CONTRACT: C202096 ID: R-2414A

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2414A	1	72

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34430.1.1	STP-158(2)	PE
34430.2.4		ROW & UTILITIES
34430.3.2		CONST.

CONTENTS:

LINE	STATION	SHEET NO.
-L-	7+13 TO 45+68	4-15, 16-22
-L1-	7+12 TO 9+33	4, 16
-Y-	10+40 TO 10+98	14, 22

X-SECTS:	STATION	SHEET NO.
-L-	7+13 TO 45+68	23 - 72
-L1-	7+12 TO 9+33	23 - 26

STATE OF NORTH CAROLINA

DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

GEOTECHNICAL UNIT

METRIC

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

SUBSURFACE INVESTIGATION

STATE PROJECT 34430.1.1 I.D. NO. R-2414A

F.A. PROJECT STP-158 (2)

COUNTY CAMDEN

DESCRIPTION US 158 - NC 34 FROM EAST OF THE PASQOTANK RIVER IN ELIZABETH CITY TO SOUTH OF SR 1257 (HAVENWOOD DRIVE)

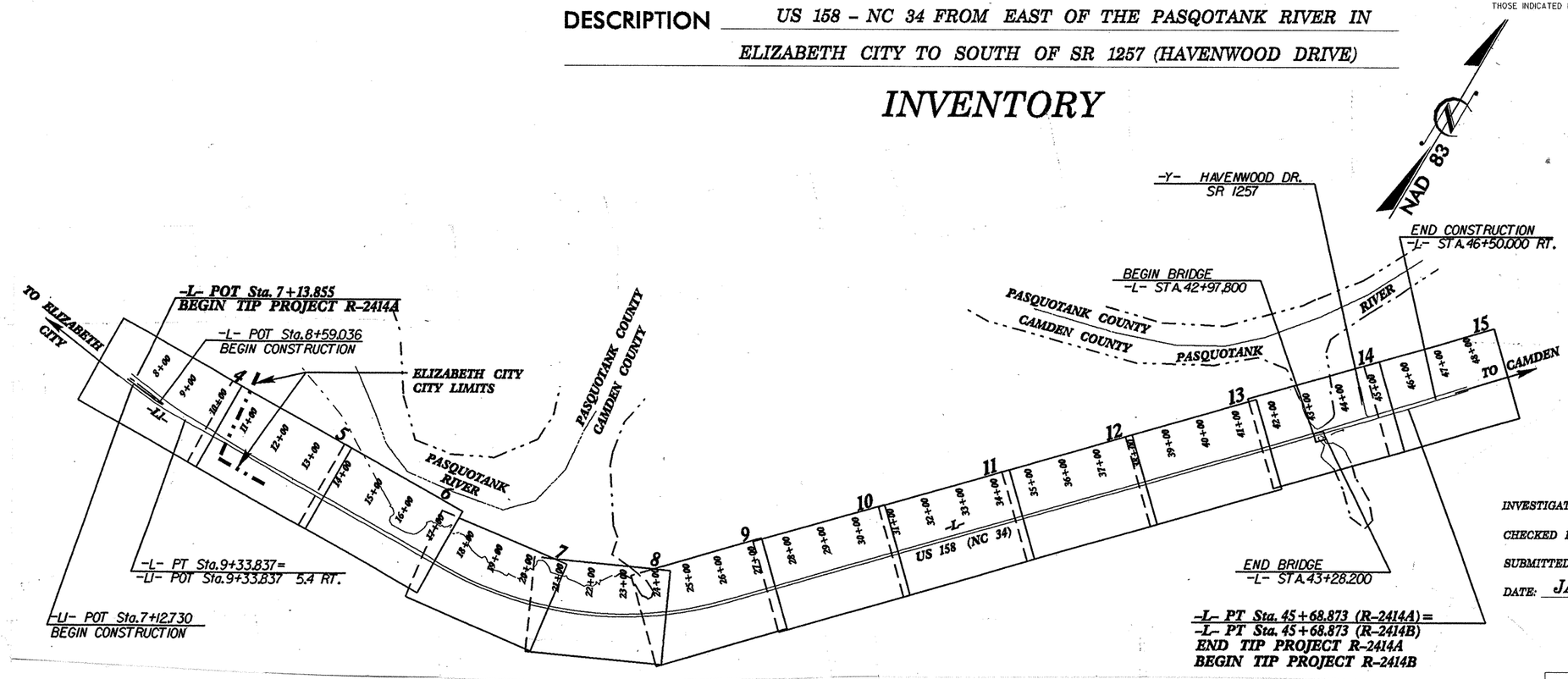
INVENTORY

CAUTION NOTICE

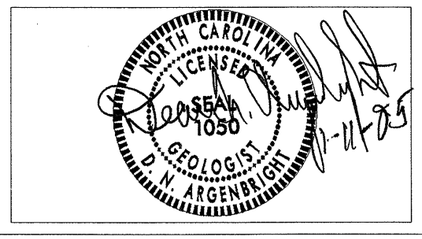
THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WAS MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING 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.



INVESTIGATED BY:	DNA	PERSONNEL:	RLE
CHECKED BY:	JLS		DBC
SUBMITTED BY:	DNA		MBO
DATE:	JANUARY, 2005		JEB



DRAWN BY: JLS

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

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
R-2414A	34430.1.1	2	72

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

GENERAL CLASS.	GRANULAR MATERIALS (≤35% PASSING #200)							SILT-CLAY MATERIALS (>35% PASSING #200)				ORGANIC MATERIALS		
GROUP CLASS.	A-1		A-3	A-2				A-4	A-5	A-6	A-7	A-1, A-2 A-3	A-4, A-5 A-6, A-7	
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6			
SYMBOL														
% PASSING # 10	50 MX											GRANULAR SOILS	SILT-CLAY SOILS	MUCK, PEAT
# 40	30 MX	50 MX	51 MN											
# 200	15 MX	25 MX	10 MX	35 MX	35 MX	35 MX	35 MX	36 MN	36 MN	36 MN	36 MN			
LIQUID LIMIT	6 MX		N.P.	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	40 MX	41 MN	SOILS WITH LITTLE OR MODERATE AMOUNTS OF ORGANIC MATTER		HIGHLY ORGANIC SOILS
PLASTIC INDEX				10 MX	10 MN	11 MN	11 MN	10 MX	10 MX	11 MN	11 MN			
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 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	2.0	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
GRAIN SIZE 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) PL — PLASTIC LIMIT	- WET - (W)	SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE
OM — OPTIMUM MOISTURE SL — SHRINKAGE LIMIT	- MOIST - (M)	SOLID; AT OR NEAR OPTIMUM MOISTURE
	- DRY - (D)	REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE

PLASTICITY

	PLASTICITY INDEX (PI)	DRY STRENGTH
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
- [x] CME-45B
- [ ] CME-550
- [ ] PORTABLE HOIST
- [ ] OTHER_____
- [ ] OTHER_____

ADVANCING TOOLS:
- [x] CLAY BITS
- [x] 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:
- [x] POST HOLE DIGGER
- [x] HAND AUGER
- [x] SOUNDING ROD
- [x] 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 GEOLOGIST'S 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:

APPROXIMATE LIMITS OF ORGANIC SOILS

REVISED 09/15/00

CONTRACT: TIP PROJECT: R-2414A

See Sheet 1-A For Index of Sheets

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CAMDEN COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2414A	2A	72

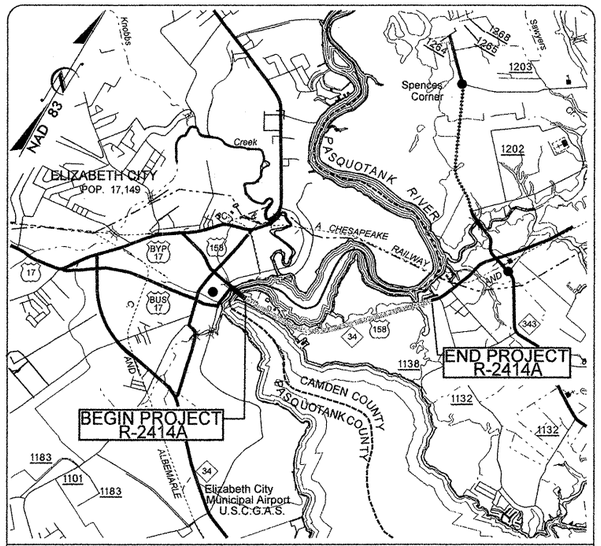
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34430.1.1	STP-158(2)	PE

METRIC

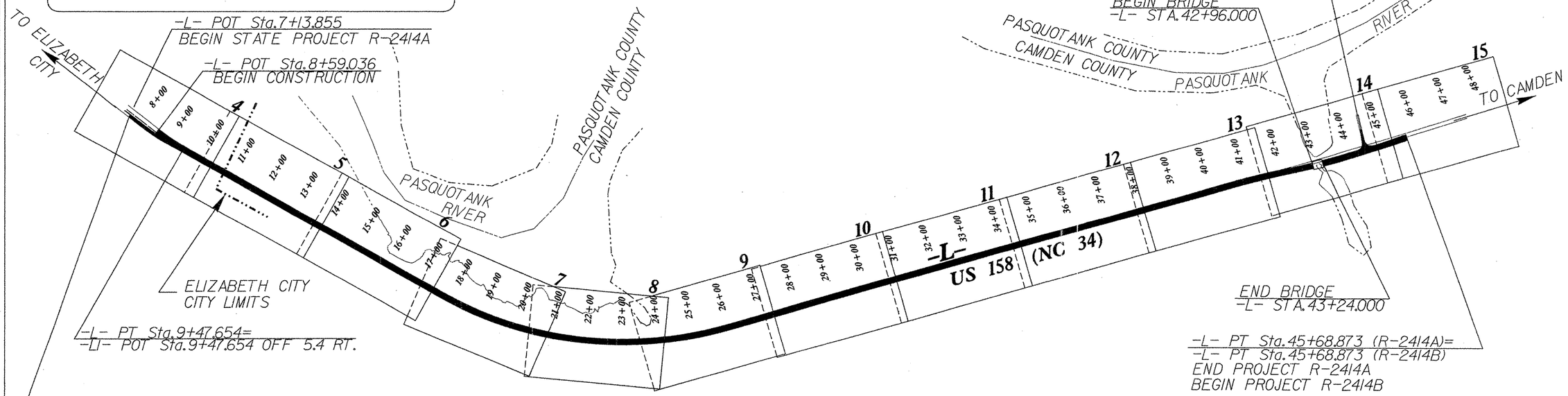
ALL DIMENSIONS IN THESE PLANS ARE IN METERS AND/OR MILLIMETERS UNLESS OTHERWISE SHOWN

LOCATION: US 158 / NC 34 FROM EAST OF PASQUOTANK RIVER TO SOUTH OF SR 1257 (HAVENWOOD DR.) BETWEEN ELIZABETH CITY AND CAMDEN

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



VICINITY MAP



-LI- POT Sta. 7+12.730
BEGIN CONSTRUCTION

CLEARING TO BE PERFORMED BY METHOD _____

THIS PROJECT IS WITHIN MUNICIPAL BOUNDARIES OF ELIZABETH CITY

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

GRAPHIC SCALES

5 0 10 — PLANS

5 0 10 — PROFILE (HORIZONTAL)

1 0 2 — PROFILE (VERTICAL)

DESIGN DATA

ADT 2007 = 24435
ADT 2025 = 38400
DHV = 12 %
D = 60 %
T = 6 % *
V = 80-100 KM/H
* (TTST 2 % + DUAL 4 %)
FUNC. CLASS. = ARTERIAL

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2414A	=	3.827 KM
LENGTH STRUCTURE TIP PROJECT R-2414A	=	0.028 KM
TOTAL LENGTH TIP PROJECT R-2414A	=	3.855 KM

Prepared In the Office of:
WETHERILL ENGINEERING
559 JONES FRANKLIN ROAD
SUITE 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION
For The North Carolina Department Of Transportation
2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 17, 2005
LETTING DATE: DECEMBER 18, 2007

EDWARD G. WETHERILL, PE — PROJECT ENGINEER
BOB A. MAY, PE — PROJECT DESIGN ENGINEER

NCDOT CONTACT: TERESA BRUTON, PE — ROADWAY DESIGN - ENGINEERING COORDINATION PROJECT 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

09/09/06

28-OCT-2004 09:53
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H:\pulor BY MIKE TALLORSUS.temp

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

January 11, 2005

STATE PROJECT:	34430.1.1 R-2414A
FEDERAL PROJECT:	STP-158(2)
COUNTY:	Camden
DESCRIPTION:	US 158 (NC 34) from East of the Pasquotank River in Elizabeth City to South of SR 1257 (Havenwood Drive)
SUBJECT:	Geotechnical Report - Inventory

Project Description

The project consists of constructing a five lane curb and gutter section from the beginning of the project to -L- station 8+90. A four lane facility with paved shoulders will be constructed to station 42+95. Another five lane section will begin at station 42+95 and extend to the end of the project. A second curb and gutter section begins at 44+30 and continues along the remaining portion. The project begins just east of the Pasquotank River in Elizabeth City and proceeds 3.8± kilometers in a northeasterly direction to the vicinity of Havenwood Drive. Investigation of subsurface conditions was confined to the corridor of proposed new construction.

The following base lines were investigated for this project:

Line	Station
-L-	7+13 to 45+68
-L1-	7+12 to 9+33
-Y-	10+40 to 10+98

Areas of Special Geotechnical Interest

1) The following sections contain relatively soft clay and organic soils which have the potential for settlement and stability problems (see accompanying plan view for approximate limits of organic soils):

Line	Station
-L-	7+13 to 43+05
-L1-	7+12 to 9+33

MAILING ADDRESS:
EASTERN REGIONAL OFFICE
GEOTECHNICAL ENGINEERING UNIT
1570 MAIL SERVICE CENTER
RALEIGH NC 27699-1570

TELEPHONE: 919-662-4710
FAX: 919-662-3095

WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:
3301 JONES SAUSAGE RD., SUITE 100
GARNER, NC 27529-9489

2) Typically, the entire project exhibits a high water table, seasonal high ground water or the potential for ground water related construction problems.

3) An old road bed (pre-1940's) was encountered in the vicinity of station 16+60 left of -L-, 25+40 right of -L- and from station 35+75 to 41+90 right of -L-. It generally lies 0.5± meters below the existing ground surface.

Physiography and Geology

The project corridor is located between Elizabeth City and Camden along the existing US 158/NC 34 roadway. Typically, the entire project lies in the Pasquotank River flood plain except the last 200± meters which is upland terrain. Topography is nearly flat in the flood plain and flat to moderately sloping on the upland area. Elevations of natural ground in the flood plain range from sea level to 1 meter. Elevations along the upland area range from 2 to 3 meters. Existing US 158/NC 34 lies at an elevation of 2± meters.

Geology of the majority of the project area consists of Quaternary fluvial sediments deposited by the Pasquotank River. The upland area consists of Quaternary coastal plain soils. Drainage along the project is provided by the Pasquotank River. Surface drainage is generally poor along the entire project.

Ground Water

Ground water data was collected during the winter of 1996 and spring of 1997 during average rainfall conditions. Water is generally at or near the natural ground surface in flood plain areas. The water table was generally encountered within 2± meters of the existing roadway shoulder and the upland areas.

Soils

Soils encountered during this investigation are separated into three major categories based on origin and published data. These categories are fluvial soils, surficial soils and embankment soils.

Fluvial soils occur from the beginning of the project to -L- station 43+05±. Fluvial soils generally consist of 4 to 8 meters of organic soils (muck and moderately organic silt). Organic content of tested samples range from 13 to 76 percent. Moisture content of tested organic samples were 45 to 592 percent. Vane Shear Tests performed in the organic soils range from 0.8 to 30 kPa. Approximately 2 to 6 meters of very soft sandy and silty clay (A-6, A-7-5, A-7-6) soils underlie the organic soils in some locations along the project. Natural moisture contents range from 58 to 110 percent. Plasticity indices range from 11 to 32. Loose to medium dense fine to coarse sand (A-2-4, A-3) underlies the organic and/or cohesive soils. Borings were usually terminated in the sandy deposits. However, in a deeper boring near the beginning of the project, this sand was found to be 2± meters thick and underlain by muck and clay soils. Typically the organic and clay sediments, due to their low shear strengths and high compressibility, have the potential to cause embankment stability and/or long term settlement problems.

Upland surficial soils occur at the end of the project (station 43+05± to 45+68) and consist of 0.5± meters of very loose to loose fine to coarse sand (A-2-4) underlain by 0.3 to 3 meters of medium stiff sandy silt (A-4). The plasticity index of a tested silt sample was 4. The silt soils are underlain by loose to medium dense fine to coarse sand (A-2-4).

Embankment soils are man-made fills built during construction of the existing and previous US 158/NC 403 roadway. In the early 1940's, dredges were used to remove all or portions of the soft organic and clay soils. Sandy (A-2-4, A-3) soils were used as backfill to construct the existing roadway. Because of the undercutting, the organic and clay soils are not laterally continuous from the left side to the right side of the existing roadway. Therefore, a profile of soil conditions was not practical due to the significant disturbance of natural ground. However, all borings are shown on the accompanying cross section sheets submitted with this report. The embankment soils range in thickness from 0.3 to 9.5 meters. Borings indicate the sandy material is thickest under the existing roadway and becomes thinner to the left and right.

Undisturbed Samples

Undisturbed (Shelby Tube) samples were taken in the organic soils at the following locations and submitted for Triaxial CU and Consolidation testing:

Sample No.	Station	Depth (m)
ST-1	36+60, 30 m Rt.	0.3 - 0.9
ST-2	20+60, 30 m Lt.	0.2 - 0.8

Respectfully submitted,

J.L. Stone
Assistant Project Geologist

3B/72

Earthwork Balance Sheet
Volumes in Cubic **Meters**

PROJECT: R-**2414A** COUNTY: **CAMDEN** DATE: **1/26/2009** COMPILED BY: **ABP** SHEET 1 OF 2 SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. (+) 30%		ROCK	SUITABLE	UNSUIT.	TOTAL
BEGIN SUMMARY #1															
L LT 8+59.036	TO 16+00.000	460				460	1011		1011	1314	854				
END SUMMARY #1		460				460	1011		1011	1314	854				
BEGIN SUMMARY #2															
L LT 16+00.000	TO 25+00.000	1993				1993	960		960	1248			745		745
END SUMMARY #2		1993				1993	960		960	1248			745		745
BEGIN SUMMARY #3															
L LT 25+00.000	TO 34+00.000	1026				1026	1442		1442	1875	849				
END SUMMARY #3		1026				1026	1442		1442	1875	849				
BEGIN SUMMARY #4															
L LT 34+00.000	TO 41+00.000	1122				1122	393		393	511			611		611
END SUMMARY #4		1122				1122	393		393	511			611		611
BEGIN SUMMARY #5															
L RT 38+80.000	TO 42+97.800	368				368	3476		3476	4519	4151				
END SUMMARY #5		368				368	3476		3476	4519	4151				
BEGIN SUMMARY #6															
L RT 43+28.200	TO 46+50.000	73				73	3788		3788	4924	4851				
END SUMMARY #6		73				73	3788		3788	4924	4851				
SHEET TOTAL		5042				5042	11070		11070	14391	10705		1356		1356

Note: Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geothechnical Engineering Unit.

2/3/2009 3:37 PM

30/72

Earthwork Balance Sheet
Volumes in Cubic **Meters**

PROJECT: R-**2414A** COUNTY: **CAMDEN** DATE: **1/26/2009** COMPILED BY: **ABP** SHEET 2 OF 2 SHEETS

STATION	STATION	EXCAVATION					EMBANKMENT				BORROW	WASTE			
		TOTAL UNCLASS.	ROCK	UNDERCUT	UNSUIT. UNCLASS.	SUITABLE UNCLASS.	TOTAL	ROCK	EARTH	EMBANK. (+) 30%		ROCK	SUITABLE	UNSUIT.	T0TAL
BEGIN SUMMARY #7															
L RT 7+13.855	TO 16+00.000	819				819	1947		1947	2531	1712				
END SUMMARY #7		819				819	1947		1947	2531	1712				
BEGIN SUMMARY #8															
L RT 16+00.000	TO 25+00.000	372				372	5411		5411	7034	6662				
END SUMMARY #8		372				372	5411		5411	7034	6662				
BEGIN SUMMARY #9															
L RT 25+00.000	TO 34+00.000	648				648	1794		1794	2332	1684				
END SUMMARY #9		648				648	1794		1794	2332	1684				
BEGIN SUMMARY #10															
L RT 34+00.000	TO 38+80.000	661				661	344		344	447			214		214
END SUMMARY #10		661				661	344		344	447			214		214
BEGIN SUMMARY #11															
L LT 41+00.000	TO 42+97.800	9				9	1734		1734	2254	2245				
END SUMMARY #11		9				9	1734		1734	2254	2245				
BEGIN SUMMARY #12															
L LT 43+28.200	TO 46+50.000	29				29	3898		3898	5067	5038				
Y 10+40.000	TO 10+88.987	73				73	32		32	42			31		31
END SUMMARY #12		102				102	3930		3930	5109	5038		31		31
SHEET TOTAL		2611				2611	15160		15160	19707	17341		245		245
TOTALS		7653				7653	26230		26230	34098	28046		1601		1601
SELECT MATERIAL IN LIEU OF BORROW							-5300			-5300	-5300				
WASTE IN LIEU OF BORROW											-1601		-1601		-1601
SHOULDER MATERIAL							3092		3092	4020	4020				
PROJECT TOTAL		7653									25165		0		0
ESTIMATED 5% TO REPLACE TOPSOIL ON BORROW PIT											1258				
GRAND TOTAL		7653									26423				
SAY		8000									27000				

UNDERCUT EXCAVATION = 3000 CUBIC METERS (PER GEOTECH MEMO DATED APRIL 5, 2005 & JANUARY 30, 2009)

PAVEMENT STRUCTURE VOLUME = 7020 CUBIC METERS

Note: Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geothechnical Engineering Unit.

2/3/2009 3:37 PM

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2414-1"
WITH NAD 83 STATE PLANE GRID COORDINATES OF
NORTHING: 286521.540(m) EASTING: 859732.336(m)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.0000523
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2414-1" TO -L- STATION IS
S 75° 06' 23.8" W 41.309m
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2414A	4
	R/W SHEET NO.	
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
5 0 10	PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
CONST.REV.	INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
R/W REV.		

WETHERILL ENGINEERING
559 JONES FRANKLIN ROAD
SUITE 164
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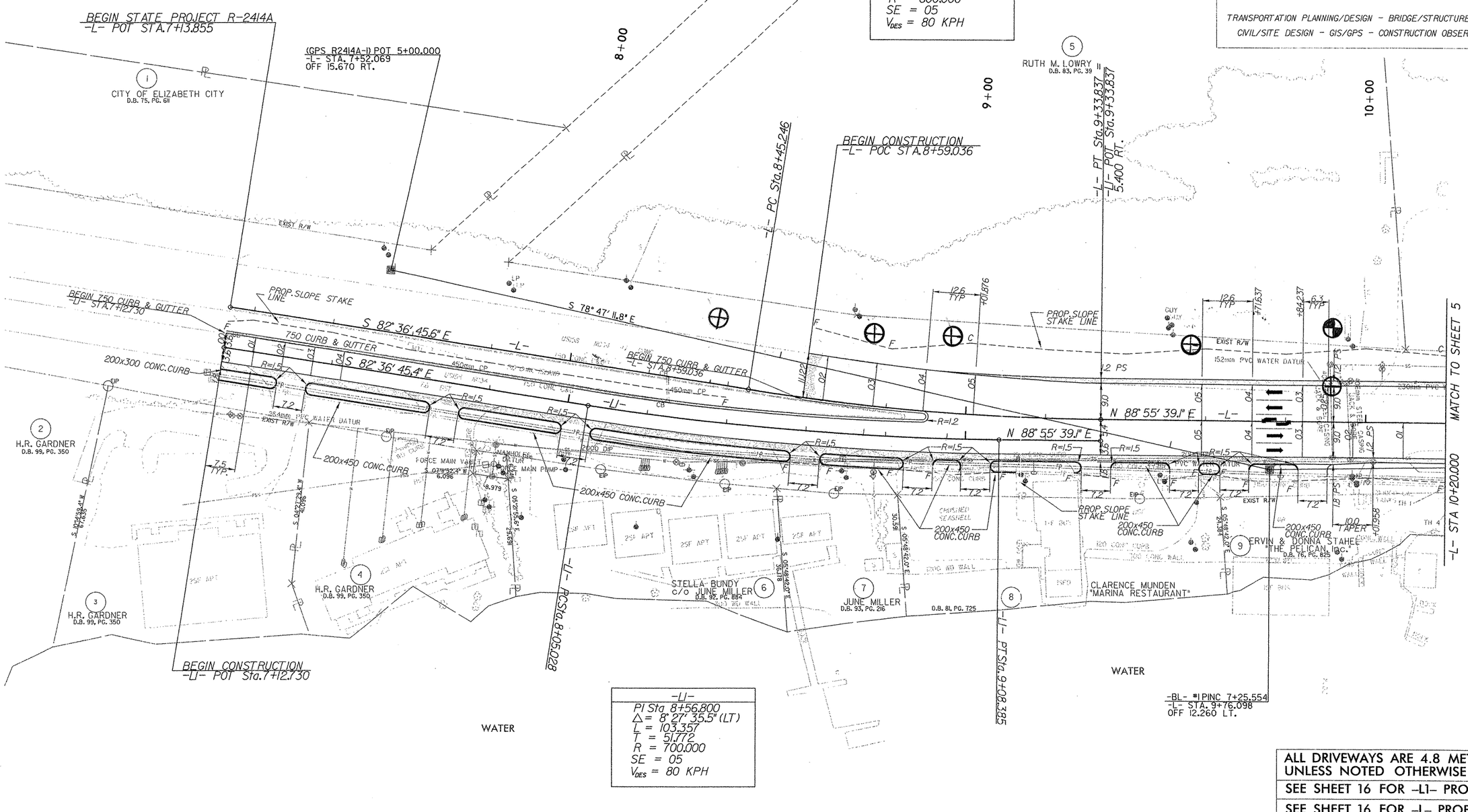
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



ALL DRIVEWAYS ARE 4.8 METERS UNLESS NOTED OTHERWISE

SEE SHEET 16 FOR -L1- PROFILE

SEE SHEET 16 FOR -L- PROFILE

REVISIONS

8/17/99

28-OCT-2004 09:50
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PROJECT REFERENCE NO.	SHEET NO.
R-2414A	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST. REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

WETHERILL ENGINEERING
559 JONES FRANKLIN ROAD
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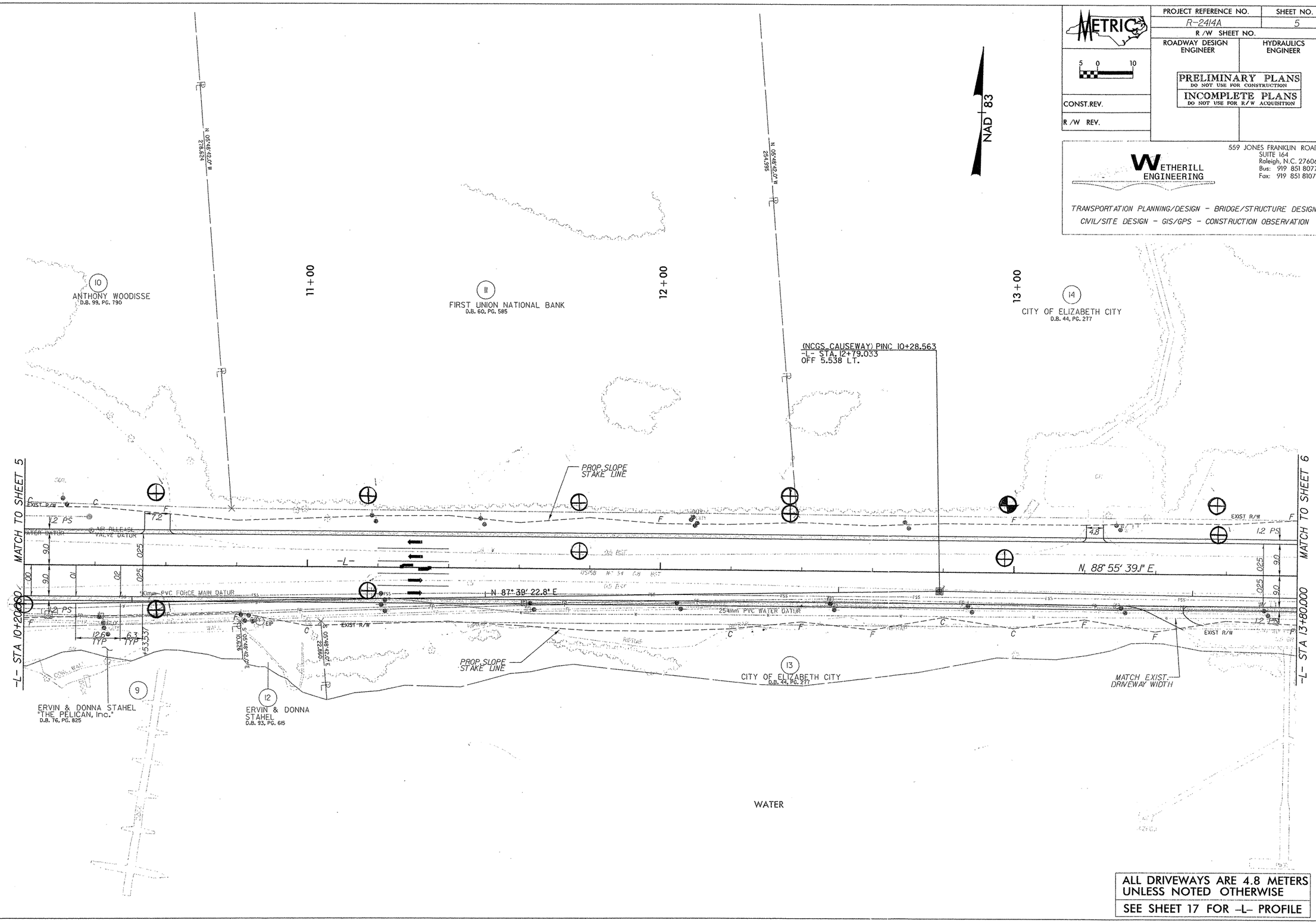
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



ALL DRIVEWAYS ARE 4.8 METERS UNLESS NOTED OTHERWISE

SEE SHEET 17 FOR -L- PROFILE

REVISIONS

8/17/99

28-OCT-2004 09:50
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MTaylor AT MIKE ATLONGSCE1.*

PROJECT REFERENCE NO.	SHEET NO.
R-2414A	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
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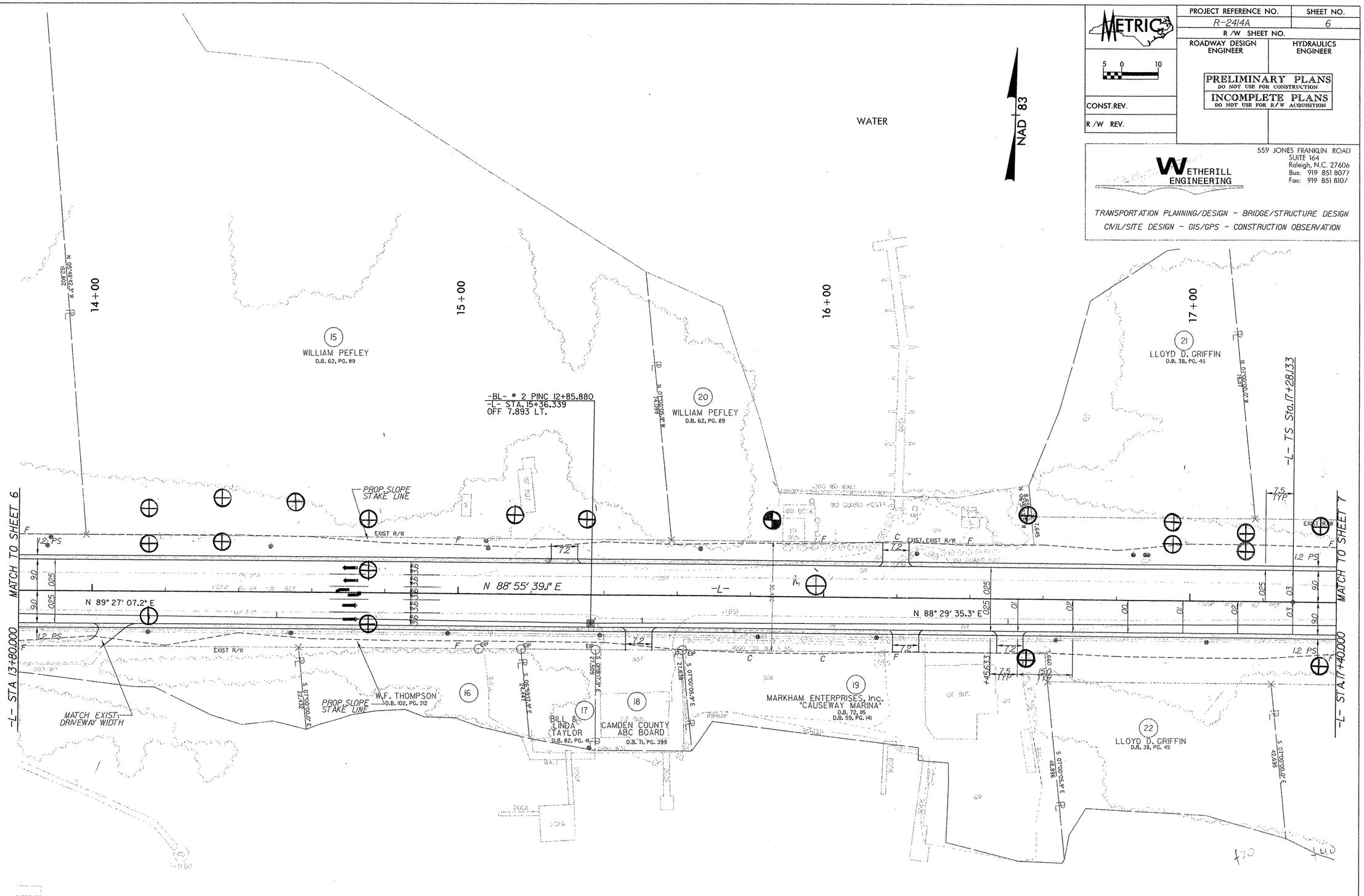
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



ALL DRIVEWAYS ARE 4.8 METERS UNLESS NOTED OTHERWISE

SEE SHEET 17 FOR -L- PROFILE

REVISIONS

8/7/09

28-OCT-2014 09:46
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PROJECT REFERENCE NO.	SHEET NO.
R-2414A	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

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

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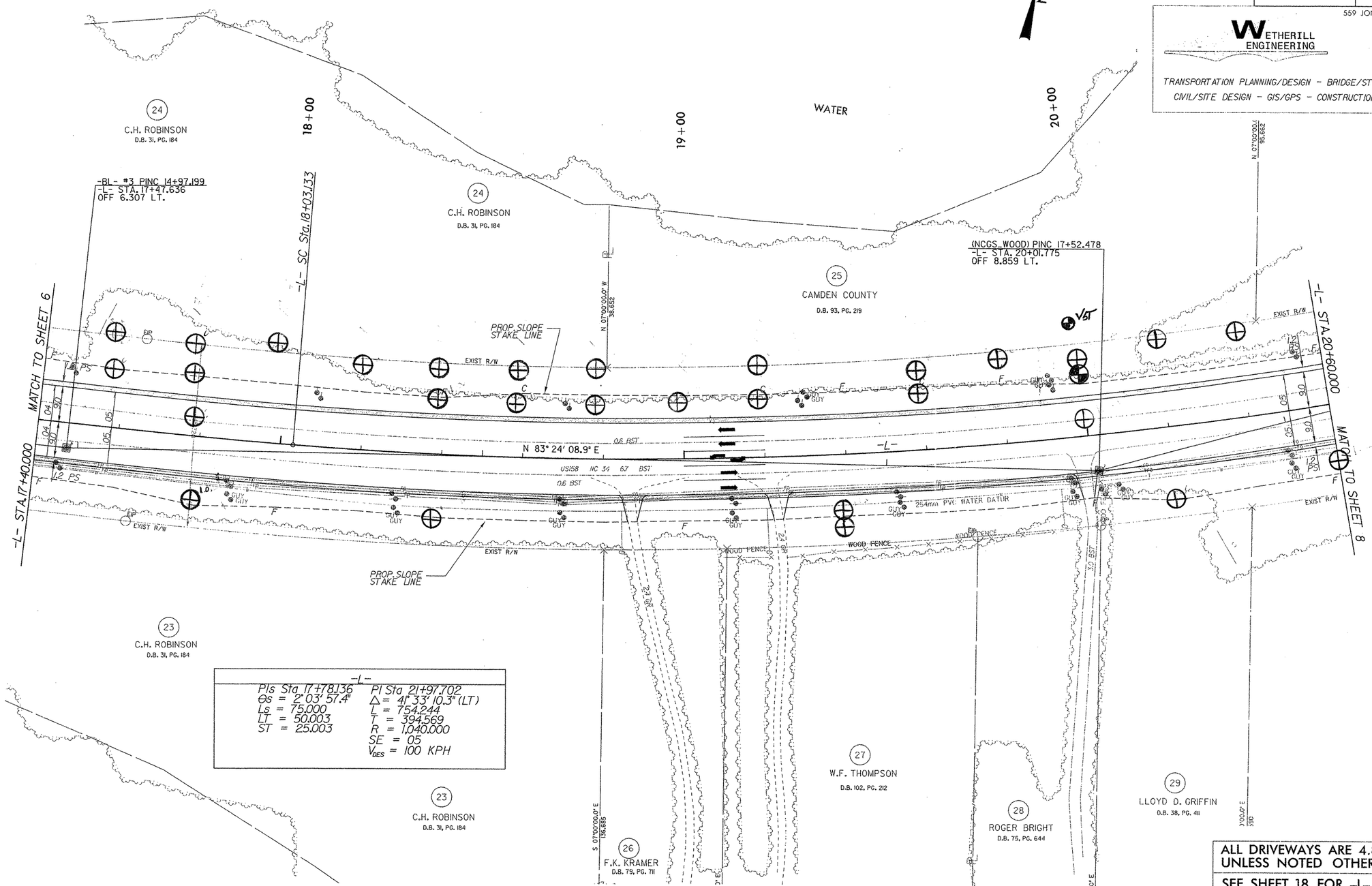
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



-L-
PIs Sta 17+78.136 — PI Sta 21+97.702
θs = 2° 03' 57.4" — Δ = 41° 33' 10.3" (LT)
Ls = 75.000 — L = 754.244
LT = 50.003 — T = 394.569
ST = 25.003 — R = 1,040.000
SE = 05
V_{DES} = 100 KPH

ALL DRIVEWAYS ARE 4.8 METERS UNLESS NOTED OTHERWISE

SEE SHEET 18 FOR -L- PROFILE

REVISIONS

8/7/09

28-OCT-2009 09:48
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PROJECT REFERENCE NO.	SHEET NO.
R-2414A	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

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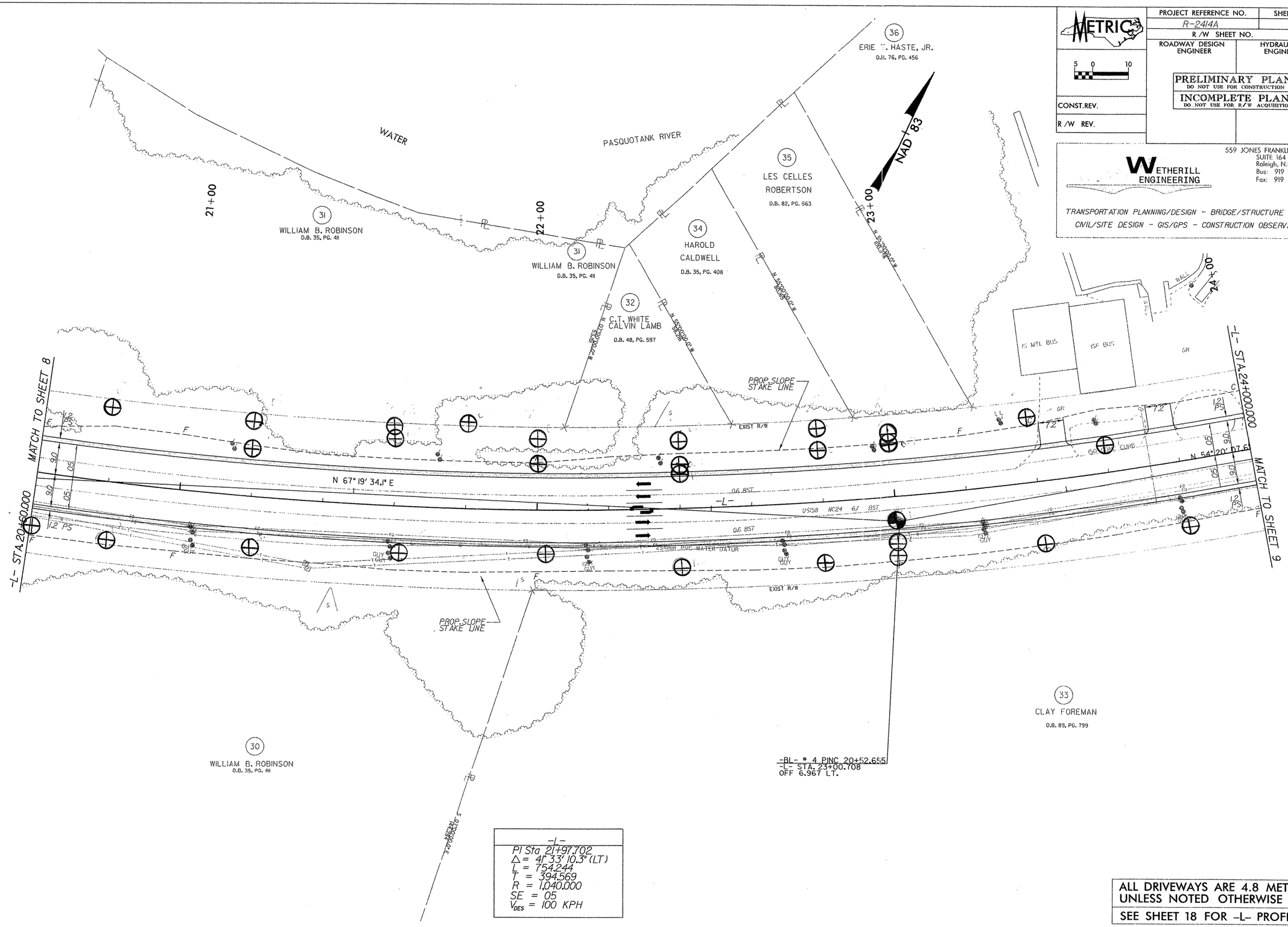
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



ALL DRIVEWAYS ARE 4.8 METERS UNLESS NOTED OTHERWISE

SEE SHEET 18 FOR -L- PROFILE

REVISIONS

8/17/99

28-JCT-2004 09:48
MTWilson=NP MIKEPAYLOR\DGN\R-2414A_RDY_R8_PSH.DGN

PROJECT REFERENCE NO.	SHEET NO.
R-2414A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
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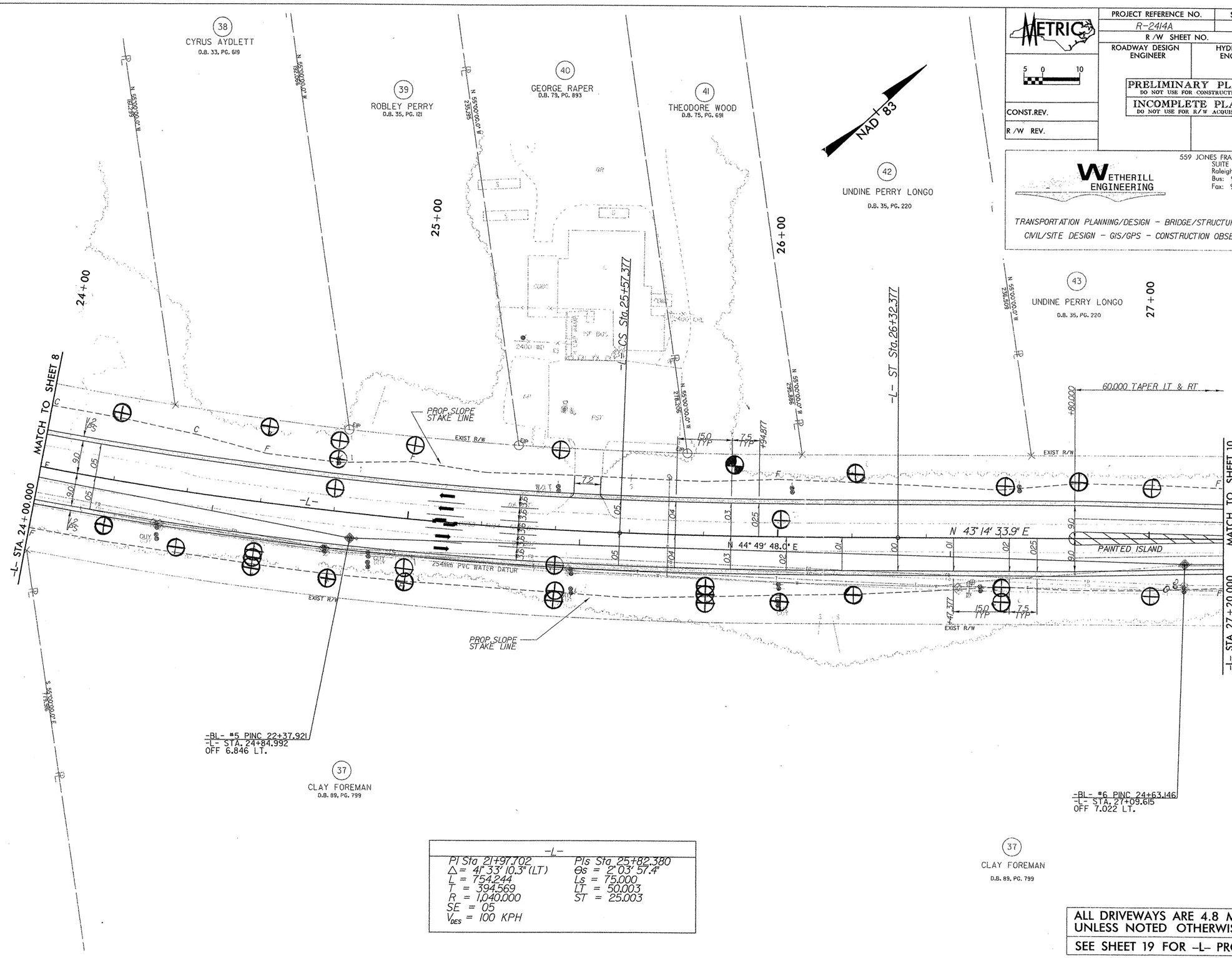
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



-L-	
PI Sta 21+97.702	PIs Sta 25+82.380
Δ = 41° 33' 10.3" (LT)	Θs = 2° 03' 57.4"
L = 754.244	Ls = 75.000
T = 394.569	LT = 50.003
R = 1,040.000	ST = 25.003
SE = 05	
V_{DES} = 100 KPH	

ALL DRIVEWAYS ARE 4.8 METERS UNLESS NOTED OTHERWISE

SEE SHEET 19 FOR -L- PROFILE

REVISIONS

8/17/99

28-OCT-2004 09:48
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PROJECT REFERENCE NO.	SHEET NO.
R-2414A	10
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R /W REV.

