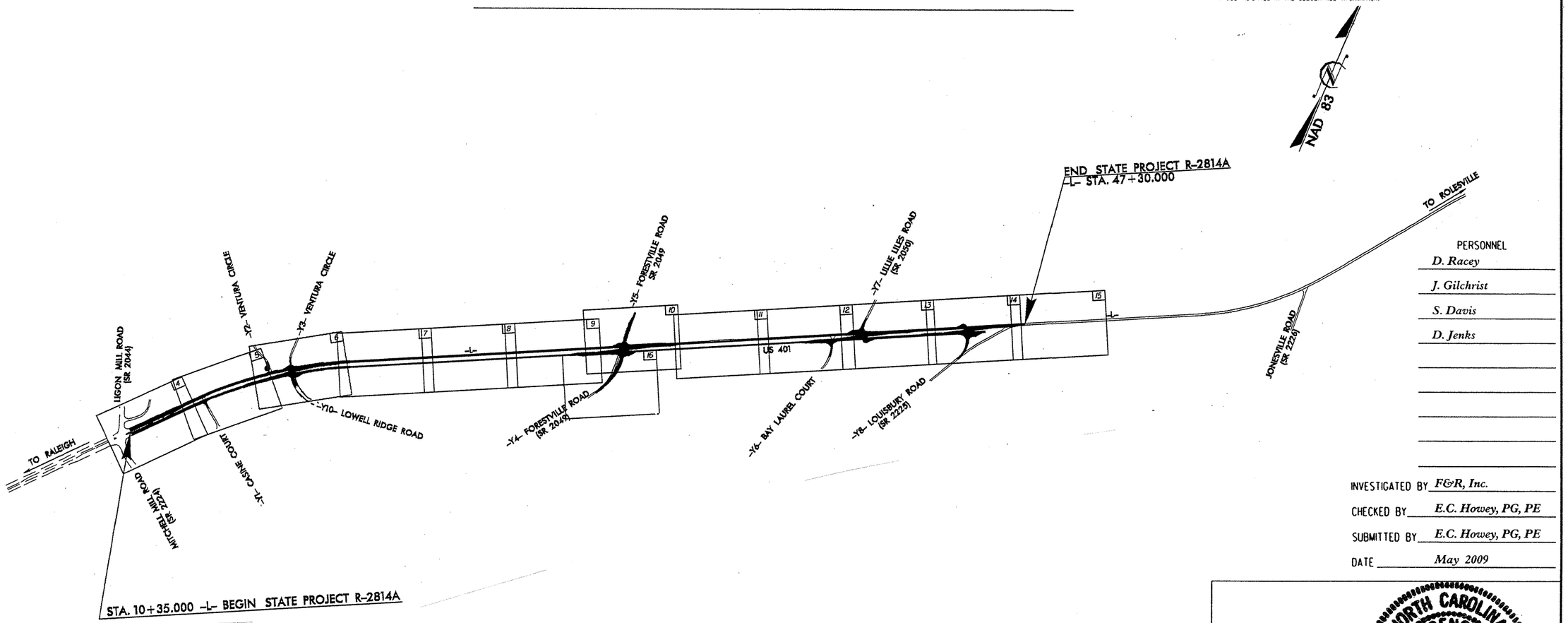
CONTENTS

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) 250-4088. 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

S. Davis

D. Jenks

INVESTIGATED BY F&R, Inc.

CHECKED BY E.C. Howey, PG, PE

SUBMITTED BY E.C. Howey, PG, PE

DATE May 2009

NORTH CAROLINA LICENSED SEAL 671 GEOLOGIST ELIZABETH C. HOWEY 5/20/09

Elizabeth C. Howey

DRAWN BY: D. Racey

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NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
GEOTECHNICAL ENGINEERING UNIT

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	2

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 30 CM 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 11 MN	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 (kN/m^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	<25 25 TO 50 50 TO 100 100 TO 200 200 TO 400 >400

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
- SOUNDING ROD
- SPT CPT DPT DMT VST PMT — TEST BORING
- AUGER BORING
- CORE BORING
- MW — MONITORING WELL
- PIEZOMETER INSTALLATION
- SLOPE INDICATOR INSTALLATION
- SPT N-VALUE
- REF — SPT REFUSAL

