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

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5023B	1	28
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		P.E.	
		NW & UTIL.	

CONTENTS

LINE	STATION	PLAN	PROFILE
-L-	10+00 TO 103+87	4-15	16-19

ROADWAY  
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 41922.1.1 (R-5023B) F.A. PROJ. STP-0053(8)  
COUNTY ONslow  
PROJECT DESCRIPTION NC 53 FROM 0.18 MI. WEST OF SR 1214  
(FOY LOCKAMY RD.) TO SR 1116 (ONslow PINES RD.)

INVENTORY

CONTENTS

LINE	STATION	SHEET
-L-	54+00 TO 57+00	20-23
-L-	89+00 TO 92+50	24-25
-L-	98+50 TO 103+50	26-28

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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 SPECIFIC 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

C.M. WRIKE

J.D. GEMPERLINE

R.E. SMITH

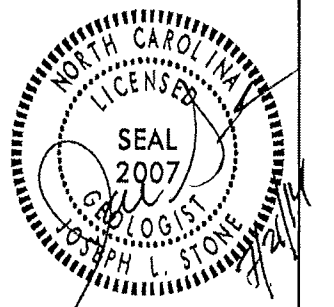
D.G. PINTER

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE JULY 2014



NOTE - THE INFORMATION CONTAINED HEREIN IS NOT WARRANTEED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE (WARRANTY 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.

DRAWN BY: C.P. TURNER

CONTRACT: 41922.1.1 ID: R-5023B

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

## SUBSURFACE INVESTIGATION

### SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

SOIL DESCRIPTION	GRADATION	ROCK DESCRIPTION	TERMS AND DEFINITIONS
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 120 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (ASHTO T208, 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: <i>VERY STIFF, GRAY-SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HARD PLASTIC, A-7-6</i>	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. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.	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 60 BLOWS PER FOOT 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) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)	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 DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRODUCED 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 IN OR BPF) OF A 148 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 60 BLOWS PER FOOT. STRATA CORE RECOVERY (SCREC) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>	<b>ANGULARITY OF GRAINS</b>	<b>WEATHERING</b>	
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS	MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.	FRESH ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING, ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL.) 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 (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1/4 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED, CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES 'CLUNK' SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL. SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT, SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF. VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED, ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF. COMPLETE ROCK REDUCED TO SOIL, ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIXES OR STAINERS. SAPROLITE IS ALSO AN EXAMPLE.	
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>	<b>MINERALOGICAL COMPOSITION</b>	<b>WEATHERING</b>	
GROUP CLASS. A-1, A-2, A-3, A-4, A-5, A-6, A-7	SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50	CRISTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)	
<b>PERCENTAGE OF MATERIAL</b>	<b>GROUND WATER</b>	<b>WEATHERING</b>	
ORGANIC MATERIAL GRANULAR SOILS SILT-CLAY SOILS OTHER MATERIAL	WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP	FRESH VERY SLIGHT (V SL.) SLIGHT (SL.) MODERATE (MOD.) MODERATELY SEVERE (MOD. SEV.) SEVERE (SEV.) VERY SEVERE (V SEV.) COMPLETE	
<b>CONSISTENCY OR DENSENESS</b>	<b>MISCELLANEOUS SYMBOLS</b>	<b>ROCK HARDNESS</b>	
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )	ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES	VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK, GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PIECES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK, PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGERNAIL.	
<b>TEXTURE OR GRAIN SIZE</b>	<b>ABBREVIATIONS</b>	<b>ROCK HARDNESS</b>	
U.S. STD. SIEVE SIZE OPENING (MM) 4 10 40 60 200 270	AR - AUGER REFUSAL BT - BORING TERMINATED CL - CLAY CPT - CONE PENETRATION TEST CSE - COARSE DHT - DILATOMETER TEST DPT - DYNAMIC PENETRATION TEST e - VOID RATIO F - FINE FOSS. - FOSSILIFEROUS FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HL - HIGHLY	VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT	
<b>SOIL MOISTURE - CORRELATION OF TERMS</b>	<b>EQUIPMENT USED ON SUBJECT PROJECT</b>	<b>ROCK HARDNESS</b>	
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION	DRILL UNITS: MOBILE B, BK-51, CME-45C, CME-55B, PORTABLE HOIST	VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT	
<b>PLASTICITY</b>	<b>EQUIPMENT USED ON SUBJECT PROJECT</b>	<b>ROCK HARDNESS</b>	
NONPLASTIC LOW PLASTICITY MED. PLASTICITY HIGH PLASTICITY	ADVANCING TOOLS: CLAY BITS, 6" CONTINUOUS FLIGHT AUGER, 8" HOLLOW AUGERS, HARD FACED FINGER BITS, TUNG-CARBIDE INSERTS, CASING w/ ADVANCER, TRICONE 2 1/8" STEEL TEETH, TRICONE TUNG-CARB., CORE BIT	VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT	
<b>COLOR</b>	<b>EQUIPMENT USED ON SUBJECT PROJECT</b>	<b>ROCK HARDNESS</b>	
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.	HAMMER TYPE: AUTOMATIC, MANUAL CORE SIZE: B, N, H HAND TOOLS: POST HOLE DIGGER, HAND AUGER, SOUNDING ROD, VANE SHEAR TEST	VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT	
	<b>FRACATURE SPACING</b>	<b>ROCK HARDNESS</b>	
	TERM SPACING: VERY WIDE MORE THAN 10 FEET, WIDE 3 TO 10 FEET, MODERATELY CLOSE 1 TO 3 FEET, CLOSE 0.16 TO 1 FEET, VERY CLOSE LESS THAN 0.16 FEET	VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT	
	<b>BEDDING</b>	<b>ROCK HARDNESS</b>	
	TERM THICKNESS: VERY THICKLY BEDDED > 4 FEET, THICKLY BEDDED 1.5 - 4 FEET, THINLY BEDDED 0.16 - 1.5 FEET, VERY THINLY BEDDED 0.03 - 0.16 FEET, THICKLY LAMINATED 0.028 - 0.03 FEET, THINLY LAMINATED < 0.028 FEET	VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT	
	<b>INDURATION</b>	<b>ROCK HARDNESS</b>	
	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.	VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT	
	<b>BENCH MARK:</b>	<b>ROCK HARDNESS</b>	
	ELEVATION: FT.	VERY HARD HARD MODERATELY HARD MEDIUM HARD SOFT VERY SOFT	
	<b>NOTES:</b>	<b>ROCK HARDNESS</b>	

See Sheet 1-A For Index of Sheets

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**ONSLOW COUNTY**

LOCATION: NC 53 FROM 0.18 MI. WEST OF SR 1214  
(FOY LOCKAMY RD.) TO SR 1116 (ONSLOW PINES RD.)