PRELIMINARY PLANS
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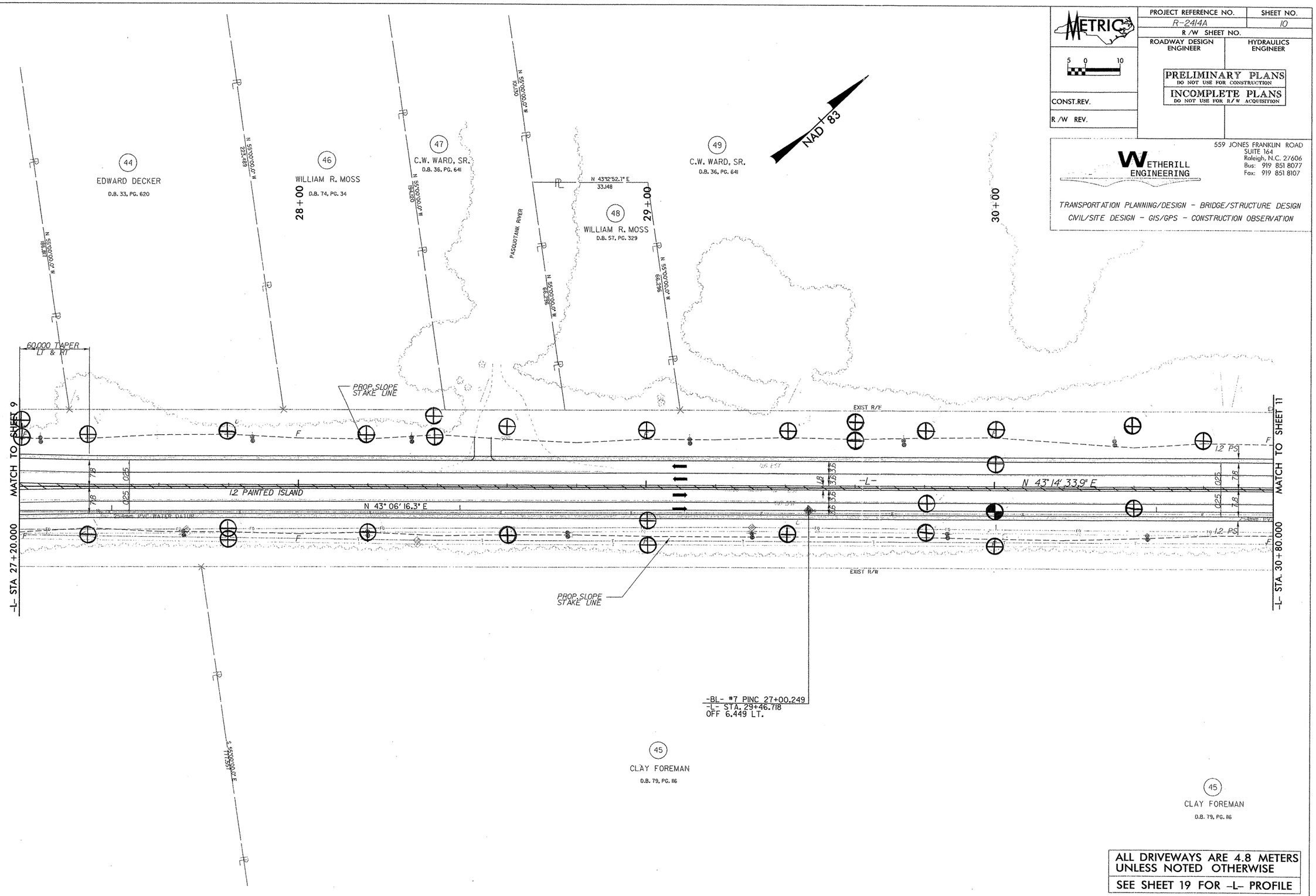

ALL DRIVEWAYS ARE 4.8 METERS UNLESS NOTED OTHERWISE

SEE SHEET 19 FOR -L- PROFILE

REVISIONS

5/17/99

28-OCT-2004 09:47
r:\roadway\proj\r2414a_rdy_10_psh.dgn
mtaylor AT MKETAYLORCC-CS*

PROJECT REFERENCE NO.	SHEET NO.
R-2414A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

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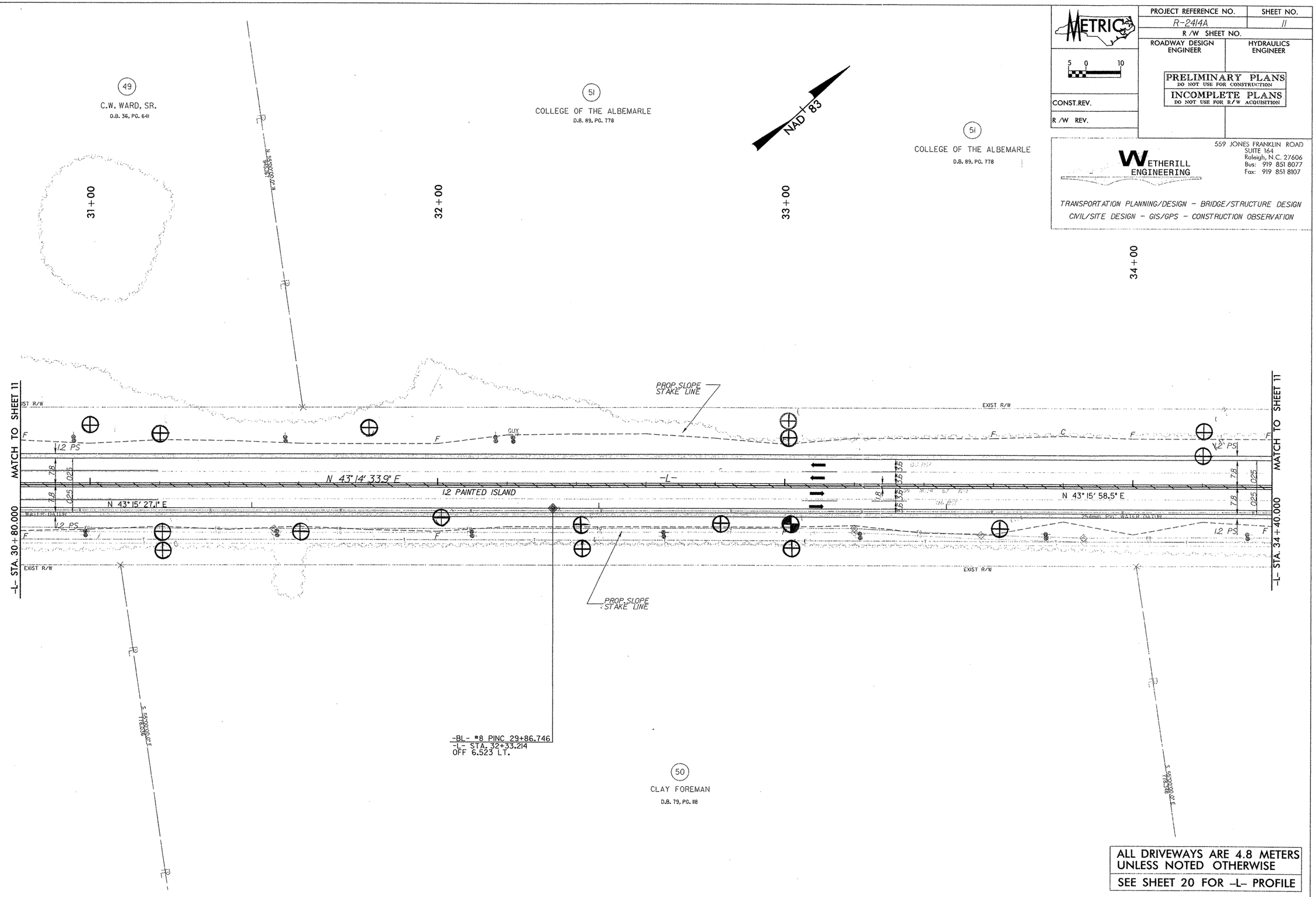
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



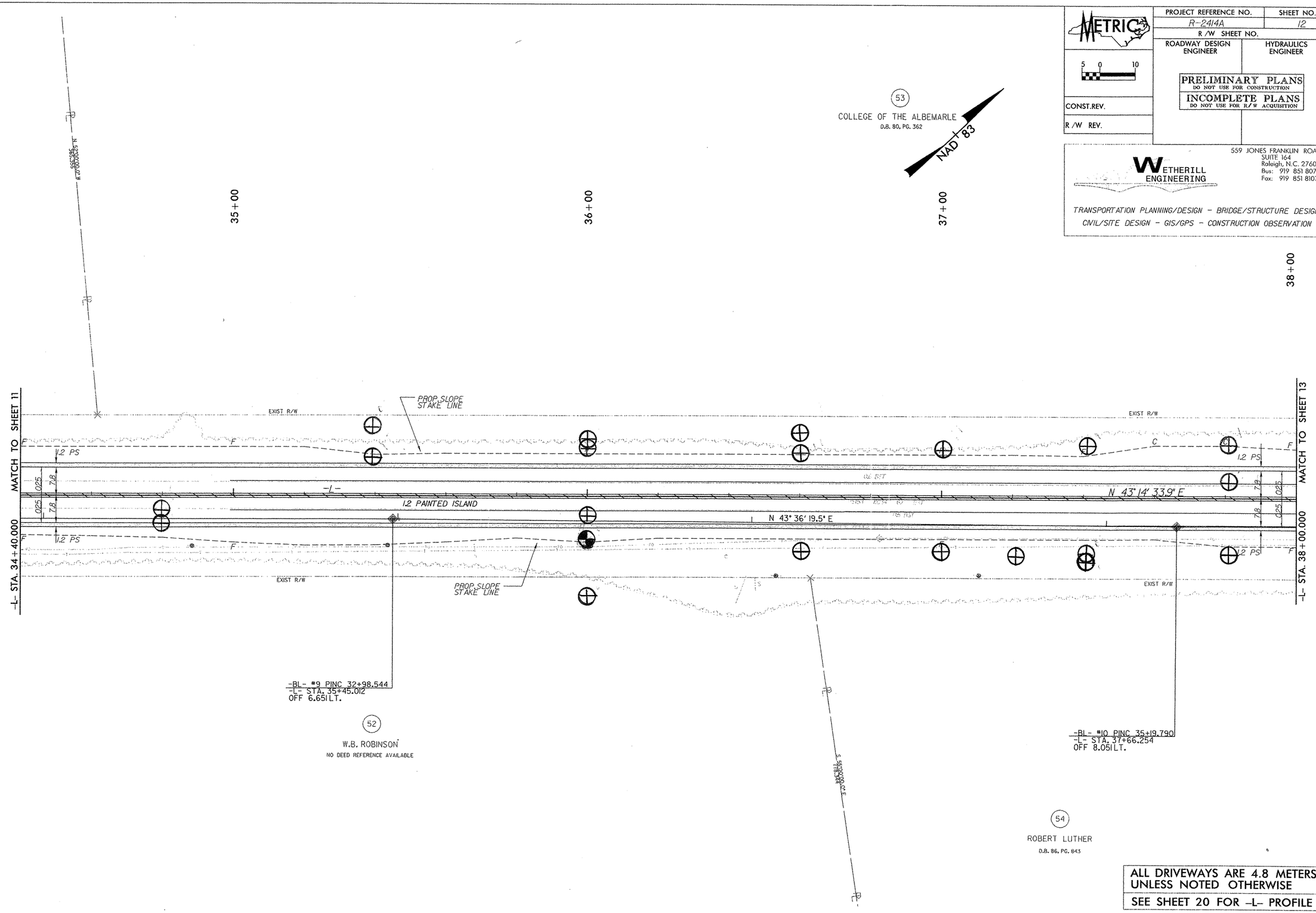
ALL DRIVEWAYS ARE 4.8 METERS UNLESS NOTED OTHERWISE

SEE SHEET 20 FOR -L- PROFILE

REVISIONS

8/17/99

28-OCT-2004 09:47
r:\Roadway\Proj\R-2414A_RDY_11_PSH.DGN
Mayor AT MIKETAYLOR=C:*



METRIC
5 0 10
PROJECT REFERENCE NO.
R-2414A
SHEET NO.
12
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.
WETHERILL ENGINEERING
559 JONES FRANKLIN ROAD
SUITE 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION
53
COLLEGE OF THE ALBEMARLE
D.B. 80, PG. 362
NAD 83
35+00
36+00
37+00
38+00
MATCH TO SHEET 11
MATCH TO SHEET 13
-L- STA. 34+40.000
-L- STA. 38+00.000
EXIST R/W
PROP. SLOPE STAKE LINE
1.2 PS
1.2 PAINTED ISLAND
N 43° 36' 19.5" E
N 43° 14' 33.9" E
-BL- #9 PINC 32+98.544
-L- STA. 35+45.012
OFF 6.65 LT.
52
W.B. ROBINSON
NO DEED REFERENCE AVAILABLE
-BL- #10 PINC 35+19.790
-L- STA. 37+66.254
OFF 8.05 LT.
54
ROBERT LUTHER
D.B. 86, PG. 843
ALL DRIVEWAYS ARE 4.8 METERS UNLESS NOTED OTHERWISE
SEE SHEET 20 FOR -L- PROFILE
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2414A	13
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

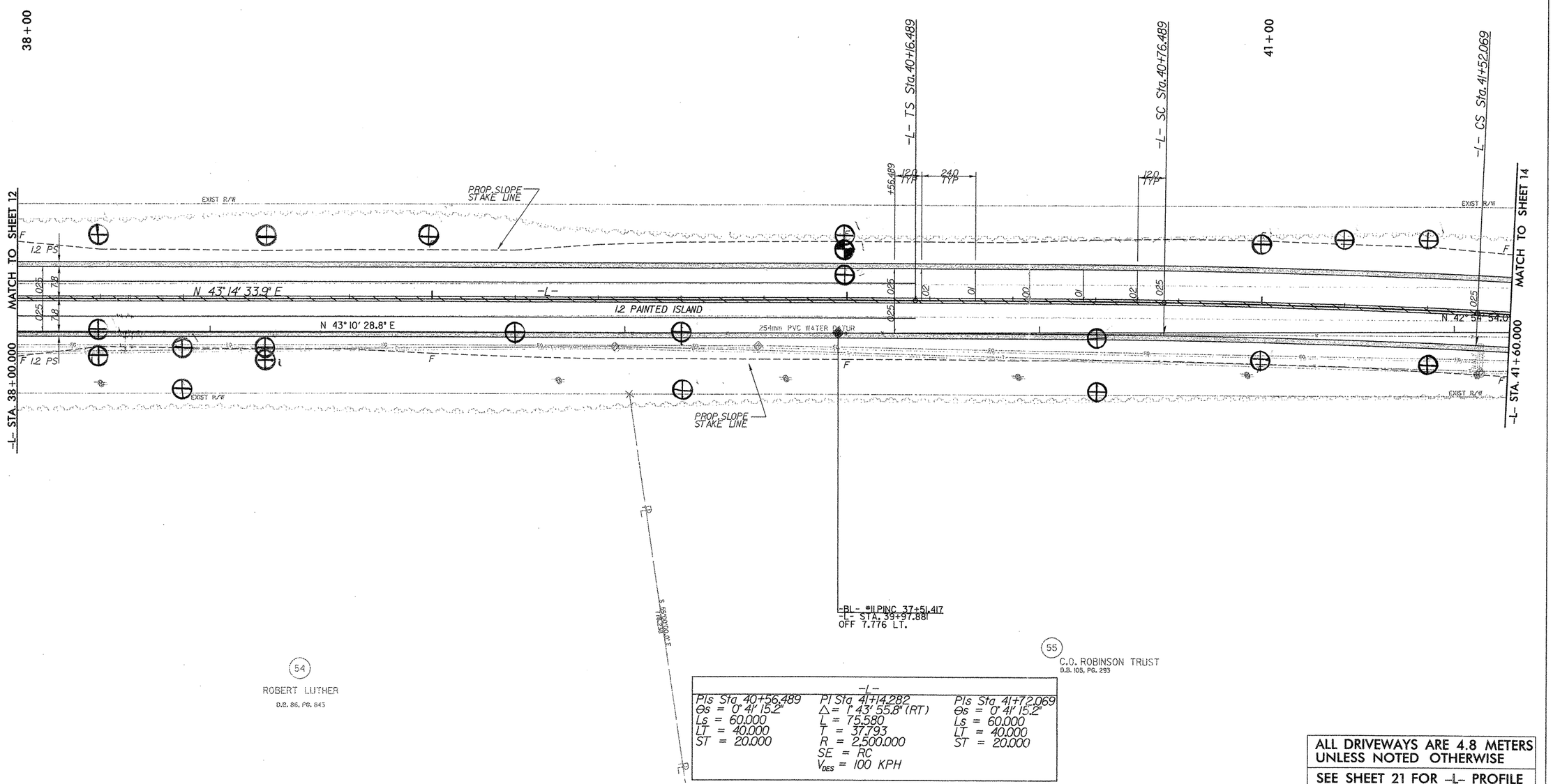
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

CONST.REV.

R /W REV.

WETHERILL ENGINEERING
559 JONES FRANKLIN ROAD
SUITE 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



-L-		
PIs Sta 40+56.489	PI Sta 41+14.282	PIs Sta 41+72.069
Θs = 0° 41' 15.2"	Δ = 1° 43' 55.8" (RT)	Θs = 0° 41' 15.2"
Ls = 60.000	L = 75.580	Ls = 60.000
LT = 40.000	T = 37.793	LT = 40.000
ST = 20.000	R = 2,500.000	ST = 20.000
	SE = RC	
	V_{DES} = 100 KPH	

ALL DRIVEWAYS ARE 4.8 METERS UNLESS NOTED OTHERWISE

SEE SHEET 21 FOR -L- PROFILE

REVISIONS

8/17/99

17-NOV-2004 16:35
R:\Roadway\Proj\R-2414A_RDY_13_PSH.DGN
HP_{ROM} WETHERIL-BGSend

WETHERILL ENGINEERING
559 JONES FRANKLIN ROAD
SUITE 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

METRIC 5 0 10

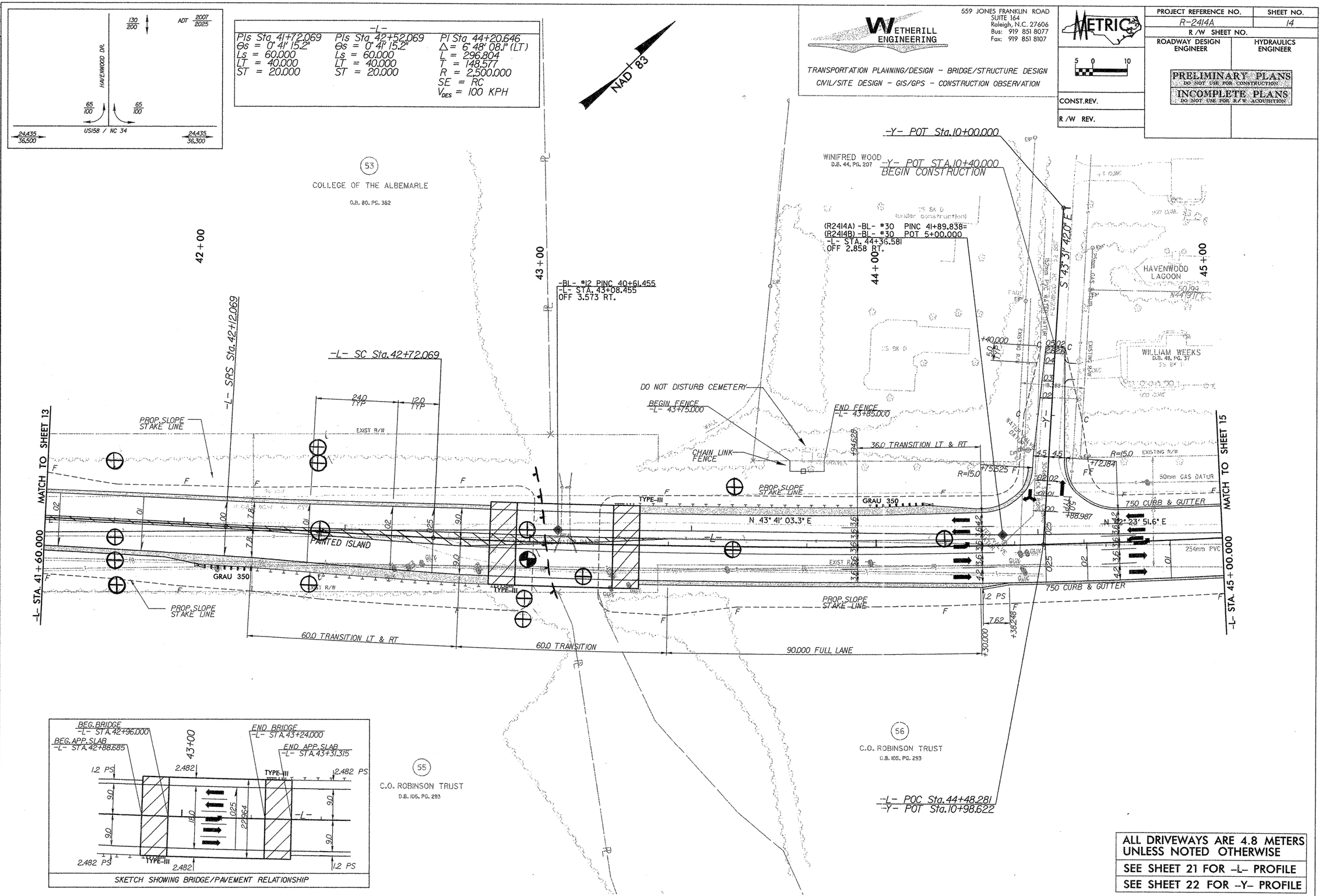
PROJECT REFERENCE NO.	SHEET NO.
R-2414A	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

CONST.REV.
R/W REV.

REVISIONS

8/17/99



ALL DRIVEWAYS ARE 4.8 METERS UNLESS NOTED OTHERWISE

SEE SHEET 21 FOR -L- PROFILE

SEE SHEET 22 FOR -Y- PROFILE

17-NOV-2004 16:36
B:\Roadway\R2414a_R01_14_PSH.DGN
Bing: AV, WETHERILL, SBBeng

PROJECT REFERENCE NO.	SHEET NO.
R-2414A	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

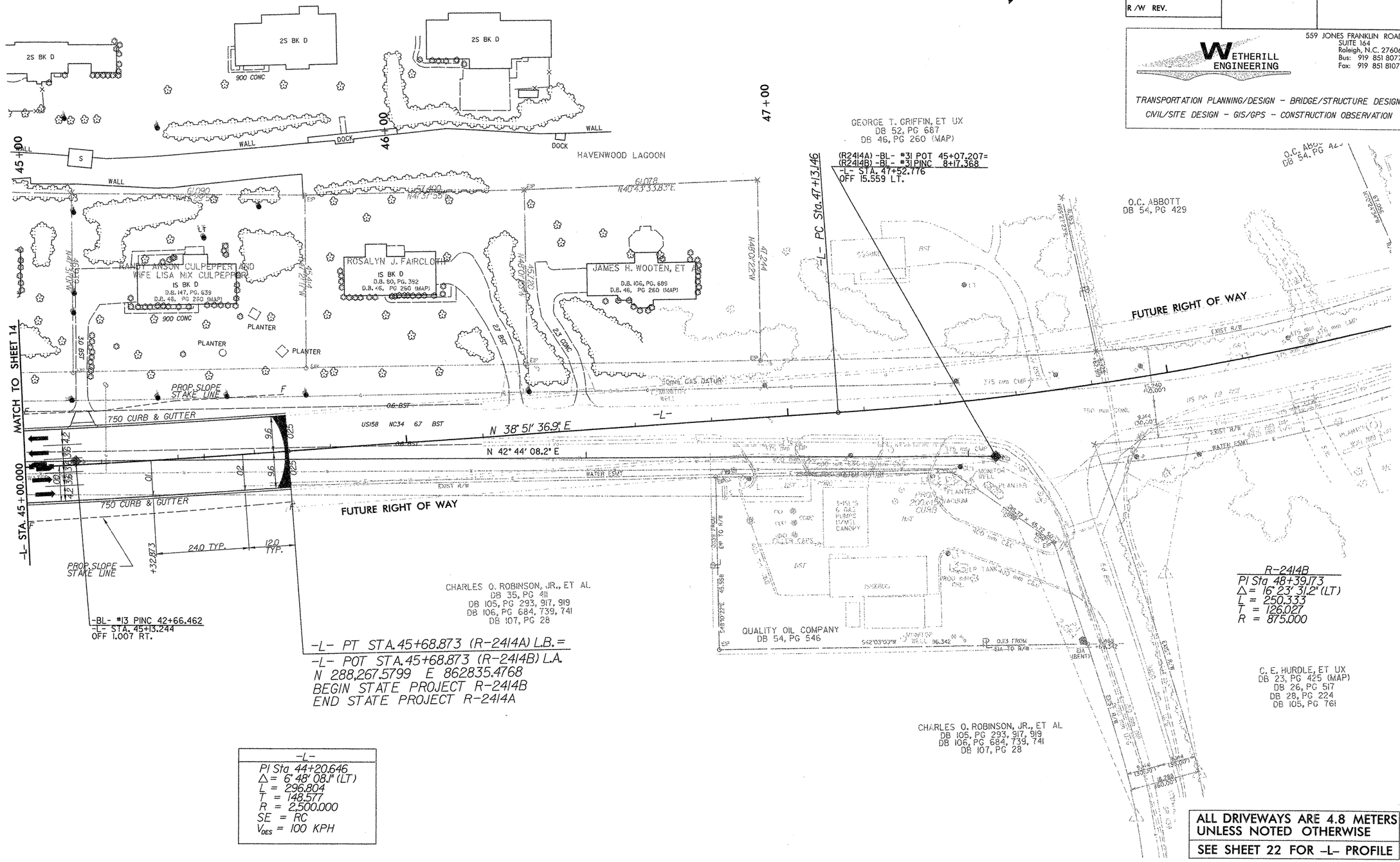
CONST. REV.

R/W REV.

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

WETHERILL ENGINEERING
559 JONES FRANKLIN ROAD
SUITE 164
Raleigh, N.C. 27606
Bus: 919 851 8077
Fax: 919 851 8107

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION



REVISIONS

8/17/99

17-NOV-2004 16:36
BN:Roadway\R2414B\R2414A_RDY_15_FSH.DGN
Dsng: NH WETHERILL 800x44 1

PROJECT REFERENCE NO.	SHEET NO.
R-2414A	16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

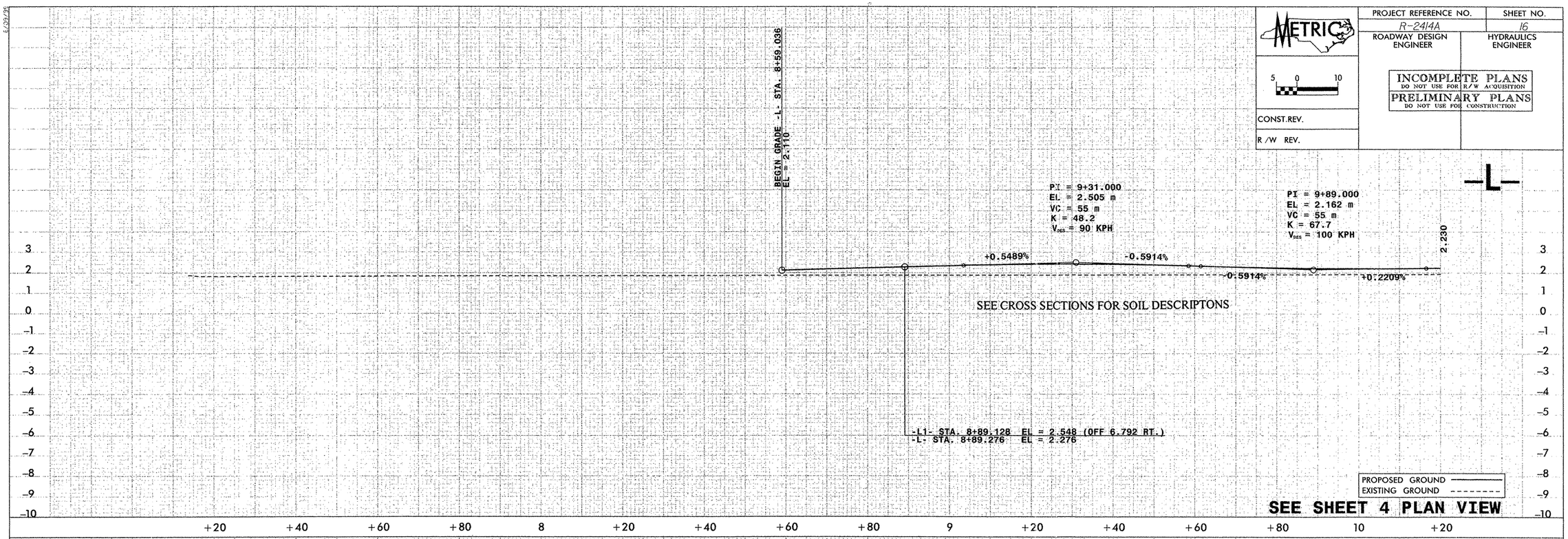
5 0 10

CONST.REV.

R /W REV.

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

-L-



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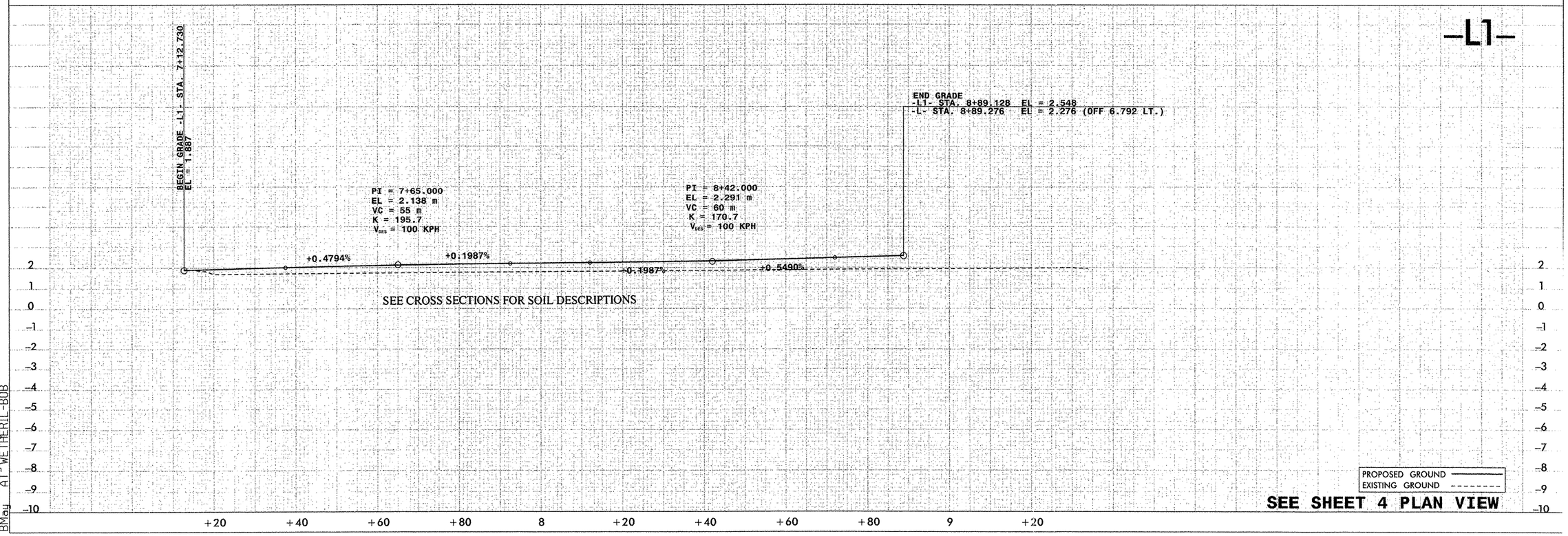


28-SEP-2004 09:09
R:\Roadway\Proj\R-2414A_RDY_PFL.DGN
BMay AT3 WETHERIL-BOB

6/09/32

PROJECT REFERENCE NO.	SHEET NO.
R-2414A	17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

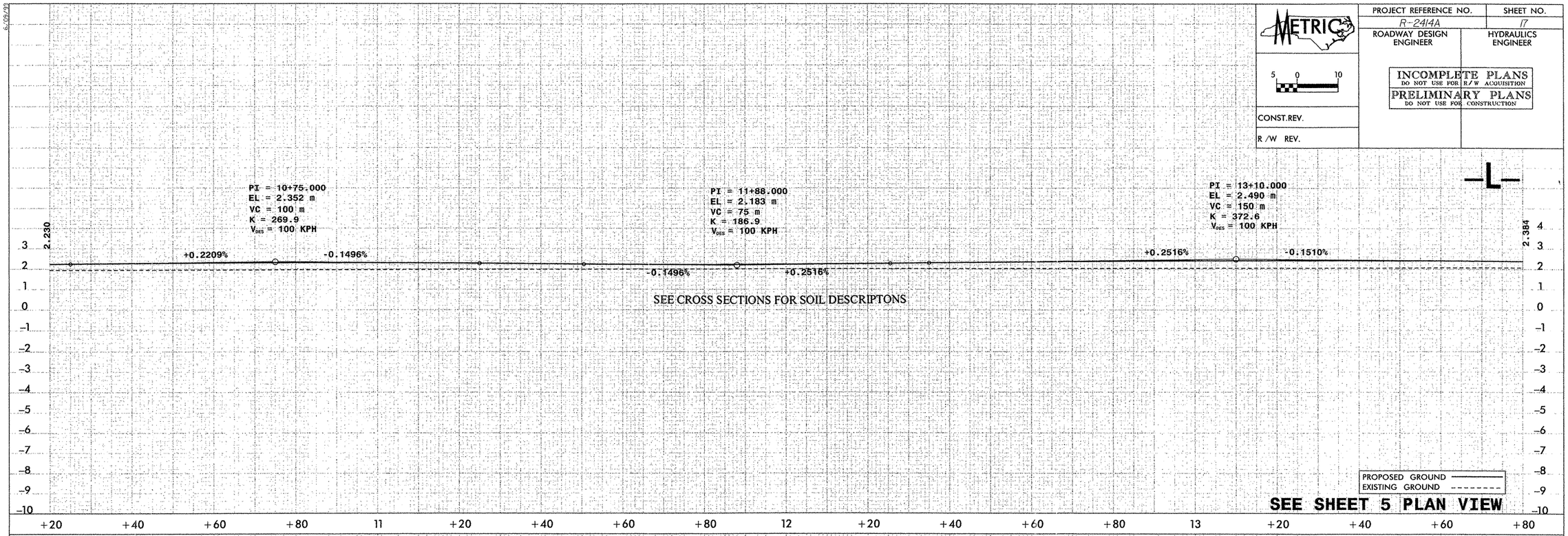
METRIC

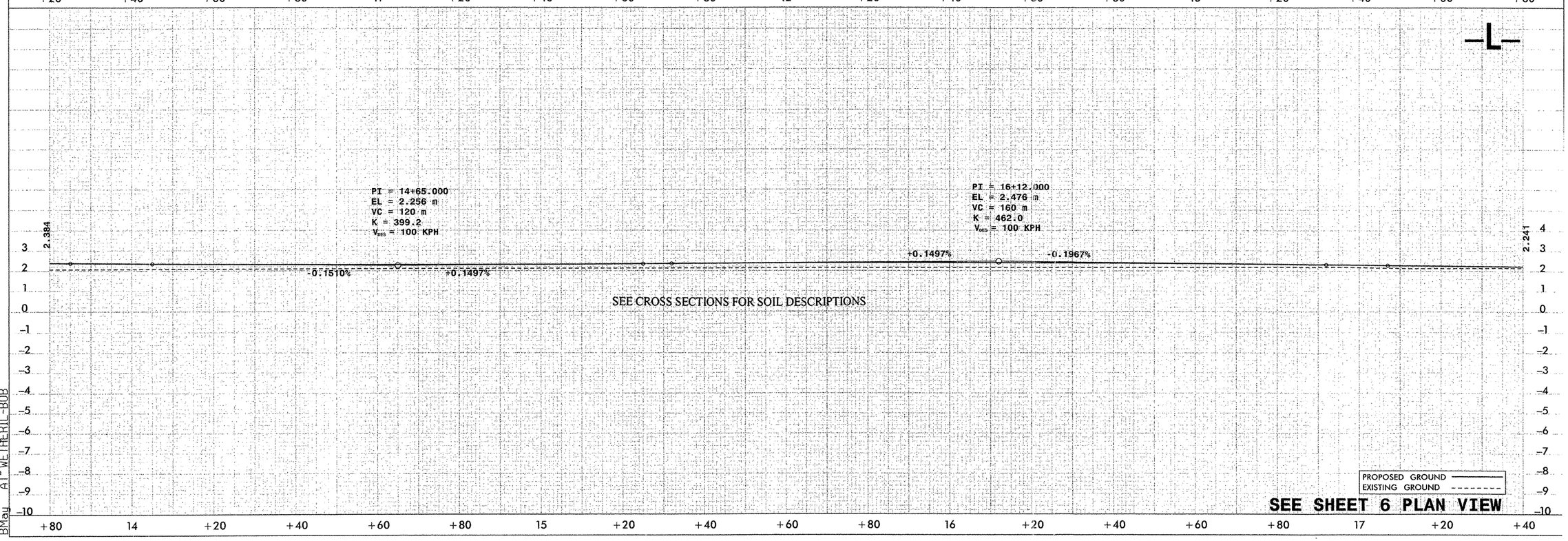
5 0 10

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

CONST.REV.