SAMPLE DESIGNATIONS

S - BULK SAMPLE
SS - SPLIT SPOON SAMPLE
ST - SHELBY TUBE SAMPLE
RS - ROCK SAMPLE
RT - RECOMPACTED TRIAXIAL SAMPLE
CBR - CALIFORNIA BEARING RATIO SAMPLE

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

EQUIPMENT USED ON SUBJECT PROJECT

DRILL UNITS:
- [ ] MOBILE B-___
- [ ] BK-51
- [ ] CME-45C
- [X] CME-750
- [ ] PORTABLE HOIST
- [ ] _____
- [ ] _____

ADVANCING TOOLS:
- [ ] CLAY BITS
- [ ] 152mm CONTINUOUS FLIGHT AUGER
- [X] 57mm ID HOLLOW AUGERS
- [ ] HARD FACED FINGER BITS
- [ ] TUNG.-CARBIDE INSERTS
- [X] CASING [ ] W/ ADVANCER
- [ ] TRICONE _____mm STEEL TEETH
- [ ] TRICONE _____mm TUNG.-CARB.
- [X] CORE BIT
- [ ] _____

HAMMER TYPE:
- [X] AUTOMATIC [ ] MANUAL

CORE SIZE:
- [ ] -B_____
- [X] -N 03
- [ ] -H_____

HAND TOOLS:
- [ ] POST HOLE DIGGER
- [ ] HAND AUGER
- [ ] 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 3 CM 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 30 CM 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 BLOWS PER 30 CM*
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 BLOWS PER 30 CM*
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 6 MM 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 13 MM DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 25 MM 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 25 MM OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.

FRACTURE SPACING

TERM	SPACING
VERY WIDE	MORE THAN 3 M
WIDE	3 TO 10 M
MODERATELY CLOSE	30 TO 100 CM
CLOSE	5 TO 30 CM
VERY CLOSE	LESS THAN 5 CM

BEDDING

TERM	THICKNESS
VERY THICKLY BEDDED	> 1 M
THICKLY BEDDED	0.5 - 1 M
THINLY BEDDED	0.05 - 0.5 M
VERY THINLY BEDDED	10 - 50 MM
THICKLY LAMINATED	2.5 - 10 MM
THINLY LAMINATED	< 2.5 MM

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 10 CM 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) OF A 63.5 KG HAMMER FALLING 0.76 M REQUIRED TO PRODUCE A PENETRATION OF 30 CM INTO SOIL WITH A 5 CM OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 3 CM 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 10 CM DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE.

TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.

BENCH MARK: 1: -BL7-: -BL- Sta. 13+68.727 CL, N: 237,643.018 E: 653,050.078
2: -BL8-: -BL- Sta. 15+48.036 CL, N: 237,724.417 E: 653,209.847
ELEVATION: 1: 79.485m; 2: 89.659m

NOTES:

PROJECT REFERENCE NO.	SHEET NO.
R-2814A	3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST.REV.