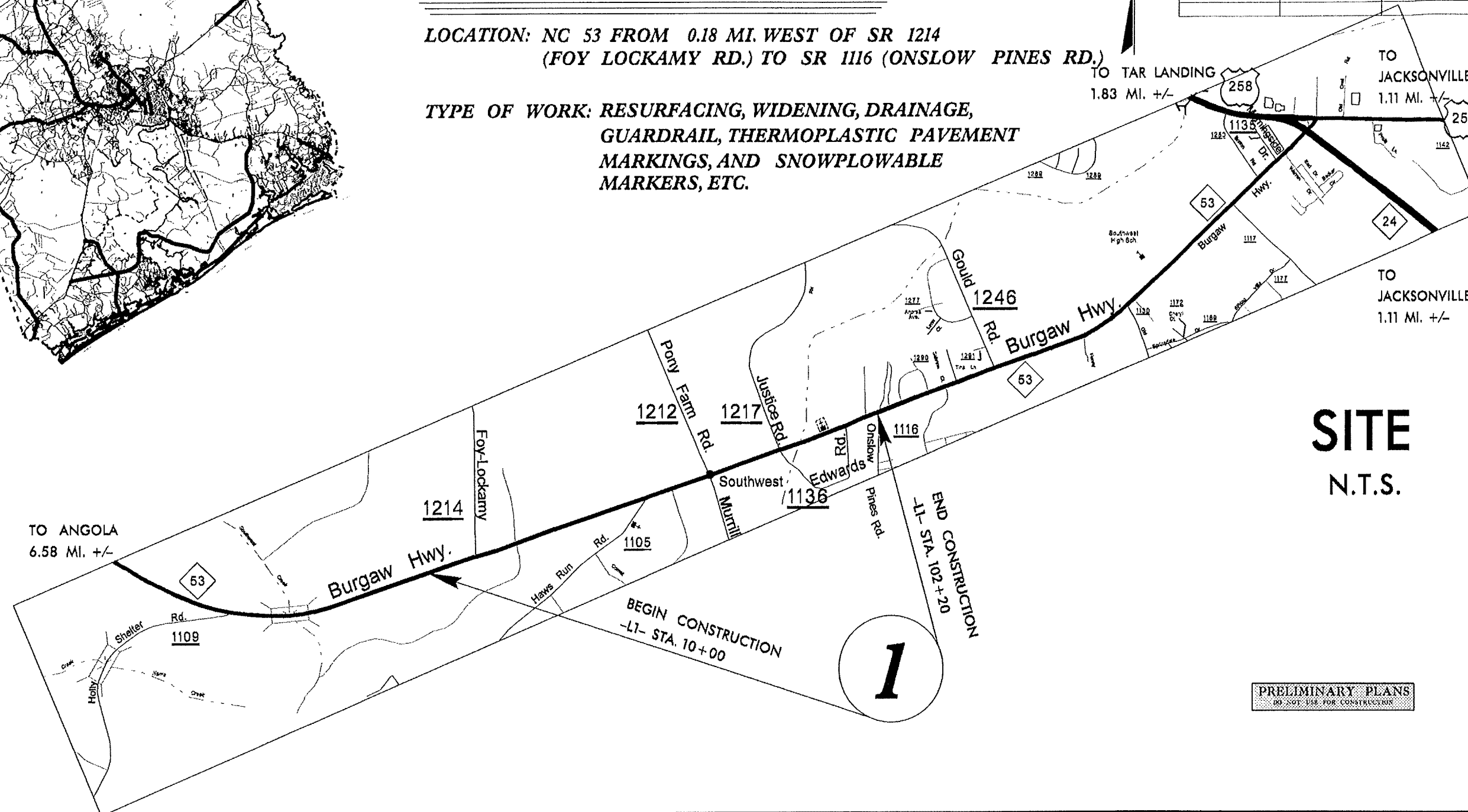
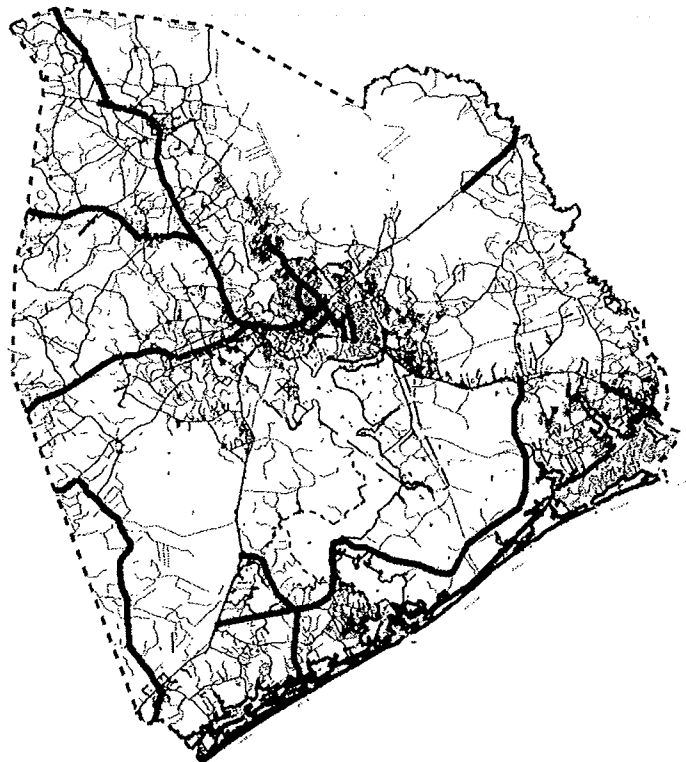
TYPE OF WORK: RESURFACING, WIDENING, DRAINAGE,  
GUARDRAIL, THERMOPLASTIC PAVEMENT  
MARKINGS, AND SNOWPLOWABLE  
MARKERS, ETC.

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	WBS: 41922.1.1	2A	28
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
41922	STP-0053(8)		
41922.3.1	STP-0053(8)	PRELIM. ENG.	
41922.3.2	STP-0053(8)	RIGHT OF WAY	
41922.3.3	STP-0053(8)	CONSTRUCTION	

TO TAR LANDING 1.83 MI. +/-

TO JACKSONVILLE 1.11 MI. +/-

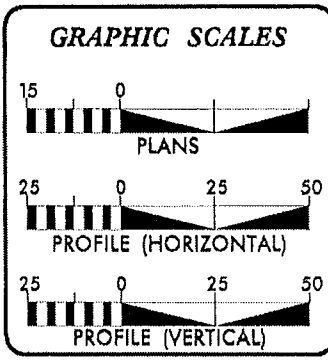
TO JACKSONVILLE 1.11 MI. +/-



**SITE**  
N.T.S.

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

CONTRACT: C-XXXXX TIP PROJECT: R-5023 B



**DESIGN DATA**

ADT	=	
DHV	=	%
D	=	%
T	=	% *
V	=	MPH
* TTST		DUAL

**PROJECT LENGTH**

MAP NO. 1 = 1.75 MILES (WBS NO. 41922.1.1)

MAP NO. 2 = 0.15 MILES (WBS NO. 43463.1.1)

**TOTAL = 1.90 MILES**

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**  
124 Division Dr., Wilmington, NC 28401

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: \_\_\_\_\_

LETTING DATE: \_\_\_\_\_

**HYDRAULICS ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

**ROADWAY DESIGN TECHNICIAN**

SIGNATURE: \_\_\_\_\_ DNL

SIGNATURE: \_\_\_\_\_

**DIVISION OF HIGHWAYS**  
STATE OF NORTH CAROLINA

SCOTT EVANS COOKE  
PROFESSIONAL ENGINEER  
SEAL 024905

DIVISION DESIGN ENGINEER

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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY  
GOVERNOR

ANTHONY J. TATA  
SECRETARY

July 21, 2014

STATE PROJECT: 41922.1.1 (R-5023B)  
F.A. PROJECT: STP-0053(8)  
COUNTY: Onslow  
DESCRIPTION: NC 53 from 0.18 miles west of SR 1214 (Foy Lockamy Rd.)  
to SR 1116 (Onslow Pines Rd.)

SUBJECT: Geotechnical Inventory Report

**Project Description**

This project begins just west of the existing NC 53/ SR 1214 intersection in Onslow County, and extends eastward approximately 1.9 miles. This geotechnical investigation was confined to the areas of proposed construction.

Fieldwork was conducted in February 2014. SPT and hand auger borings were completed at various offsets along the project corridor. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the Materials and Tests Unit.

The following alignments were investigated. Subsurface profiles and selected cross sections of these alignments are included in this report.

<u>Line</u>	<u>Station(±)</u>
-L-	10+00 to 103+87

**Areas of Special Geotechnical Interest**

- 1) The entire project was found to exhibit seasonal high ground water.
- 2) The following sections contain cohesive soils which have the potential to cause embankment/subgrade and or slope stability problems during construction.

<u>Line</u>	<u>Station(±)</u>
-L-	10+00 to 25+50
-L-	31+00 to 33+00
-L-	39+00 to 44+50
-L-	49+50 to 50+50
-L-	53+50 to 58+50
-L-	59+50 to 65+00
-L-	76+00 to 78+00
-L-	84+50 to 103+87

- 3) The following sections contain organic soils that have the potential to cause embankment/subgrade and or slope stability problems during construction.

<u>Line</u>	<u>Station(±)</u>
-L-	54+50 to 56+50

**Physiography and Geology**

This project corridor is located within the Coastal Plain Physiographic Province. Topography along the project is nearly flat to gently sloping. Natural ground elevations ranged from 34± to 62± feet above sea level.

Surficial soils in this area are classified as undivided coastal plain sediments.

**Ground Water**

Ground water data was collected from February 2014, during a time of normal precipitation. Ground water elevations ranged from 37± to 59± feet above sea level.

**Soils**

Soils encountered within this project area have been divided into categories, undivided coastal plain soils and roadway embankment.

Soils identified as undivided coastal plain are composed of 3± to 11± feet of very loose to medium dense sand (A-2-4), underlain by up to 26± feet of very soft to soft sandy, silty clay (A-6, A-7-6) and sandy silt (A-4). Moisture samples taken within these cohesive units returned natural moisture contents from 18% to 41% and vane shear test indicate shear strengths ranging from 500 to 4000 psf. Soils with trace to little organic content were also identified. These soils were typically 10± to 12± feet thick and composed of very loose sand (A-2-4). Organic samples taken within these soils returned organic percentages ranging from 2% to 3%.

MAILING ADDRESS:  
NC DEPARTMENT OF TRANSPORTATION  
GEOTECHNICAL ENGINEERING UNIT  
1589 MAIL SERVICE CENTER  
RALEIGH NC 27699-1589

TELEPHONE: 919-707-6850  
FAX: 919-250-4237  
WEBSITE: WWW.DOH.DOT.STATE.NC.US

LOCATION:  
CENTURY CENTER COMPLEX  
ENTRANCE B-2  
1020 BIRCH RIDGE DRIVE  
RALEIGH NC

Roadway embankment soils were found along the existing NC 53 corridor. Where encountered it was composed of 1± to 6± feet of loose sand (A-2-4).