R/W REV.





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BMay WETHERIL-BOB

5/29/99

PROJECT REFERENCE NO.	SHEET NO.
R-2414A	18
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

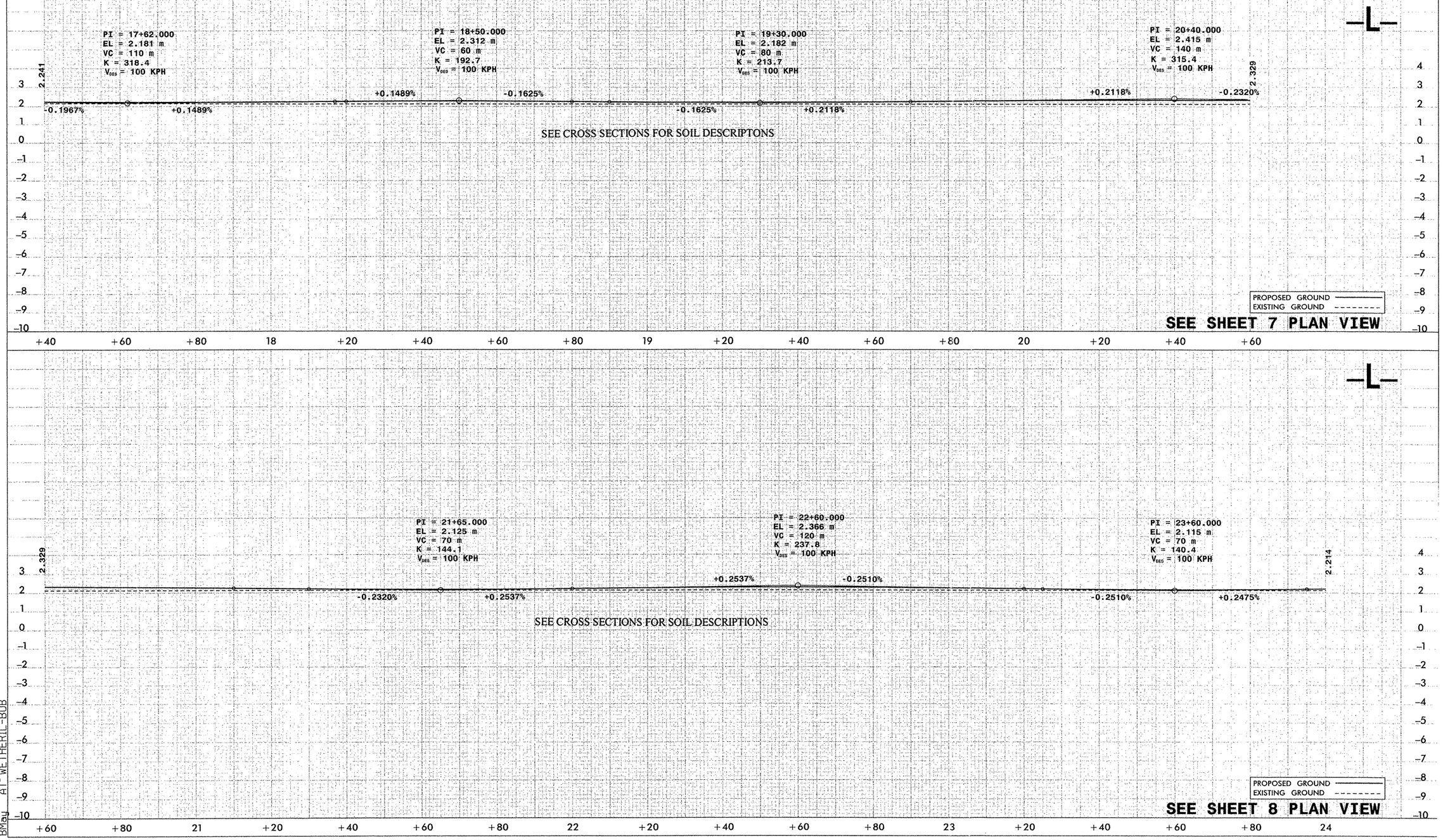
5 0 10

CONST.REV.

R /W REV.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



28-SEP-2004 09:12
R:\Roadway\Proj\R-2414A_RDY_PFL.DGN
BMay AT WETHERIL-BOB

PROJECT REFERENCE NO.	SHEET NO.
R-2414A	19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

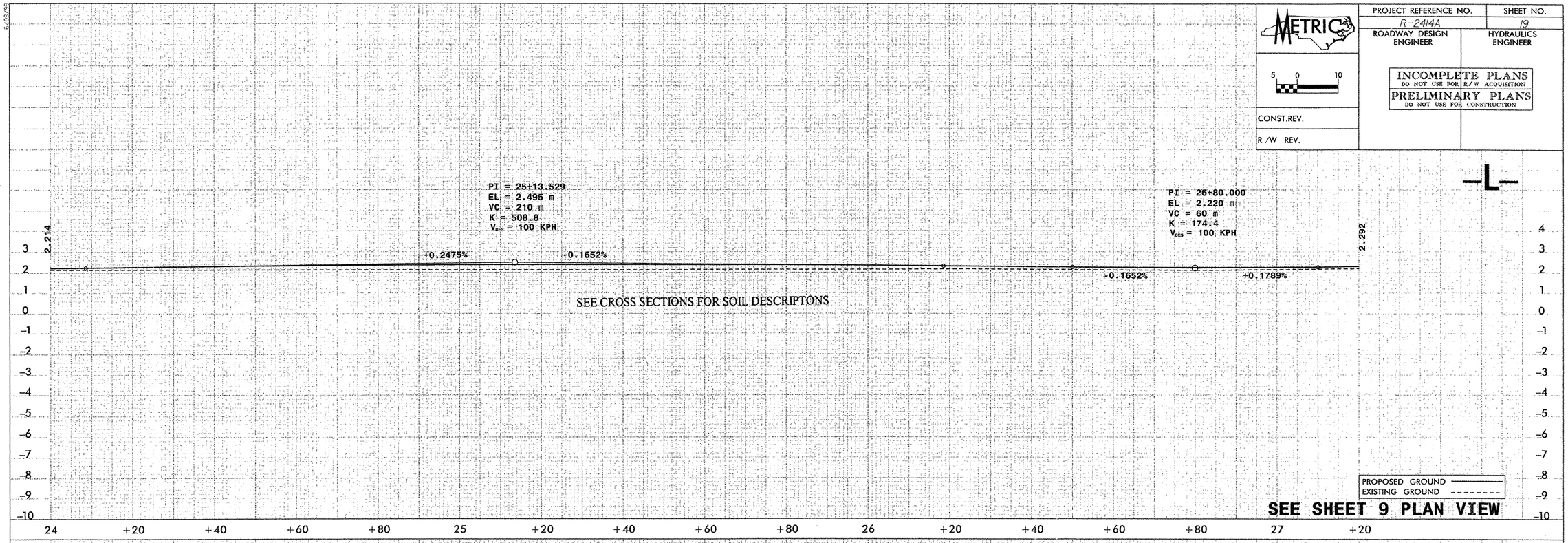
5 0 10

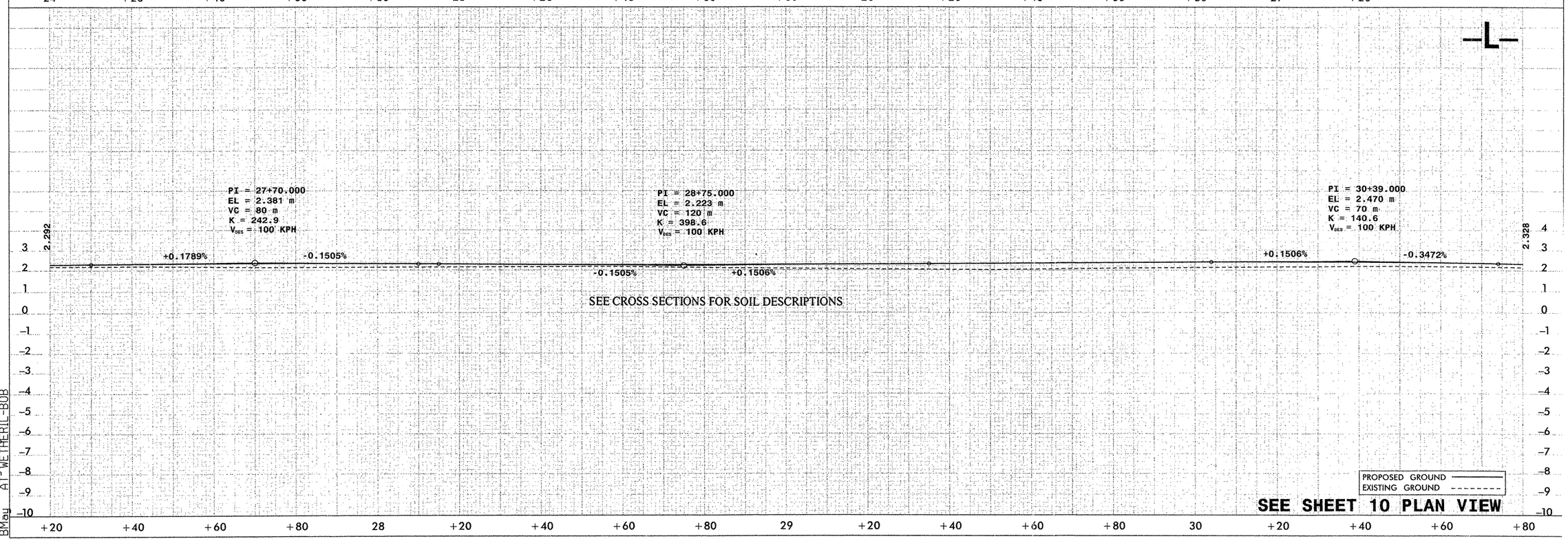
CONST.REV.

R /W REV.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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BMay AT3 WETHERIL-BOB

5/09/99

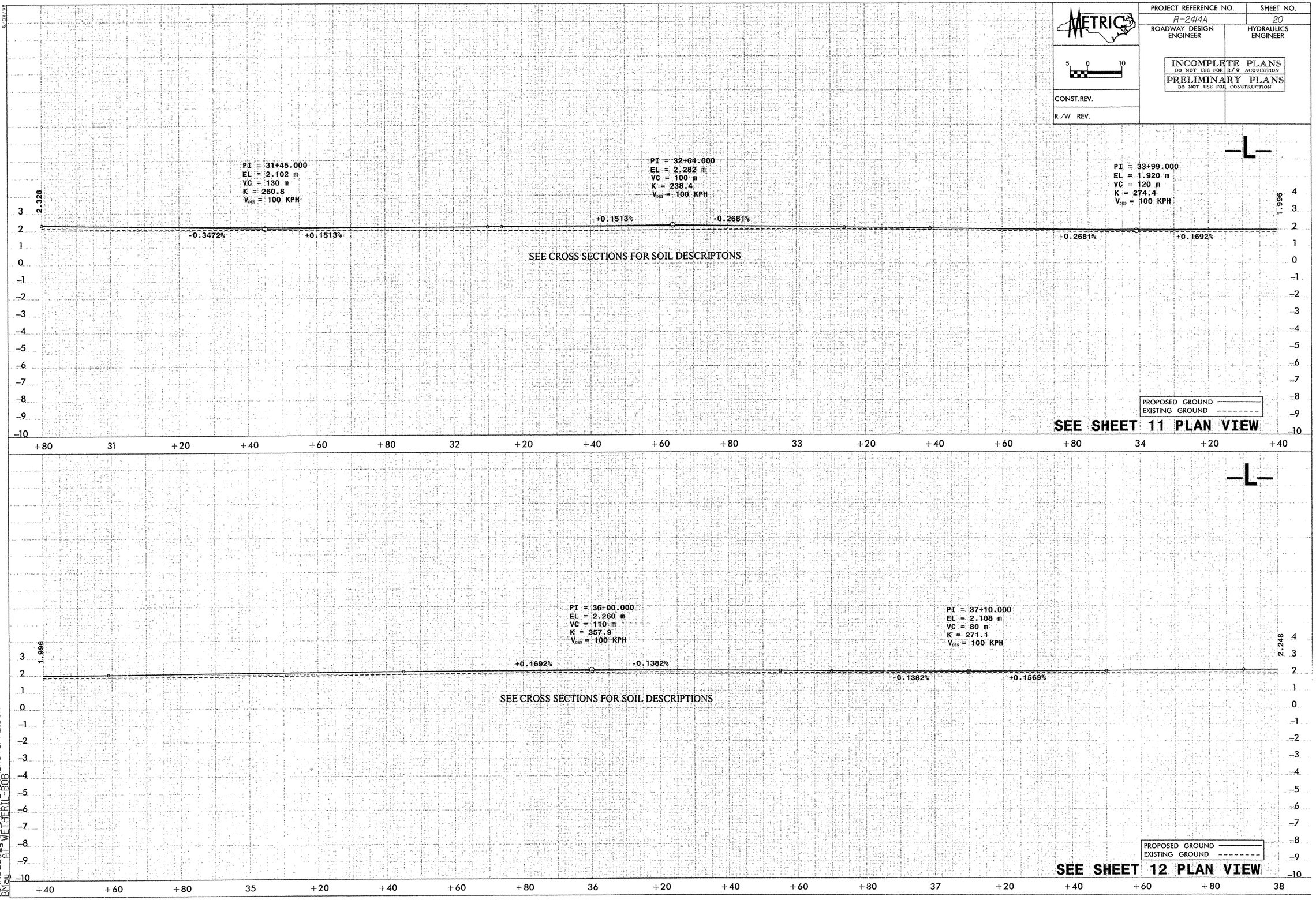
METRIC	PROJECT REFERENCE NO.	SHEET NO.
	R-2414A	20
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

5 0 10

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

CONST.REV.

R/W REV.



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R:\Roadway\Proj\R-2414A_RDY_PFL.DGN
BMay A11 WETHERIL-BOB

6/09/99

PROJECT REFERENCE NO.	SHEET NO.
R-2414A	21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

5 0 10

CONST.REV.

R/W REV.

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

-L-

PI = 39+05.000
EL = 2.414 m
VC = 230 m
K = 644.4
V_{DES} = 100 KPH

PI = 41+00.000
EL = 2.024 m
VC = 60 m
K = 89.4
V_{DES} = 100 KPH

2.248 +0.1569% -0.2000% -0.2000% +0.4711% 2.307

SEE CROSS SECTIONS FOR SOIL DESCRIPTONS

PROPOSED GROUND
EXISTING GROUND

SEE SHEET 13 PLAN VIEW

38 +20 +40 +60 +80 39 +20 +40 +60 +80 40 +20 +40 +60 +80 41 +20 +40 +60

-L-

BEGIN BRIDGE
-L- STA. 42+96.000

END BRIDGE
-L- STA. 43+24.000

PI = 44+25.000
EL = 3.555 m
VC = 140 m
K = 181.6
V_{DES} = 100 KPH

2.307 +0.4711% 3.330

NATURAL GROUND

NWS = 0.341

SEE CROSS SECTIONS FOR SOIL DESCRIPTIONS

PROPOSED GROUND
EXISTING GROUND

SEE SHEET 14 PLAN VIEW

+60 +80 42 +20 +40 +60 +80 43 +20 +40 +60 +80 44 +20 +40 +60 +80 45

17-NOV-2004 16:37
f:\Roadway\Proj\R-2414A_RDY_PFL.DGN
BWay AT WETHERIL-BOBand *

PROJECT REFERENCE NO.	SHEET NO.
R-2414A	22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

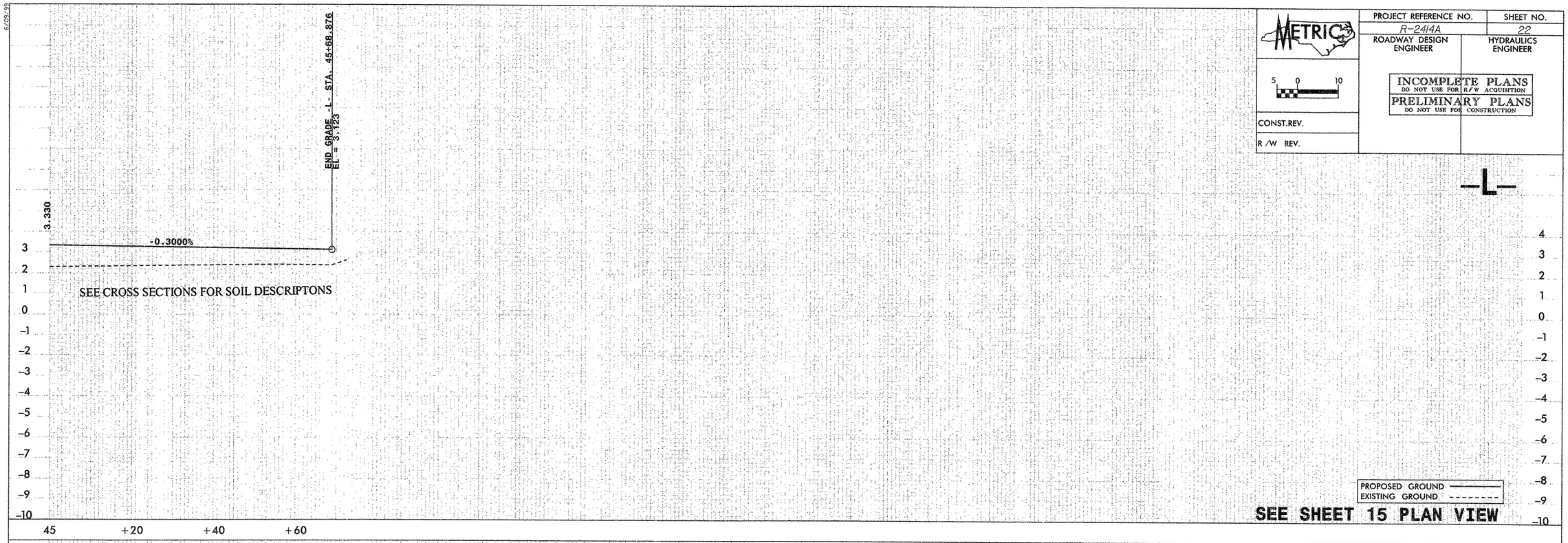
5 0 10

CONST.REV.

R/W REV.

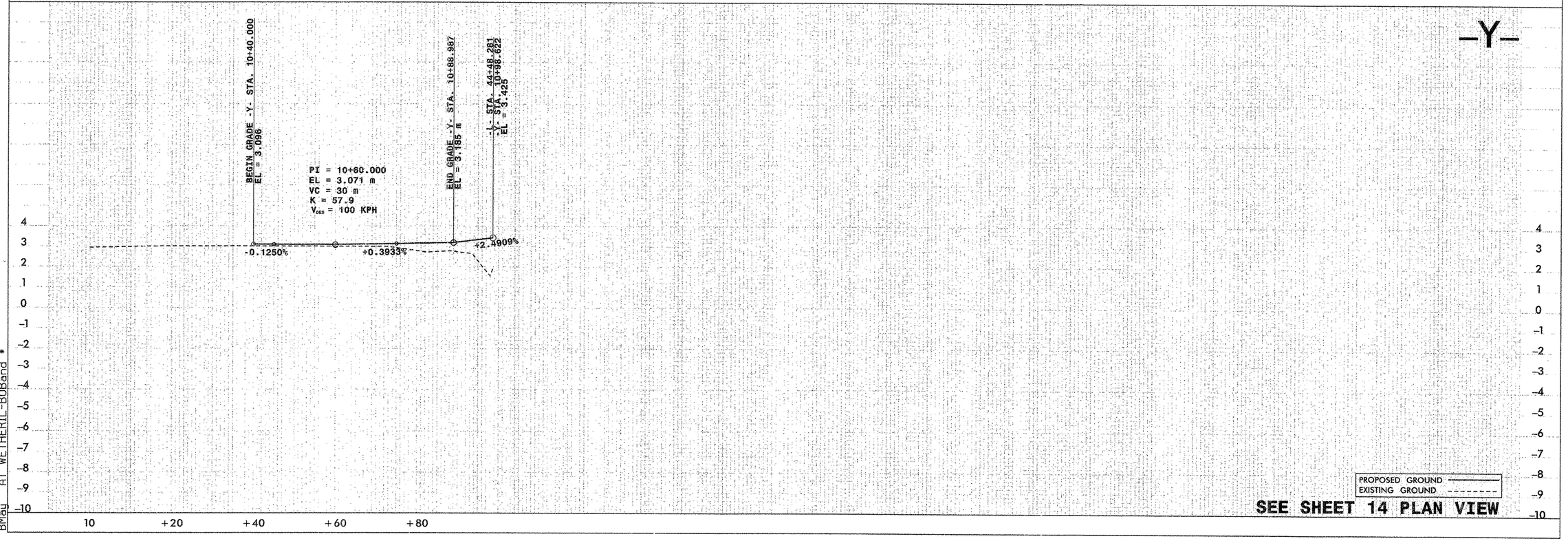
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-



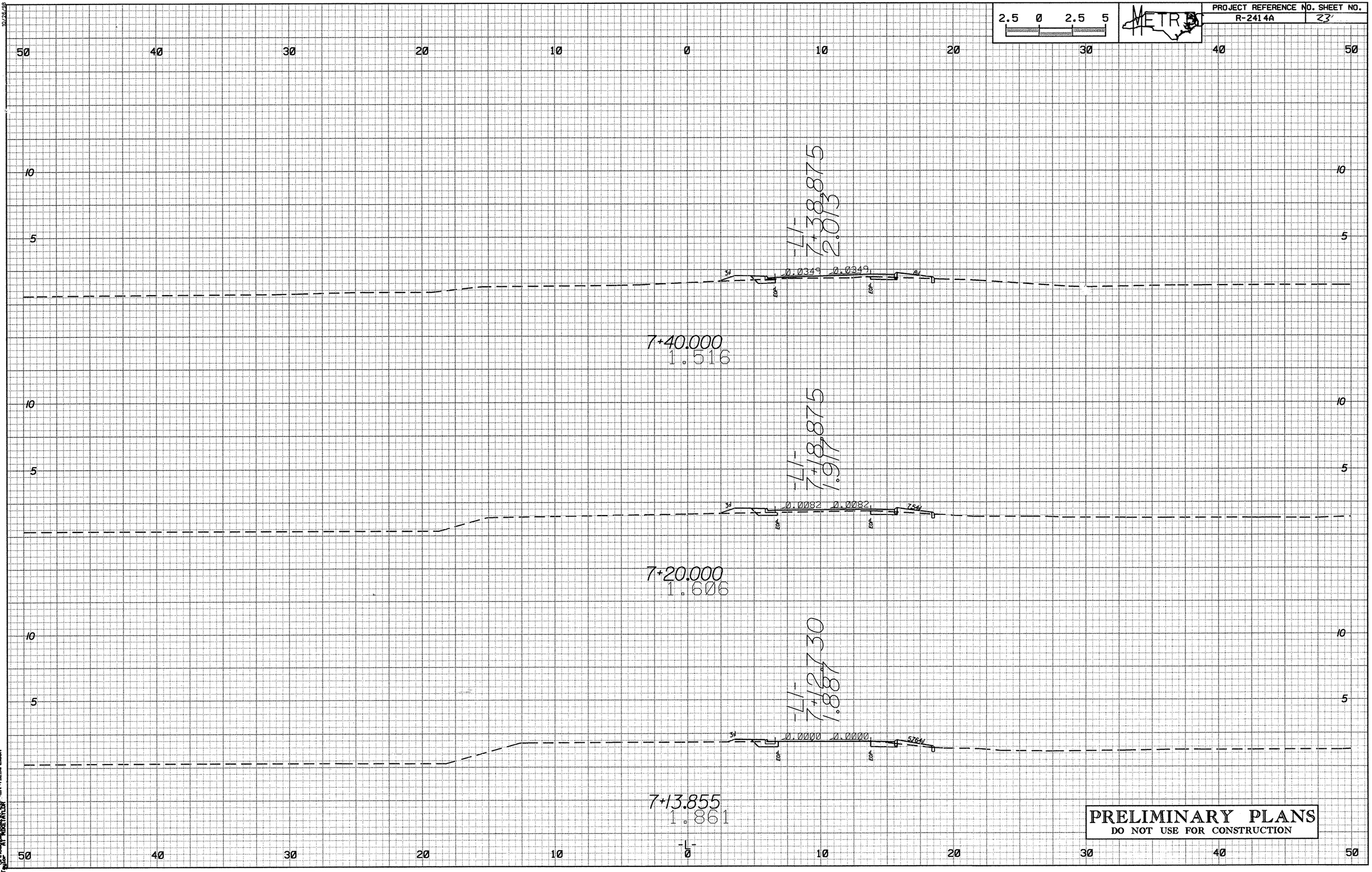
SEE SHEET 15 PLAN VIEW

-Y-

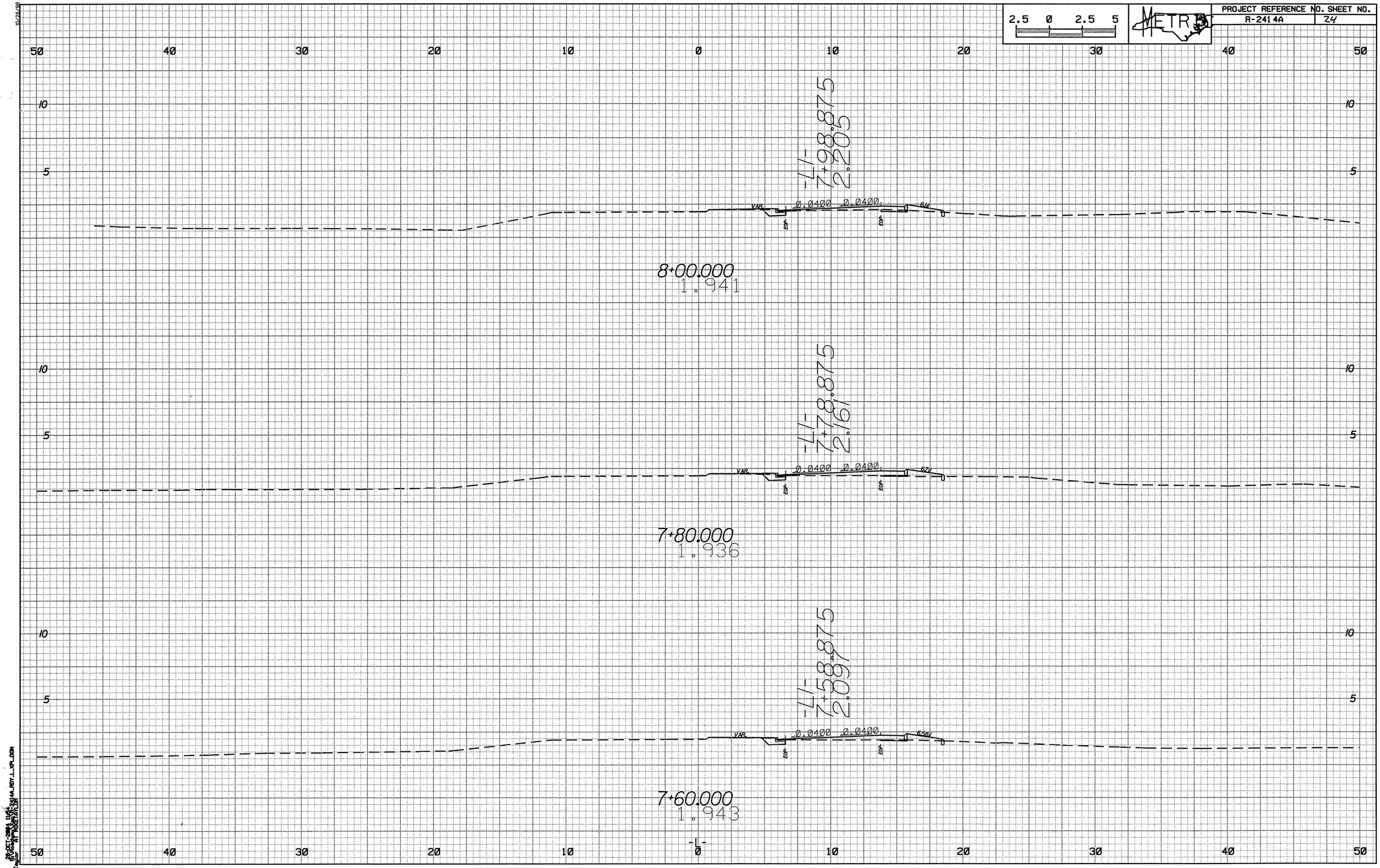


SEE SHEET 14 PLAN VIEW

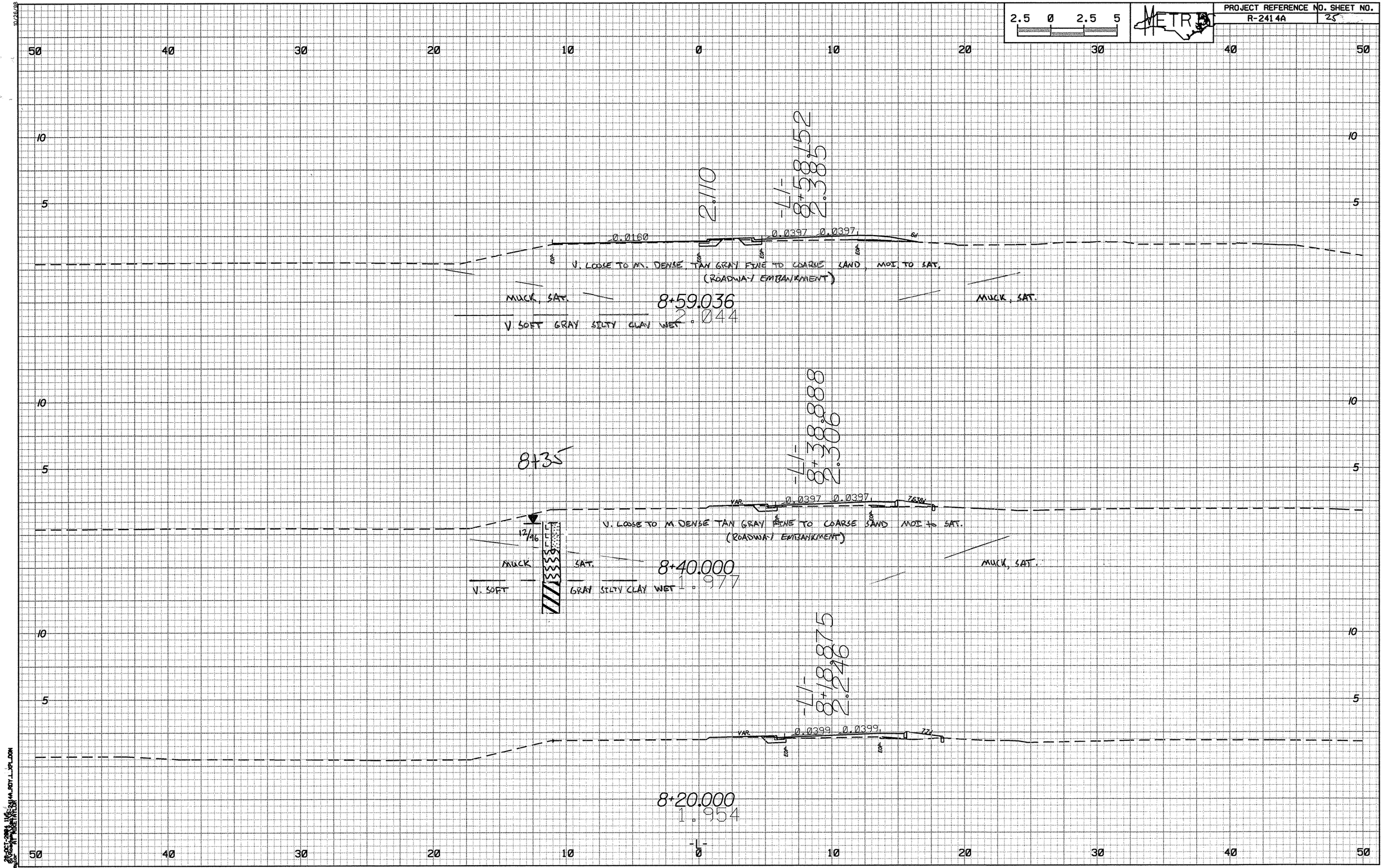
6/09/99
17-NOV-2004 16:37
f:\Roadway Proj\R-2414A-RDY_PFL.DGN
bMay AT WETHERIL-BOBand *



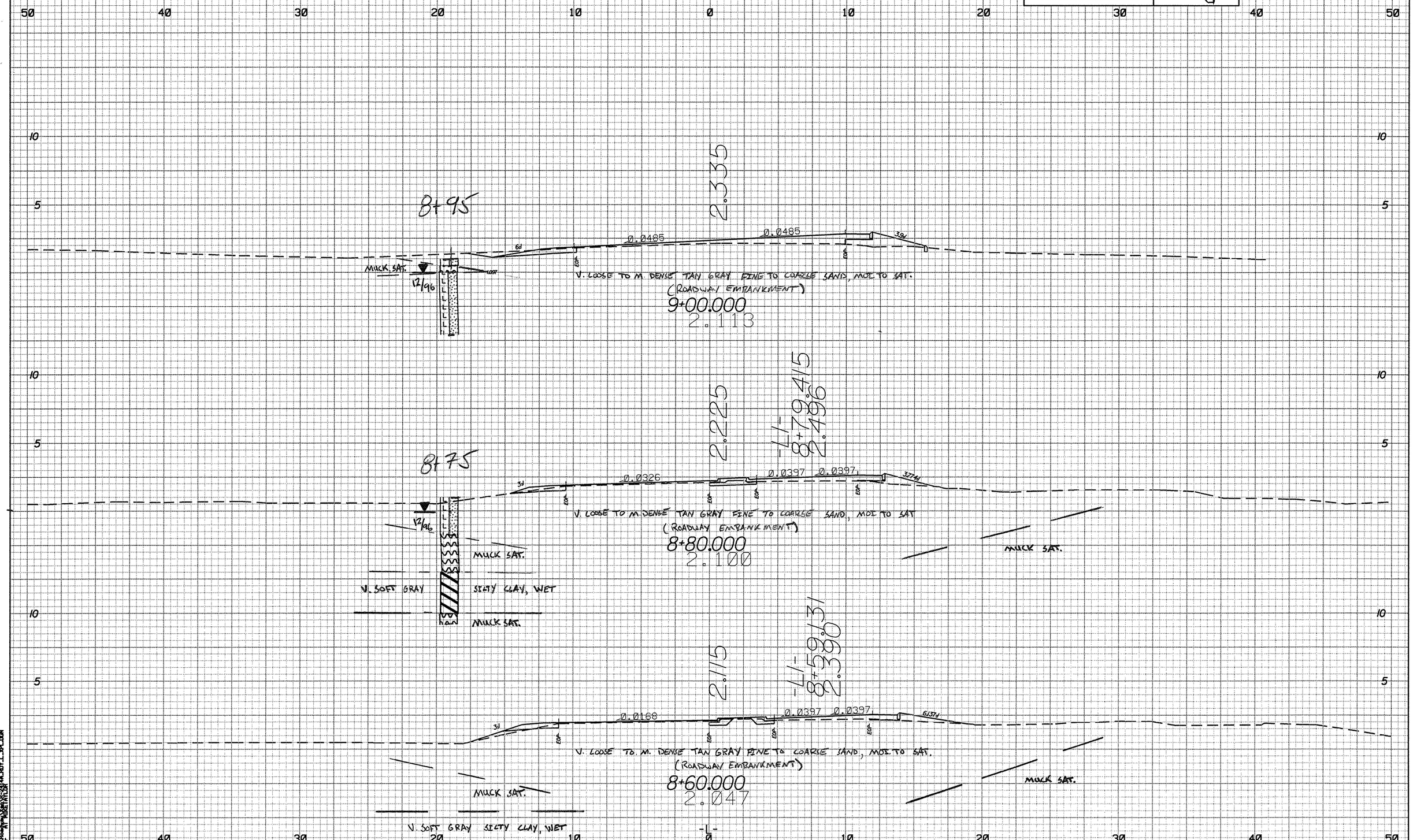
2.5 0 2.5 5
METRO
PROJECT REFERENCE NO. SHEET NO.
R-2414A
23
-L1-
7+38.875
2.013
0.0349 0.0349
7+40.000
1.516
-L1-
7+18.875
1.917
0.0082 0.0082
7+20.000
1.606
-L1-
7+12.730
1.887
0.0000 0.0000
7+13.855
1.861
-L-
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



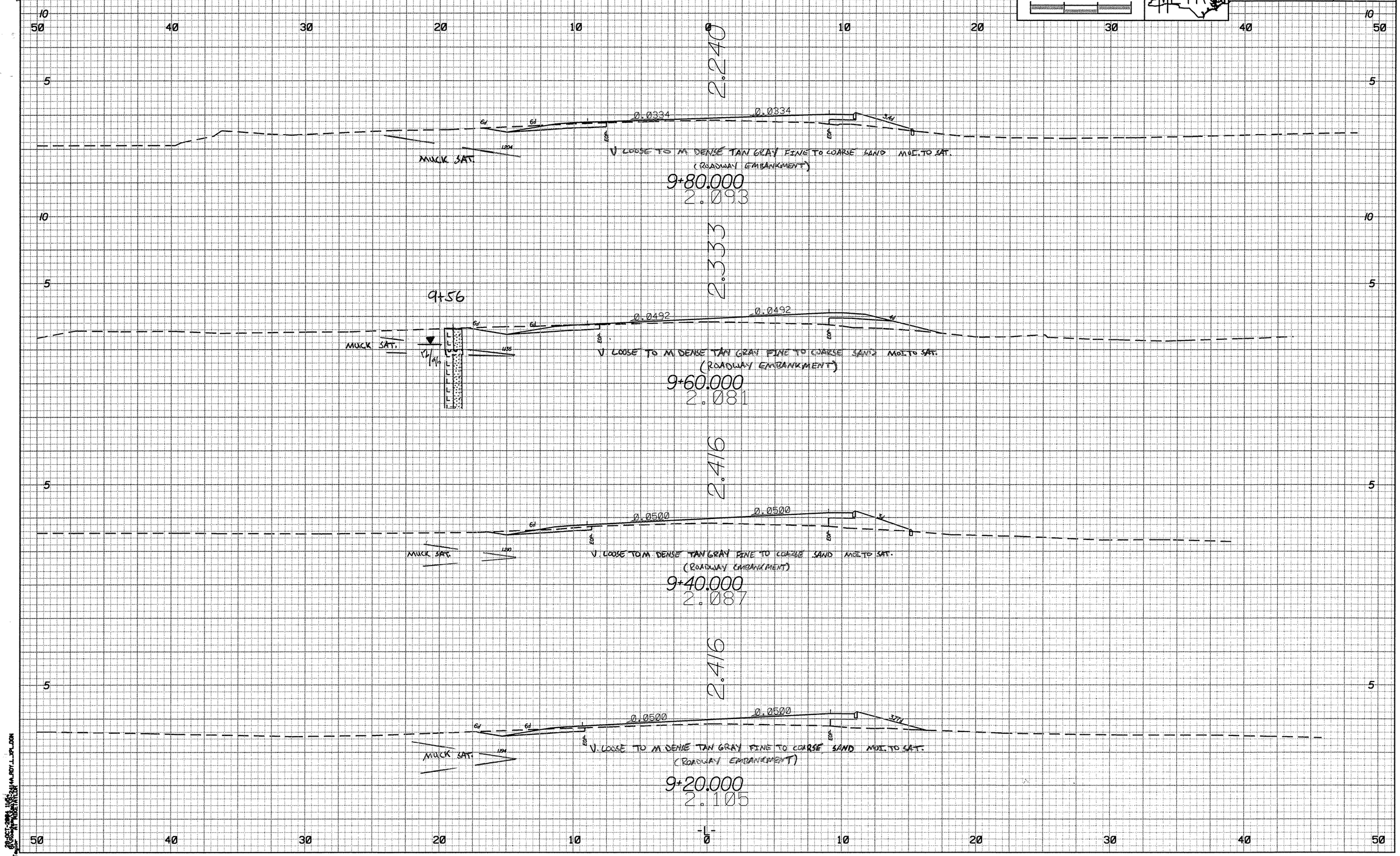
2.5 0 2.5 5
METRO
PROJECT REFERENCE NO. SHEET NO.
R-2414A 24
-L1-
7+98.875
2.205
0.0400 0.0400
VAR.
EOP
8+00.000
1.941
-L1-
7+78.875
2.161
0.0400 0.0400
VAR.
EOP
7+80.000
1.936
-L1-
7+58.875
2.097
0.0400 0.0400
VAR.
EOP
7+60.000
1.943
-L-