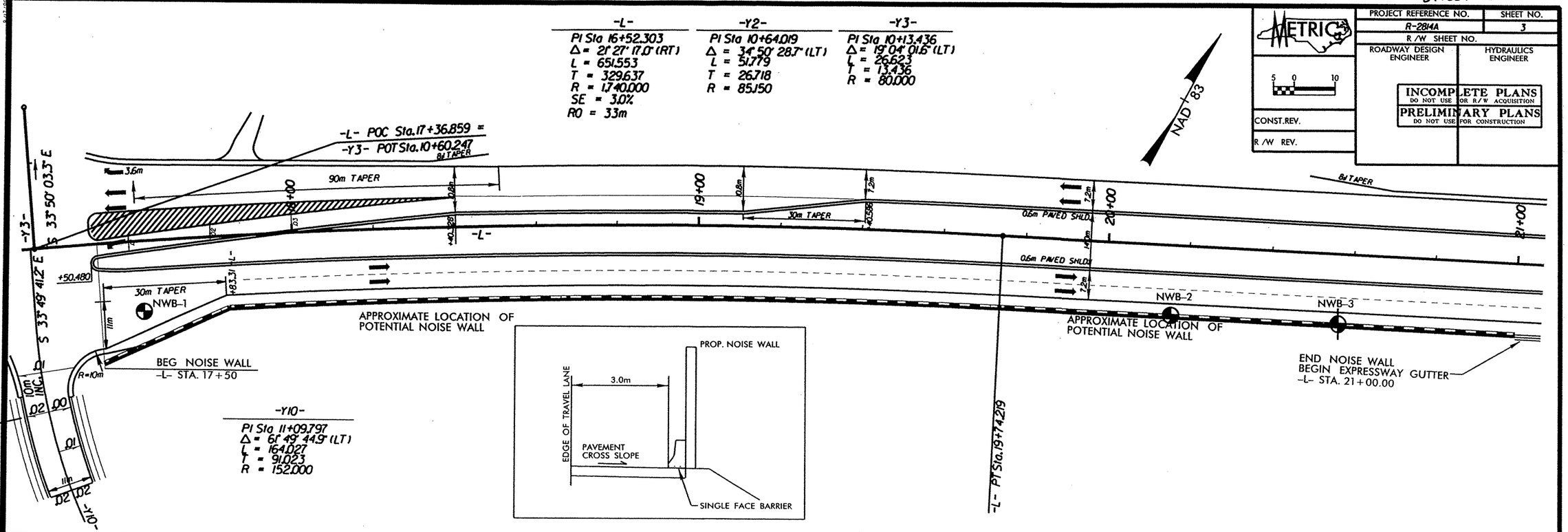
R/W REV.

NAD 83

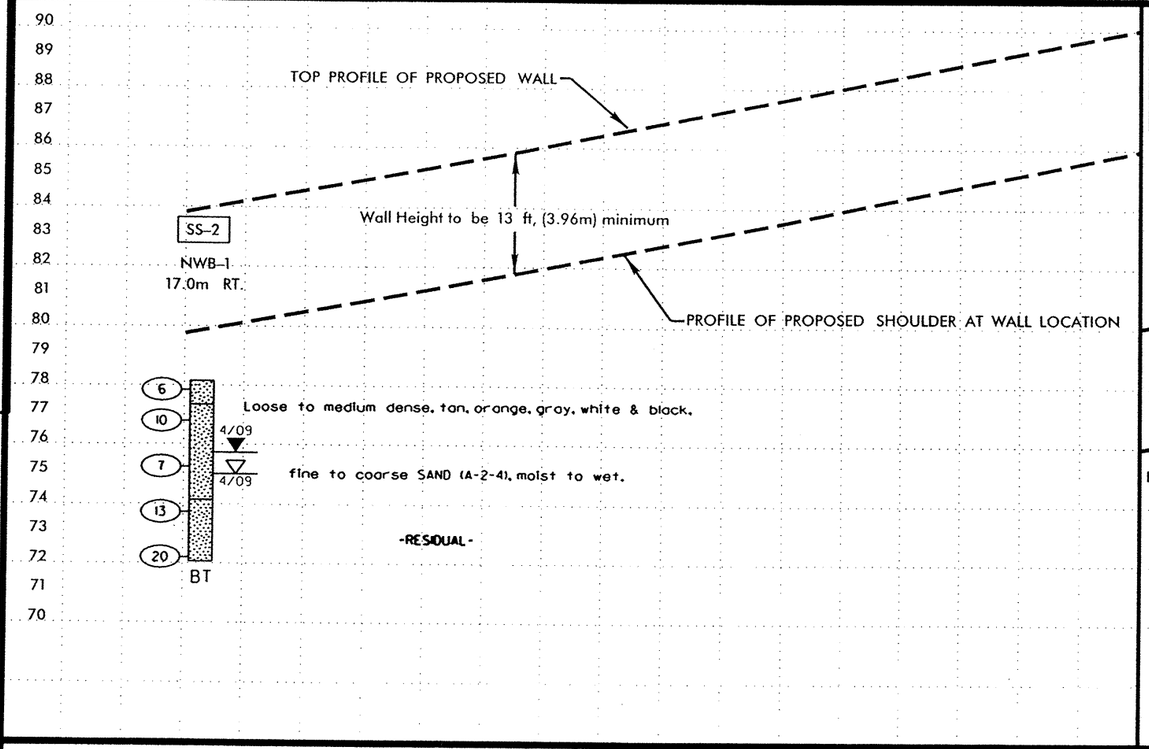
-L-
PI Sta 16+52.303
Δ = 21° 27' 17.0" (RT)
L = 651.553
T = 329.637
R = 1,740.000
SE = 3.0%
RO = 33m