**Undisturbed Samples**

Undisturbed thin wall Shelby tube samples were collected at the following locations and submitted for testing.

<u>Sample No.</u>	<u>Station</u>	<u>Depth</u>	<u>Test</u>
ST-1	-L- 56+00, 24' RT	4.0-5.6	Triaxial/Consolidation
ST-2	-L- 24+00, 25' RT	4.6-6.1	Triaxial/Consolidation
ST-3	-L- 24+00, 25' RT	9.7-11.6	Triaxial/Consolidation
ST-4	-L- 87+54, 34' LT	9.2-11.2	Triaxial/Consolidation
ST-5	-L- 87+54, 34' LT	14.2-16.2	Triaxial/Consolidation
ST-6	-L- 87+54, 34' LT	19.2-21.2	Triaxial/Consolidation

**Culvert at -L- Station 87+38±**

Natural ground elevations range from 34± feet in the bottom of the ditch to 42± feet along the existing NC 53 embankment. Borings completed in the vicinity indicate 2± feet of existing roadway embankment composed of loose sand (A-2-4) underlain by 1± to 2± feet of loose alluvial sand (A-2-4), and 21 or more feet of very soft to medium stiff sandy silt (A-4). At the time of this investigation ground water was measured at an elevation of 38± feet.

Respectfully Submitted,



Joseph L. Stone, I.G.  
Project Engineering Geologist





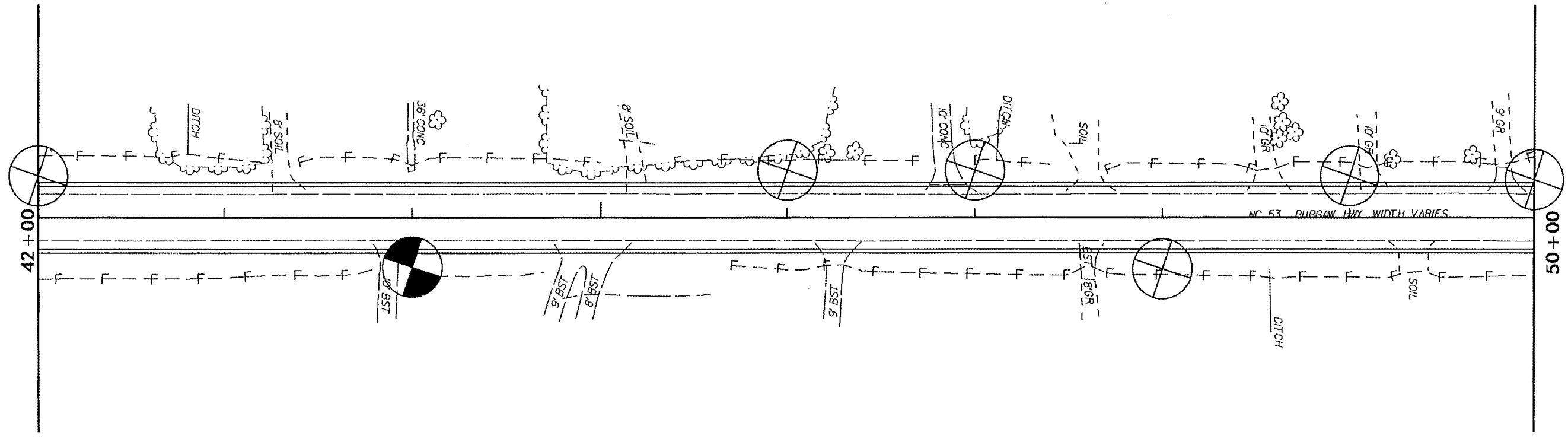






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REVISIONS



45

PROJECT REFERENCE NO. R-5023B	SHEET NO. 8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PROJECT REFERENCE NO. R-5023B	SHEET NO. 9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

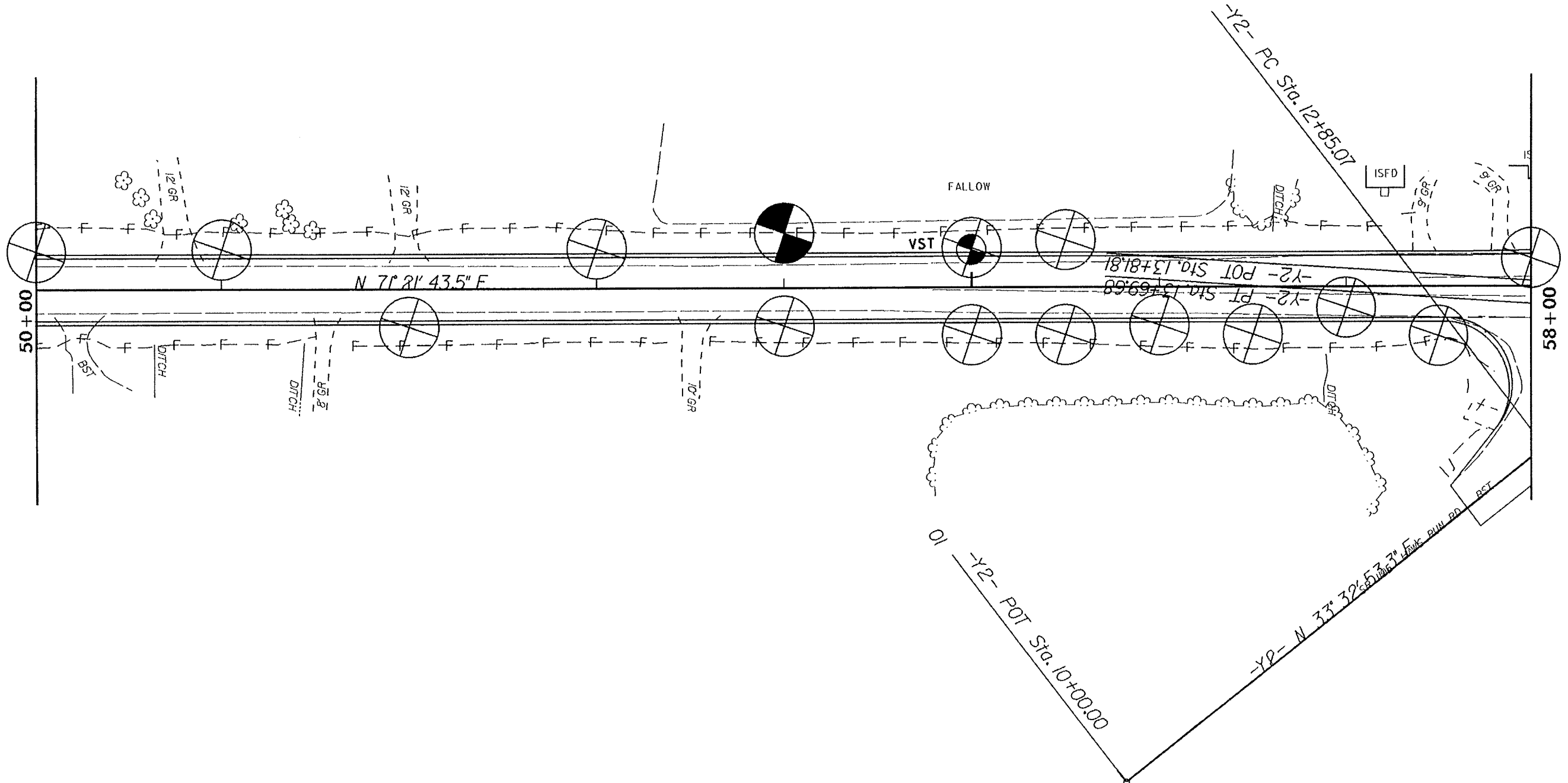
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REVISIONS