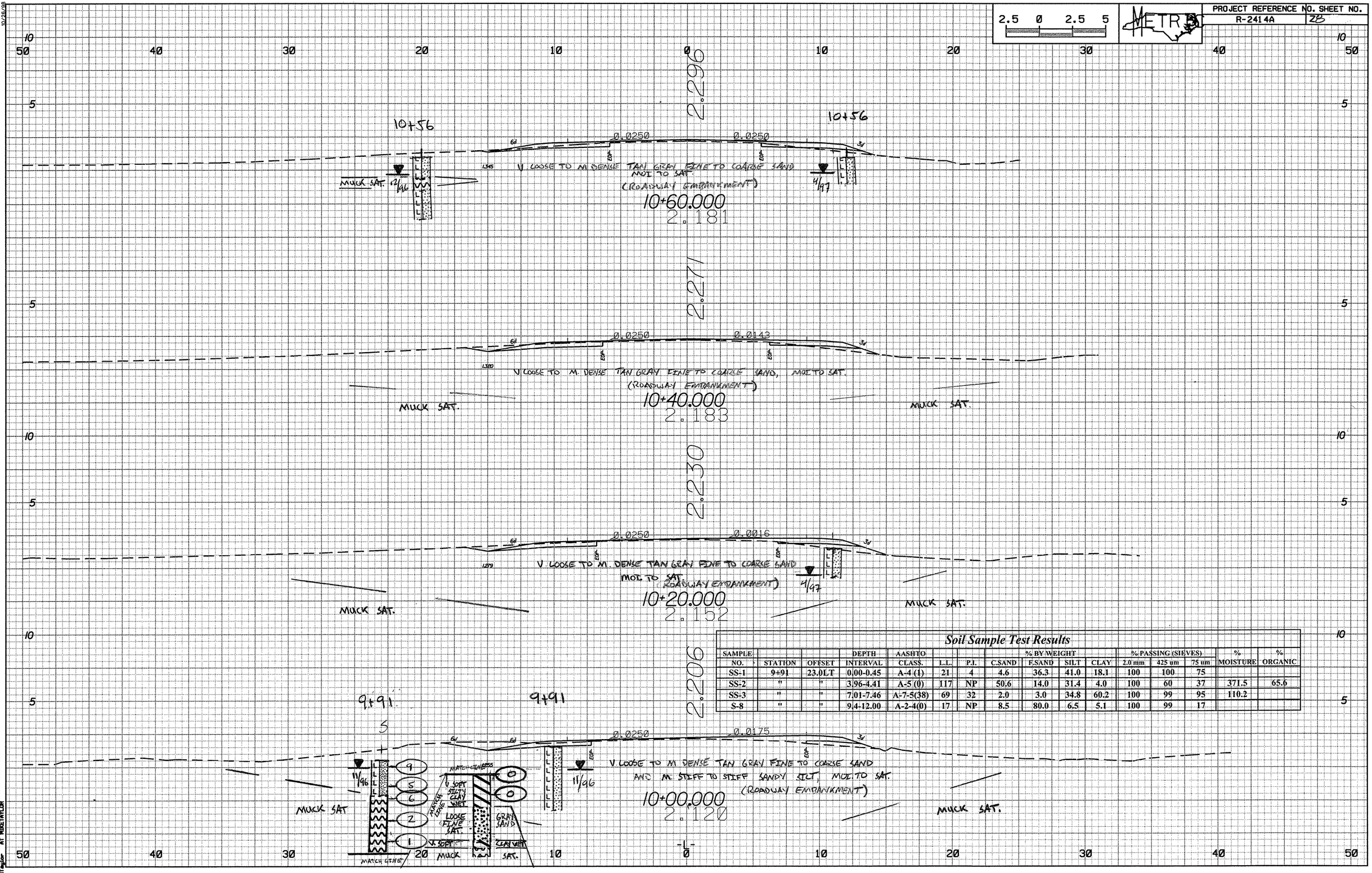
2.5 0 2.5 5
METRO
PROJECT REFERENCE NO. SHEET NO.
R-2414A 25
50 40 30 20 10 0 10 20 30 40 50
10
5
2.110
-L1-
8+58.152
2.385
0.0160
0.0397 0.0397
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK, SAT.
8+59.036
2.044
V. SOFT GRAY SILTY CLAY WET
MUCK, SAT.
8+35
-L1-
8+38.888
2.306
VAR.
0.0397 0.0397
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND MOI. to SAT.
(ROADWAY EMBANKMENT)
12/96
MUCK SAT.
8+40.000
1.977
V. SOFT GRAY SILTY CLAY WET
MUCK, SAT.
-L1-
8+18.875
2.246
VAR.
0.0399 0.0399
8+20.000
1.954
-L-



PROJECT REFERENCE NO. R-2414A
SHEET NO. 26
2.5 0 2.5 5
METRO
8+95
2.335
0.0485
0.0485
MUCK SAT.
12/96
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
9+00.000
2.113
8+75
2.225
-L1-
8+79.415
2.496
0.0326
0.0397
0.0397
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
8+80.000
2.100
MUCK SAT.
V. SOFT GRAY SILTY CLAY, WET
MUCK SAT.
MUCK SAT.
2.115
-L1-
8+59.131
2.390
0.0168
0.0397
0.0397
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
8+60.000
2.047
MUCK SAT.
MUCK SAT.
V. SOFT GRAY SILTY CLAY, WET
-L-

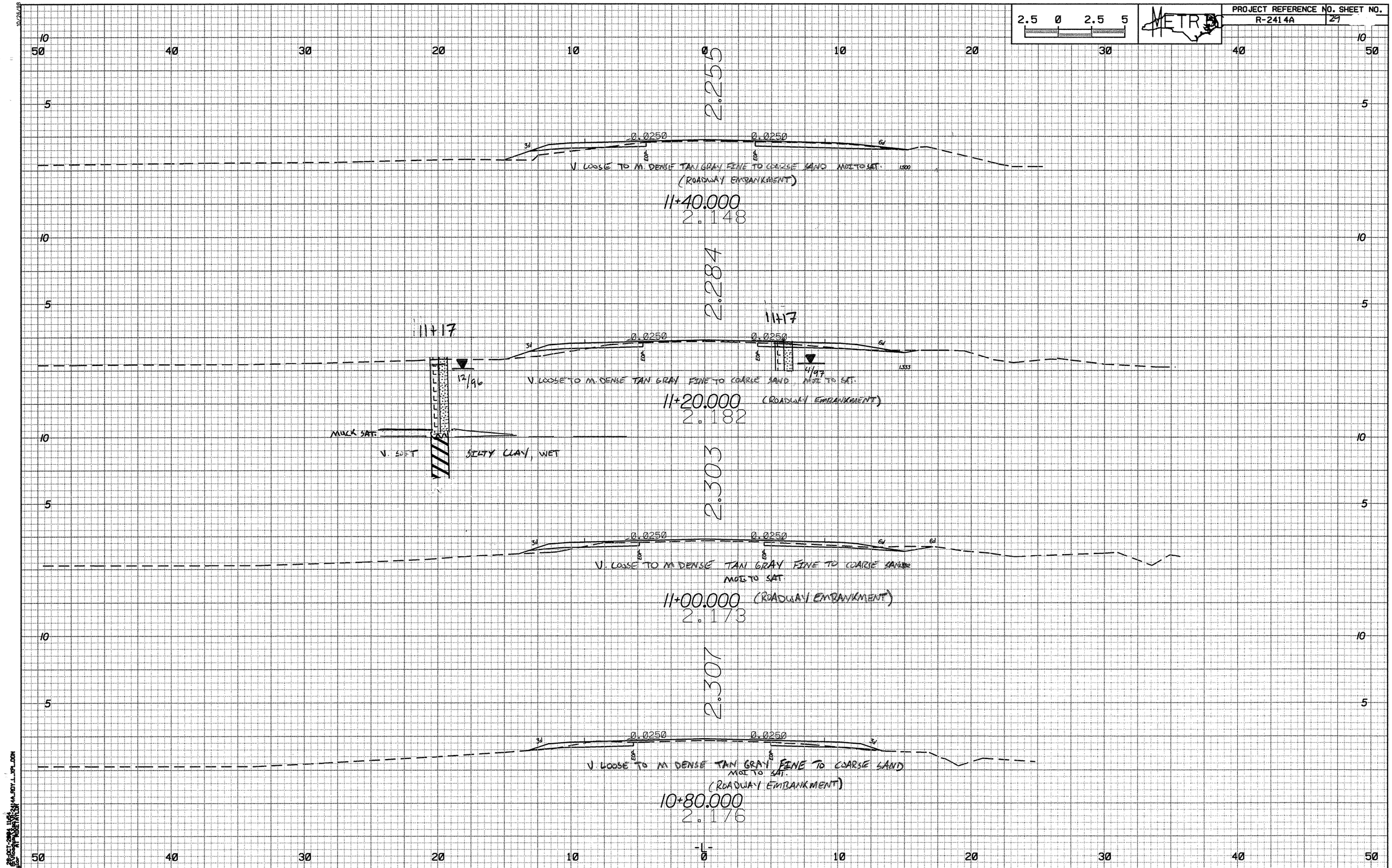


2.5 0 2.5 5
METRO
PROJECT REFERENCE NO. SHEET NO.
R-2414A 27
2.240
0.0334
0.0334
MUCK SAT.
V LOOSE TO M DENSE TAN GRAY FINE TO COARSE SAND MOI. TO SAT.
(ROADWAY EMBANKMENT)
9+80.000
2.093
2.333
9+56
0.0492
0.0492
MUCK SAT.
V LOOSE TO M DENSE TAN GRAY FINE TO COARSE SAND MOI. TO SAT.
(ROADWAY EMBANKMENT)
9+60.000
2.081
2.416
0.0500
0.0500
MUCK SAT.
V. LOOSE TO M DENSE TAN GRAY FINE TO COARSE SAND MOI. TO SAT.
(ROADWAY EMBANKMENT)
9+40.000
2.087
2.416
0.0500
0.0500
MUCK SAT.
V. LOOSE TO M DENSE TAN GRAY FINE TO COARSE SAND MOI. TO SAT.
(ROADWAY EMBANKMENT)
9+20.000
2.105
-L-



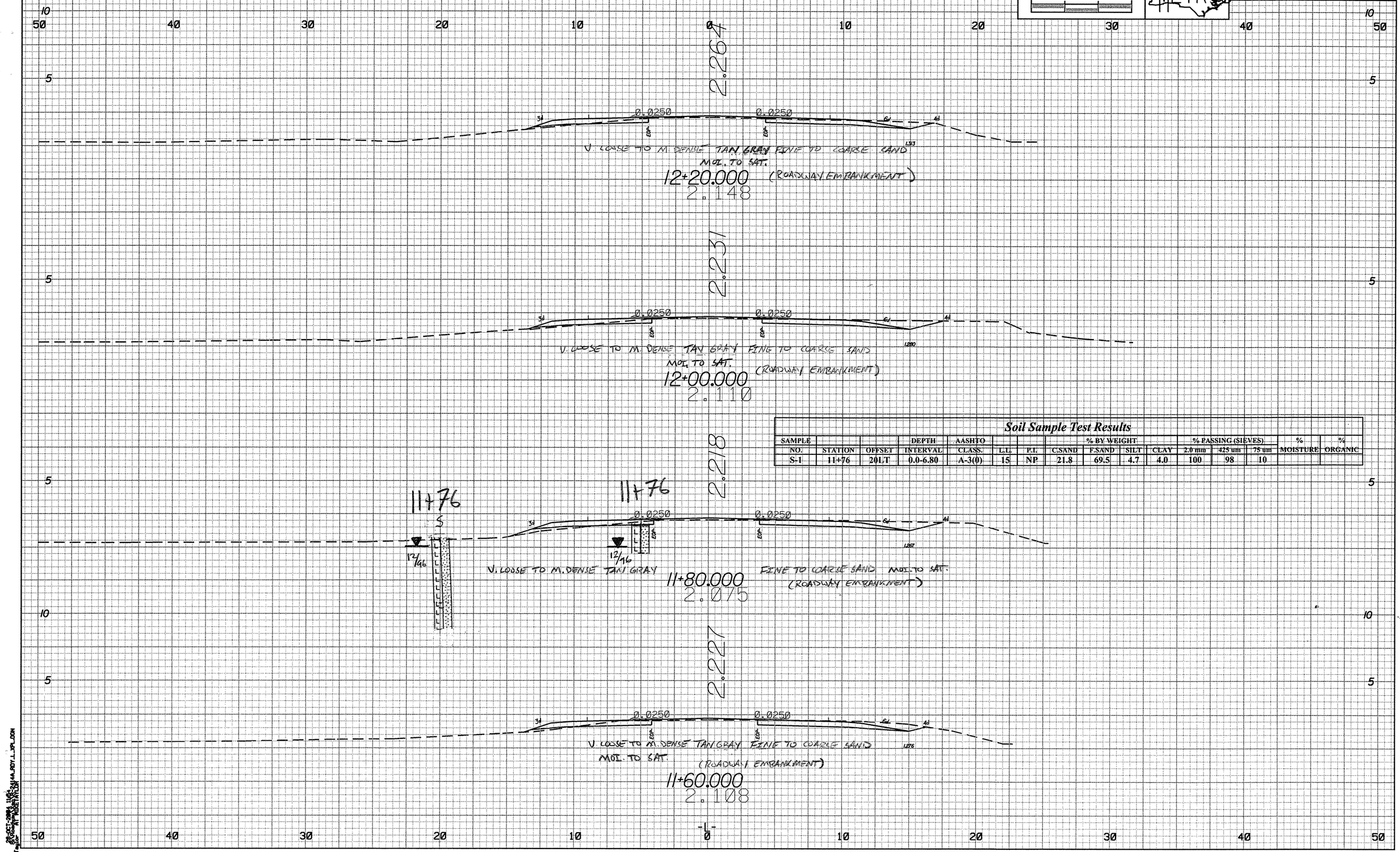
Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
SS-1	9+91	23.0LT	0.00-0.45	A-4 (1)	21	4	4.6	36.3	41.0	18.1	100	100	75		
SS-2	"	"	3.96-4.41	A-5 (0)	117	NP	50.6	14.0	31.4	4.0	100	60	37	371.5	65.6
SS-3	"	"	7.01-7.46	A-7-5(38)	69	32	2.0	3.0	34.8	60.2	100	99	95	110.2	
S-8	"	"	9.4-12.00	A-2-4(0)	17	NP	8.5	80.0	6.5	5.1	100	99	17		



2.5 0 2.5 5
METRO
PROJECT REFERENCE NO. SHEET NO.
R-2414A
29
2.255
0.0250
0.0250
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND MOI TO SAT.
(ROADWAY EMBANKMENT)
11+40.000
2.148
2.284
11+17
11+17
12/96
4/97
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND MOI TO SAT.
11+20.000 (ROADWAY EMBANKMENT)
2.182
MUCK SAT.
V. SOFT SILTY CLAY, WET
2.303
V. LOOSE TO M DENSE TAN GRAY FINE TO COARSE SAND
MOI TO SAT.
11+00.000 (ROADWAY EMBANKMENT)
2.173
2.307
V. LOOSE TO M DENSE TAN GRAY FINE TO COARSE SAND
MOI TO SAT.
(ROADWAY EMBANKMENT)
10+80.000
2.176
-L-

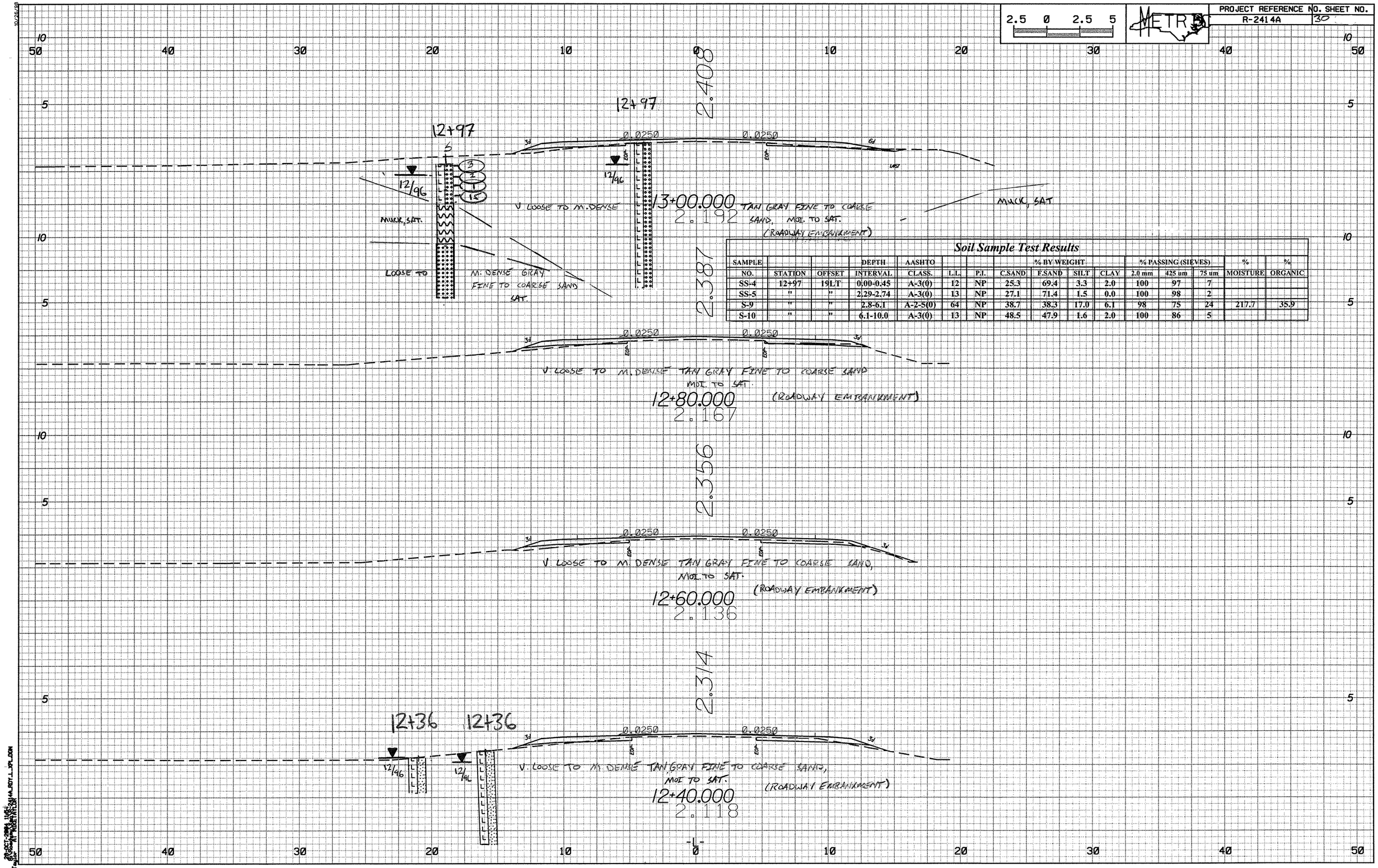
PROJECT REFERENCE NO. R-2414A | SHEET NO. X-8



Soil Sample Test Results

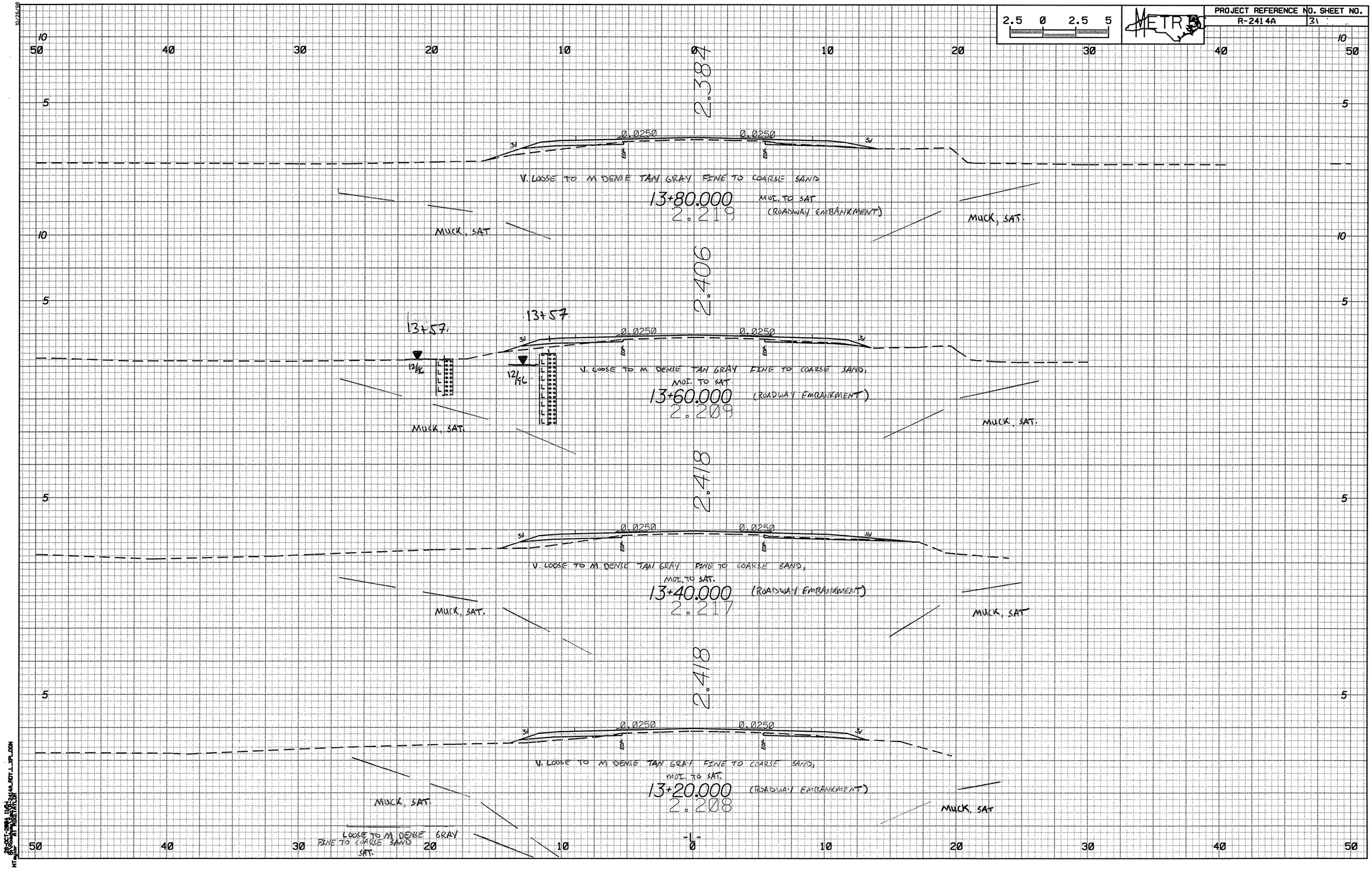
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
S-1	11+76	20LT	0.0-6.80	A-3(0)	15	NP	21.8	69.5	4.7	4.0	100	98	10		

2.5 0 2.5 5

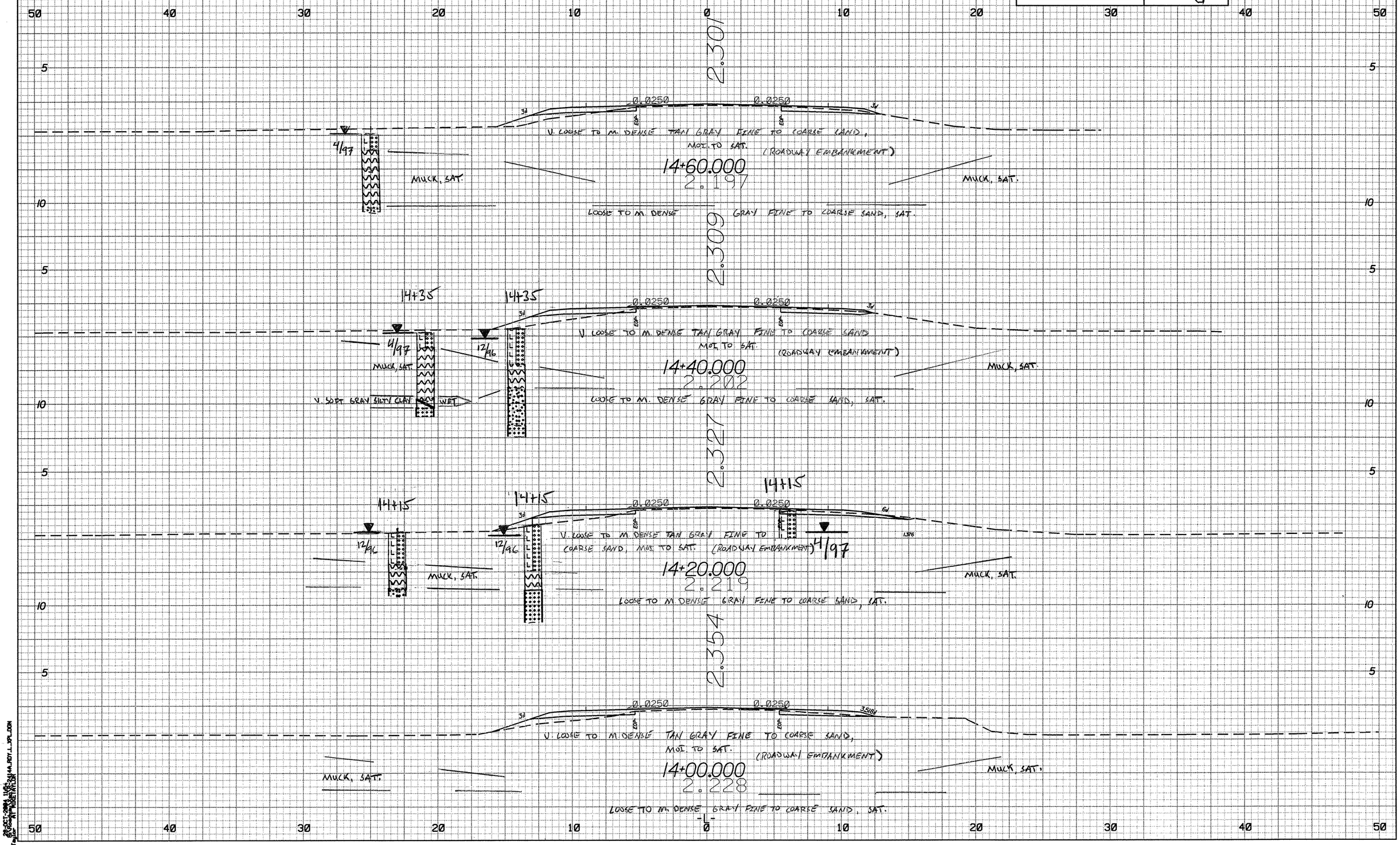


Soil Sample Test Results

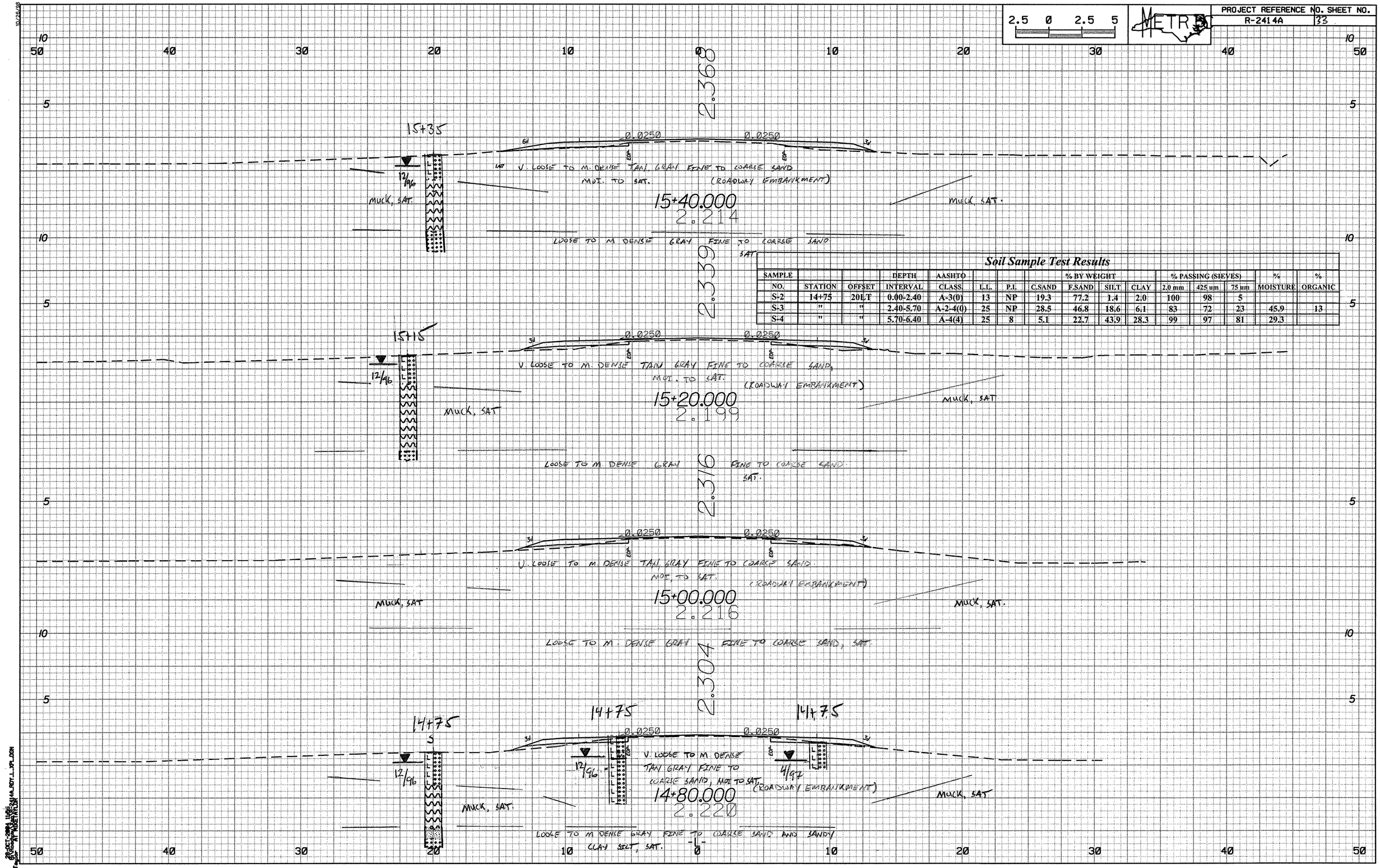
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
SS-4	12+97	19LT	0.00-0.45	A-3(0)	12	NP	25.3	69.4	3.3	2.0	100	97	7		
SS-5	"	"	2.29-2.74	A-3(0)	13	NP	27.1	71.4	1.5	0.0	100	98	2		
S-9	"	"	2.8-6.1	A-2-5(0)	64	NP	38.7	38.3	17.0	6.1	98	75	24	217.7	35.9
S-10	"	"	6.1-10.0	A-3(0)	13	NP	48.5	47.9	1.6	2.0	100	86	5		


2.5 0 2.5 5
METRIC
2.384
0.0250
0.0250
3:1
EOP
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND
13+80.000
MOI. TO SAT
(ROADWAY EMBANKMENT)
2.219
MUCK, SAT.
MUCK, SAT.
2.406
13+57
13+57
12/96
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND,
MOI. TO SAT
13+60.000
(ROADWAY EMBANKMENT)
2.209
MUCK, SAT.
MUCK, SAT.
2.418
1:1
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND,
MOI. TO SAT.
13+40.000
(ROADWAY EMBANKMENT)
2.217
MUCK, SAT.
MUCK, SAT
2.418
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND,
MOI. TO SAT.
13+20.000
(ROADWAY EMBANKMENT)
2.208
MUCK, SAT.
MUCK, SAT
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND SAT.
-L-

2.5 0 2.5 5

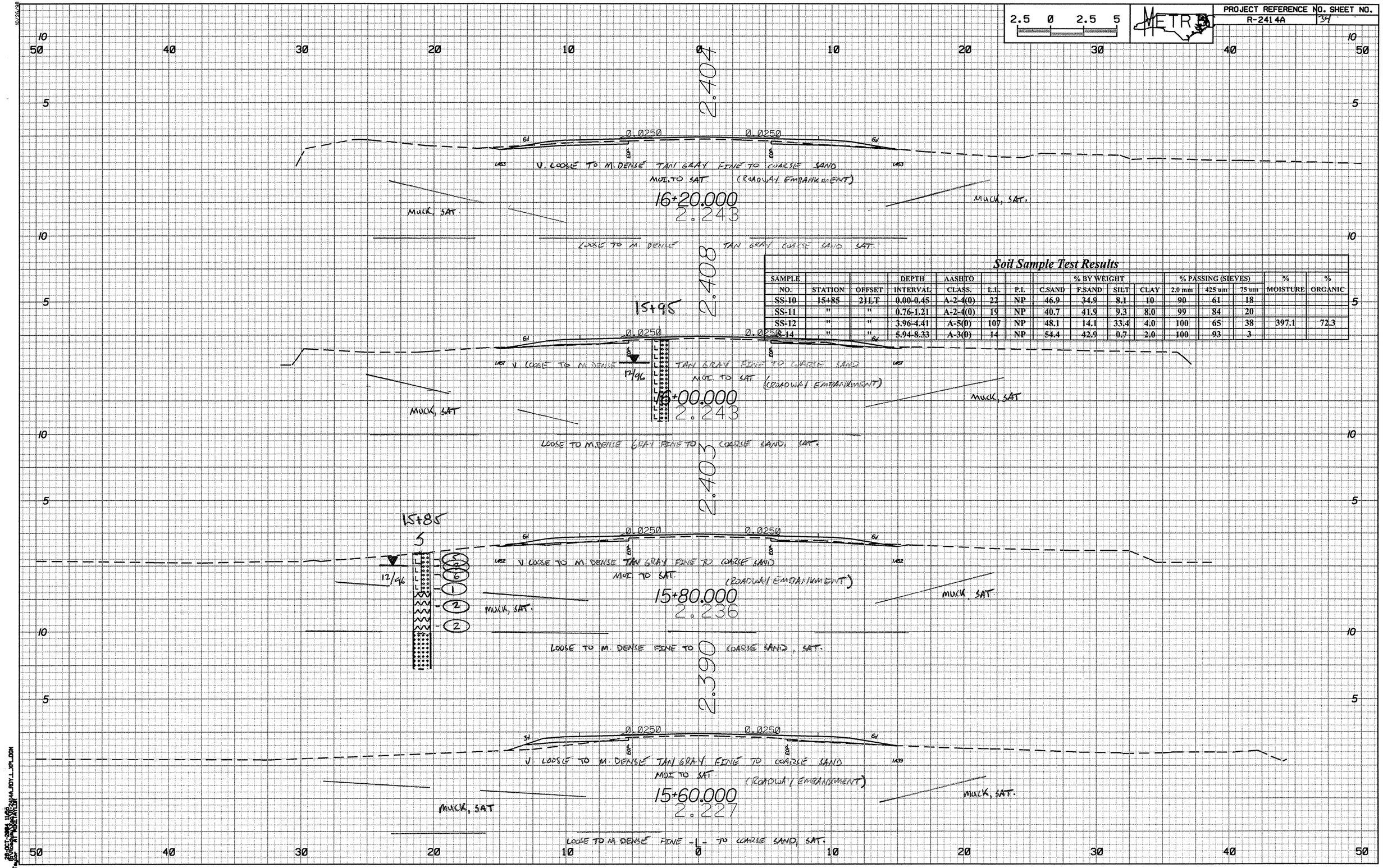

2.301
0.0250
0.0250
3:1
EOP
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT. (ROADWAY EMBANKMENT)
4/97
MUCK, SAT.
14+60.000
2.197
MUCK, SAT.
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND, SAT.
2.309
14+35
14+35
0.0250
0.0250
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND MOI. TO SAT. (ROADWAY EMBANKMENT)
4/97
12/96
MUCK, SAT.
14+40.000
2.202
MUCK, SAT.
V. SOFT GRAY SILTY CLAY
WET
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND, SAT.
2.327
14+15
14+15
14+15
0.0250
0.0250
6:1
1.376
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT. (ROADWAY EMBANKMENT)
4/97
12/96
12/96
MUCK, SAT.
14+20.000
2.219
MUCK, SAT.
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND, SAT.
2.354
0.0250
0.0250
3.516
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT. (ROADWAY EMBANKMENT)
MUCK, SAT.
14+00.000
2.228
MUCK, SAT.
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND, SAT.