-Y2-
PI Sta 10+64.019
Δ = 34° 50' 28.7" (LT)
L = 51.779
T = 26.718
R = 85.150

-Y3-
PI Sta 10+13.436
Δ = 19° 04' 01.6" (LT)
L = 26.623
T = 13.436
R = 80.000

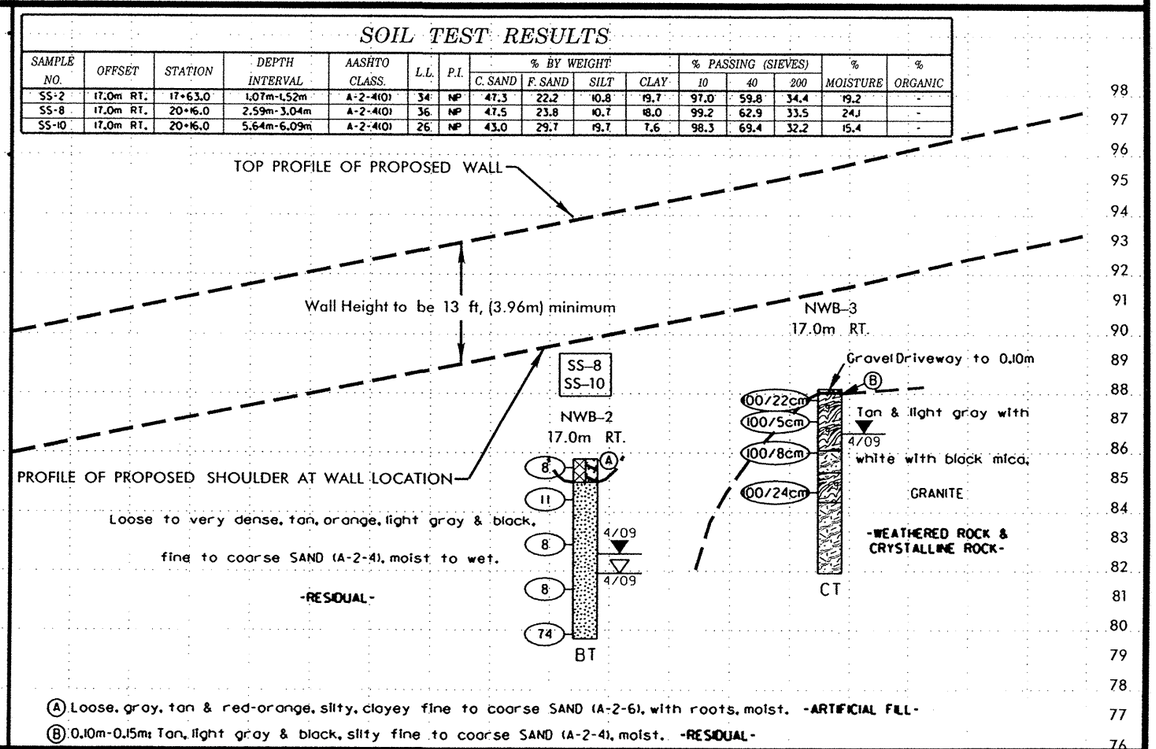


-Y10-
PI Sta 11+09.797
Δ = 61° 49' 44.9" (LT)
L = 164.027
T = 91.023
R = 152.000



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-2	17.0m RT.	17+63.0	1.07m-1.52m	A-2-4(0)	34	NP	47.3	22.2	10.8	19.7	97.0	59.8	34.4	19.2	-
SS-8	17.0m RT.	20+16.0	2.59m-3.04m	A-2-4(0)	36	NP	47.5	23.8	10.7	18.0	99.2	62.9	33.5	24.1	-
SS-10	17.0m RT.	20+16.0	5.64m-6.09m	A-2-4(0)	26	NP	43.0	29.7	19.7	7.6	98.3	69.4	32.2	15.4	-