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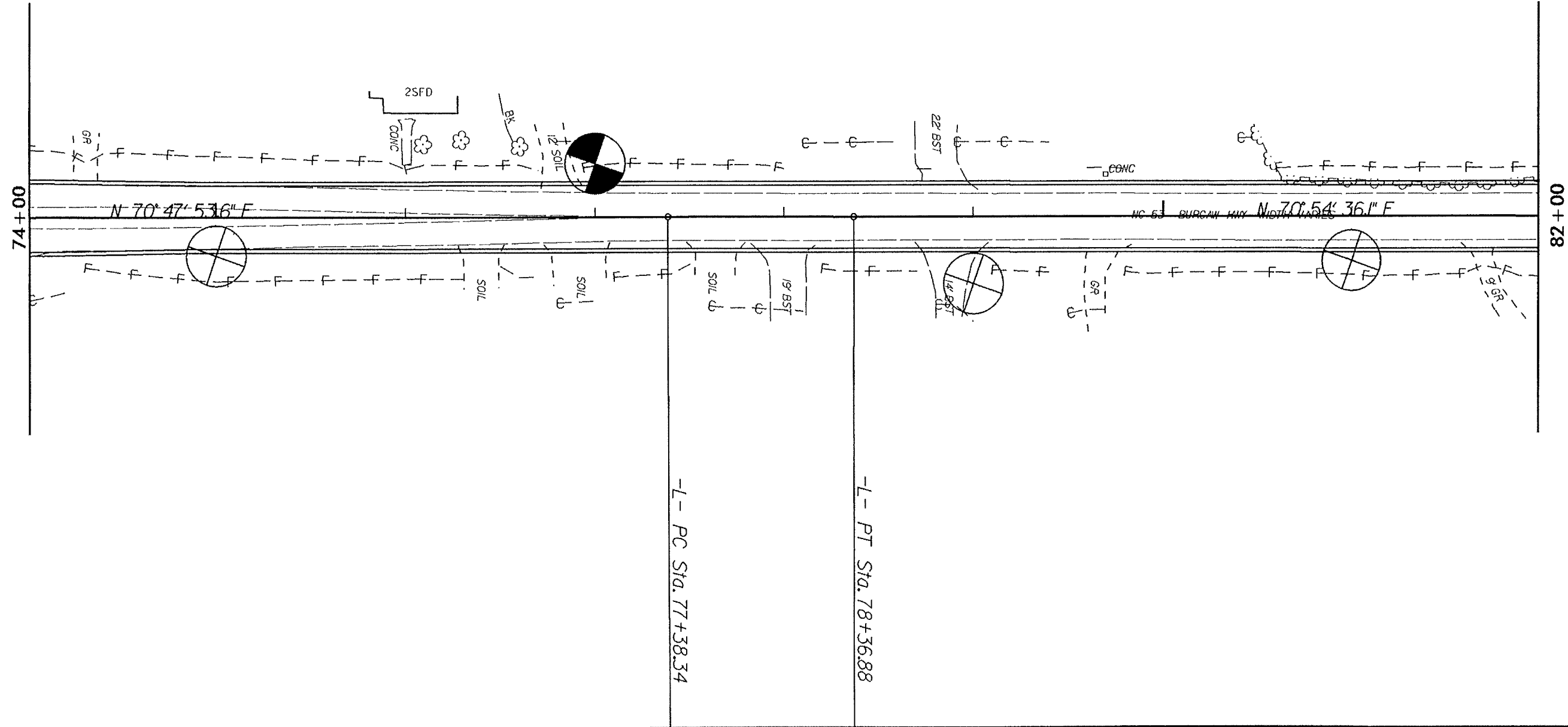




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R-5023B	12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

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REVISIONS







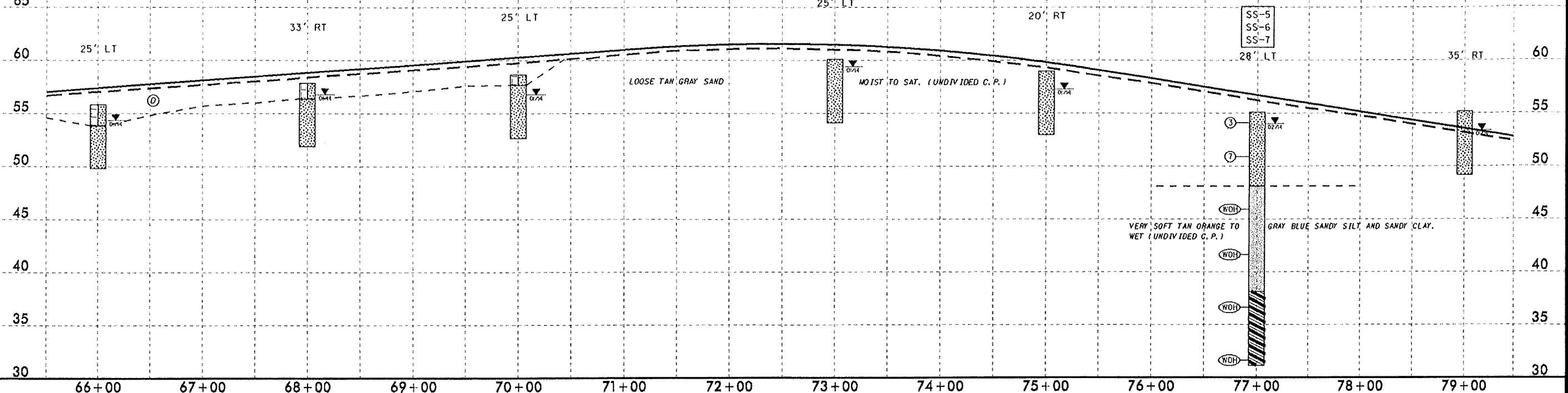






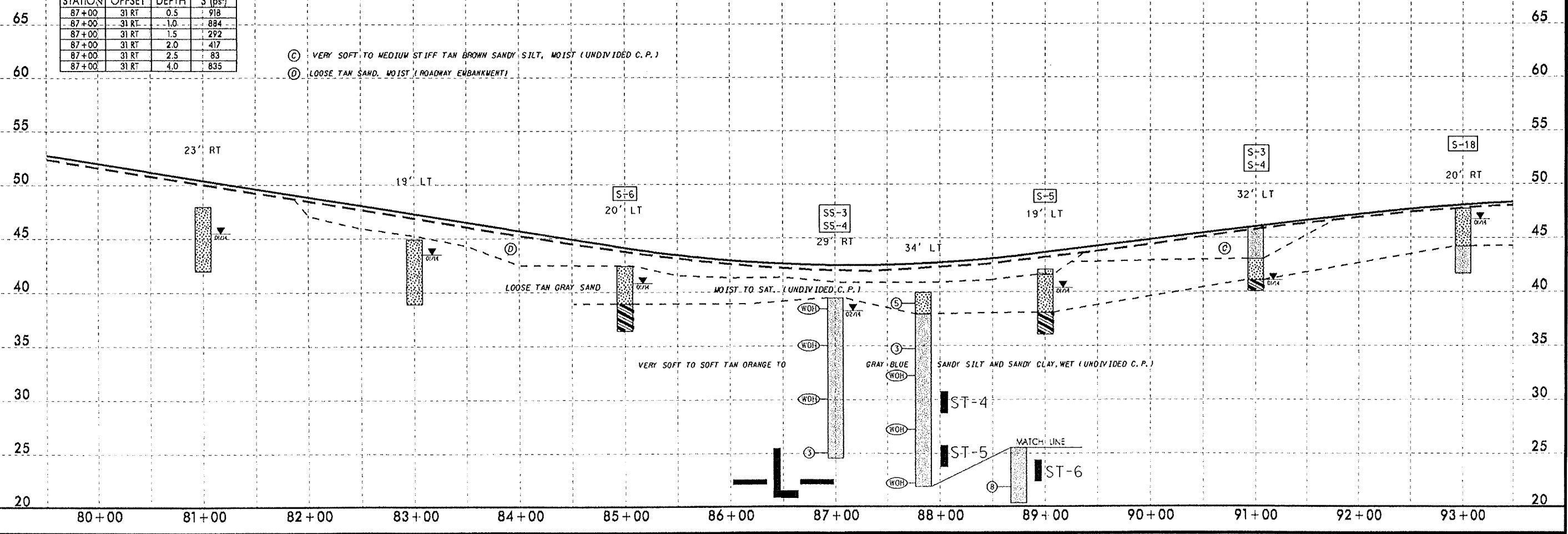


SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	ASBTD CLASS	L.L.	P.L.	% BY WEIGHT			% PASSING / SIEVES			% MOISTURE	% ORGANIC	
							C SAND	F SAND	SILT	# 10	# 40	# 100			
S-7	25' LT	73+00	0.0-6.0	A-2-4(0)	22	VP	3.2	83.9	4.8	8.1	100	100	18		
SS-5	28' LT	77+00	0.0-1.5	A-2-4(0)	21	VP	13.0	67.1	7.8	12.0	87	80	20		
SS-6	28' LT	77+00	1.5-9.7	A-4(0)	23	5	1.4	55.9	20.6	22.0	100	95	54		
SS-7	28' LT	77+00	17.5-19.0	A-6(7)	30	11	0.2	42.7	39.1	18.0	100	100	75		
S-6	20' LT	85+00	3.5-6.0	A-6(7)	31	13	0.2	45.9	21.4	32.5	100	100	69		
SS-3	29' RT	87+00	0.0-1.5	A-4(1)	25	6	4.8	50.5	20.6	24.0	95	84	56		
SS-4	29' RT	87+00	1.5-9.9	A-4(0)	23	4	3.0	49.5	25.5	23.0	100	99	63		
S-5	19' LT	89+00	4.0-6.0	A-6(8)	33	13	1.6	44.5	23.5	30.5	100	99	72		
S-3	32' LT	91+00	0.0-3.0	A-4(0)	22	4	3.5	61.9	10.3	24.4	100	99	47	18.9	
S-4	32' LT	91+00	5.0-6.0	A-6(7)	33	12	0.8	47.1	17.6	34.5	100	99	69		
S-18	20' RT	93+00	3.5-6.0	A-4(2)	26	6	0.4	54.0	21.2	24.4	100	100	65		