2.5 0 2.5 5



Soil Sample Test Results

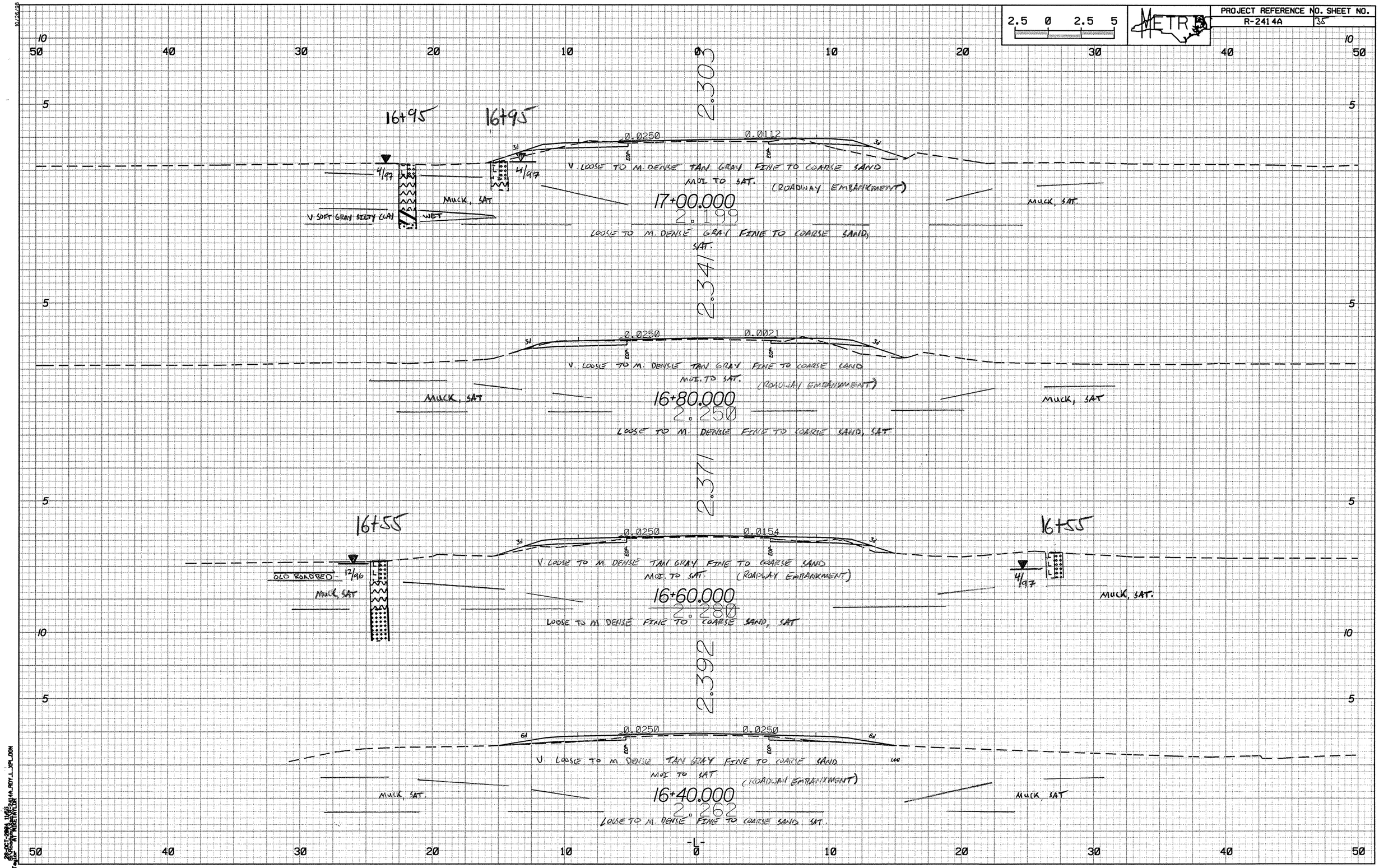
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
S-2	14+75	20LT	0.00-2.40	A-3(0)	13	NP	19.3	77.2	1.4	2.0	100	98	5		
S-3	"	"	2.40-5.70	A-2-4(0)	25	NP	28.5	46.8	18.6	6.1	83	72	23	45.9	13
S-4	"	"	5.70-6.40	A-4(4)	25	8	5.1	22.7	43.9	28.3	99	97	81	29.3	

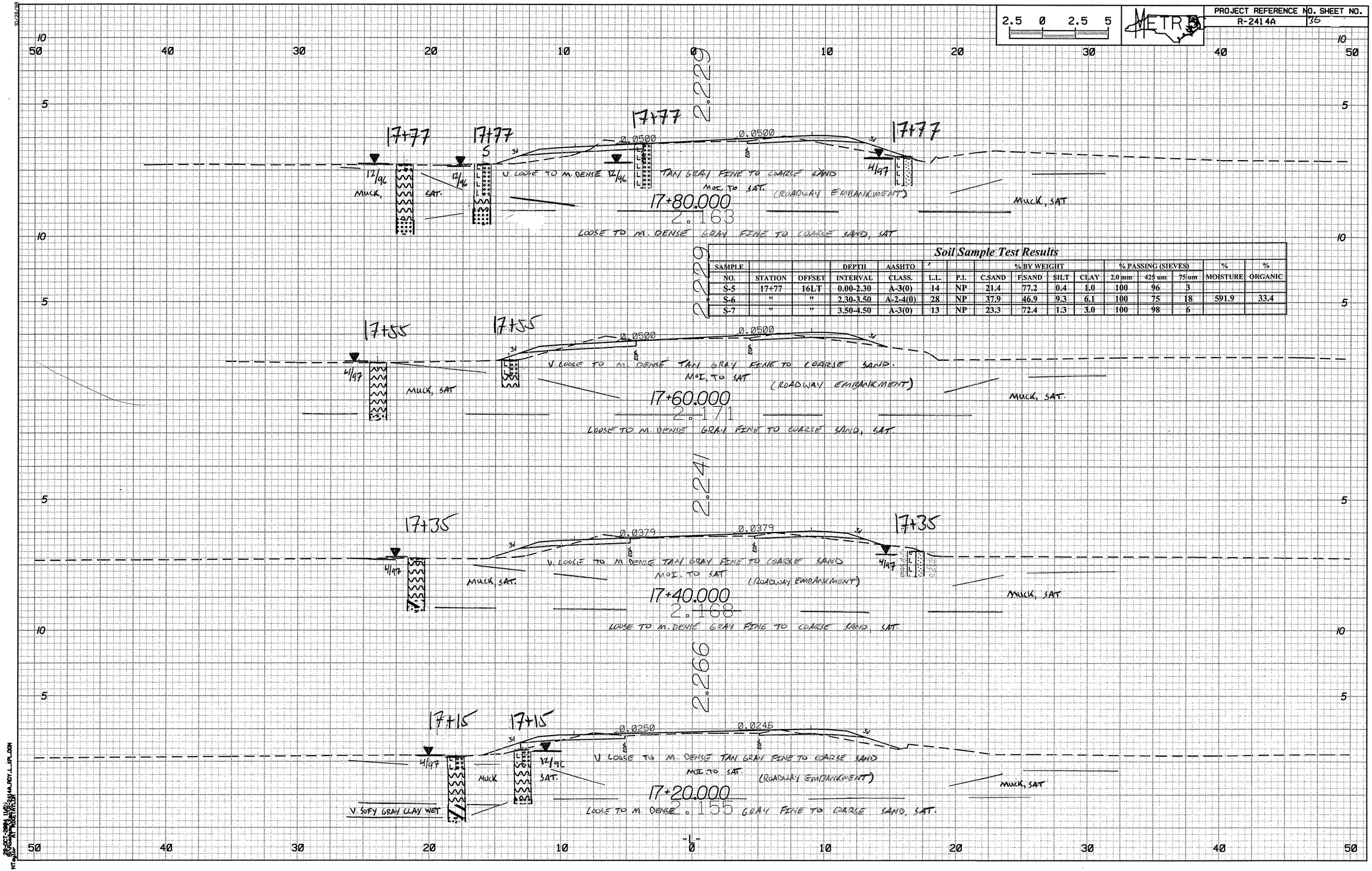


Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
SS-10	15+85	21LT	0.00-0.45	A-2-4(0)	22	NP	46.9	34.9	8.1	10	90	61	18		
SS-11	"	"	0.76-1.21	A-2-4(0)	19	NP	40.7	41.9	9.3	8.0	99	84	20		
SS-12	"	"	3.96-4.41	A-5(0)	107	NP	48.1	14.1	33.4	4.0	100	65	38	397.1	72.3
SS-14	"	"	5.94-8.33	A-3(0)	14	NP	54.4	42.9	0.7	2.0	100	93	3		

2.5 0 2.5 5

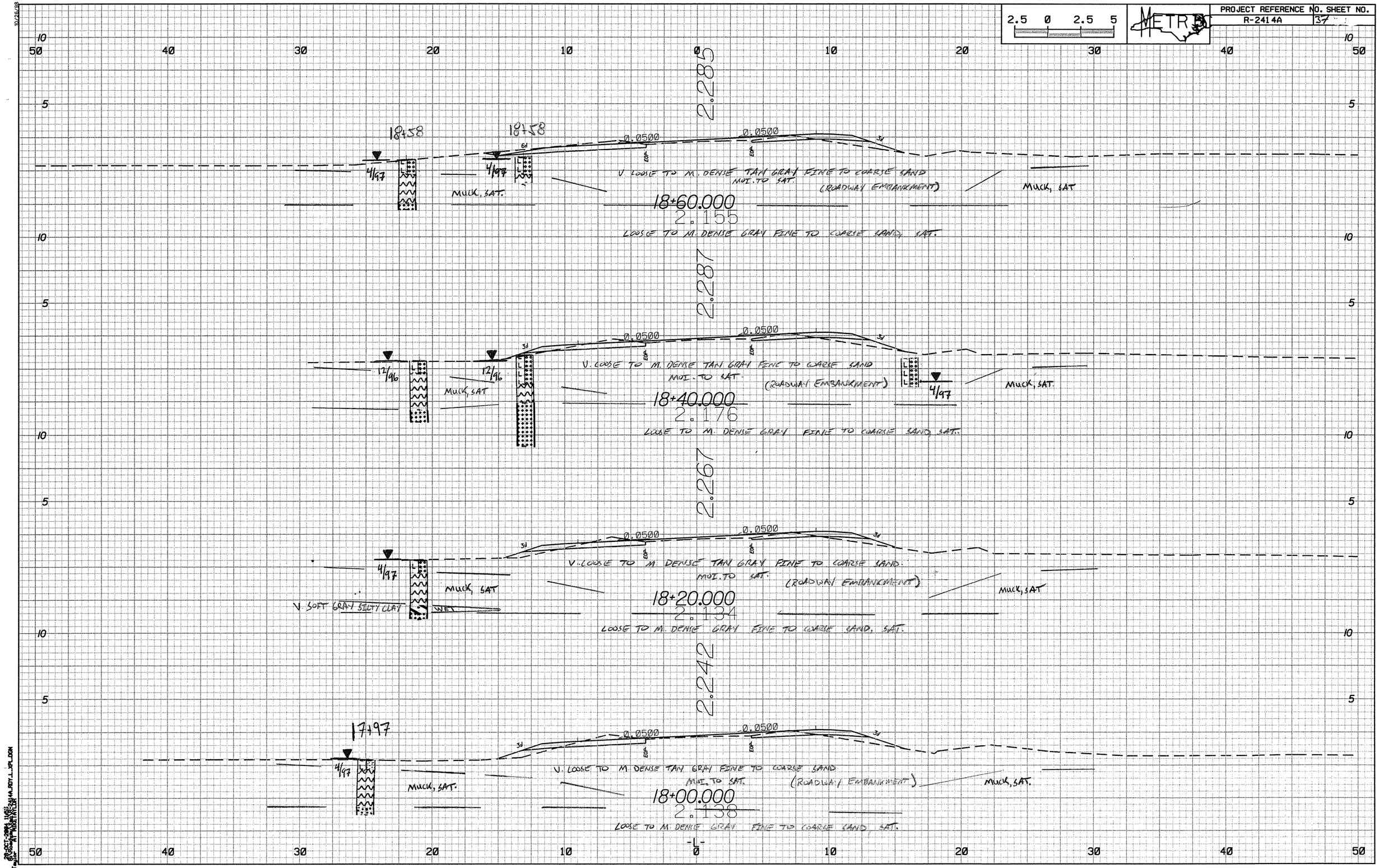

16+95
16+95
2.303
0.0250
0.0112
3:1
3:1
EOP
EOP
4/97
4/97
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND
MOI. TO SAT. (ROADWAY EMBANKMENT)
MUCK, SAT
V. SOFT GRAY SILTY CLAY
WET
MUCK, SAT.
17+00.000
2.199
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND, SAT.
2.341
0.0250
0.0021
3:1
3:1
EOP
EOP
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND
MOI. TO SAT. (ROADWAY EMBANKMENT)
MUCK, SAT
MUCK, SAT
16+80.000
2.250
LOOSE TO M. DENSE FINE TO COARSE SAND, SAT.
2.371
16+55
16+55
0.0250
0.0154
3:1
3:1
EOP
EOP
OLD ROADBED
12/96
4/97
MUCK, SAT
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND
MOI. TO SAT (ROADWAY EMBANKMENT)
MUCK, SAT.
16+60.000
2.280
LOOSE TO M. DENSE FINE TO COARSE SAND, SAT
2.392
0.0250
0.0250
6:1
6:1
EOP
EOP
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND
MOI. TO SAT (ROADWAY EMBANKMENT)
MUCK, SAT.
MUCK, SAT
16+40.000
2.262
LOOSE TO M. DENSE FINE TO COARSE SAND, SAT.
-L-

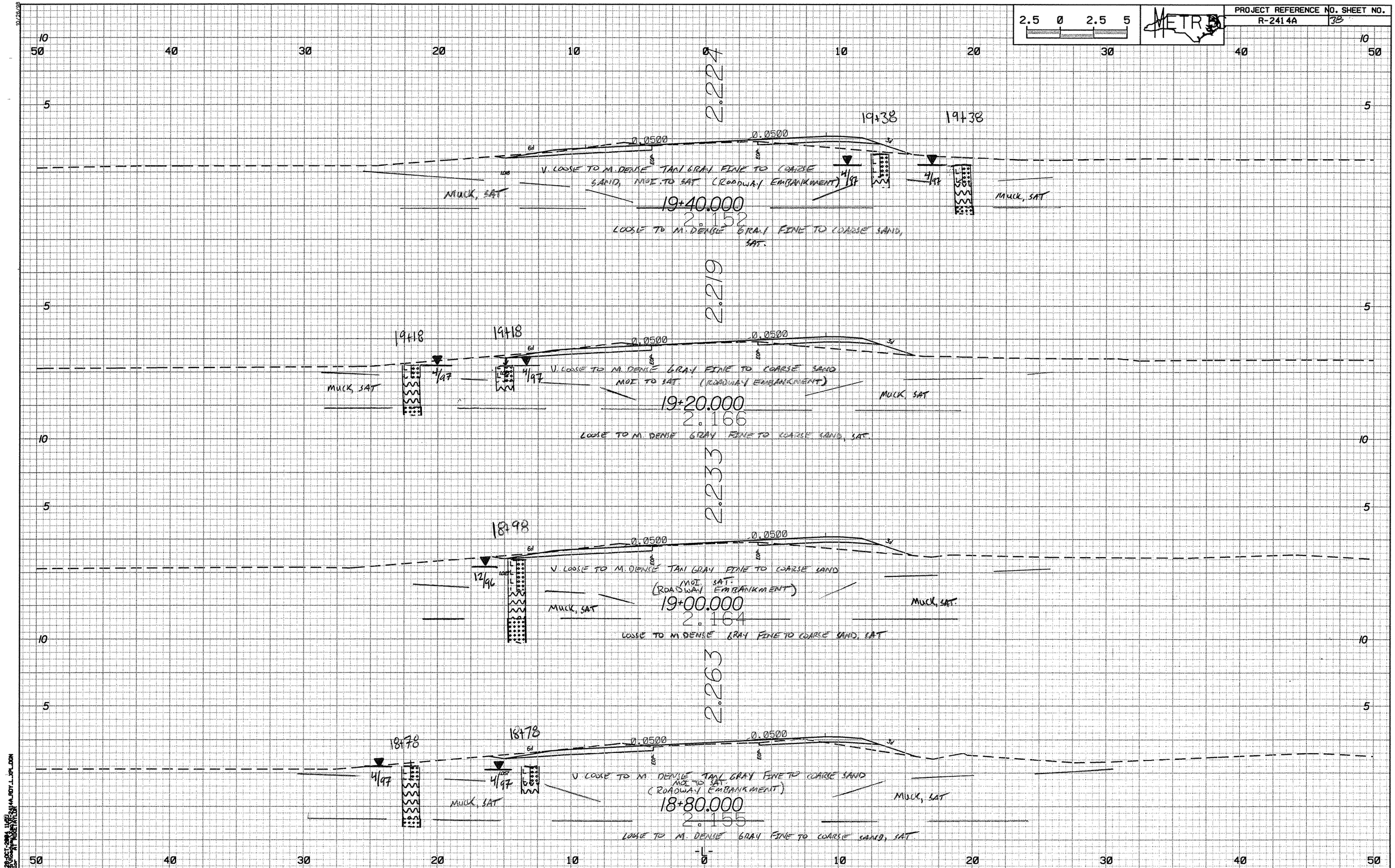


Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
S-5	17+77	16LT	0.00-2.30	A-3(0)	14	NP	21.4	77.2	0.4	1.0	100	96	3		
S-6	"	"	2.30-3.50	A-2-4(0)	28	NP	37.9	46.9	9.3	6.1	100	75	18	591.9	33.4
S-7	"	"	3.50-4.50	A-3(0)	13	NP	23.3	72.4	1.3	3.0	100	98	6		

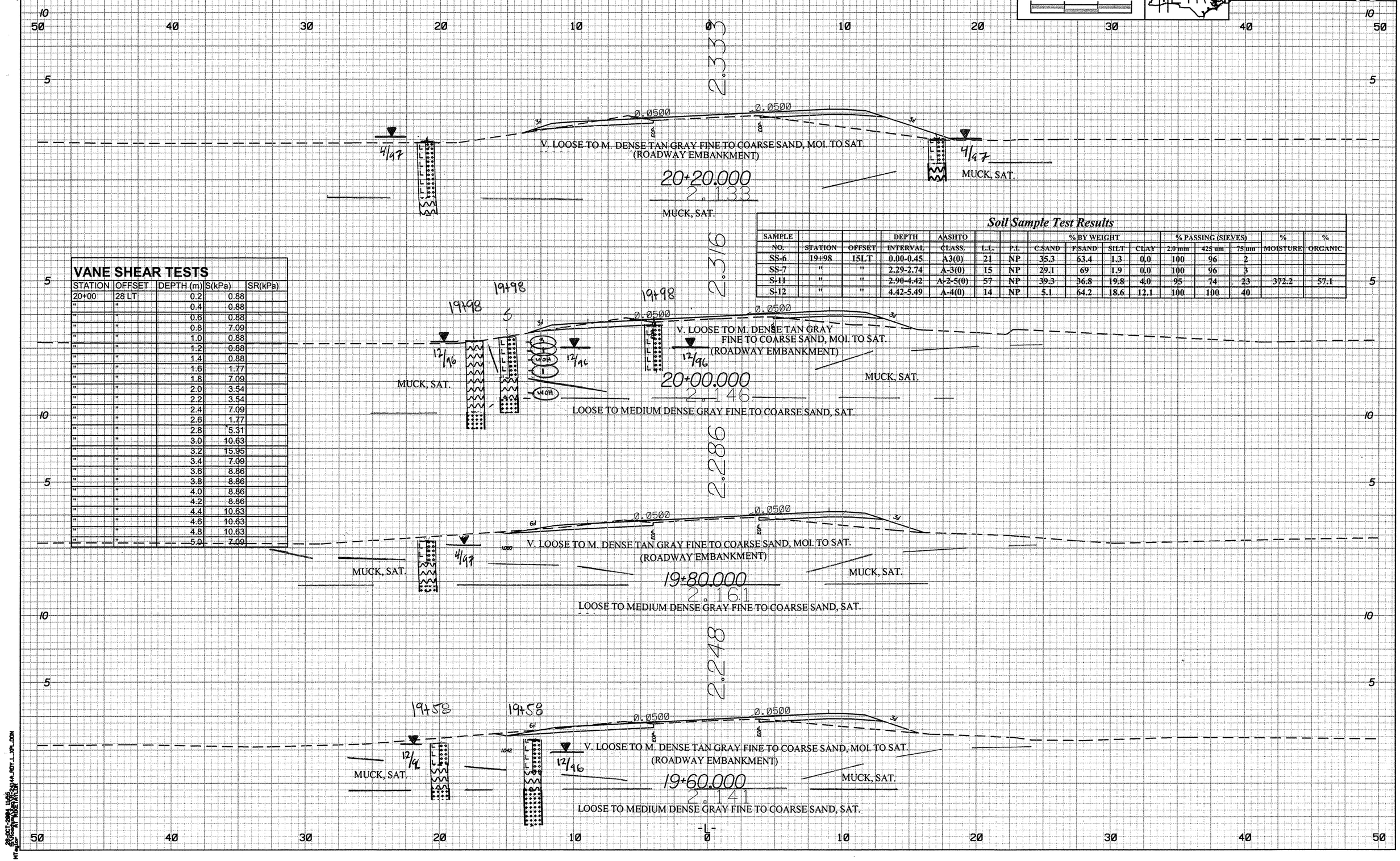
2.5 0 2.5 5


18+58
4/97
MUCK, SAT.
18+58
4/97
6H
0.0500
0.0500
EOP
EOP
3H
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND
MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK, SAT
18+60.000
2.155
2.285
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND, SAT.
12/96
MUCK, SAT
12/96
3H
0.0500
0.0500
EOP
EOP
3H
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND
MOI. TO SAT.
(ROADWAY EMBANKMENT)
4/97
MUCK, SAT.
18+40.000
2.176
2.287
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND, SAT.
4/97
V. SOFT GRAY SILTY CLAY
MUCK, SAT
WET
3H
0.0500
0.0500
EOP
EOP
3H
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND.
MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK, SAT
18+20.000
2.134
2.267
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND, SAT.
17+97
4/97
MUCK, SAT.
3H
0.0500
0.0500
EOP
EOP
3H
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND
MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK, SAT.
18+00.000
2.138
2.242
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND, SAT.
-L-



PROJECT REFERENCE NO. SHEET NO.
R-2414A
38
2.5 0 2.5 5
METRO
2.224
19+38
19+38
0.0500
0.0500
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT. (ROADWAY EMBANKMENT)
MUCK, SAT
MUCK, SAT
4/97
4/97
19+40.000
2.152
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND, SAT.
2.219
19+18
19+18
0.0500
0.0500
V. LOOSE TO M. DENSE GRAY FINE TO COARSE SAND MOI. TO SAT. (ROADWAY EMBANKMENT)
MUCK, SAT
MUCK, SAT
4/97
4/97
19+20.000
2.166
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND, SAT.
2.233
18+98
0.0500
0.0500
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND MOI. SAT. (ROADWAY EMBANKMENT)
12/96
MUCK, SAT
MUCK, SAT.
19+00.000
2.164
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND, SAT
2.263
18+78
18+78
0.0500
0.0500
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND MOI. TO SAT. (ROADWAY EMBANKMENT)
4/97
4/97
MUCK, SAT
MUCK, SAT
18+80.000
2.155
LOOSE TO M. DENSE GRAY FINE TO COARSE SAND, SAT.
-L-

2.5 0 2.5 5

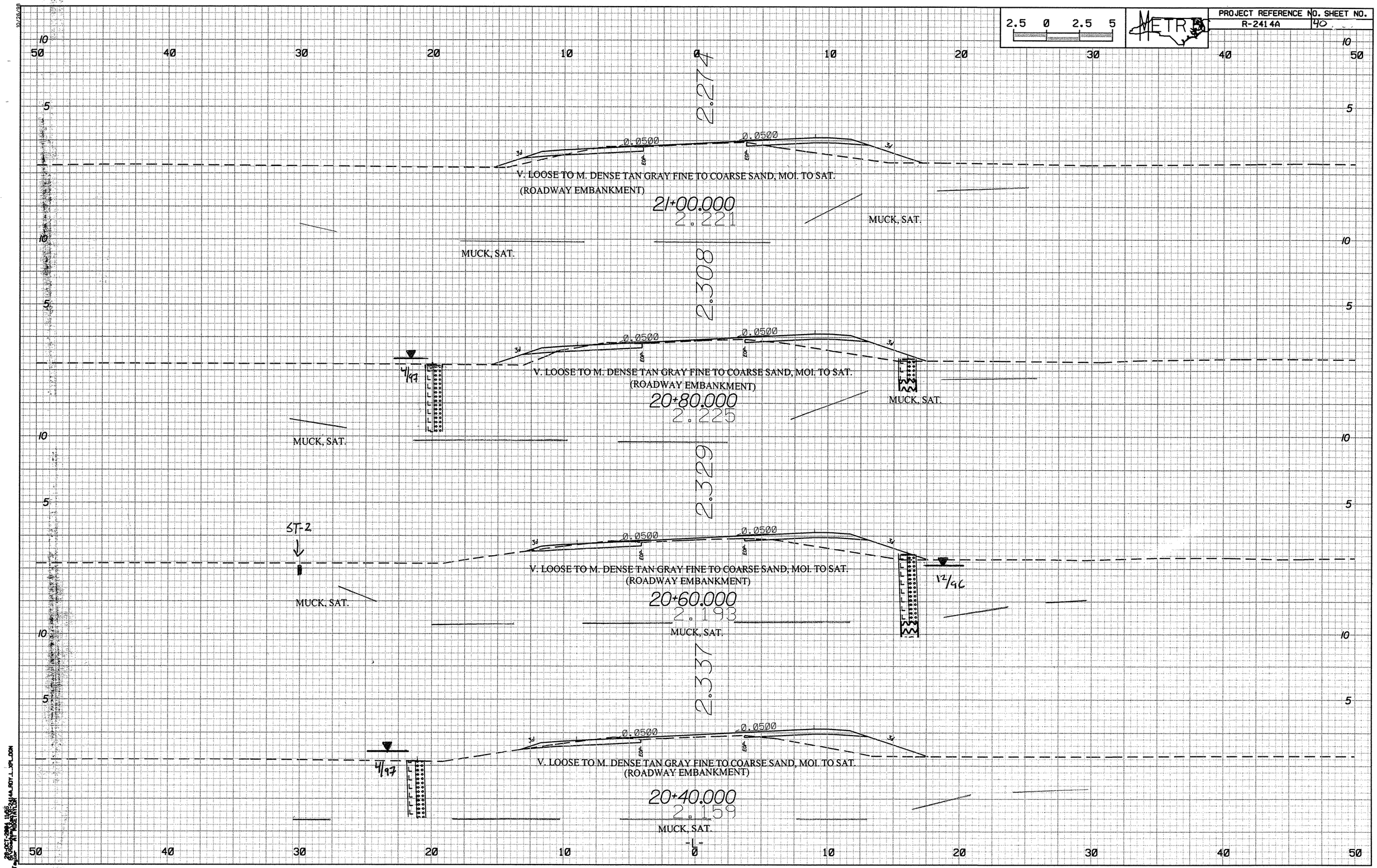


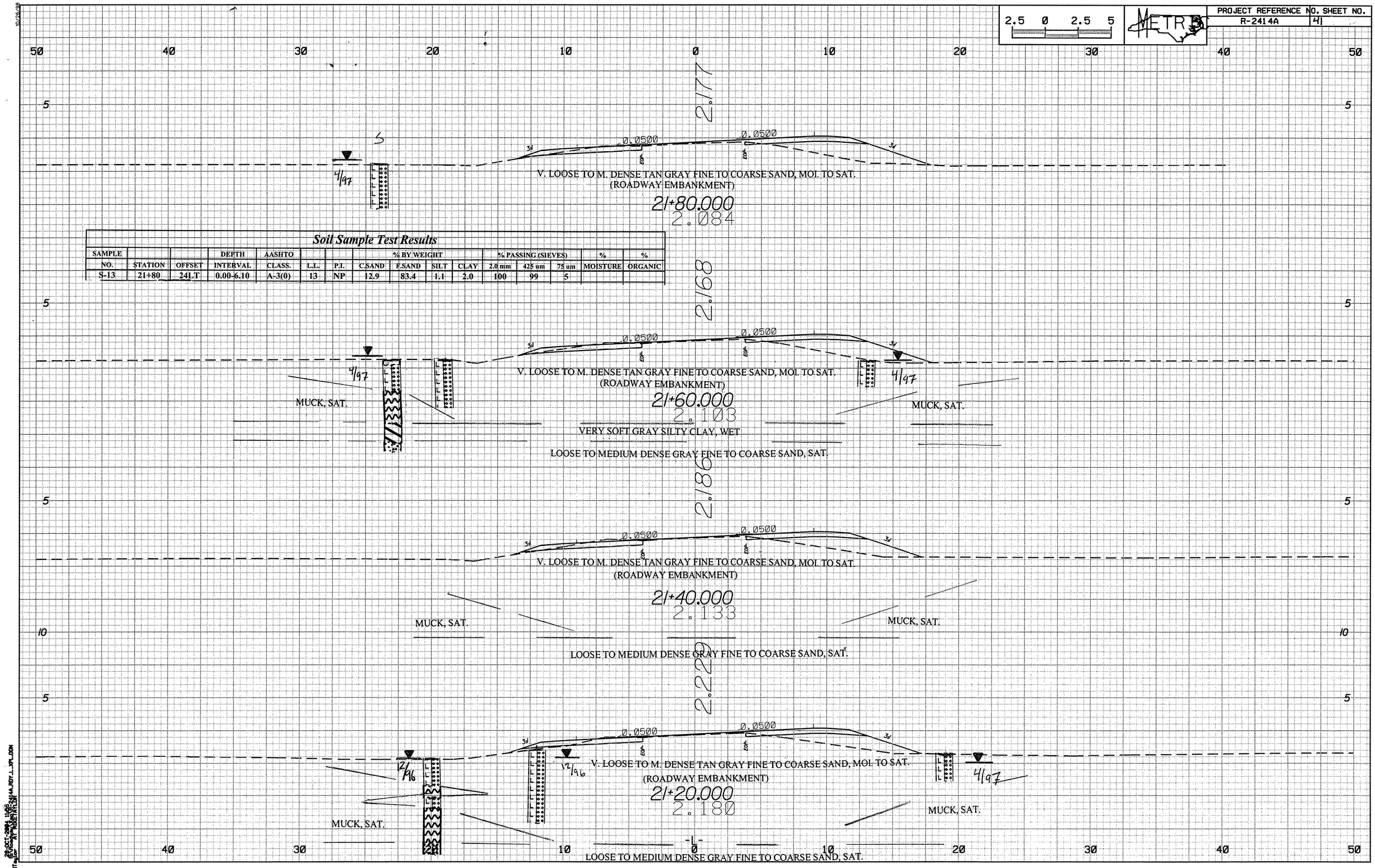
VANE SHEAR TESTS

STATION	OFFSET	DEPTH (m)	S(kPa)	SR(kPa)
20+00	28 LT	0.2	0.88	
"	"	0.4	0.88	
"	"	0.6	0.88	
"	"	0.8	7.09	
"	"	1.0	0.88	
"	"	1.2	0.88	
"	"	1.4	0.88	
"	"	1.6	1.77	
"	"	1.8	7.09	
"	"	2.0	3.54	
"	"	2.2	3.54	
"	"	2.4	7.09	
"	"	2.6	1.77	
"	"	2.8	5.31	
"	"	3.0	10.63	
"	"	3.2	15.95	
"	"	3.4	7.09	
"	"	3.6	8.86	
"	"	3.8	8.86	
"	"	4.0	8.86	
"	"	4.2	8.86	
"	"	4.4	10.63	
"	"	4.6	10.63	
"	"	4.8	10.63	
"	"	5.0	7.09	

Soil Sample Test Results

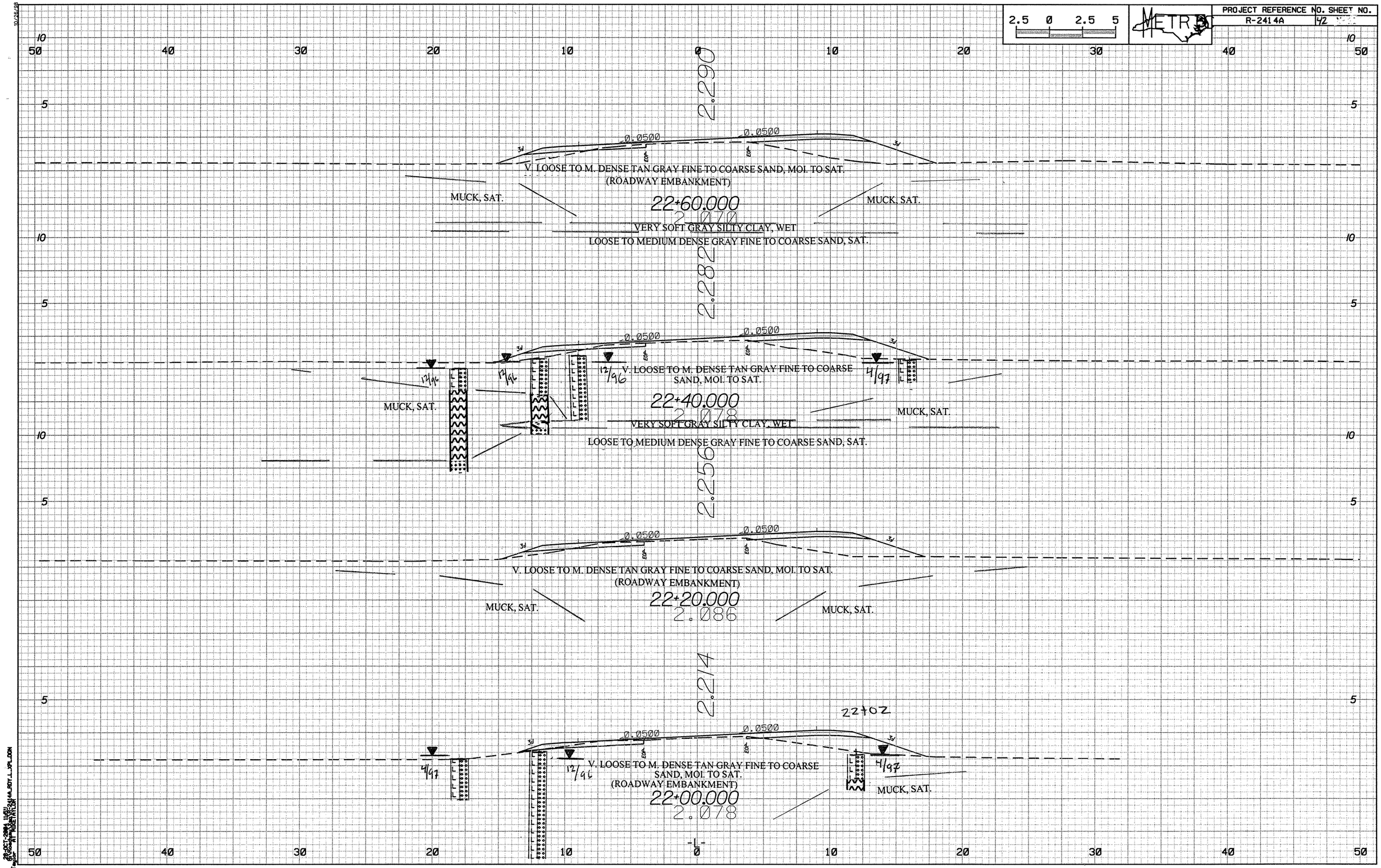
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
SS-6	19+98	15LT	0.00-0.45	A3(0)	21	NP	35.3	63.4	1.3	0.0	100	96	2		
SS-7	"	"	2.29-2.74	A-3(0)	15	NP	29.1	69	1.9	0.0	100	96	3		
S-11	"	"	2.90-4.42	A-2-5(0)	57	NP	39.3	36.8	19.8	4.0	95	74	23	372.2	57.1
S-12	"	"	4.42-5.49	A-4(0)	14	NP	5.1	64.2	18.6	12.1	100	100	40		

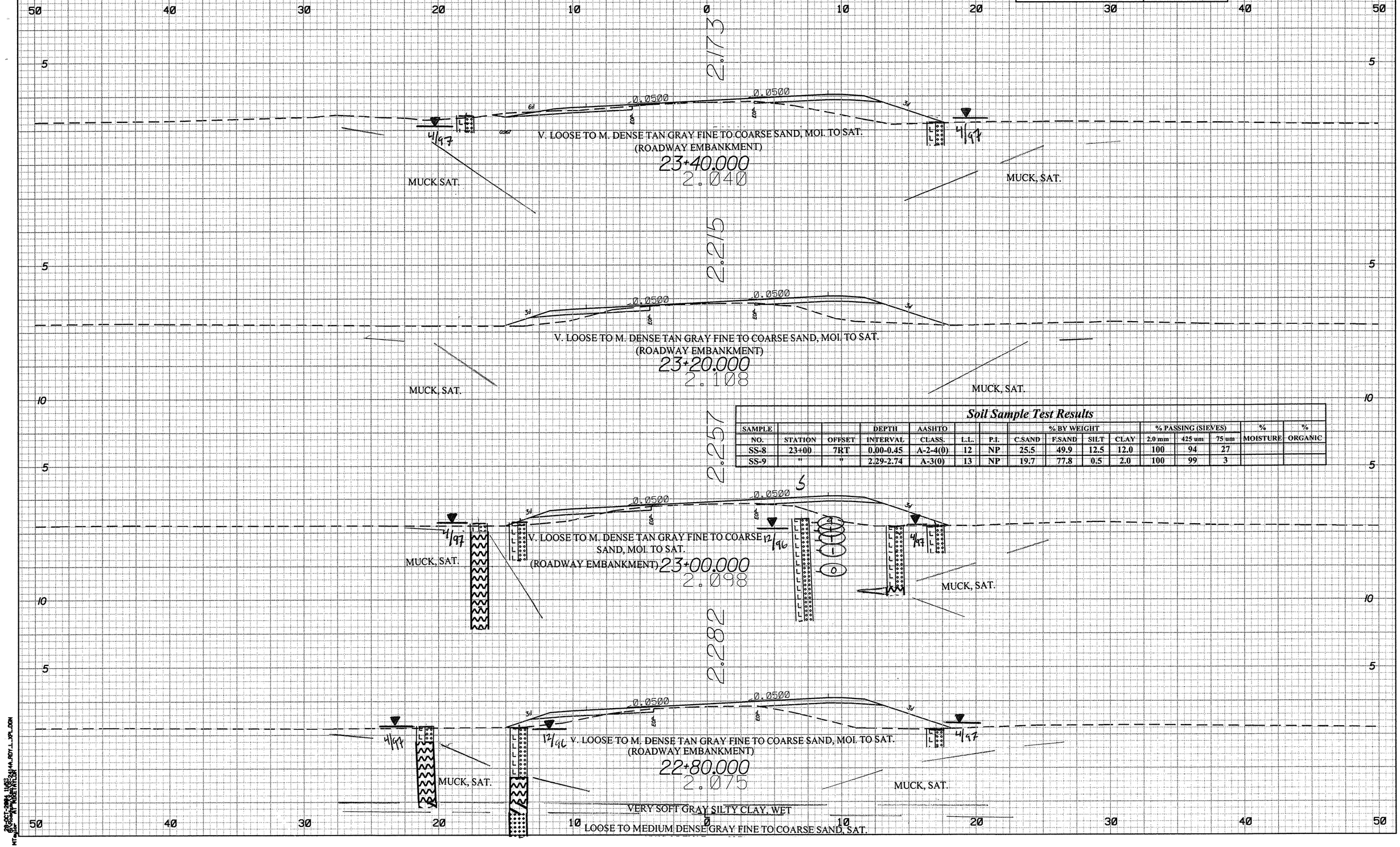

2.5 0 2.5 5
METRIC
2.274
0.0500
0.0500
3:1
EOP
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
21+00.000
2.221
MUCK, SAT.
MUCK, SAT.
2.308
4/97
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
20+80.000
2.225
MUCK, SAT.
MUCK, SAT.
2.329
ST-2
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
12/96
20+60.000
2.193
MUCK, SAT.
MUCK, SAT.
2.337
4/97
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
20+40.000
2.159
MUCK, SAT.
-L-



Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
S-13	21+80	24LT	0.00-6.10	A-3(0)	13	NP	12.9	83.4	1.1	2.0	100	99	5		

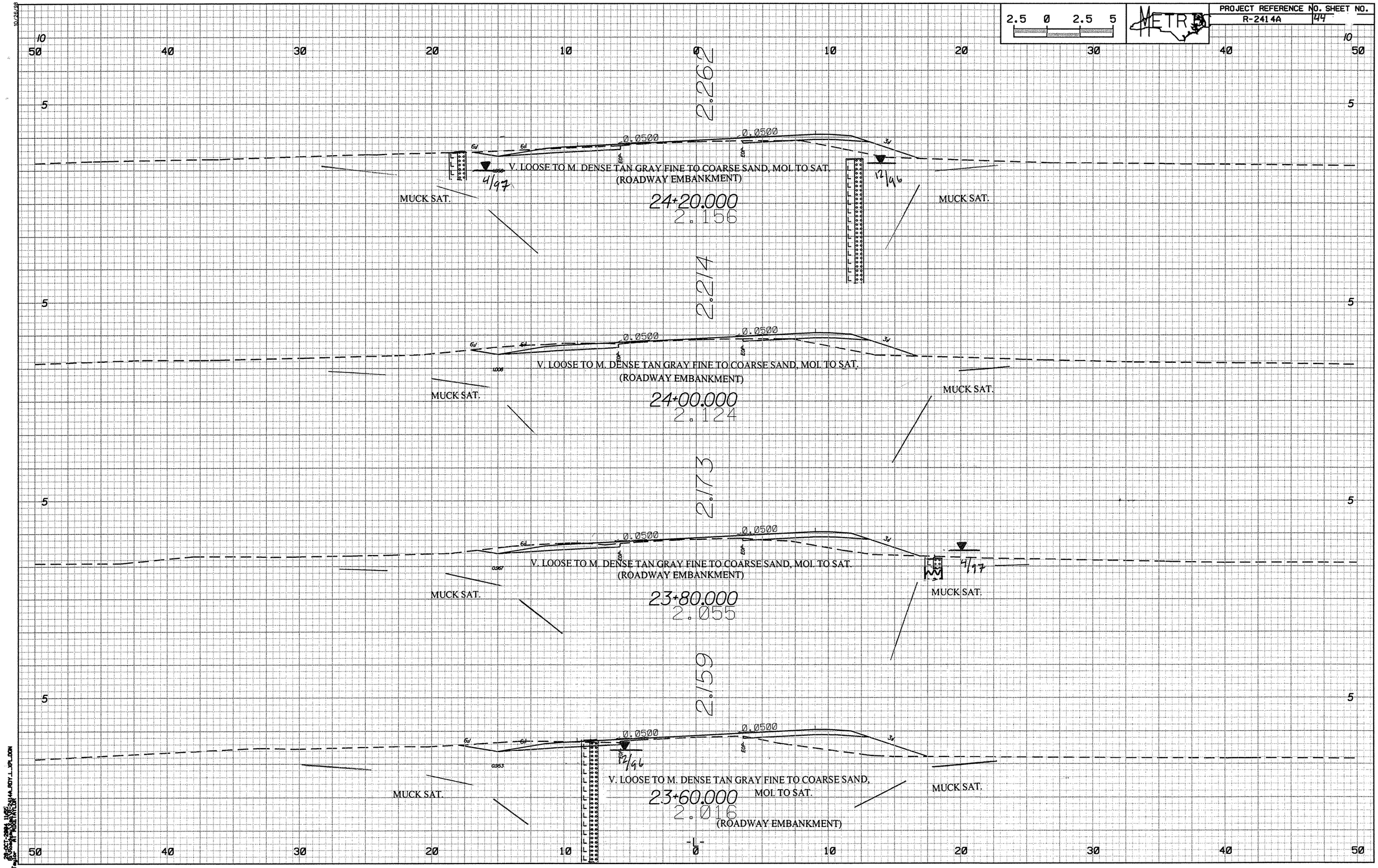

2.5 0 2.5 5
METRO
2.290
0.0500
0.0500
3:1
EOP
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK, SAT.
22+60.000
2.070
VERY SOFT GRAY SILTY CLAY, WET
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.282
12/96
4/97
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
22+40.000
2.078
2.256
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
22+20.000
2.086
2.214
22+02
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
22+00.000
2.078
-L-