Ⓐ Loose, gray, tan & red-orange, silty, clayey fine to coarse SAND (A-2-6), with roots, moist. -ARTIFICIAL FILL-

Ⓑ 0.10m-0.15m: Tan, light gray & black, silty fine to coarse SAND (A-2-4), moist. -RESIDUAL-

90 89 88 87 86 85 84 83 82 81 80 79 78 77 76 75 74 73 72 71 70

98 97 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 80 79 78 77 76

+60 +80 18 +20 +40 +60 +80 19 +20 +40 +60 +80 20 +20 +40 +60 +80 21

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

SHEET

PROJECT NO. 34506.1.1	**ID.** R-2814A	**COUNTY** Wake	**GEOLOGIST** D. Racey
SITE DESCRIPTION Proposed Noise Wall-US 401 from SR 2044 (Ligon Mill Rd.) to S. of SR 2226 (Jonesville Rd.)			**GROUND WTR (m)**
BORING NO. NWB-1	**STATION** 17+63.0	**OFFSET** 17.0m RT	**ALIGNMENT** -L-	**0 HR.** 3.14
COLLAR ELEV. 78.15 m	**TOTAL DEPTH** 6.09 m	**NORTHING** 237,569.2	**EASTING** 652,973.8	**24 HR.** 2.41
DRILL MACHINE CME 550	**DRILL METHOD** 57mm ID HSA		**HAMMER TYPE** Automatic	
START DATE 04/21/09	**COMP. DATE** 04/21/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** N/A	

ELEV (m)	DRIVE ELEV (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (m)	DEPTH (m)
79											
78	78.15	0.00	1	3	3	6		M		78.15 GROUND SURFACE	0.00
										RESIDUAL Loose, tan-brown, silty fine to coarse SAND (A-2-4), with roots, trace clay.	
77	77.08	1.07								77.35	0.80
			4	5	5	10	SS-2	19%		Loose to medium dense, tan, orange, gray, white & black, fine to coarse SAND (A-2-4(0)), with mica, little clay & silt, saprolitic.	
76											
	75.56	2.59									
75			3	3	4	7		W			
74	74.04	4.11								74.15	4.00
			5	6	7	13				Medium dense, gray, tan, white & black, fine to coarse SAND (A-2-4), with mica, trace clay, little silt, saprolitic.	
73								W			
	72.51	5.64									
72			8	10	10	20		W		72.06	6.09
										Boring Terminated at Elevation 72.06 m in RESIDUAL (SAND)	
71											
70											
69											
68											
67											
66											
65											
64											
63											
62											
61											
60											
59											

NCDOT BORE SINGLE 66I-0063.GPJ NC_DOT.GDT 5/8/09

SHEET 4 OF 8

NCDOT GEOTECHNICAL ENGINEERING UNIT
BOREHOLE REPORT

PROJECT NO. 34506.1.1	**ID.** R-2814A	**COUNTY** Wake	**GEOLOGIST** D. Racey
SITE DESCRIPTION Proposed Noise Wall-US 401 from SR 2044 (Ligon Mill Rd.) to S. of SR 2226 (Jonesville Rd.)			**GROUND WTR (m)**
BORING NO. NWB-2	**STATION** 20+16.0	**OFFSET** 17.0m RT	**ALIGNMENT** -L-	**0 HR.** 3.87
COLLAR ELEV. 85.80 m	**TOTAL DEPTH** 6.09 m	**NORTHING** 237,690.3	**EASTING** 653,193.4	**24 HR.** 3.20
DRILL MACHINE CME 550	**DRILL METHOD** 57mm ID HSA		**HAMMER TYPE** Automatic	
START DATE 04/21/09	**COMP. DATE** 04/21/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** N/A	