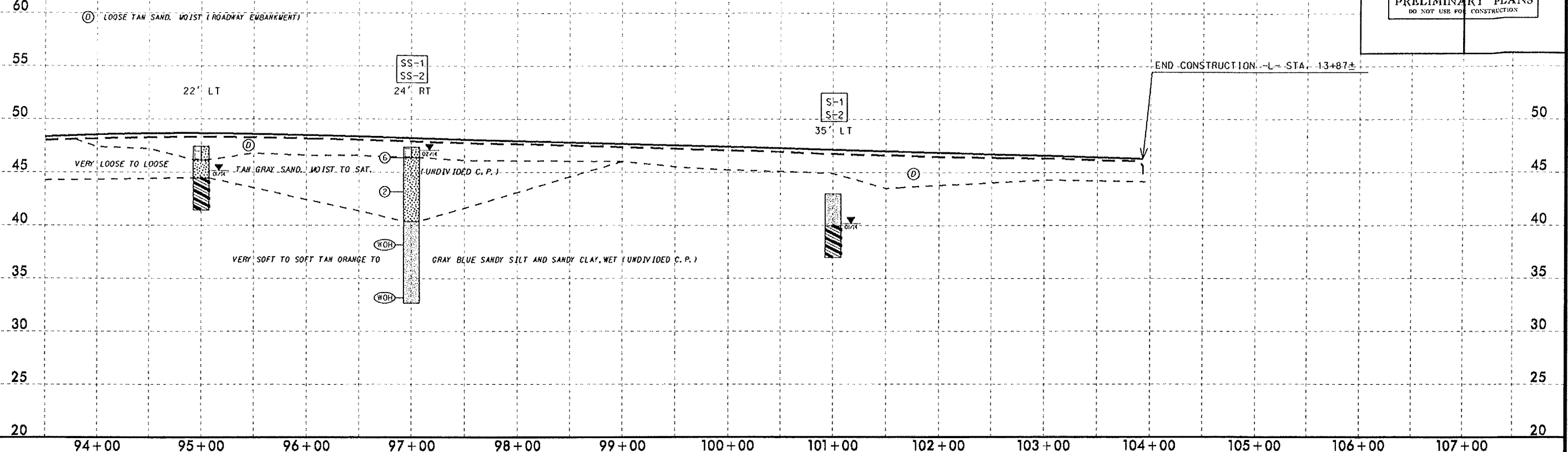
**VANE SHEAR TESTS**

STATION	OFFSET	DEPTH	S (psf)
87+00	31 RT	0.5	918
87+00	31 RT	1.0	884
87+00	31 RT	1.5	292
87+00	31 RT	2.0	417
87+00	31 RT	2.5	83
87+00	31 RT	4.0	835

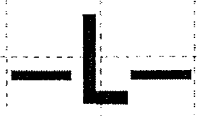


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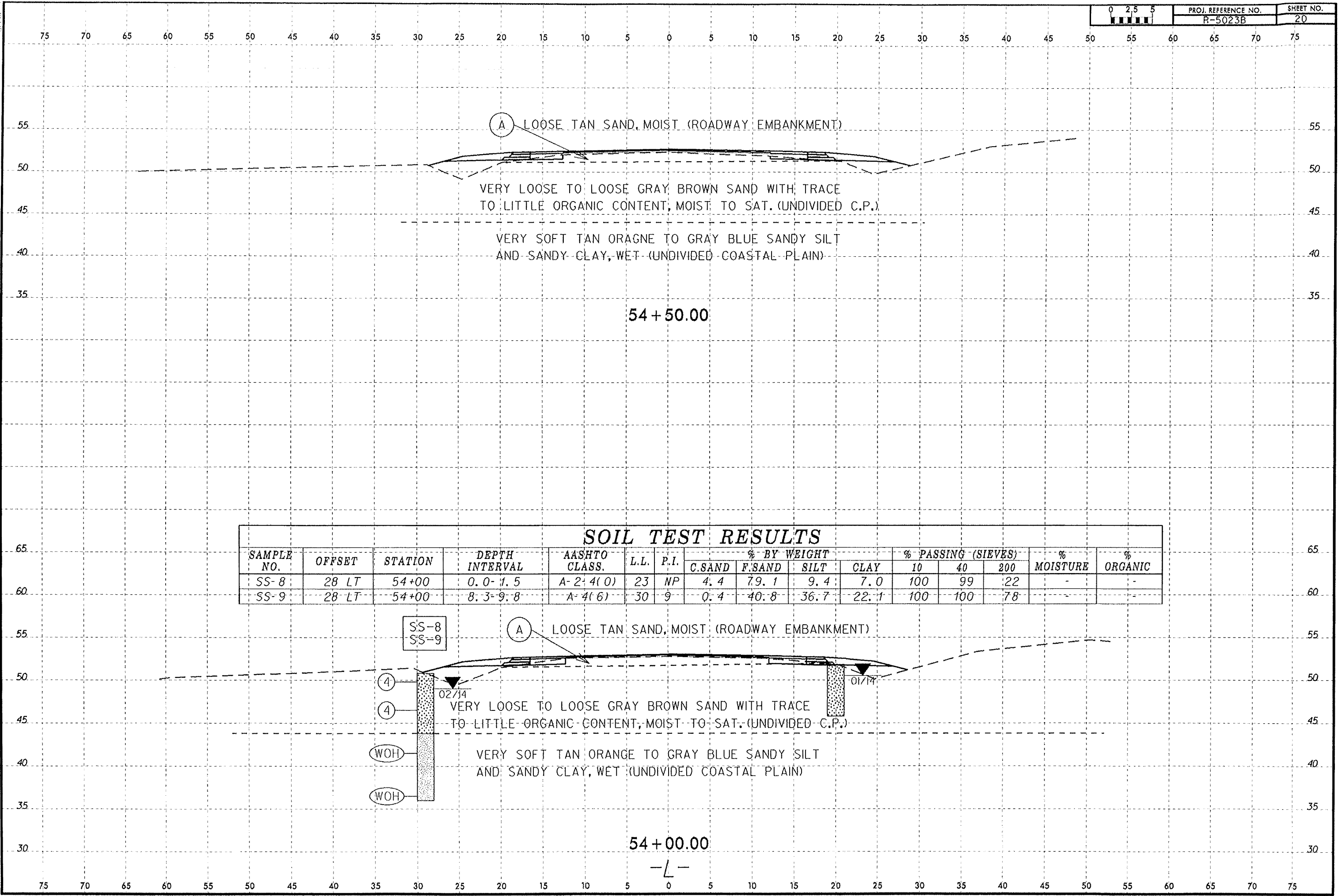
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS	L.L.	P.I.	% BY WEIGHT				% PASSING SIEVES			% MOISTURE	% ORGANIC
							SAND	SILT	CLAY	NO. 10	NO. 40	NO. 200			
SS-1	24 RT	97+00	0.0-1.5	A-2-4(0)	25	MP	17.0	65.5	13.4	4.0	88	81	21		
SS-2	24 RT	97+00	0.2-9.7	A-4(3)	27	6	0.4	47.1	38.5	14.0	100	100	75		
S-1	35 LT	101+00	0.0-3.0	A-4(1)	23	5	1.8	51.6	18.2	28.4	100	99	61	21.0	
S-2	35 LT	101+00	3.0-6.0	A-6(5)	29	11	1.0	45.5	19.0	34.5	100	100	65		



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(A) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

VERY LOOSE TO LOOSE GRAY BROWN SAND WITH TRACE TO LITTLE ORGANIC CONTENT, MOIST TO SAT. (UNDIVIDED C.P.)

VERY SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED COASTAL PLAIN)

54 + 50.00

**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-8	28 LT	54+00	0.0-1.5	A-2-4(0)	23	NP	4.4	79.1	9.4	7.0	100	99	22	-	-
SS-9	28 LT	54+00	8.3-9.8	A-4(6)	30	9	0.4	40.8	36.7	22.1	100	100	78	-	-

SS-8  
SS-9

(A) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)

VERY LOOSE TO LOOSE GRAY BROWN SAND WITH TRACE TO LITTLE ORGANIC CONTENT, MOIST TO SAT. (UNDIVIDED C.P.)