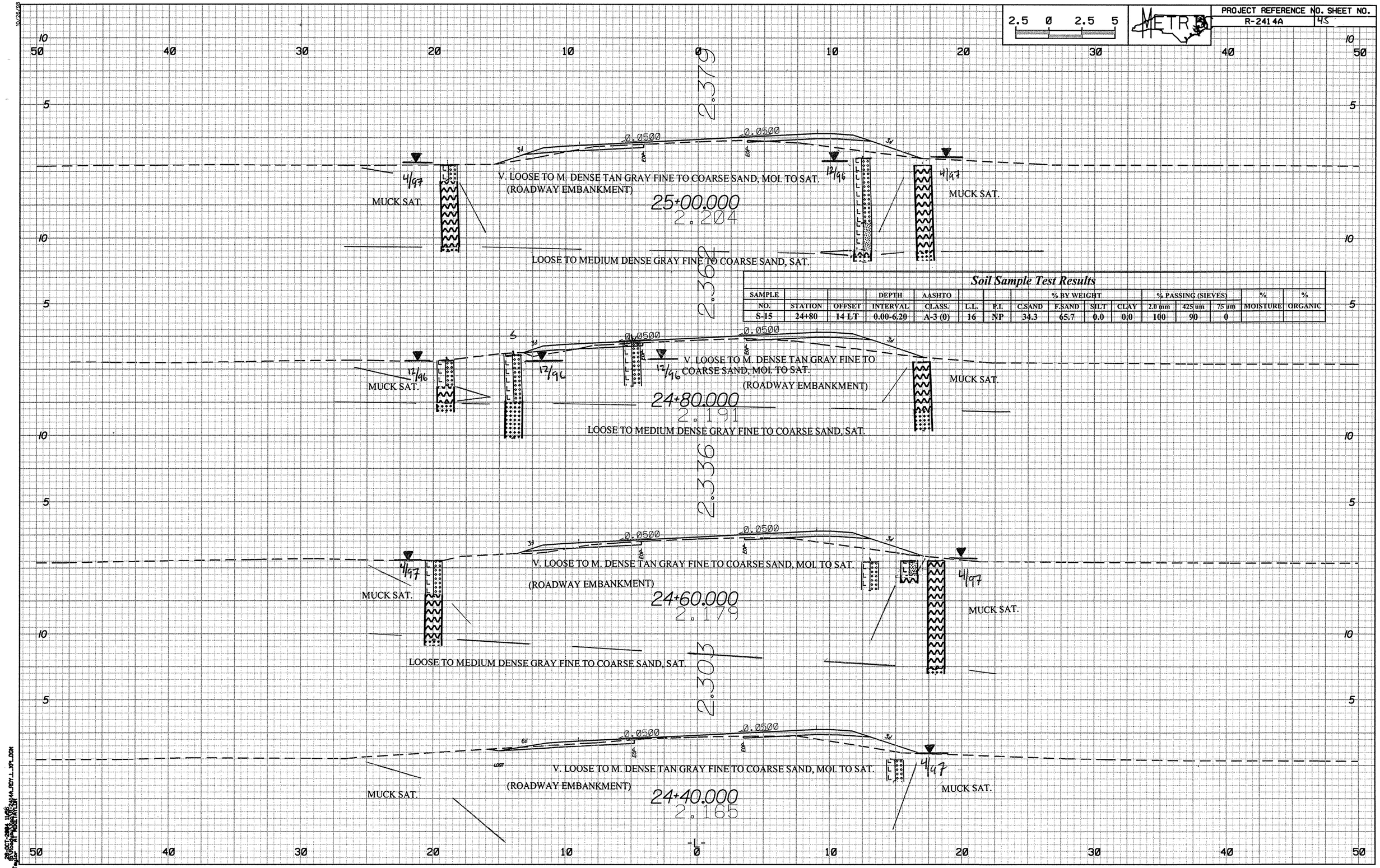
Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
SS-8	23+00	7RT	0.00-0.45	A-2-4(0)	12	NP	25.5	49.9	12.5	12.0	100	94	27		
SS-9	"	"	2.29-2.74	A-3(0)	13	NP	19.7	77.8	0.5	2.0	100	99	3		

2.5 0 2.5 5

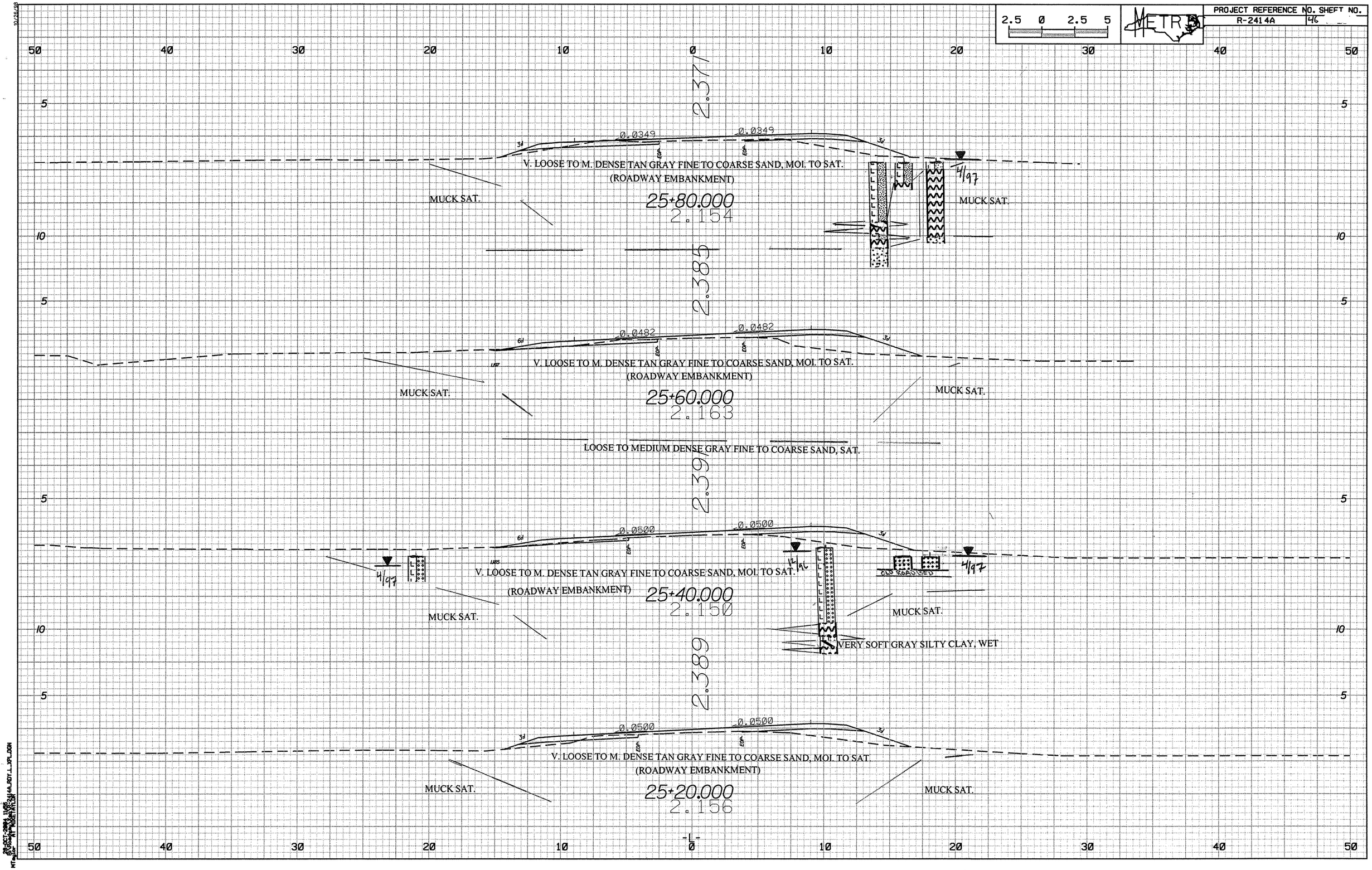

2.262
0.0500
0.0500
6:1
6:1
3:1
EOP
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
4/97
12/96
MUCK SAT.
MUCK SAT.
24+20.000
2.156
2.214
0.0500
0.0500
6:1
6:1
3:1
EOP
EOP
1.008
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
MUCK SAT.
24+00.000
2.124
2.173
0.0500
0.0500
6:1
3:1
EOP
EOP
0.967
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
4/97
MUCK SAT.
MUCK SAT.
23+80.000
2.055
2.159
0.0500
0.0500
6:1
6:1
3:1
EOP
EOP
0.953
12/96
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND,
MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
MUCK SAT.
23+60.000
2.016
-L-

2.5 0 2.5 5



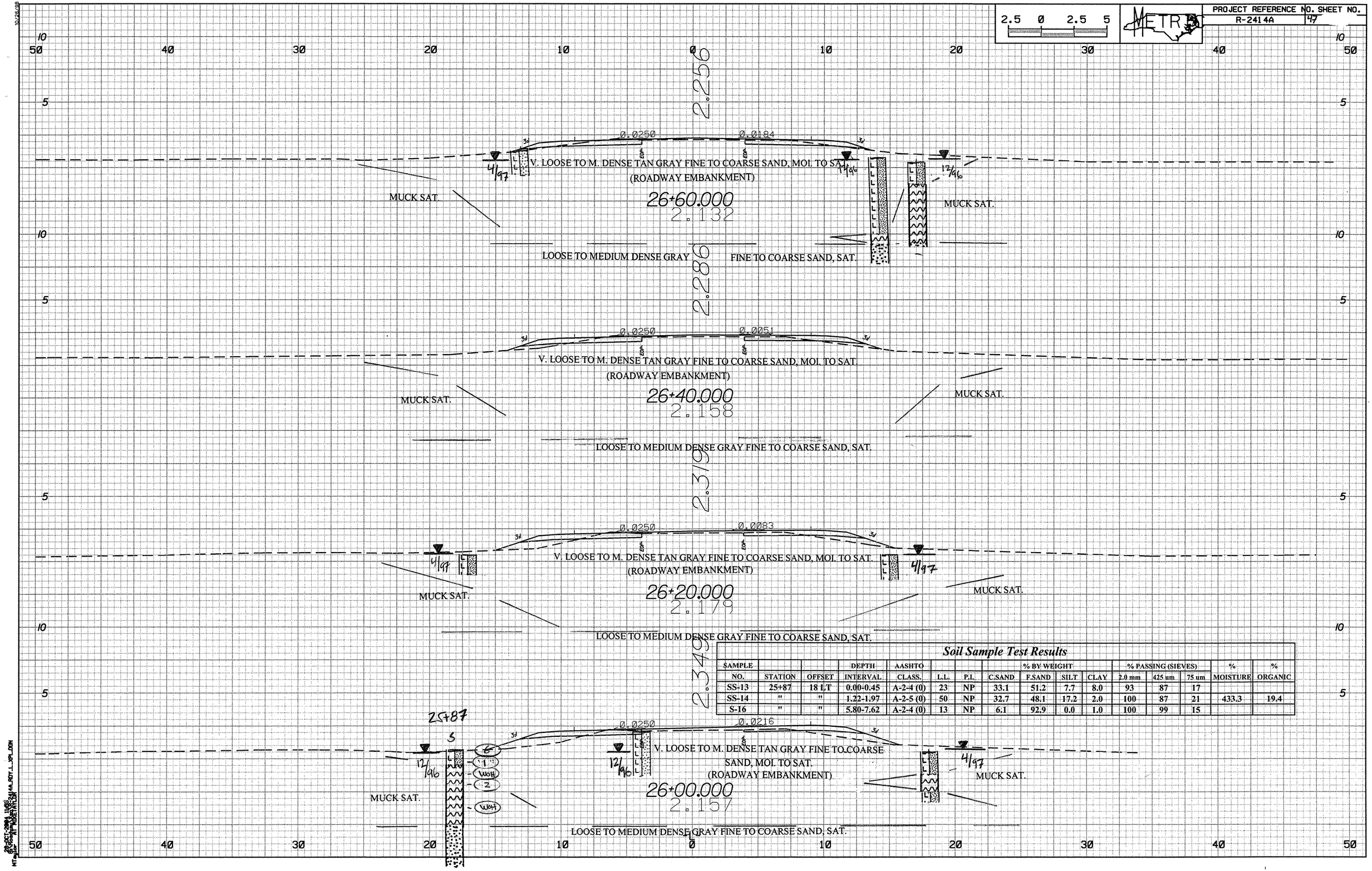
Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
S-15	24+80	14 LT	0.00-6.20	A-3 (0)	16	NP	34.3	65.7	0.0	0.0	100	90	0		



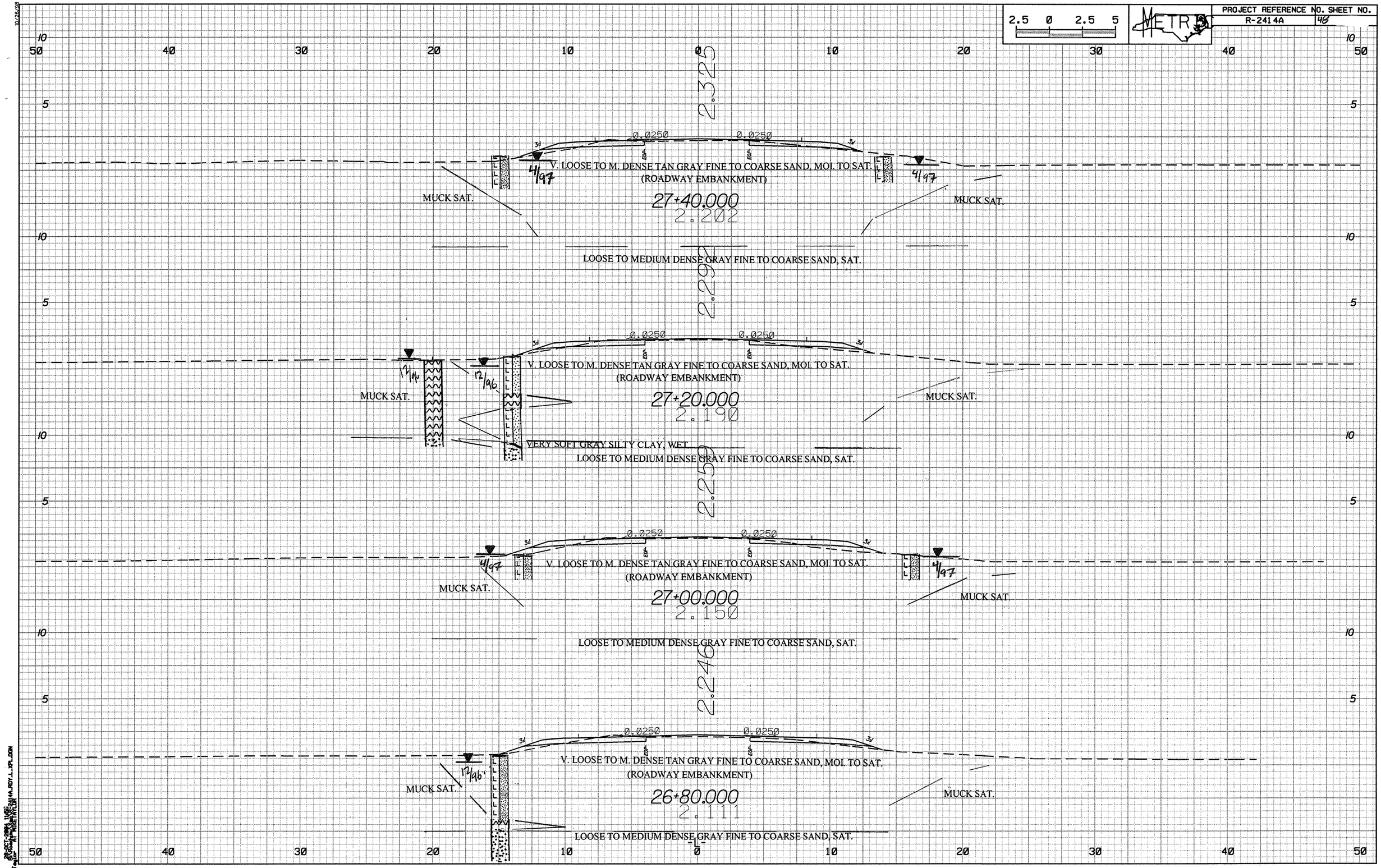
2.5 0 2.5 5
METRO
PROJECT REFERENCE NO. SHEET NO.
R-2414A 46
50 40 30 20 10 0 10 20 30 40 50
5
10
2.371
0.0349
0.0349
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
25+80.000
2.154
4/97
MUCK SAT.
2.385
0.0482
0.0482
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
25+60.000
2.163
MUCK SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.391
0.0500
0.0500
4/97
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
25+40.000
2.150
12/96
OLD ROADBED
4/97
MUCK SAT.
MUCK SAT.
VERY SOFT GRAY SILTY CLAY, WET
2.389
0.0500
0.0500
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
25+20.000
2.156
MUCK SAT.
-L-

2.5 0 2.5 5



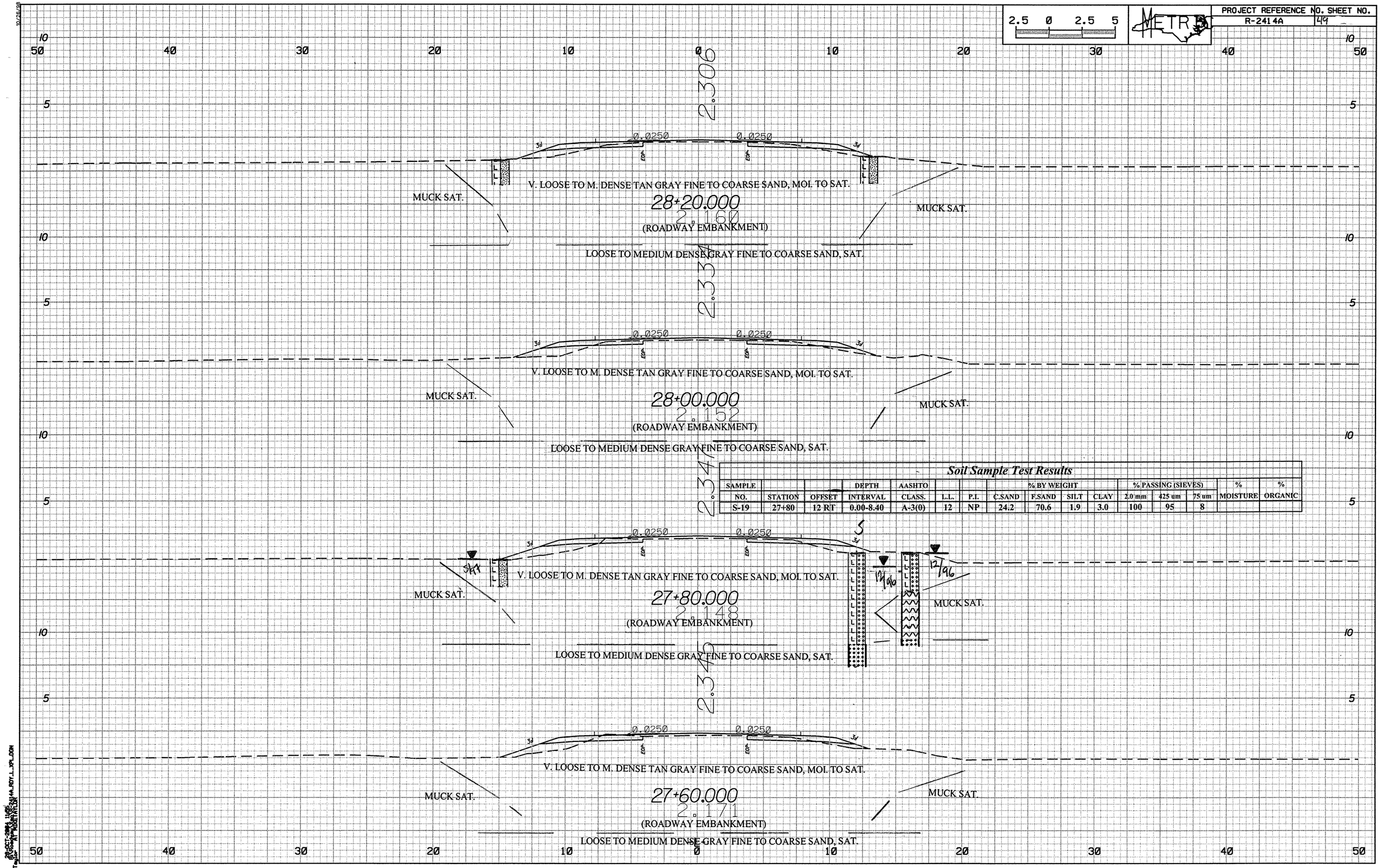
Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
SS-13	25+87	18 LT	0.00-0.45	A-2-4 (0)	23	NP	33.1	51.2	7.7	8.0	93	87	17		
SS-14	"	"	1.22-1.97	A-2-5 (0)	50	NP	32.7	48.1	17.2	2.0	100	87	21	433.3	19.4
S-16	"	"	5.80-7.62	A-2-4 (0)	13	NP	6.1	92.9	0.0	1.0	100	99	15		



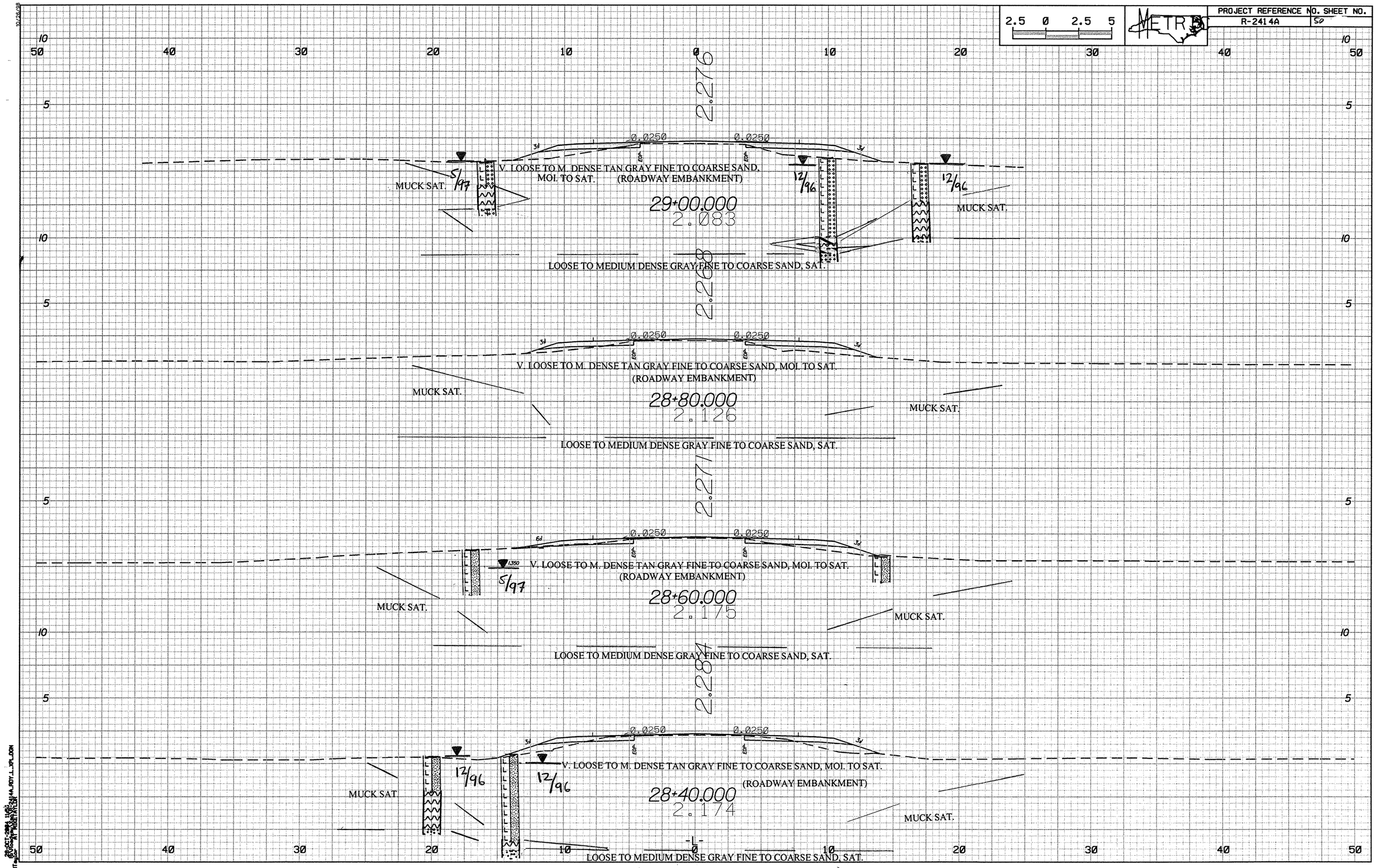
2.5 0 2.5 5
METRO
PROJECT REFERENCE NO. SHEET NO.
R-2414A 48
2.325
0.0250
0.0250
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
4/97
4/97
MUCK SAT.
MUCK SAT.
27+40.000
2.202
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.292
0.0250
0.0250
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
12/96
12/96
MUCK SAT.
MUCK SAT.
27+20.000
2.190
VERY SOFT GRAY SILTY CLAY, WET
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.259
0.0250
0.0250
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
4/97
4/97
MUCK SAT.
MUCK SAT.
27+00.000
2.150
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.246
0.0250
0.0250
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
12/96
MUCK SAT.
MUCK SAT.
26+80.000
2.111
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
-L-

2.5 0 2.5 5

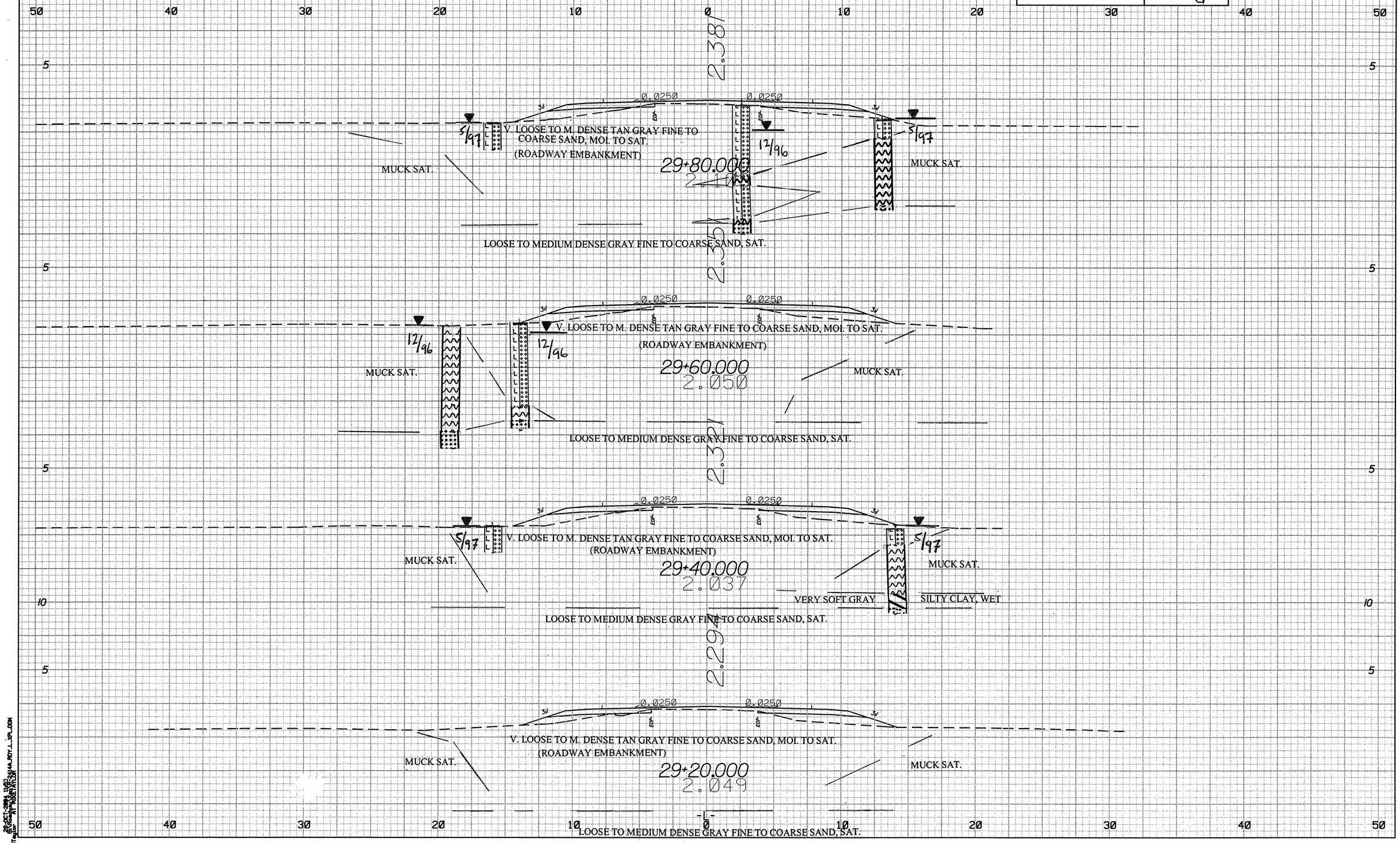


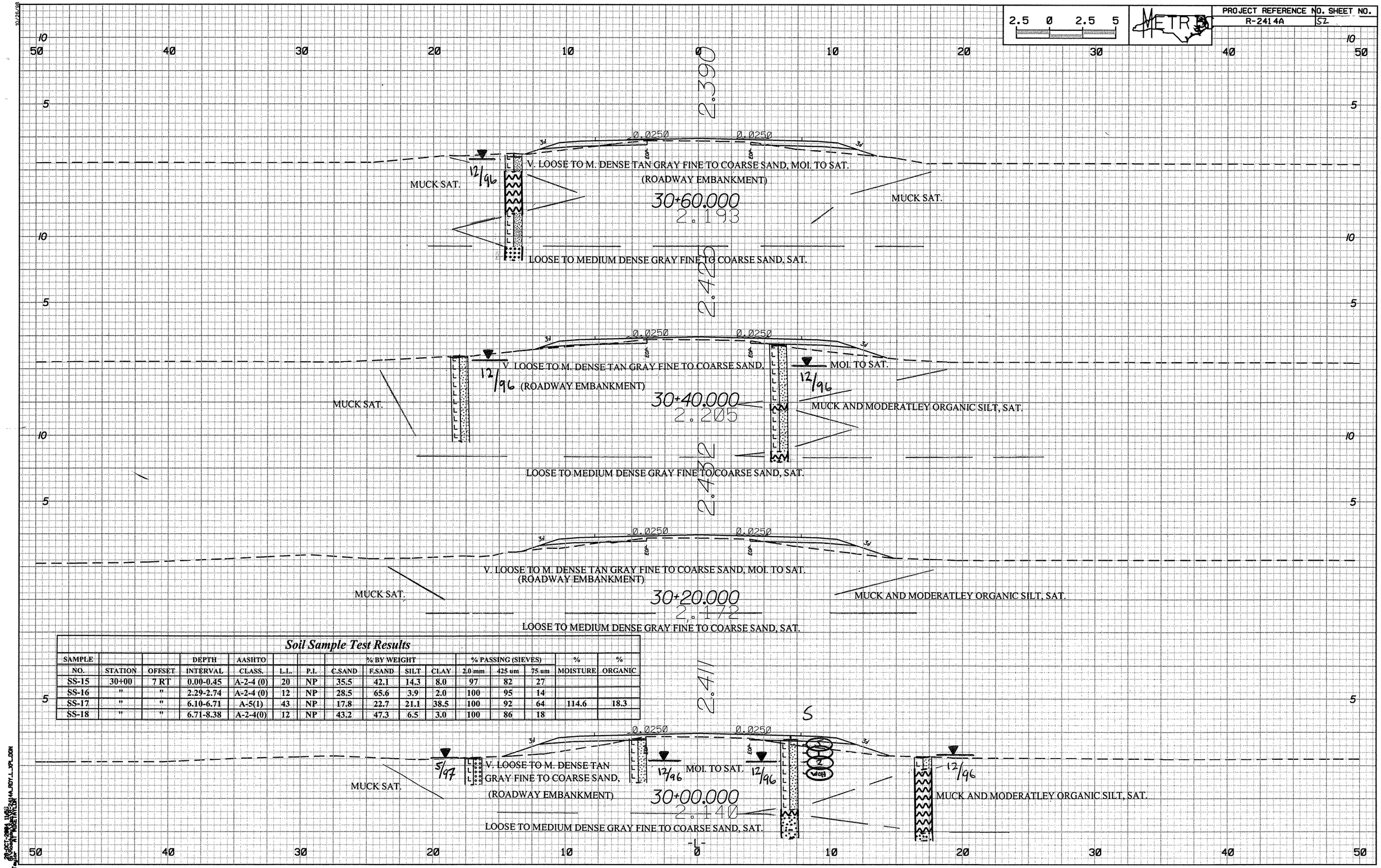
Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
S-19	27+80	12 RT	0.00-8.40	A-3(0)	12	NP	24.2	70.6	1.9	3.0	100	95	8		


2.5 0 2.5 5
METRO
2.276
0.0250
0.0250
3:1
EOP
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
5/97
12/96
12/96
MUCK SAT.
29+00.000
2.083
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.208
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
28+80.000
2.126
MUCK SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.271
6:1
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
5/97
MUCK SAT.
28+60.000
2.175
MUCK SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.284
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
12/96
12/96
MUCK SAT.
28+40.000
2.174
MUCK SAT.
-L-
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.

2.5 0 2.5 5

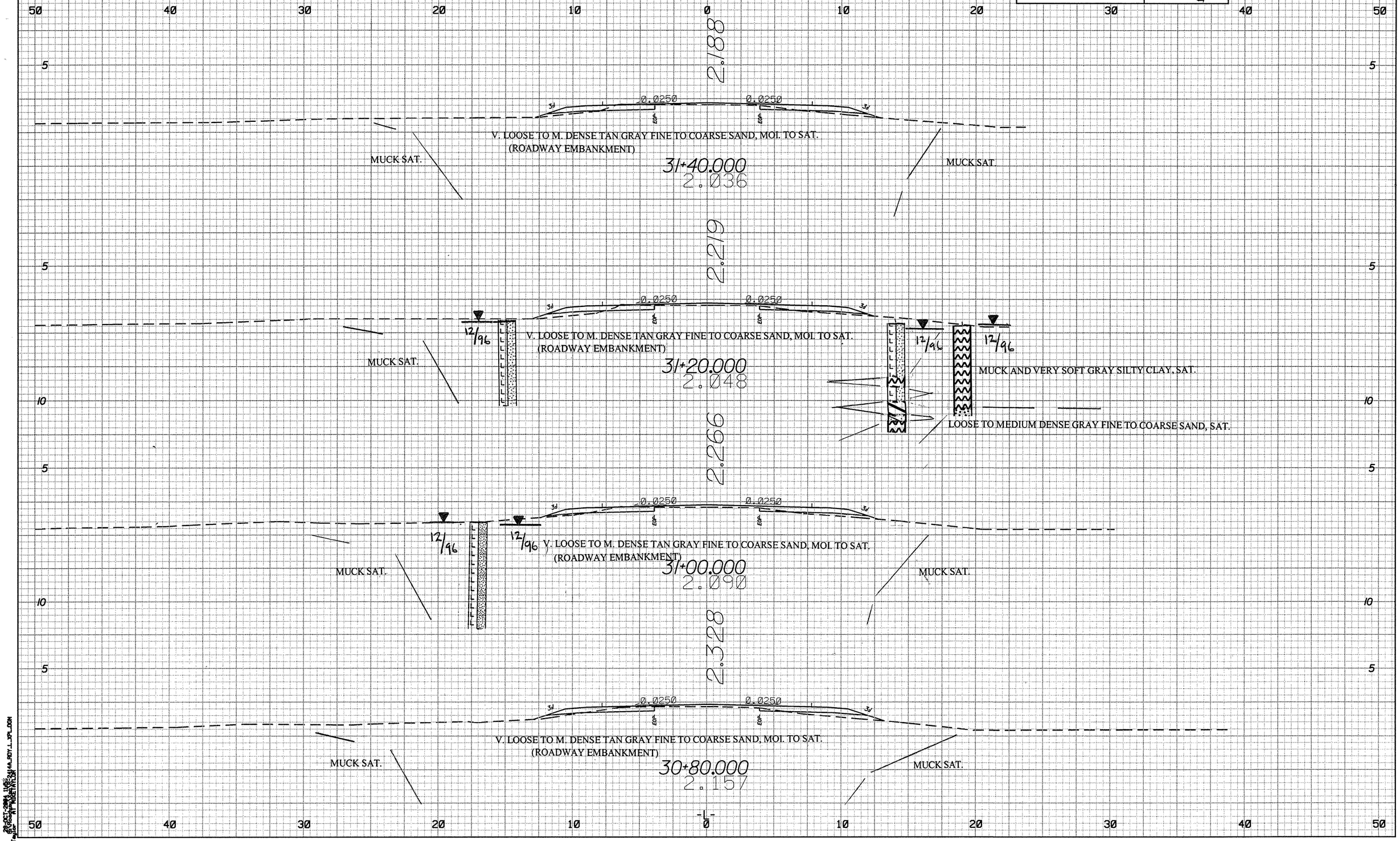

2.381
0.0250
0.0250
3:1
EOP
5/97
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
12/96
29+80.000
2.110
MUCK SAT.
MUCK SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.351
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
29+60.000
2.050
MUCK SAT.
MUCK SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.321
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
29+40.000
2.037
MUCK SAT.
MUCK SAT.
VERY SOFT GRAY SILTY CLAY, WET
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.294
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
29+20.000
2.049
MUCK SAT.
MUCK SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.