ELEV (m)	DRIVE ELEV (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (m)	DEPTH (m)
86											
	85.80	0.00	2	4	4	8		M		85.80 GROUND SURFACE	0.00
85										**ARTIFICIAL FILL** Loose, gray, tan & red-orange, silty clayey fine to coarse SAND (A-2-6), with roots, trace organics.	
	84.73	1.07								85.00	0.80
84			4	6	5	11		M		**RESIDUAL** Loose to very dense, tan, orange, light gray & black, fine to coarse SAND (A-2-4(0)), with mica, little silt, trace to little clay, saprolitic.	
	83.21	2.59									
83			4	4	4	8	SS-8	24%			
82											
	81.69	4.11									
81			3	4	4	8		W			
	80.16	5.64									
80			3	7	67	74	SS-10	15%		79.71	6.09
79										Boring Terminated at Elevation 79.71 m in RESIDUAL (SAND)	
78											
77											
76											
75											
74											
73											
72											
71											
70											
69											
68											
67											
66											

NCDOT BORE SINGLE 66I-0063.GPJ NC_DOT.GDT 5/8/09

NCDOT GEOTECHNICAL ENGINEERING UNIT
BORELOG REPORT

PROJECT NO. 34506.1.1	**ID.** R-2814A	**COUNTY** Wake	**GEOLOGIST** D. Racey
SITE DESCRIPTION Proposed Noise Wall-US 401 from SR 2044 (Ligon Mill Rd.) to S. of SR 2226 (Jonesville Rd.)			**GROUND WTR (m)**
BORING NO. NWB-3	**STATION** 20+56.7	**OFFSET** 17.0m RT	**ALIGNMENT** -L-	0 HR. Dry
COLLAR ELEV. 88.16 m	**TOTAL DEPTH** 6.22 m	**NORTHING** 237,708.2	**EASTING** 653,230.0	24 HR. 1.52
DRILL MACHINE CME 550	**DRILL METHOD** 57mm ID HSA/NQ-3 Core		**HAMMER TYPE** Automatic	
START DATE 04/21/09	**COMP. DATE** 04/21/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 2.2 m	

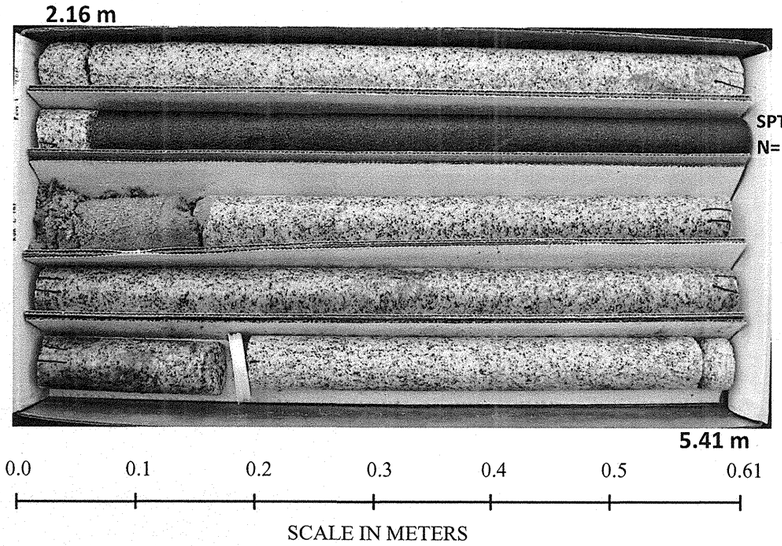
ELEV (m)	DRIVE ELEV (m)	DEPTH (m)	BLOW COUNT 15cm	15cm	15cm	BLOWS PER 30 CM 0 25 50 75 100	SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION ELEV. (m)	DEPTH (m)
89											
88	88.16	0.00	6	5	95/7cm	100/22cm		M		88.16 GROUND SURFACE	0.00
										88.06	0.10
										88.01 ARTIFICIAL FILL: Gravel driveway	0.15
87	87.09	1.07	100/5cm			100/5cm		D		RESIDUAL: Tan, tan-orange, light gray & black, silty fine to coarse SAND (A-2-4), with mica, trace to little clay, saprolitic.	
86	86.09	2.07	100/8cm			100/8cm		D		86.00 WEATHERED ROCK: Tan & light gray to white with black mica, GRANITE.	2.16
85	84.92	3.24	4	96/9cm		100/24cm				85.35 CRYSTALLINE ROCK: White with black mica, GRANITE.	2.81
84										WEATHERED ROCK: Brown & tan, GRANITE.	
										84.36	3.80
83										CRYSTALLINE ROCK: White with black mica, GRANITE.	
82											
										81.94	6.22
81										Boring Terminated at Elevation 81.94 m in CRYSTALLINE ROCK (GRANITE)	
80											
79										NOTES:	
78										1) Auger refusal at a depth of 2.07m.	
77										2) Set casing to 2.16m, began coring.	
76										3) 0 hr. water level measured before coring began.	
75										4) 24 hr. water level likely due to water remaining from water introduced for coring.	
74										5) 2 borings attempted, augers sliding on rock: 20+60.0, 17.0m Rt. & 20+58.2, 17.0m Rt.	
73											
72											
71											
70											
69											