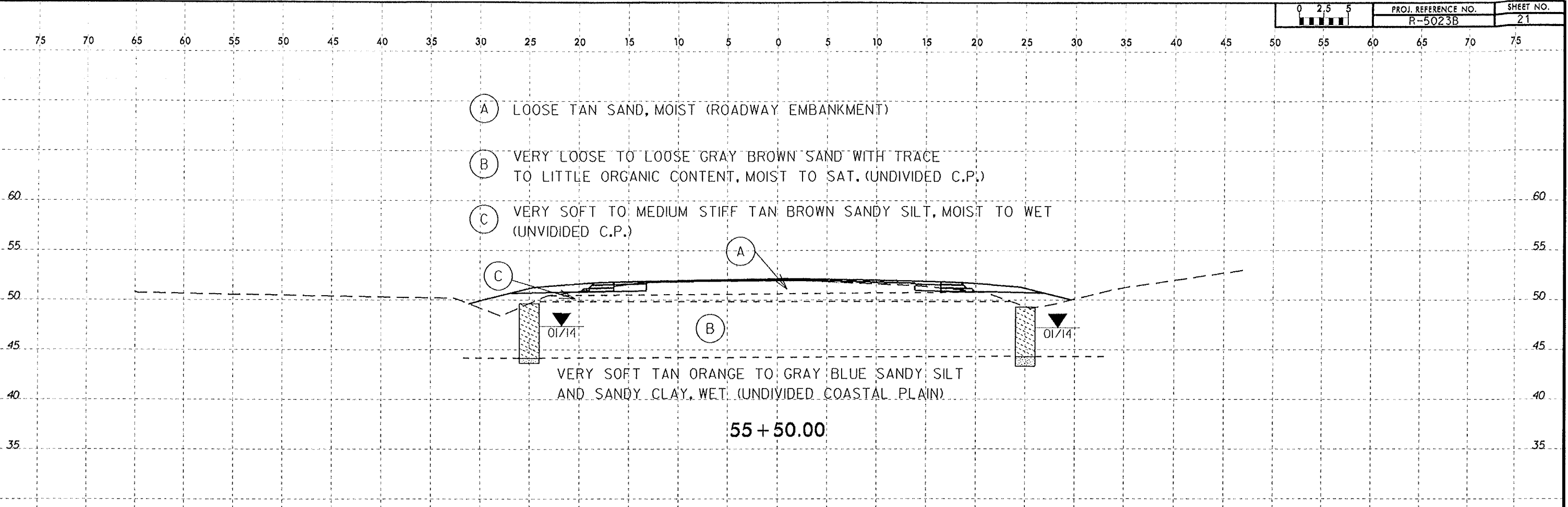
VERY SOFT TAN ORANGE TO GRAY BLUE SANDY SILT AND SANDY CLAY, WET (UNDIVIDED COASTAL PLAIN)

54 + 00.00

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- (A) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)
- (B) VERY LOOSE TO LOOSE GRAY BROWN SAND WITH TRACE TO LITTLE ORGANIC CONTENT, MOIST TO SAT. (UNDIVIDED C.P.)
- (C) VERY SOFT TO MEDIUM STIFF TAN BROWN SANDY SILT, MOIST TO WET (UNDIVIDED C.P.)



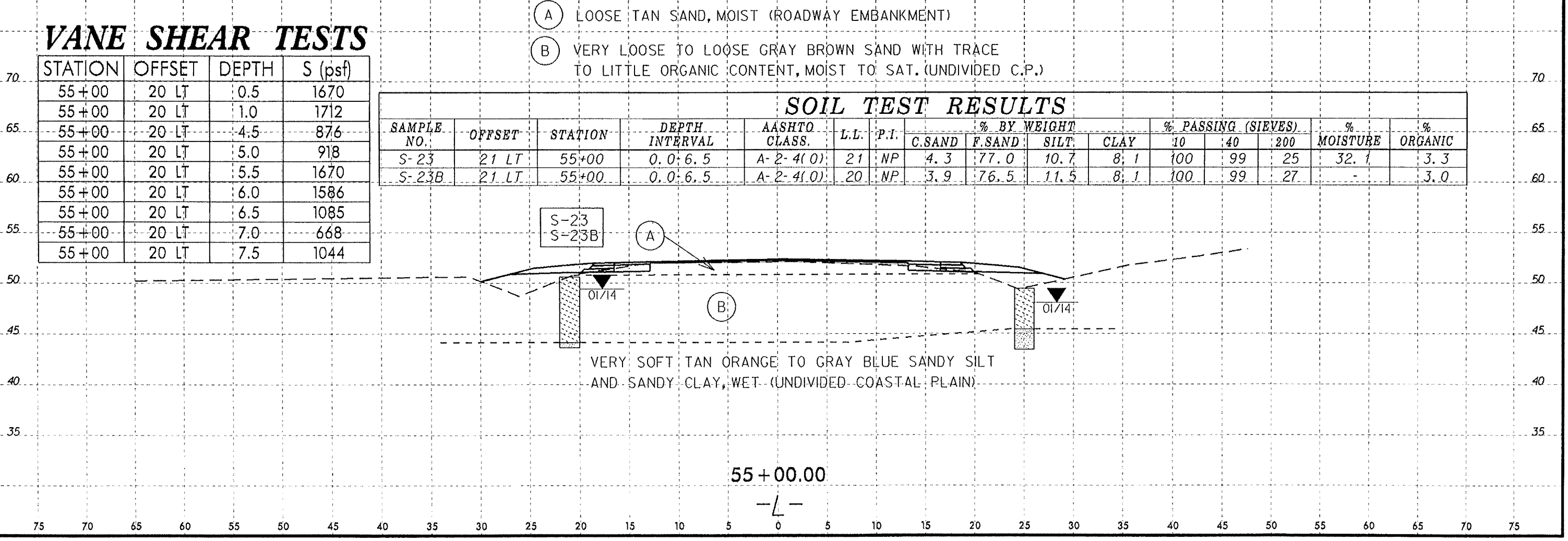
### VANE SHEAR TESTS

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55+00	20 LT	1.0	1712
55+00	20 LT	4.5	876
55+00	20 LT	5.0	918
55+00	20 LT	5.5	1670
55+00	20 LT	6.0	1586
55+00	20 LT	6.5	1085
55+00	20 LT	7.0	668
55+00	20 LT	7.5	1044

- (A) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)
- (B) VERY LOOSE TO LOOSE GRAY BROWN SAND WITH TRACE TO LITTLE ORGANIC CONTENT, MOIST TO SAT. (UNDIVIDED C.P.)

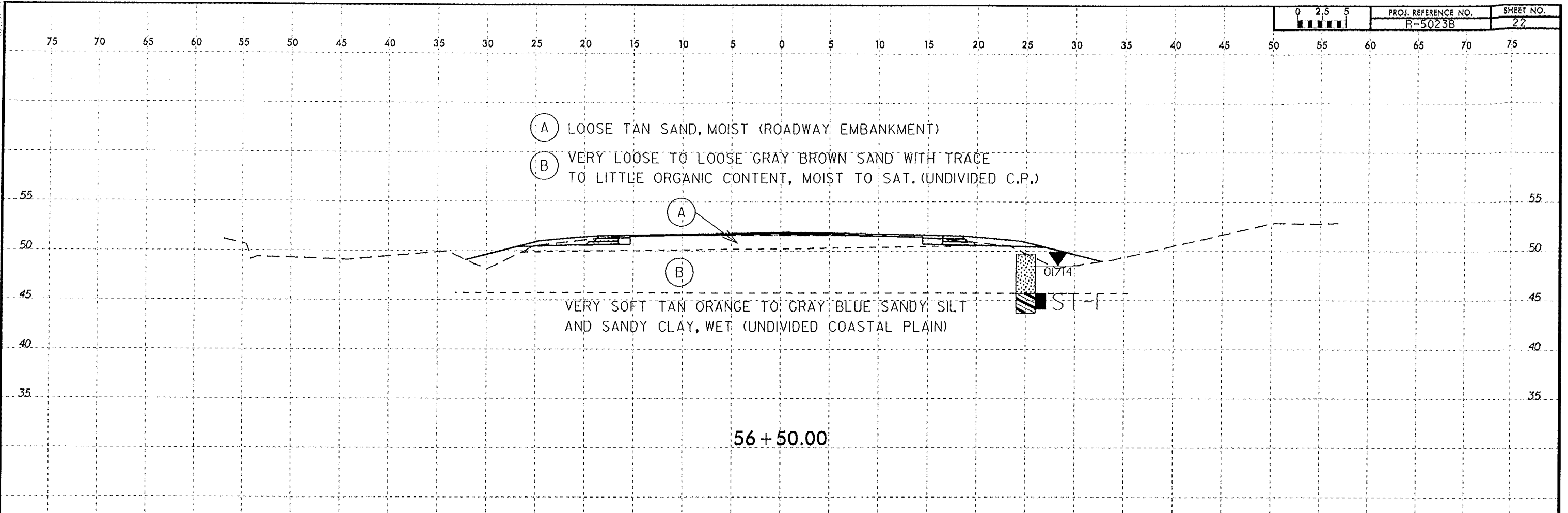
### SOIL TEST RESULTS

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-23	21 LT	55+00	0.0-6.5	A-2-4(0)	21	NP	4.3	77.0	10.7	8.1	100	99	25	32.1	3.3
S-23B	21 LT	55+00	0.0-6.5	A-2-4(0)	20	NP	3.9	76.5	11.5	8.1	100	99	27	-	3.0