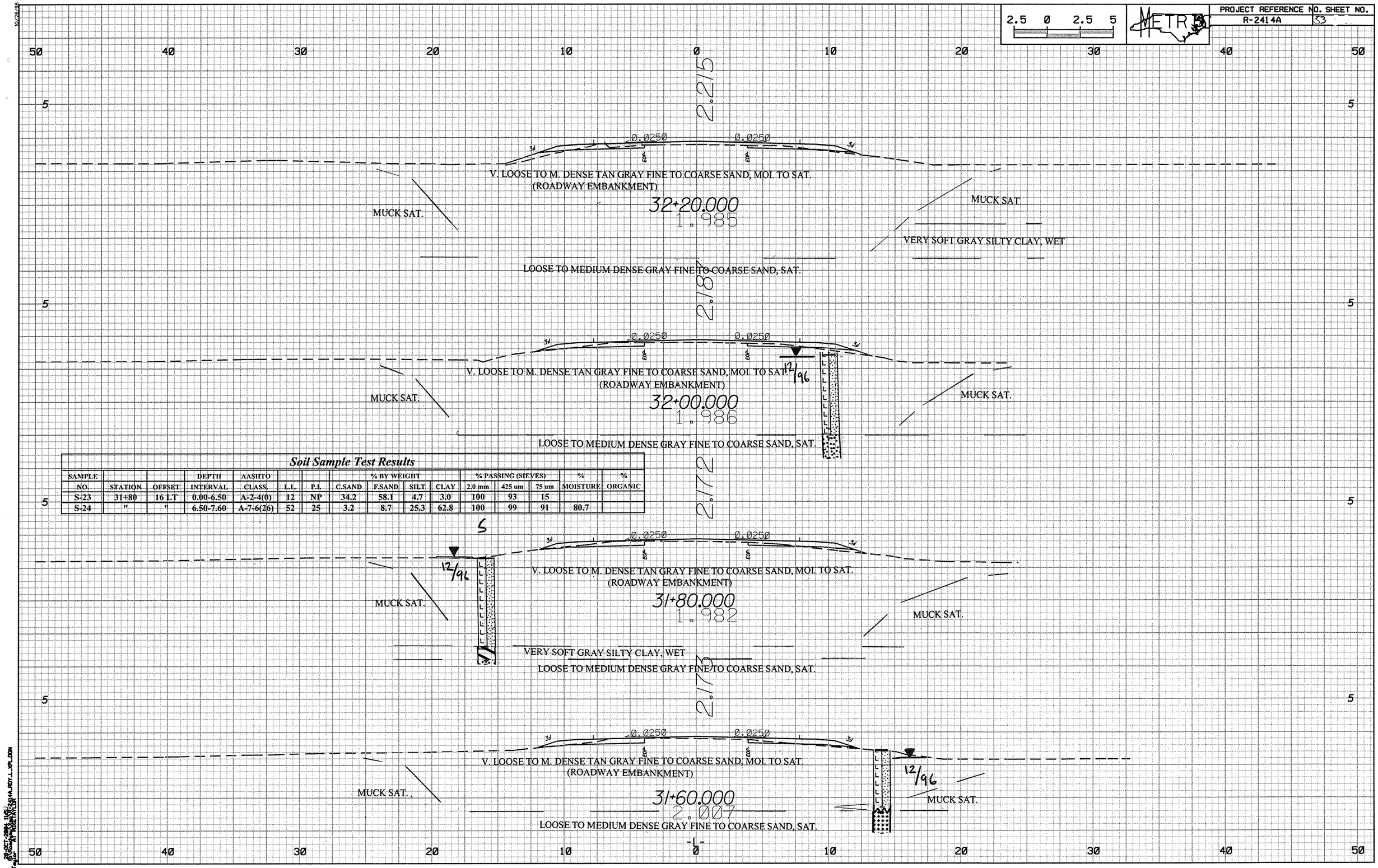
Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
SS-15	30+00	7 RT	0.00-0.45	A-2-4 (0)	20	NP	35.5	42.1	14.3	8.0	97	82	27		
SS-16	"	"	2.29-2.74	A-2-4 (0)	12	NP	28.5	65.6	3.9	2.0	100	95	14		
SS-17	"	"	6.10-6.71	A-5(1)	43	NP	17.8	22.7	21.1	38.5	100	92	64	114.6	18.3
SS-18	"	"	6.71-8.38	A-2-4(0)	12	NP	43.2	47.3	6.5	3.0	100	86	18		

2.5 0 2.5 5


50 40 30 20 10 0 10 20 30 40 50
2.188
0.0250
0.0250
3:1
EOP
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
31+40.000
2.036
2.219
12/96
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
31+20.000
2.048
MUCK AND VERY SOFT GRAY SILTY CLAY, SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.266
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
31+00.000
2.090
2.328
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
30+80.000
2.157
-L-

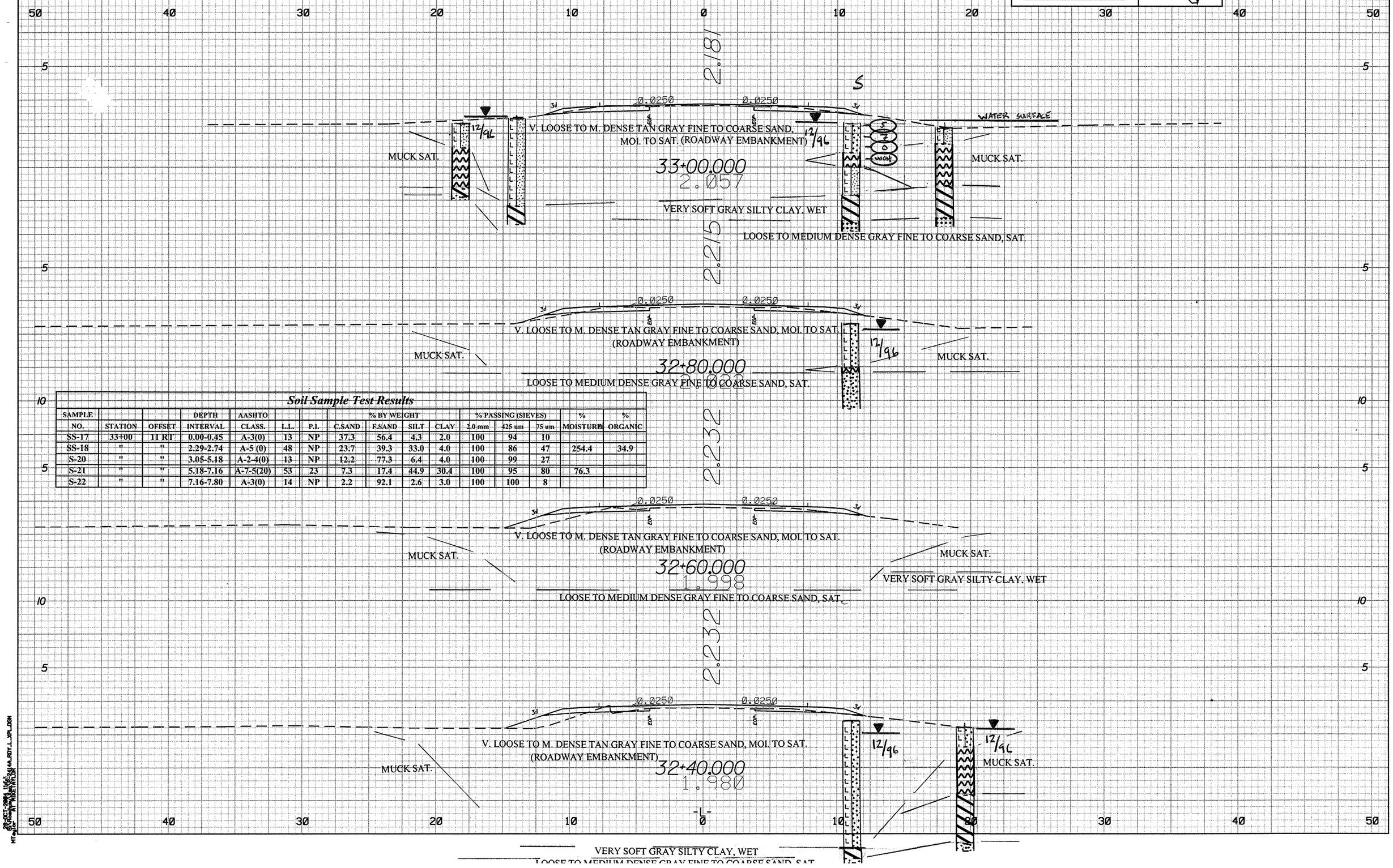
2.5 0 2.5 5



Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
S-23	31+80	16 LT	0.00-6.50	A-2-4(0)	12	NP	34.2	58.1	4.7	3.0	100	93	15		
S-24	"	"	6.50-7.60	A-7-6(26)	52	25	3.2	8.7	25.3	62.8	100	99	91	80.7	

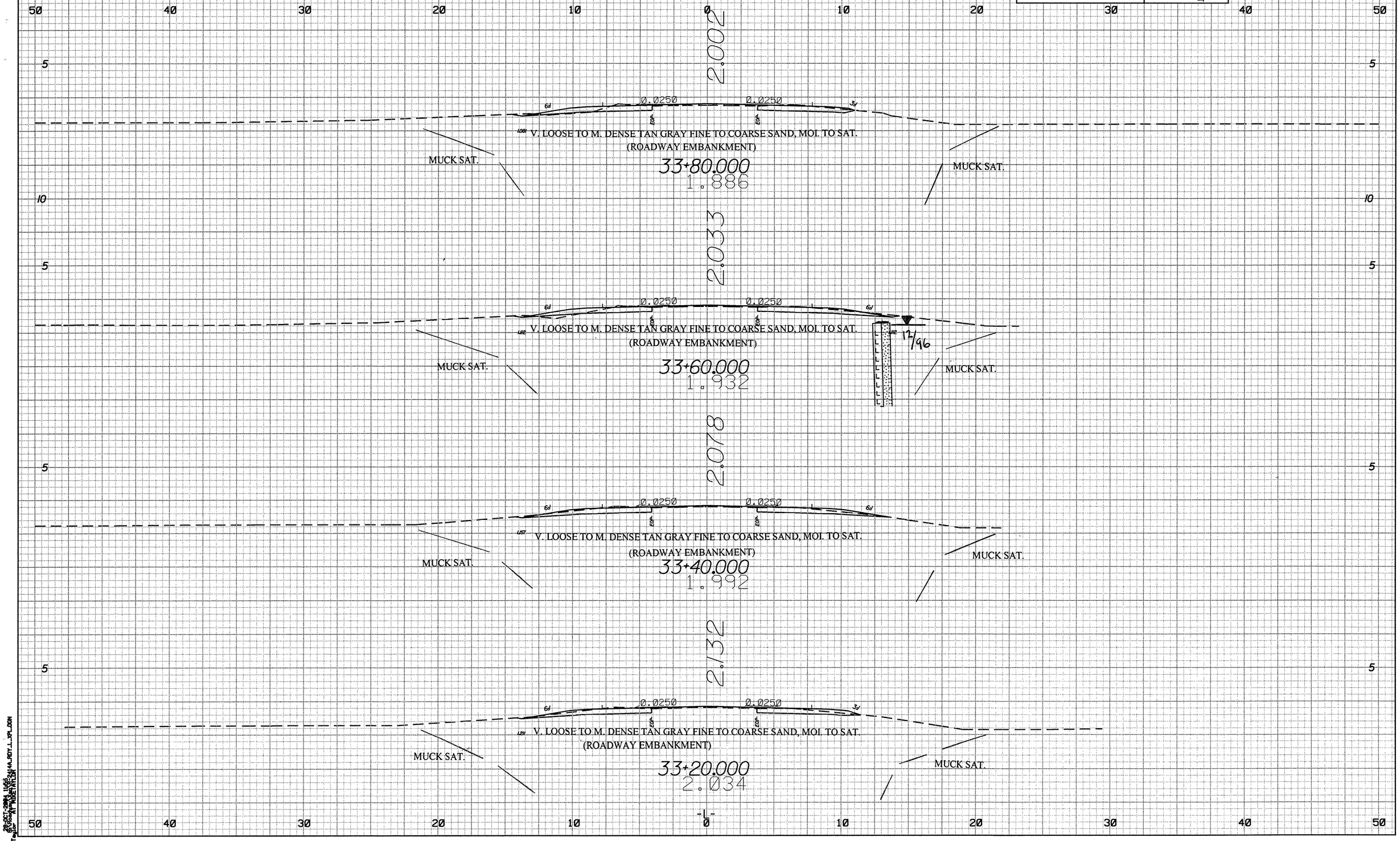
2.5 0 2.5 5



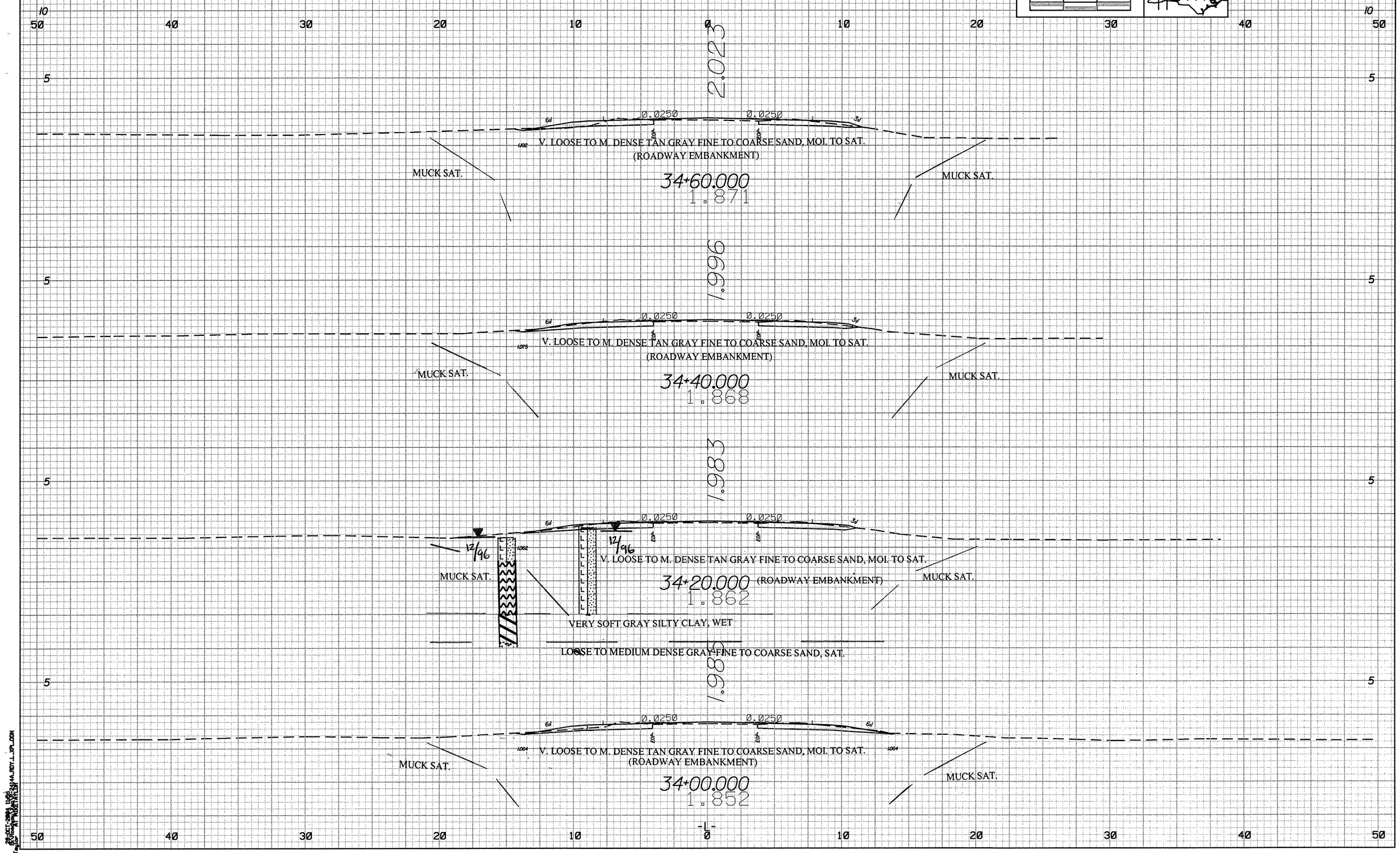
Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
SS-17	33+00	11 RT	0.00-0.45	A-3(0)	13	NP	37.3	56.4	4.3	2.0	100	94	10		
SS-18	"	"	2.29-2.74	A-5 (0)	48	NP	23.7	39.3	33.0	4.0	100	86	47	254.4	34.9
S-20	"	"	3.05-5.18	A-2-4(0)	13	NP	12.2	77.3	6.4	4.0	100	99	27		
S-21	"	"	5.18-7.16	A-7-5(20)	53	23	7.3	17.4	44.9	30.4	100	95	80	76.3	
S-22	"	"	7.16-7.80	A-3(0)	14	NP	2.2	92.1	2.6	3.0	100	100	8		

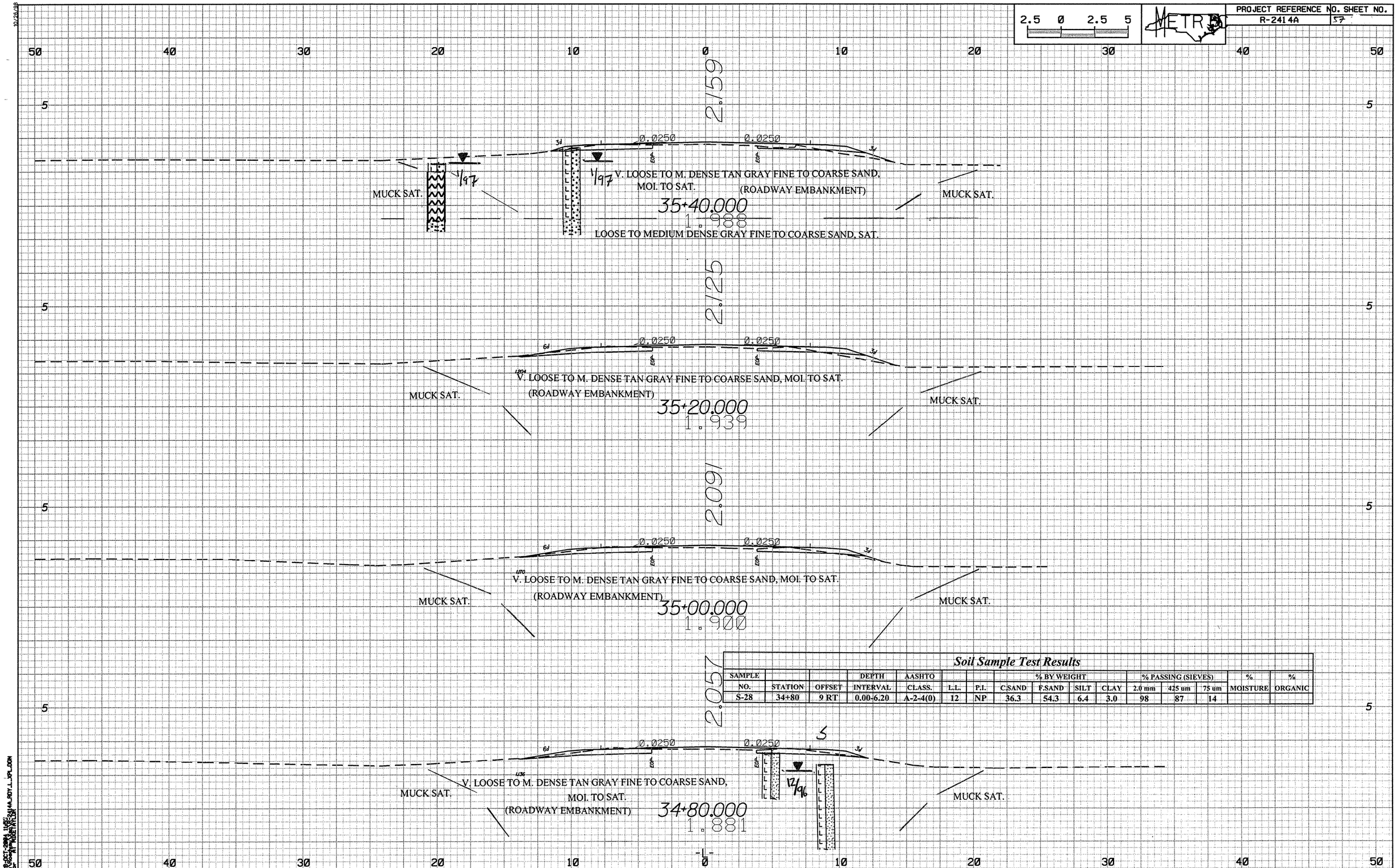
2.5 0 2.5 5


2.002
0.0250
0.0250
6:1
3:1
EOP-L
EOP-R
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
MUCK SAT.
33+80.000
1.886
2.033
0.0250
0.0250
6:1
6:1
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
12/96
MUCK SAT.
MUCK SAT.
33+60.000
1.932
2.078
0.0250
0.0250
6:1
6:1
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
MUCK SAT.
33+40.000
1.992
2.132
0.0250
0.0250
6:1
3:1
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
MUCK SAT.
33+20.000
2.034
-L-

2.5 0 2.5 5


2.023
0.0250
0.0250
6:1
3:1
EOA
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
MUCK SAT.
34+60.000
1.871
1.996
0.0250
0.0250
6:1
3:1
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
MUCK SAT.
34+40.000
1.868
1.983
0.0250
0.0250
6:1
3:1
12/96
12/96
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
MUCK SAT.
34+20.000
1.862
VERY SOFT GRAY SILTY CLAY, WET
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
1.989
0.0250
0.0250
6:1
6:1
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
MUCK SAT.
34+00.000
1.852

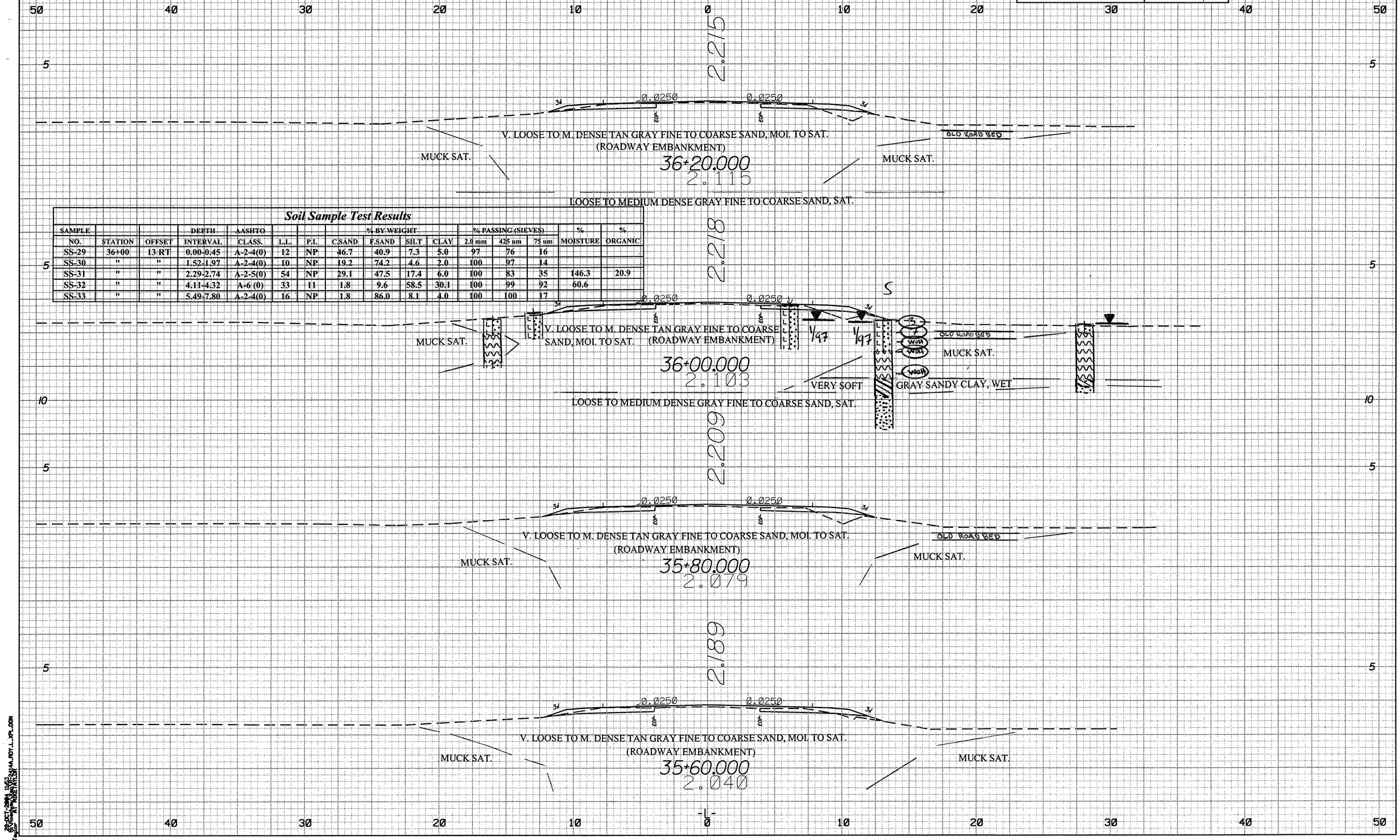
PROJECT REFERENCE NO. SHEET NO.
R-2414A 57



Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	% BY WEIGHT F.SAND	% BY WEIGHT SILT	% BY WEIGHT CLAY	% PASSING (SIEVES) 2.0 mm	% PASSING (SIEVES) 425 um	% PASSING (SIEVES) 75 um	% MOISTURE	% ORGANIC
S-28	34+80	9 RT	0.00-6.20	A-2-4(0)	12	NP	36.3	54.3	6.4	3.0	98	87	14		

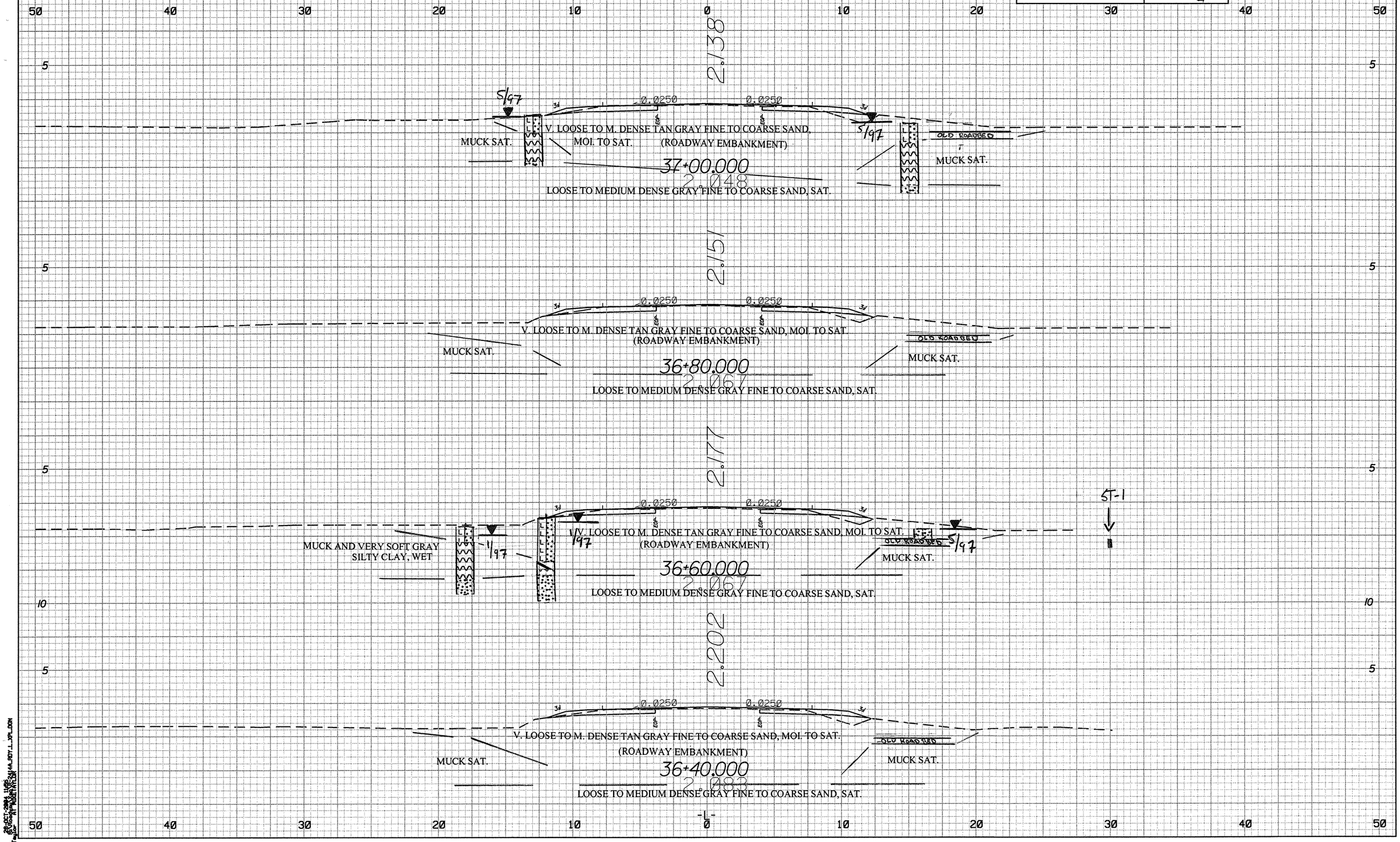
2.5 0 2.5 5



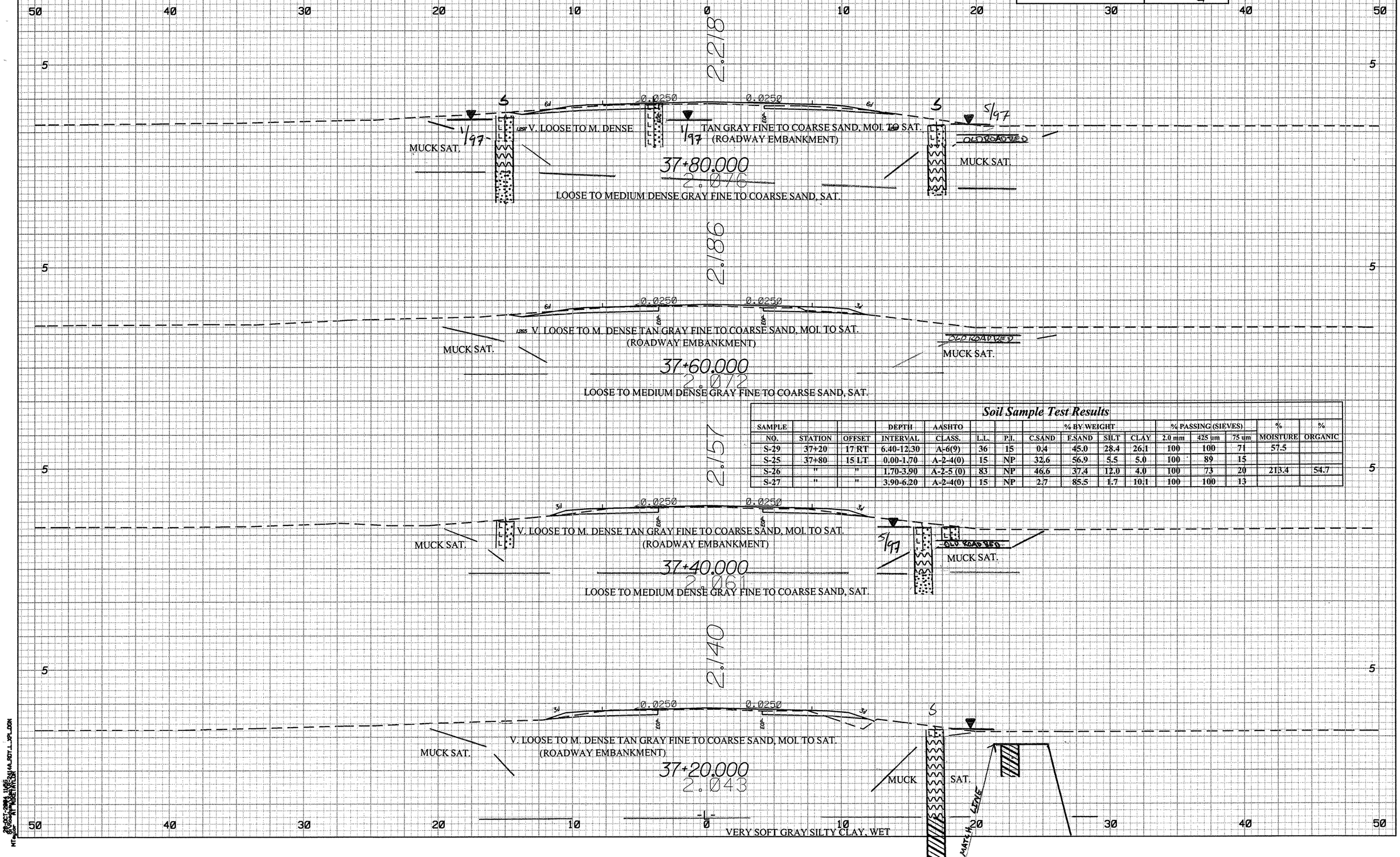
Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
SS-29	36+00	13 RT	0.00-0.45	A-2-4(0)	12	NP	46.7	40.9	7.3	5.0	97	76	16		
SS-30	"	"	1.52-1.97	A-2-4(0)	10	NP	19.2	74.2	4.6	2.0	100	97	14		
SS-31	"	"	2.29-2.74	A-2-5(0)	54	NP	29.1	47.5	17.4	6.0	100	83	35	146.3	20.9
SS-32	"	"	4.11-4.32	A-6 (0)	33	11	1.8	9.6	58.5	30.1	100	99	92	60.6	
SS-33	"	"	5.49-7.80	A-2-4(0)	16	NP	1.8	86.0	8.1	4.0	100	100	17		

2.5 0 2.5 5


2.138
5/97
0.0250
0.0250
3:1
EOP
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
OLD ROADBED
MUCK SAT.
37+00.000
2.048
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.151
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
OLD ROADBED
MUCK SAT.
36+80.000
2.067
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.177
MUCK AND VERY SOFT GRAY
SILTY CLAY, WET
1/97
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
OLD ROADBED
MUCK SAT.
ST-1
36+60.000
2.067
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.202
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
OLD ROADBED
MUCK SAT.
36+40.000
2.083
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
50 40 30 20 10 0 10 20 30 40 50
5 10

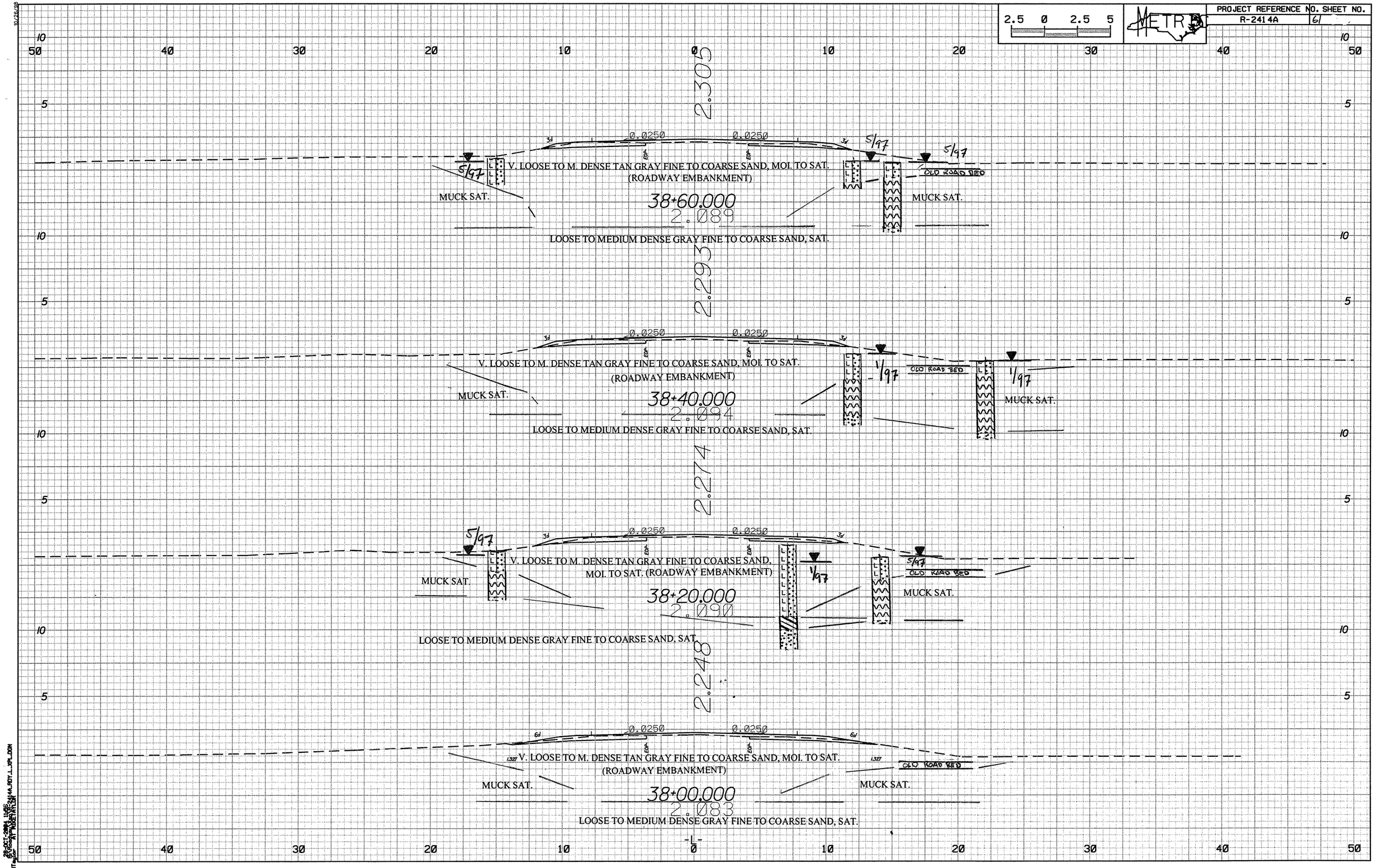
2.5 0 2.5 5



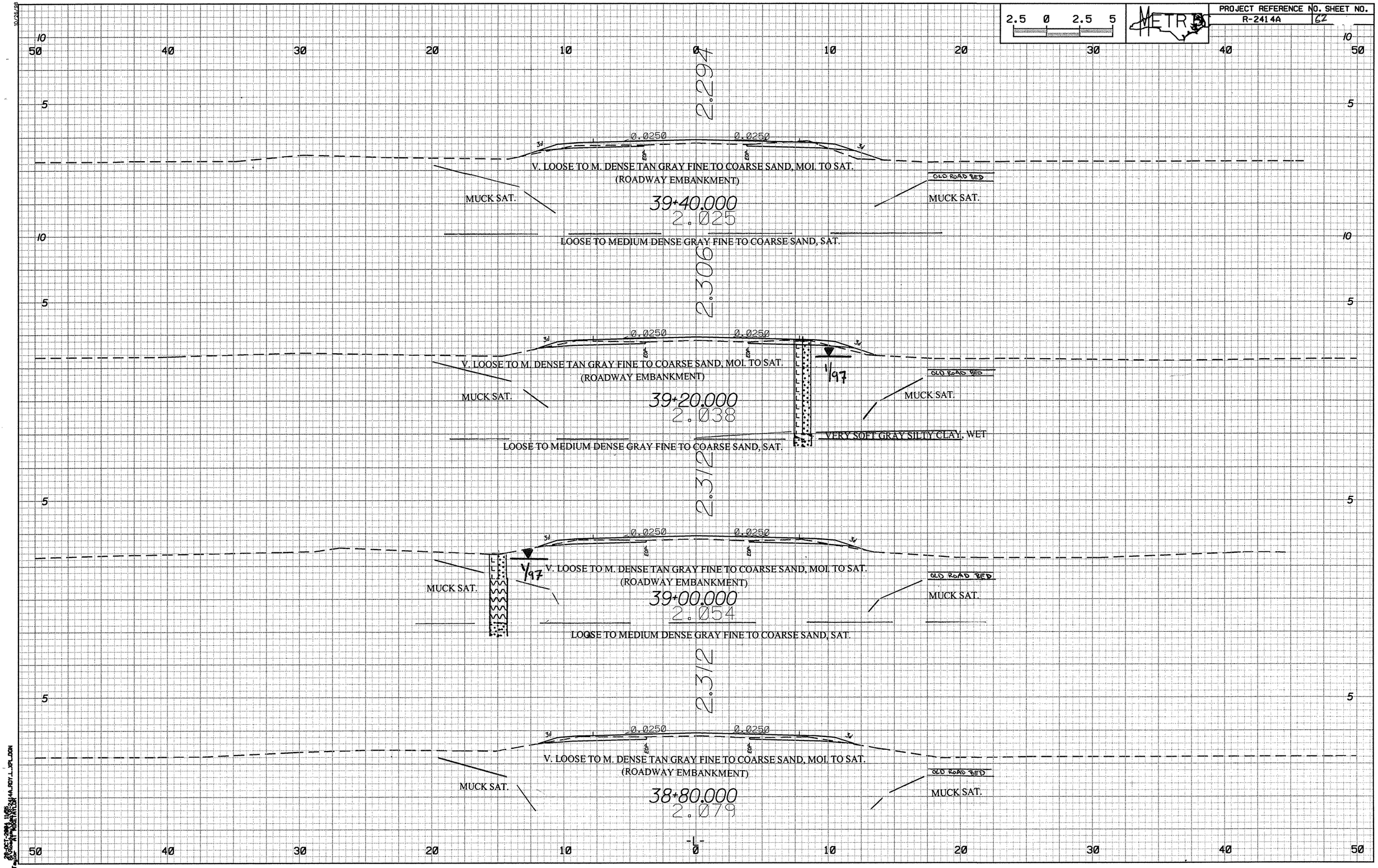
Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	E.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
S-29	37+20	17 RT	6.40-12.30	A-6(9)	36	15	0.4	45.0	28.4	26.1	100	100	71	57.5	
S-25	37+80	15 LT	0.00-1.70	A-2-4(0)	15	NP	32.6	56.9	5.5	5.0	100	89	15		
S-26	"	"	1.70-3.90	A-2-5 (0)	83	NP	46.6	37.4	12.0	4.0	100	73	20	213.4	54.7
S-27	"	"	3.90-6.20	A-2-4(0)	15	NP	2.7	85.5	1.7	10.1	100	100	13		

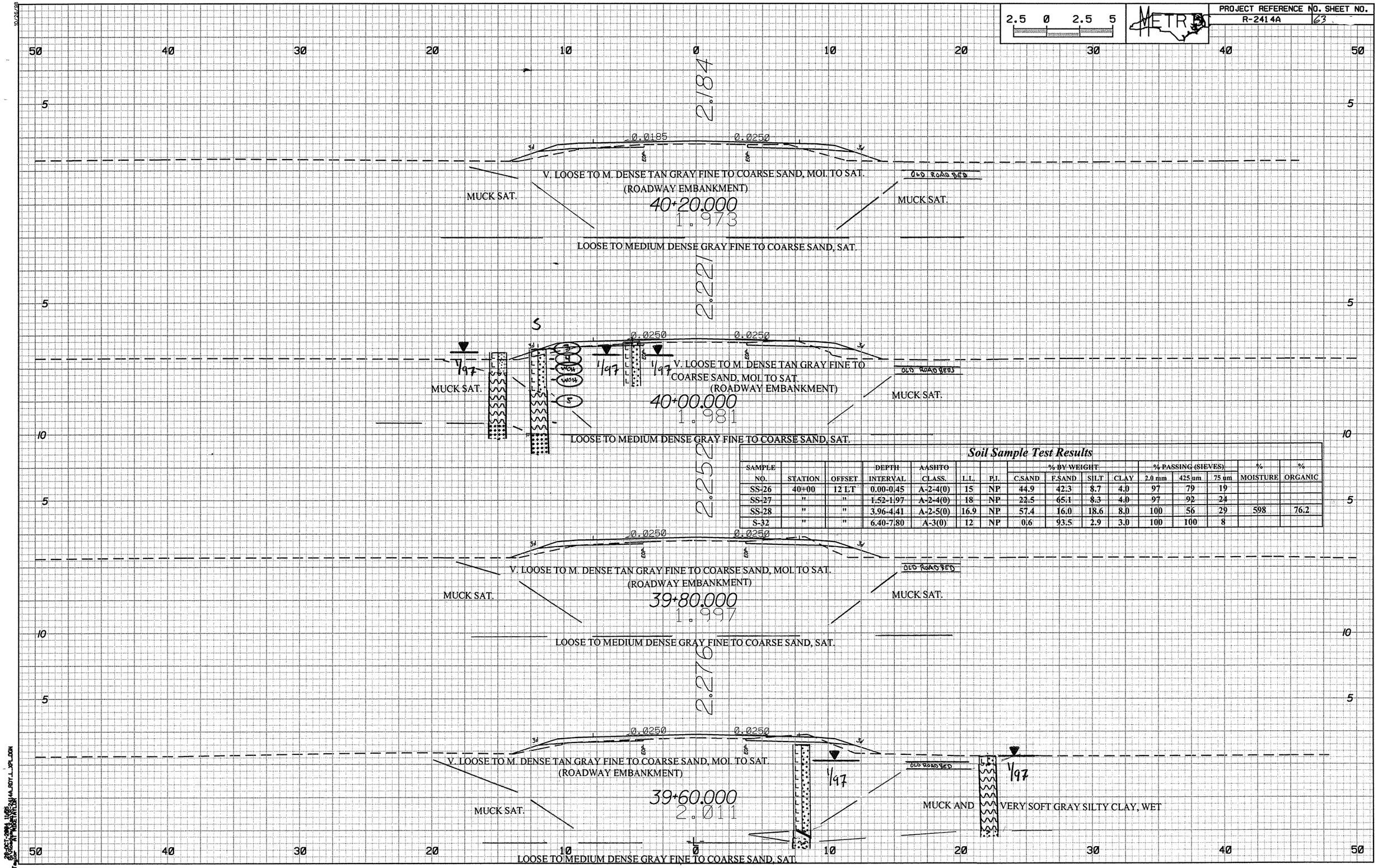
2.5 0 2.5 5


2.305
0.0250
0.0250
3:1
EOP
5/97
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
OLD ROAD BED
MUCK SAT.
38+60.000
2.089
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.293
1/97
38+40.000
2.094
2.274
38+20.000
2.090
2.248
6:1
1.327
38+00.000
2.083
-L-