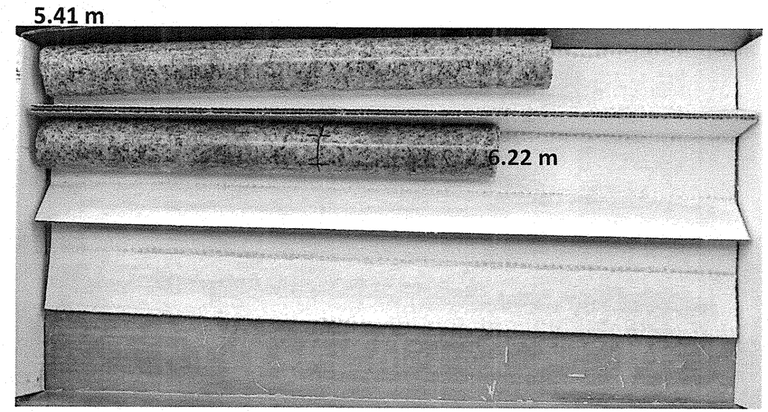
NCDOT GEOTECHNICAL ENGINEERING UNIT
CORE BORING REPORT

PROJECT NO. 34506.1.1	**ID.** R-2814A	**COUNTY** Wake	**GEOLOGIST** D. Racey
SITE DESCRIPTION Proposed Noise Wall-US 401 from SR 2044 (Ligon Mill Rd.) to S. of SR 2226 (Jonesville Rd.)			**GROUND WTR (m)**
BORING NO. NWB-3	**STATION** 20+56.7	**OFFSET** 17.0m RT	**ALIGNMENT** -L-	0 HR. Dry
COLLAR ELEV. 88.16 m	**TOTAL DEPTH** 6.22 m	**NORTHING** 237,708.2	**EASTING** 653,230.0	24 HR. 1.52
DRILL MACHINE CME 550	**DRILL METHOD** 57mm ID HSA/NQ-3 Core		**HAMMER TYPE** Automatic	
START DATE 04/21/09	**COMP. DATE** 04/21/09	**SURFACE WATER DEPTH** N/A	**DEPTH TO ROCK** 2.2 m	
CORE SIZE NQ-3	**TOTAL RUN** 3.82 m		**DRILLER** J. Gilchrist	