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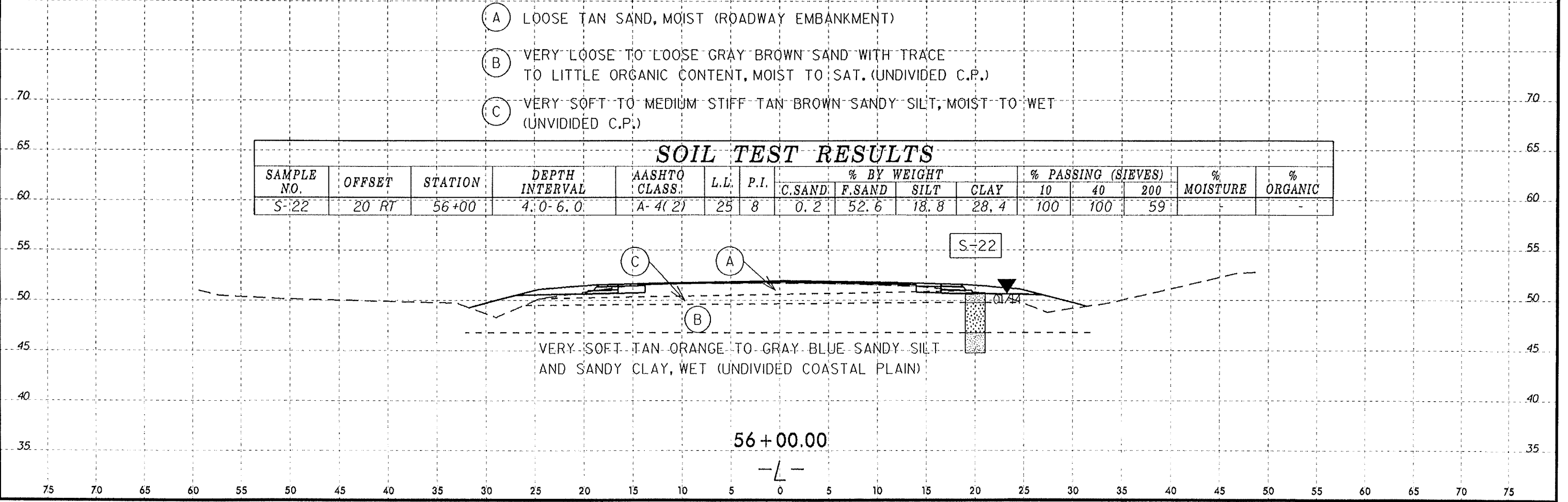
- (A) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)
- (B) VERY LOOSE TO LOOSE GRAY BROWN SAND WITH TRACE TO LITTLE ORGANIC CONTENT, MOIST TO SAT. (UNDIVIDED C.P.)



- (A) LOOSE TAN SAND, MOIST (ROADWAY EMBANKMENT)
- (B) VERY LOOSE TO LOOSE GRAY BROWN SAND WITH TRACE TO LITTLE ORGANIC CONTENT, MOIST TO SAT. (UNDIVIDED C.P.)
- (C) VERY SOFT TO MEDIUM STIFF TAN BROWN SANDY SILT; MOIST TO WET (UNDIVIDED C.P.)

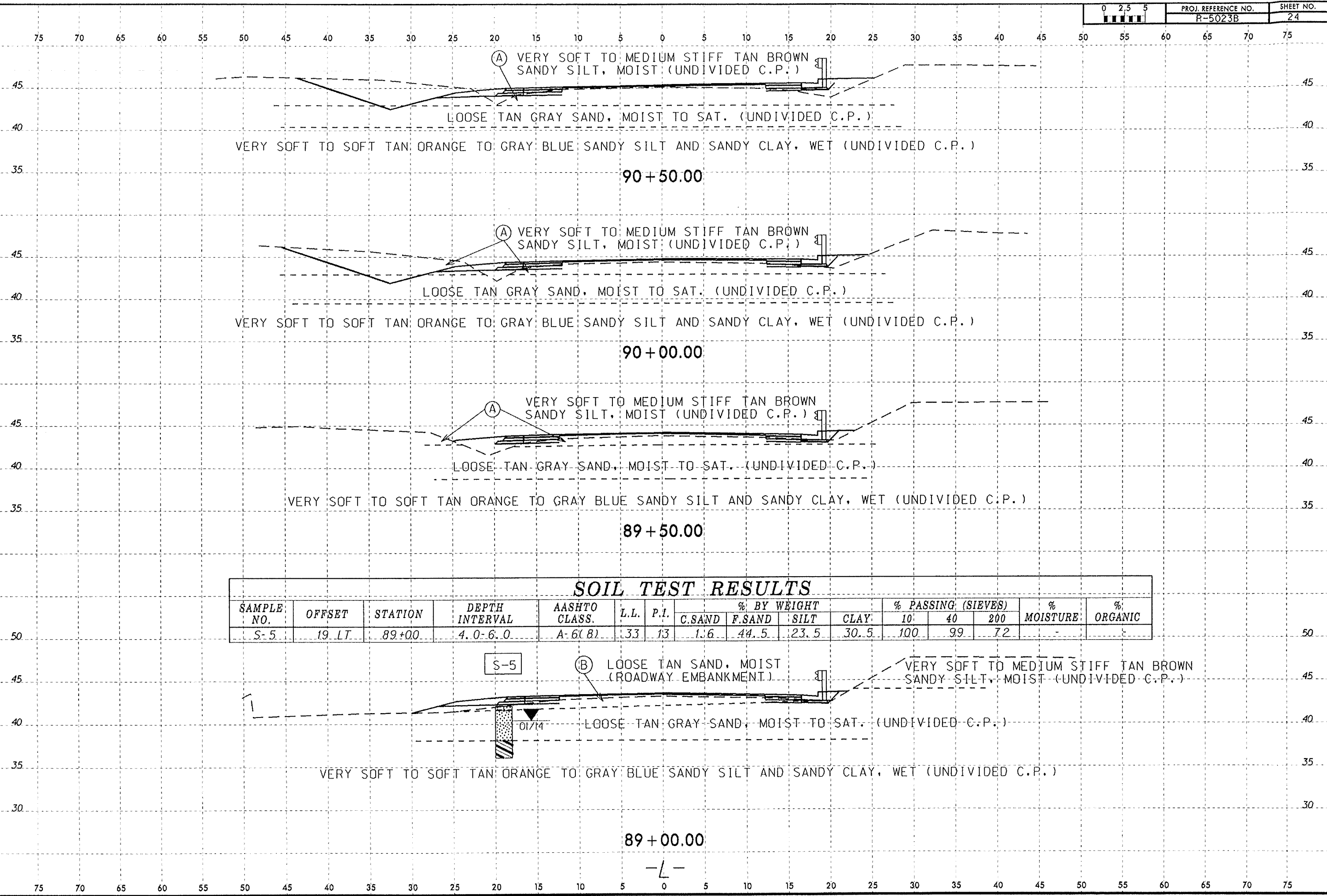
**SOIL TEST RESULTS**

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-22	20 RT	56+00	4.0-6.0	A-4(2)	25	8	0.2	52.6	18.8	28.4	100	100	59	-	



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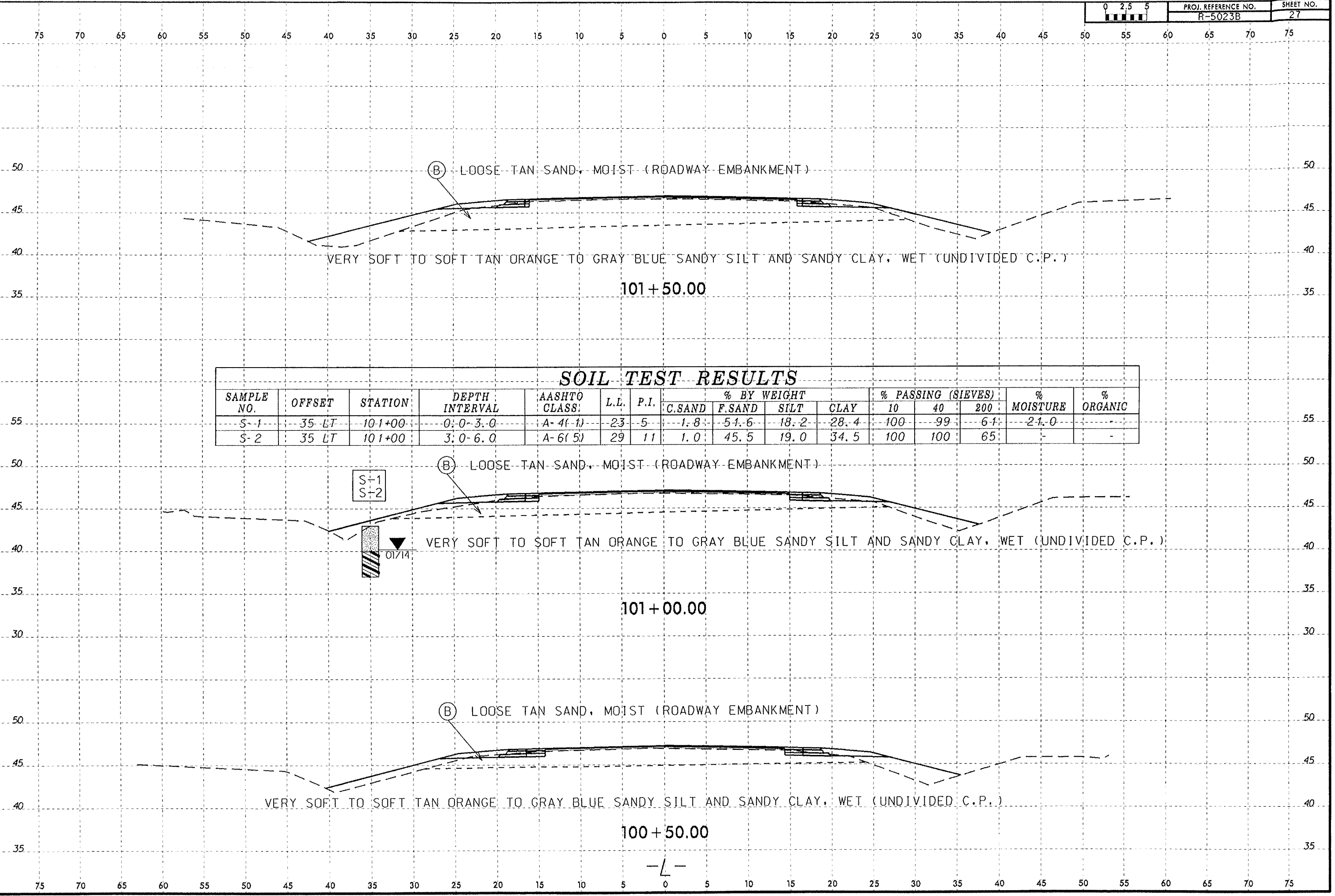
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### SOIL TEST RESULTS