2.5 0 2.5 5


2.294
0.0250
0.0250
3:1
EOP
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
OLD ROAD BED
MUCK SAT.
39+40.000
2.025
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.306
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
1/97
OLD ROAD BED
MUCK SAT.
39+20.000
2.038
VERY SOFT GRAY SILTY CLAY, WET
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.312
V/97
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
OLD ROAD BED
MUCK SAT.
39+00.000
2.054
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.312
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
OLD ROAD BED
MUCK SAT.
38+80.000
2.079
-L-

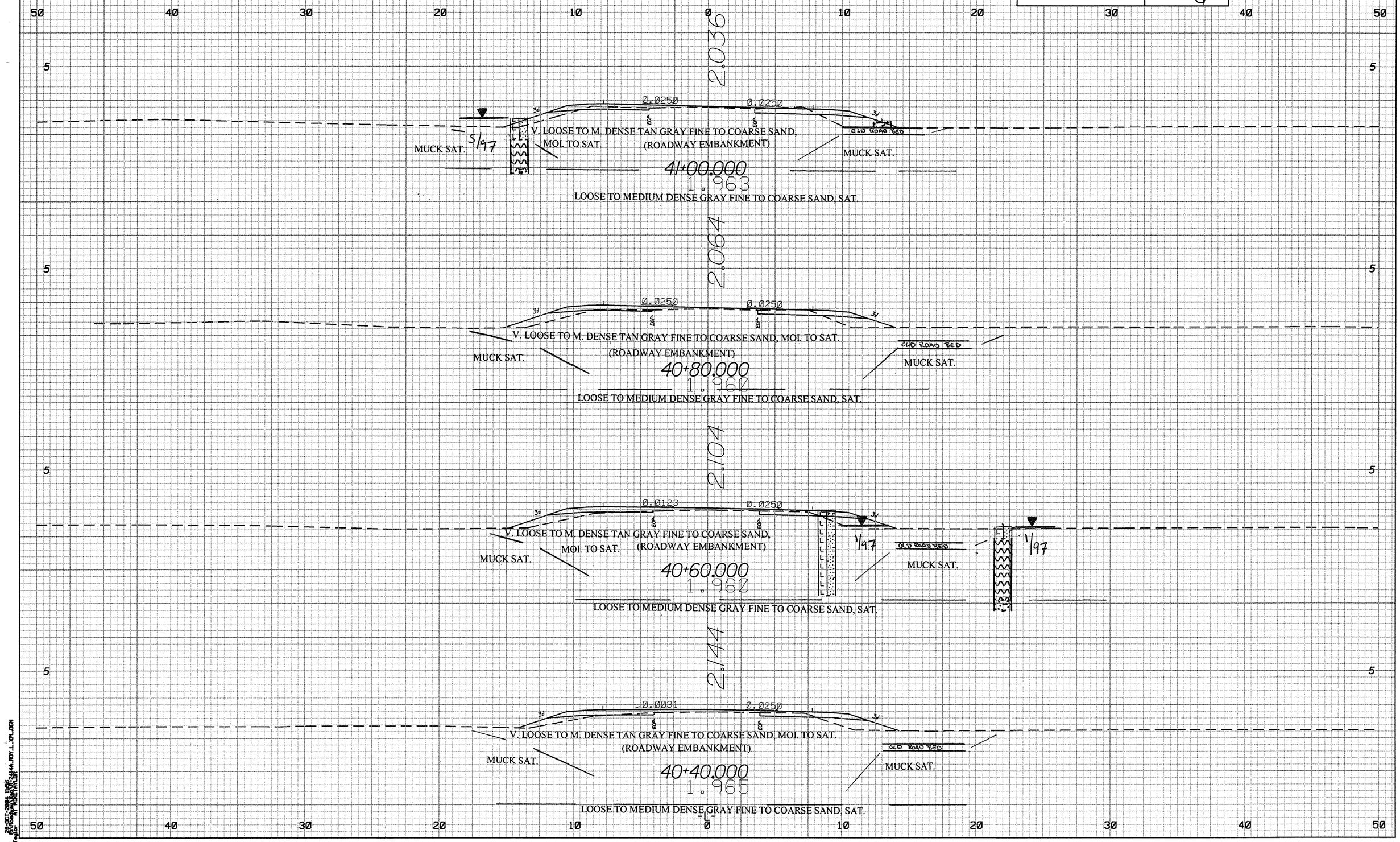
2.5 0 2.5 5



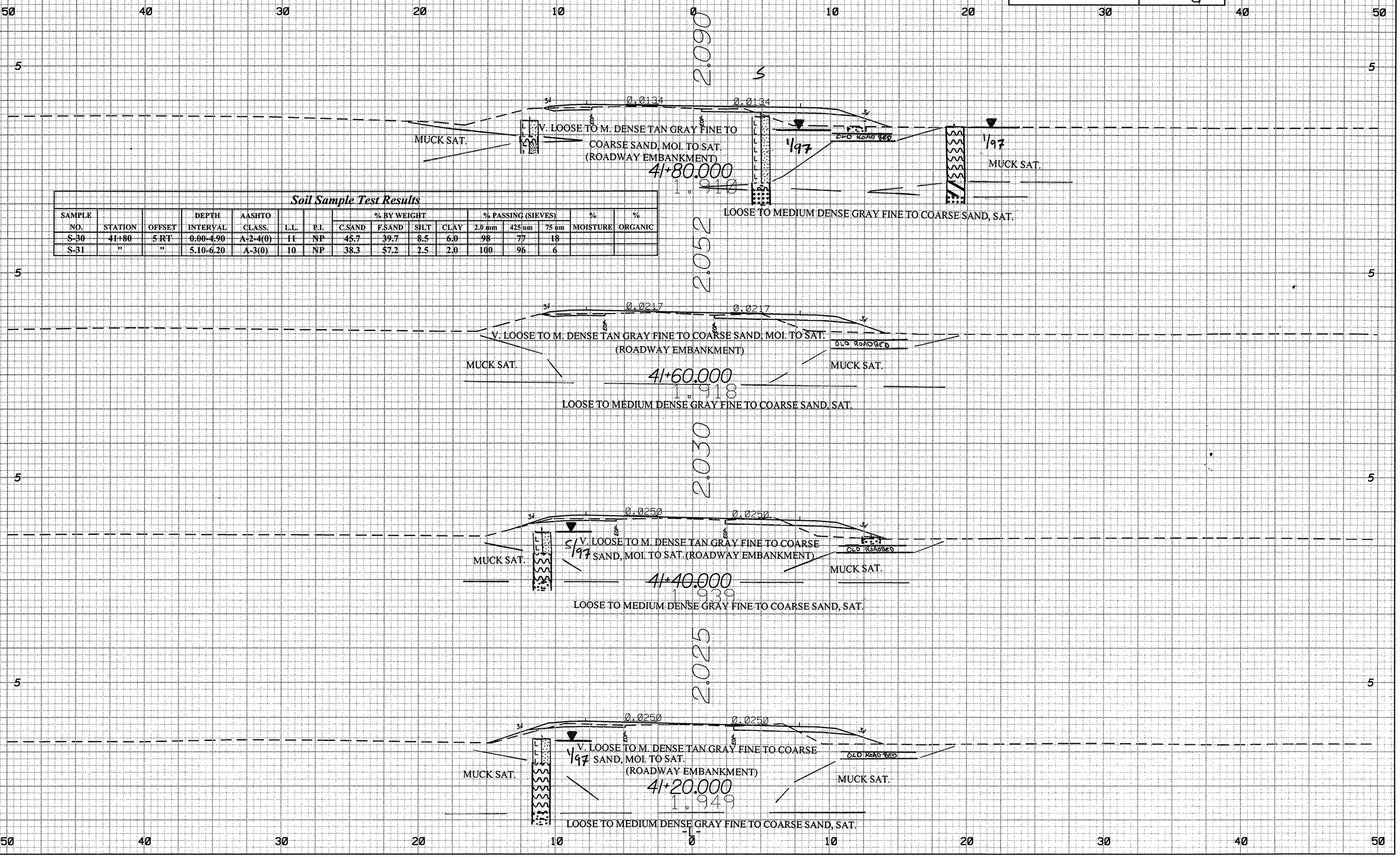
Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
SS-26	40+00	12 LT	0.00-0.45	A-2-4(0)	15	NP	44.9	42.3	8.7	4.0	97	79	19		
SS-27	"	"	1.52-1.97	A-2-4(0)	18	NP	22.5	65.1	8.3	4.0	97	92	24		
SS-28	"	"	3.96-4.41	A-2-5(0)	16.9	NP	57.4	16.0	18.6	8.0	100	56	29	598	76.2
S-32	"	"	6.40-7.80	A-3(0)	12	NP	0.6	93.5	2.9	3.0	100	100	8		

2.5 0 2.5 5


2.036
0.0250
0.0250
3:1
EOP
EOP
OLD ROAD BED
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND,
MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
5/97
MUCK SAT.
41+00.000
1.963
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.064
0.0250
0.0250
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
OLD ROAD BED
MUCK SAT.
40+80.000
1.960
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.104
0.0123
0.0250
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND,
MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
1/97
OLD ROAD BED
MUCK SAT.
1/97
40+60.000
1.960
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.144
0.0031
0.0250
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
OLD ROAD BED
MUCK SAT.
40+40.000
1.965
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
50 40 30 20 10 0 10 20 30 40 50
5

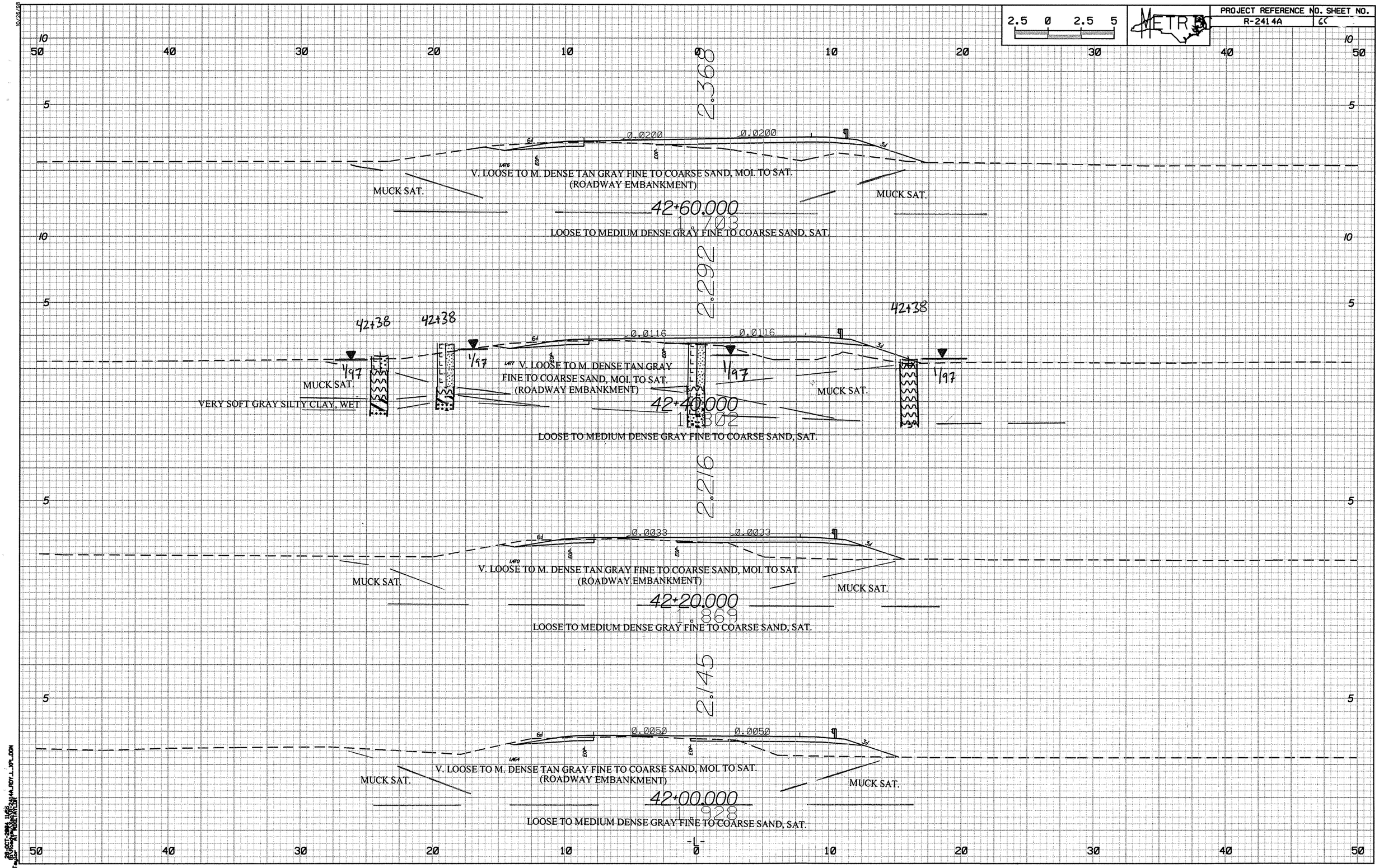
2.5 0 2.5 5



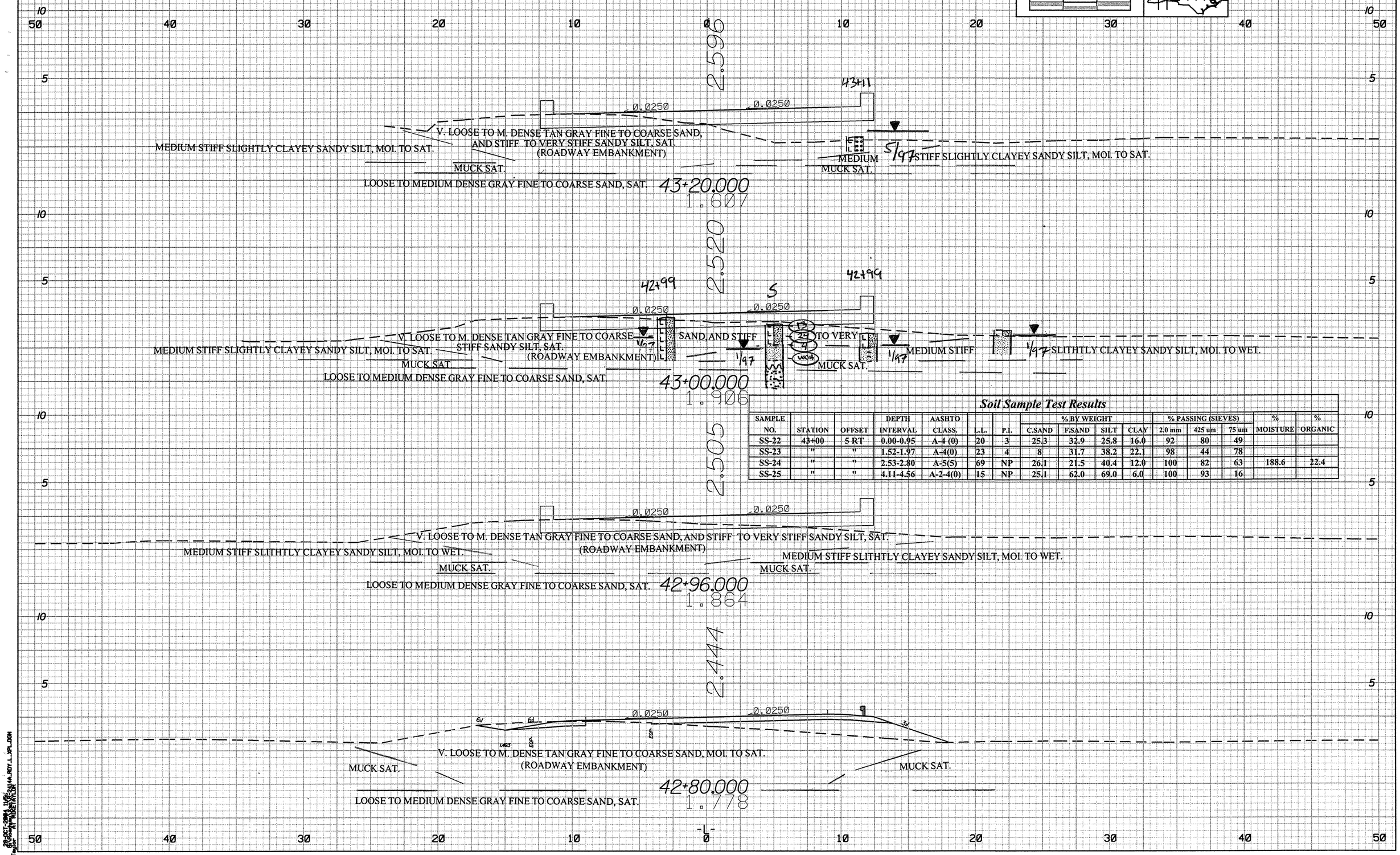
Soil Sample Test Results

SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
S-30	41+80	5 RT	0.00-4.90	A-2-4(0)	11	NP	45.7	39.7	8.5	6.0	98	77	18		
S-31	"	"	5.10-6.20	A-3(0)	10	NP	38.3	57.2	2.5	2.0	100	96	6		

2.5 0 2.5 5


2.368
0.0200
0.0200
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
MUCK SAT.
42+60.000
1.703
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.292
42+38
42+38
42+38
0.0116
0.0116
1/97
1/97
1/97
V. LOOSE TO M. DENSE TAN GRAY
FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
VERY SOFT GRAY SILTY CLAY, WET
MUCK SAT.
42+40.000
1.302
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.216
0.0033
0.0033
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
MUCK SAT.
42+20.000
1.869
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
2.145
0.0050
0.0050
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
(ROADWAY EMBANKMENT)
MUCK SAT.
MUCK SAT.
42+00.000
1.928
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
-L-

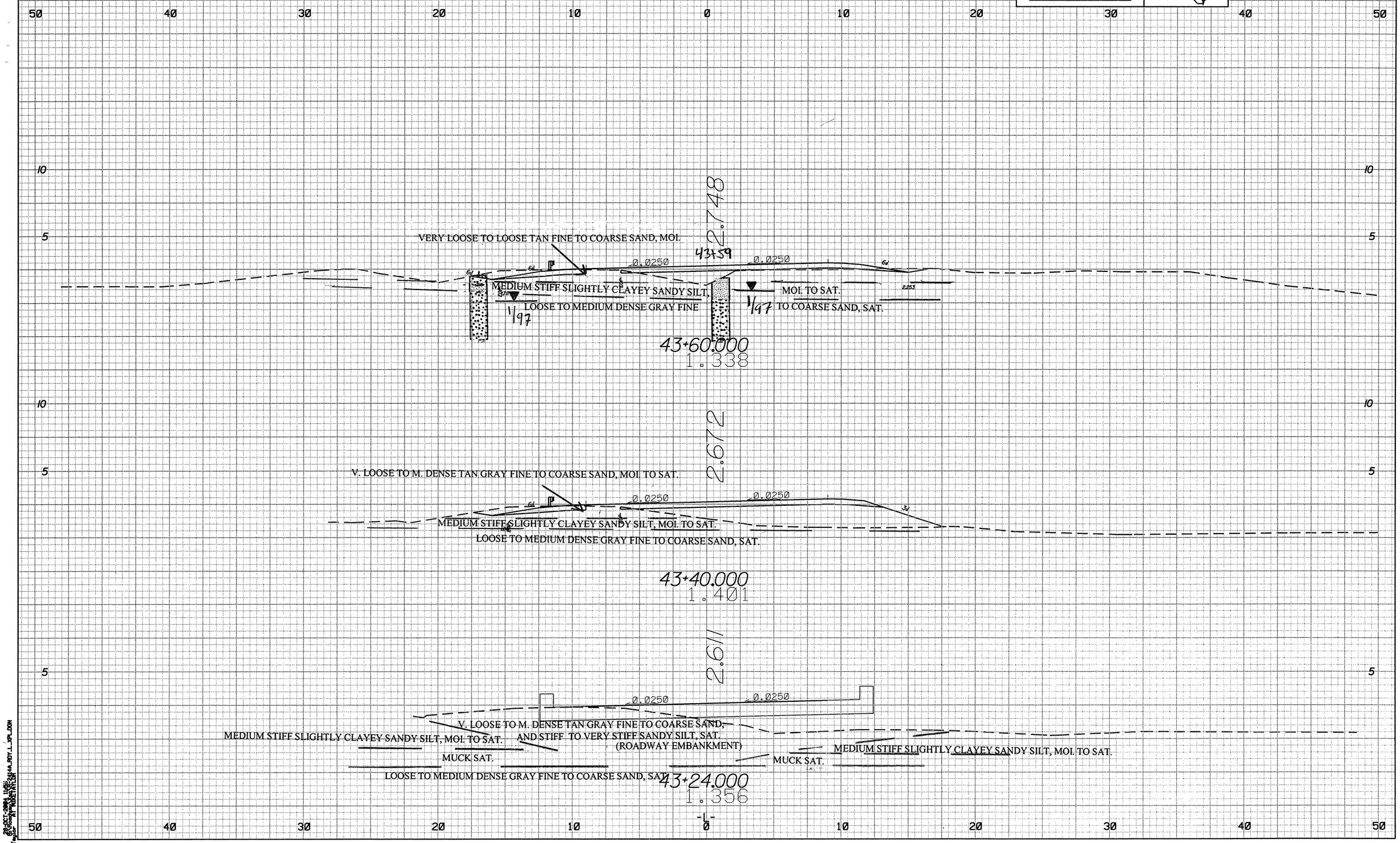
2.5 0 2.5 5

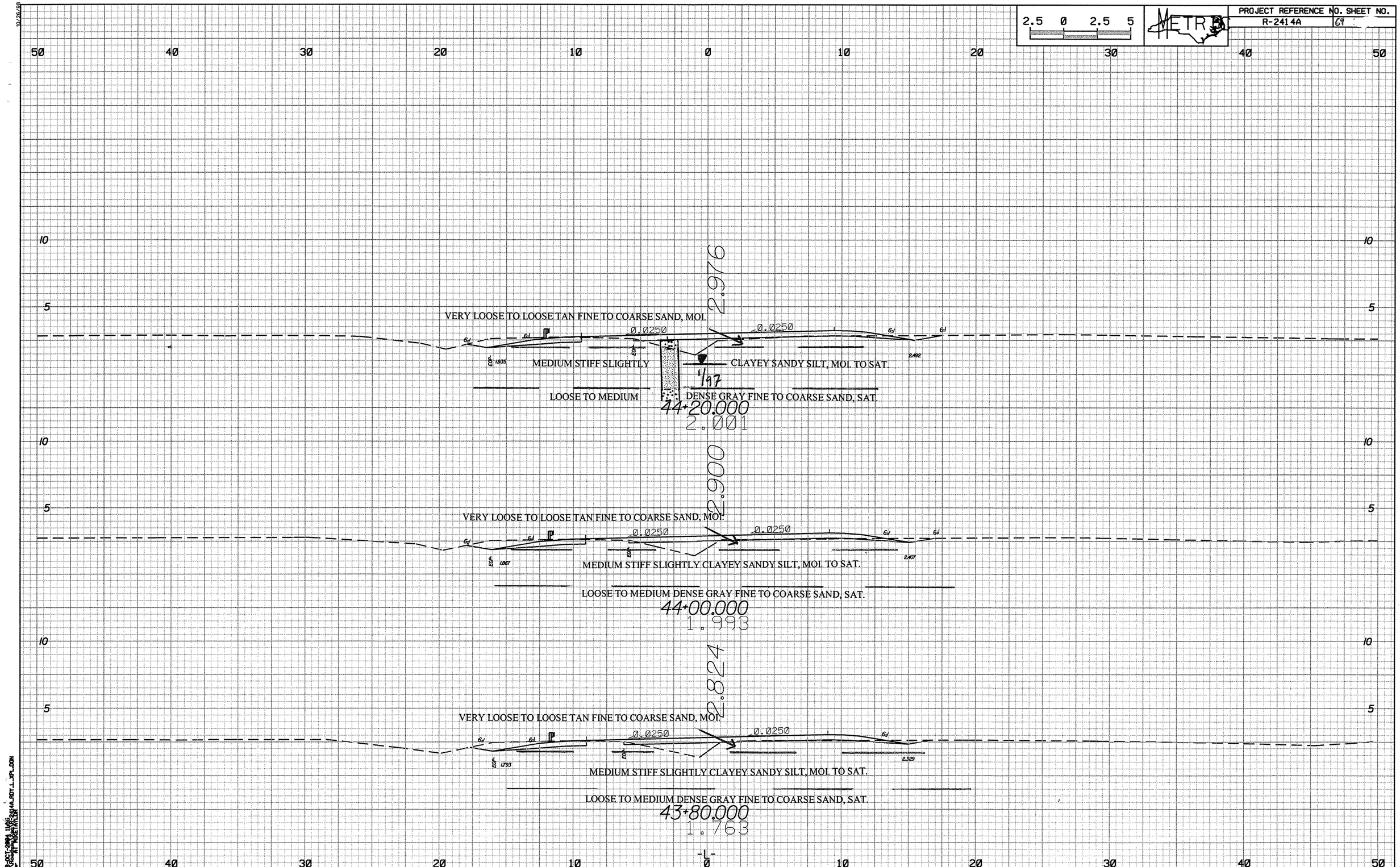


Soil Sample Test Results

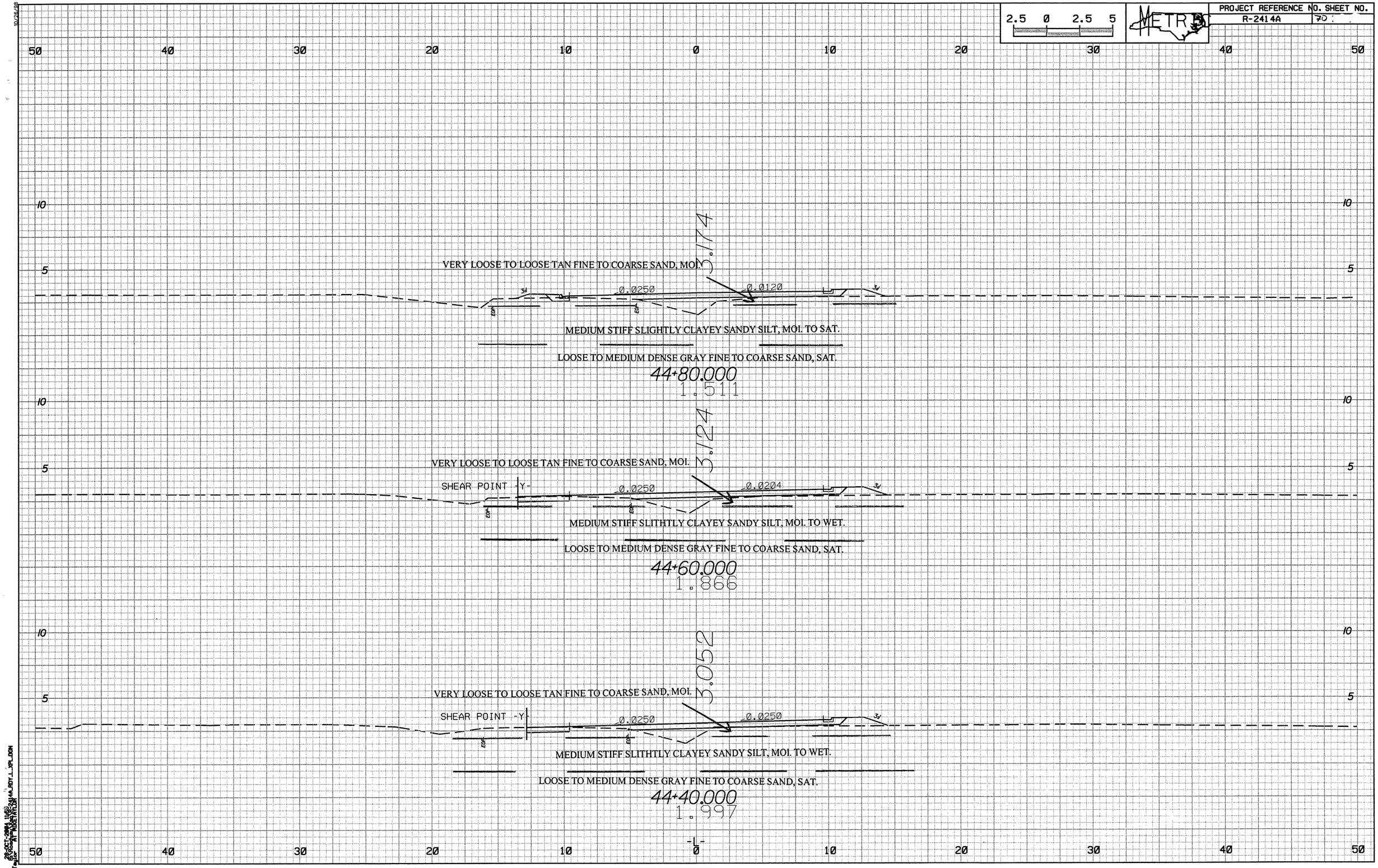
SAMPLE NO.	STATION	OFFSET	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT C.SAND	F.SAND	SILT	CLAY	% PASSING (SIEVES) 2.0 mm	425 um	75 um	% MOISTURE	% ORGANIC
SS-22	43+00	5 RT	0.00-0.95	A-4 (0)	20	3	25.3	32.9	25.8	16.0	92	80	49		
SS-23	"	"	1.52-1.97	A-4(0)	23	4	8	31.7	38.2	22.1	98	44	78		
SS-24	"	"	2.53-2.80	A-5(5)	69	NP	26.1	21.5	40.4	12.0	100	82	63	188.6	22.4
SS-25	"	"	4.11-4.56	A-2-4(0)	15	NP	25.1	62.0	69.0	6.0	100	93	16		

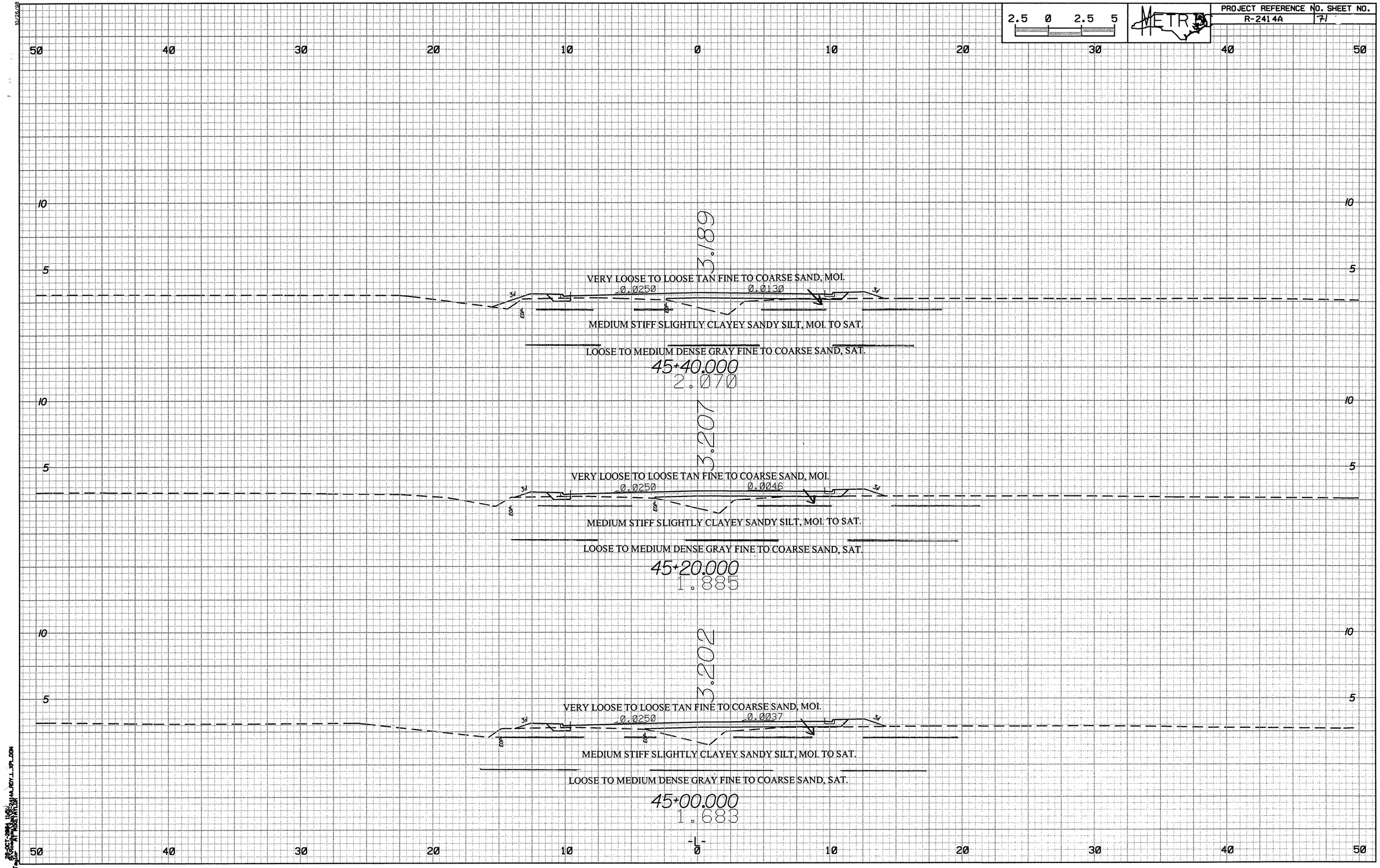
2.5 0 2.5 5

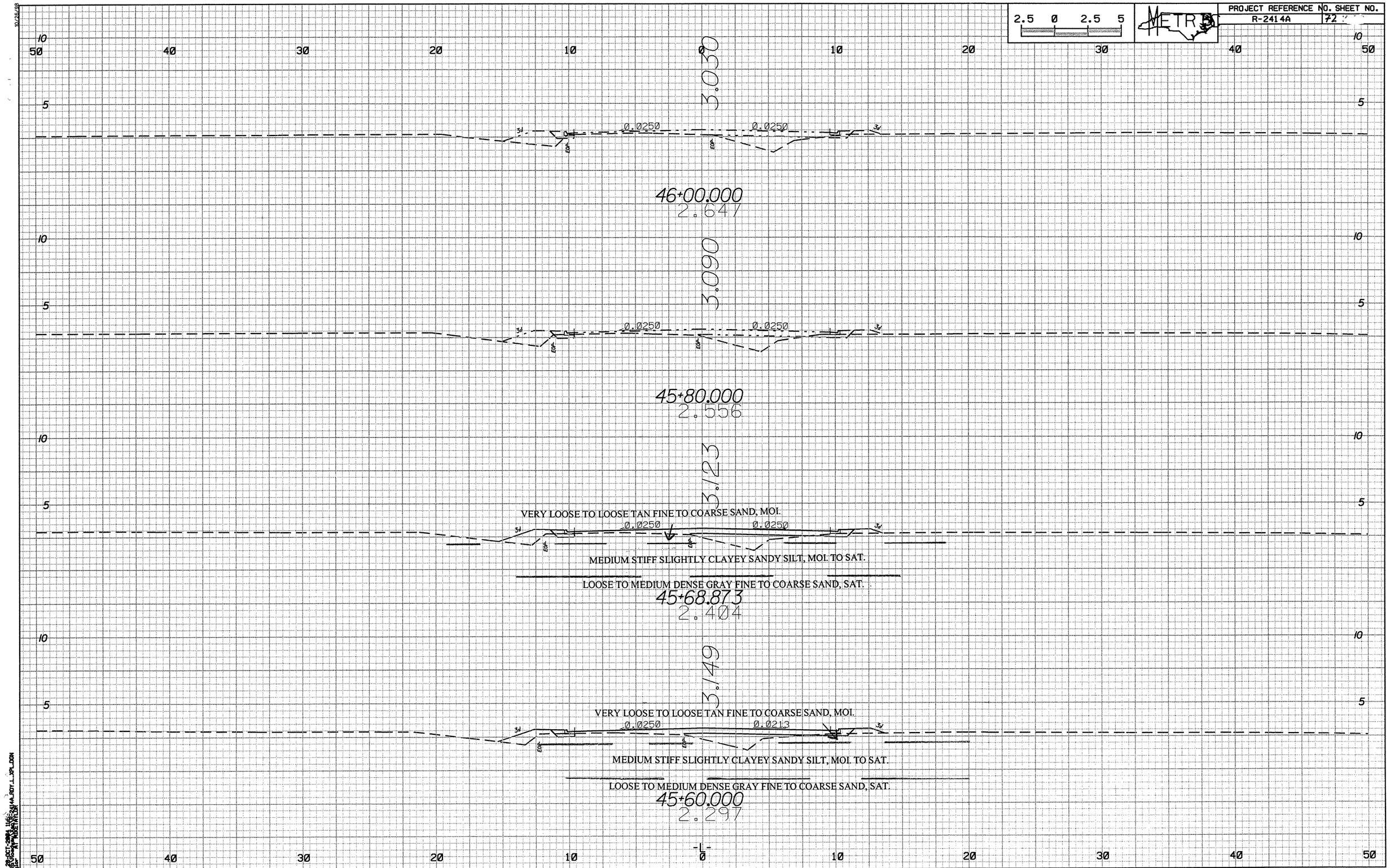

VERY LOOSE TO LOOSE TAN FINE TO COARSE SAND, MOI.
2.748
43+59
0.0250
0.0250
MEDIUM STIFF SLIGHTLY CLAYEY SANDY SILT,
LOOSE TO MEDIUM DENSE GRAY FINE
MOI. TO SAT.
TO COARSE SAND, SAT.
43+60.000
1.338
2.672
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND, MOI. TO SAT.
0.0250
0.0250
MEDIUM STIFF SLIGHTLY CLAYEY SANDY SILT, MOI. TO SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
43+40.000
1.401
2.611
0.0250
0.0250
V. LOOSE TO M. DENSE TAN GRAY FINE TO COARSE SAND,
AND STIFF TO VERY STIFF SANDY SILT, SAT.
(ROADWAY EMBANKMENT)
MEDIUM STIFF SLIGHTLY CLAYEY SANDY SILT, MOI. TO SAT.
MUCK SAT.
MEDIUM STIFF SLIGHTLY CLAYEY SANDY SILT, MOI. TO SAT.
MUCK SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
43+24.000
1.356
-L-



2.5 0 2.5 5
METRO
PROJECT REFERENCE NO. SHEET NO.
R-2414A 69
50 40 30 20 10 0 10 20 30 40 50
10
5
2.976
VERY LOOSE TO LOOSE TAN FINE TO COARSE SAND, MOI.
0.0250
0.0250
MEDIUM STIFF SLIGHTLY
CLAYEY SANDY SILT, MOI. TO SAT.
1/97
LOOSE TO MEDIUM
DENSE GRAY FINE TO COARSE SAND, SAT.
44+20.000
2.001
2.900
VERY LOOSE TO LOOSE TAN FINE TO COARSE SAND, MOI.
0.0250
0.0250
MEDIUM STIFF SLIGHTLY CLAYEY SANDY SILT, MOI. TO SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
44+00.000
1.993
2.824
VERY LOOSE TO LOOSE TAN FINE TO COARSE SAND, MOI.
0.0250
0.0250
MEDIUM STIFF SLIGHTLY CLAYEY SANDY SILT, MOI. TO SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
43+80.000
1.763
-L-


50 40 30 20 10 0 10 20 30 40 50
10
5
VERY LOOSE TO LOOSE TAN FINE TO COARSE SAND, MOI.
3.174
0.0250
0.0120
EOP
MEDIUM STIFF SLIGHTLY CLAYEY SANDY SILT, MOI. TO SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
44+80.000
1.511
VERY LOOSE TO LOOSE TAN FINE TO COARSE SAND, MOI.
3.124
SHEAR POINT -Y-
0.0250
0.0204
MEDIUM STIFF SLITHTLY CLAYEY SANDY SILT, MOI. TO WET.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
44+60.000
1.866
VERY LOOSE TO LOOSE TAN FINE TO COARSE SAND, MOI.
3.052
SHEAR POINT -Y-
0.0250
0.0250
MEDIUM STIFF SLITHTLY CLAYEY SANDY SILT, MOI. TO WET.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
44+40.000
1.997
-L-


2.5 0 2.5 5
50 40 30 20 10 0 10 20 30 40 50
10 5 10 5 10 5 10 5
3.189
VERY LOOSE TO LOOSE TAN FINE TO COARSE SAND, MOI.
0.0250
0.0130
3:1
EOP
MEDIUM STIFF SLIGHTLY CLAYEY SANDY SILT, MOI. TO SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
45+40.000
2.070
3.207
VERY LOOSE TO LOOSE TAN FINE TO COARSE SAND, MOI.
0.0250
0.0046
3:1
EOP
MEDIUM STIFF SLIGHTLY CLAYEY SANDY SILT, MOI. TO SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
45+20.000
1.885
3.202
VERY LOOSE TO LOOSE TAN FINE TO COARSE SAND, MOI.
0.0250
0.0037
3:1
EOP
MEDIUM STIFF SLIGHTLY CLAYEY SANDY SILT, MOI. TO SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
45+00.000
1.683
-L-


2.5 0 2.5 5
METRO
3.030
0.0250
0.0250
3:1
EOP
46+00.000
2.647
3.090
0.0250
0.0250
45+80.000
2.556
3.123
VERY LOOSE TO LOOSE TAN FINE TO COARSE SAND, MOI.
MEDIUM STIFF SLIGHTLY CLAYEY SANDY SILT, MOI. TO SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
45+68.873
2.404
3.149
0.0250
0.0213
VERY LOOSE TO LOOSE TAN FINE TO COARSE SAND, MOI.
MEDIUM STIFF SLIGHTLY CLAYEY SANDY SILT, MOI. TO SAT.
LOOSE TO MEDIUM DENSE GRAY FINE TO COARSE SAND, SAT.
45+60.000
2.297
-L-
50 40 30 20 10 0 10 20 30 40 50
5 10