ELEV (m)	RUN ELEV (m)	DEPTH (m)	RUN (m)	DRILL RATE (Min/0.3m)	RUN REC. (m) %	RUN RQD (m) %	SAMP. NO.	STRATA REC. (m) %	STRATA RQD (m) %	LOG	DESCRIPTION AND REMARKS ELEV. (m)	DEPTH (m)
86.00											Begin Coring @ 2.16 m	
	86.00	2.16	1.08	1:49/0.30	(0.65)	(0.60)		(0.65)	(0.60)		86.00 CRYSTALLINE ROCK: White with black mica, fresh to very slightly weathered, very hard to hard GRANITE.	2.16
85				1:53/0.30	60%	56%		100%	92%		85.35	2.81
	84.92	3.24		0:40/0.30				(0.14)	N/A		WEATHERED ROCK: Brown & tan, severely weathered, very soft GRANITE.	
	84.68	3.48		0:03/0.18				14%			84.36	3.80
			1.52	N=100/24cm							CRYSTALLINE ROCK: White with black mica, fresh, very hard GRANITE. 2 joints @ 0°	
84				0:59/0.30	(1.34)	(1.20)						
				2:44/0.30	88%	79%						
				2:45/0.30				(2.42)	(2.39)			
				2:18/0.30				100%	99%			
83	83.16	5.00		1:42/0.32								
			1.22	2:39/0.30	(1.22)	(1.19)						
				1:45/0.30	100%	98%						
82				2:07/0.30								
	81.94	6.22		4:27/0.32							81.94	6.22
81											Boring Terminated at Elevation 81.94 m in CRYSTALLINE ROCK (GRANITE)	
80												
79											NOTES:	
78											1) Auger refusal at a depth of 2.07m.	
77											2) Set casing to 2.16m, began coring	
76											3) 0 hr. water level measured before coring began.	
75											4) 24 hr. water level likely due to water remaining from water introduced for coring.	
74											5) 2 borings attempted, augers sliding on rock 20+60.0, 17.0m Rt. & 20+58.2, 17.0m Rt	
73												
72												
71												
70												
69												
68												
67												
66												

CORE PHOTOGRAPHS: NWB-3: -L- Station 20+56.7, 17.0 Meters Right





North Carolina Department of Transportation
Division of Highways
Materials and Test Unit
Soils Laboratory

T.I.P. ID NO.: R-2814 A
DESCRIPTION: US 401 from SR 2044 (Ligon Mill Road) to South of SR 2226 (Jonesville Road)

REPORT ON SAMPLES OF: SOIL FOR QUALITY

PROJECT: 34506.1.1
DATE SAMPLED: 4/9
SAMPLED FROM: -L-
SUBMITTED BY: B. Howey

COUNTY: Wake
RECEIVED: 4/23/09
REPORTED: 5/1/09
BY: D. Jenks Dave A. Jenks
Cert No. 101-02-0603

TEST RESULTS

PROJ. SAMPLE NO.	NWB-1	NWB-2	NWB-2														
BORING NO.	SS-2	SS-8	SS-10														
Retained #4 Sieve %	0.0	0.0	0.0														
Passing #10 Sieve %	97.0	99.2	98.3														
Passing #40 Sieve %	59.8	62.9	69.4														
Passing #200 Sieve %	34.4	33.5	32.2														

MINUS #10 FRACTION

SOIL MORTAR - 100%																	
Coarse Sand Ret - #60 %	47.3	47.5	43.0														
Fine Sand Ret - #270 %	22.2	23.8	29.7														
Silt 0.053 - 0.010 mm %	10.8	10.7	19.7														
Clay < 0.010 mm %	19.7	18.0	7.6														
L.L.	34	36	26														
P.L.	NP	NP	NP														
P.I.	NP	NP	NP														
AASHTO Classification	A-2-4 (0)	A-2-4 (0)	A-2-4 (0)														
Station (-L-)	17+63.0	20+16.0	20+16.0														
Offset	17.0m Rt.	17.0m Rt.	17.0m Rt.														
Depth (m)	1.07	2.59	5.64														
to	1.52	3.04	6.09														
Moisture Content (%)	19.2	24.1	15.4														

NP=Not plastic

E.C. Howey, L.G., P.E.
Soils Engineer

LABORATORY SUMMARY SHEET FOR ROCK CORE SAMPLES

PROJECT NO.: 34506.1.1
TIP NO.: U-2814A
COUNTY: Wake
DESCRIPTION: US 401 from SR 2044 (Ligon Mill Road) to South of SR 2226 (Jonesville Road)

Sample #	Boring #	Depth (m)	Rock Type	Geologic Map Unit	Run RQD	Length (mm)	Diameter (mm)	Unit Weight kPa	Unconfined Compressive Strength (kPA)	Young's Modulus (kPa)	Splitting Tensile Strength (kPa)	Remarks
RS-1	NWB-3	2.86 - 2.96	Granite	PPmg	56%	91.59	45.06	24.64	14,381			
RS-2	NWB-3	2.96 - 3.06	Granite	PPMg	56%	92.98	44.53	25.41	29,009			