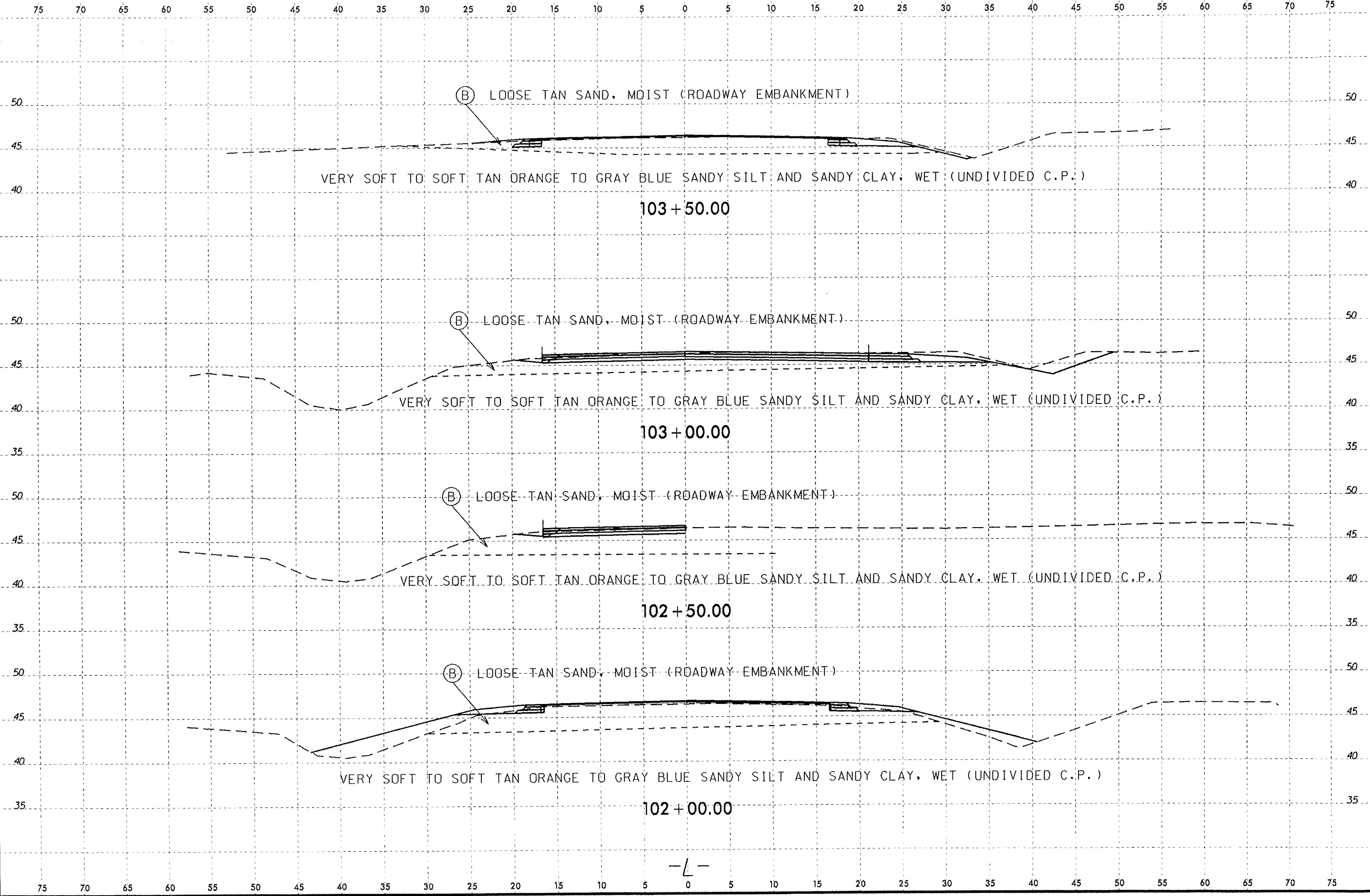
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							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-1	35 LT	101+00	0.0-3.0	A-4(1)	23	5	1.8	51.6	18.2	28.4	100	99	61	21.0	-
S-2	35 LT	101+00	3.0-6.0	A-6(5)	29	11	1.0	45.5	19.0	34.5	100	100	65	-	-

S+1  
S+2

▼  
01/14

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PROJECT: 43463.1.1 TIP: R-5023C COUNTY: ONslow

DESCRIPTION: \_\_\_\_\_

SITE DESCRIPTION: NC 53 ST SR 1109 (HOLLY SHELTER RD.)

MEMORANDUM TO: Mr. John L. Pilipchuk, L.G., P.E., State Geotechnical Engineer

**Transmitted Pages**

Color Photos in Product

- \_\_\_\_\_ Right of Way Recommendations
- 15 Roadway Inventory  Written Report Only
- Requested by:  Roadway Design  Division (Name: Amanda Glynn)
- 19 Roadway Design Recommendations
- Plans  Waiting Period  Provisions
- Requested by:  Roadway Design  Division (Name: Amanda Glynn)
- \_\_\_\_\_ Bridge Inventory  Plans
- Requested by:  Structures Management  Division (Name: \_\_\_\_\_)
- \_\_\_\_\_ Foundation Design Recommendations  Stream Crossing  Waiting Period  Provisions
- Requested by:  Structures Management  Division (Name: \_\_\_\_\_)
- \_\_\_\_\_ Retaining Wall Inventory
- Distribute to:  Structures Management  Division (Name: \_\_\_\_\_)
- \_\_\_\_\_ Retaining Wall Recommendations/Design  Plans  Provisions
- Distribute to:  Structures Management  Division (Name: \_\_\_\_\_)
- \_\_\_\_\_ Temporary Shoring Recommendations  Plans  Provisions
- Requested by:  Structures Management  Work Zone Traffic Control
- Roadway Design  Division (Name: \_\_\_\_\_)
- \_\_\_\_\_ Pavement Design Investigation  Provisions
- \_\_\_\_\_ Design-Build Project
- \_\_\_\_\_ Metal Pole Investigation
- \_\_\_\_\_ PDEA Report
- 1 Project Productivity Summary Report
- Copy for HQ project file
- Other \_\_\_\_\_

Remarks/Special Distribution Instructions: Distributed by ERO

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Distributed by: \_\_\_\_\_ Date: \_\_\_\_\_  Duplicate Copy of Recommendations Requested for Regional Office





TIP	R-5023C
WBS Element	43463.1.1
MMS Task No.	9000000 21601
Network	
Fieldwork Activity Element	

Field Office	Greenville FO
Project Geologist	JL STONE
Area Geologist Transmittal Date	

Commute

GEU personnel stayed in hotel for most of field work? (Yes/No)	yes
--	-----

Expenses

Expenses (hotel, meals, phone) for Project Geologist and crew	661.68
---	--------

Non-Road Features

Length (feet) of Non-Road Features (culverts, pipes, walls, channel changes, etc.), that were investigated <b>AND</b> included in the ROADWAY Inventory Report.	
Miles	

Borings (count)

"Line" Borings: borings located along roadway alignments, and/or on constant offset lines to roadway alignments. Usually, these borings are shown in rdwy profiles.	
"Offset" Borings: borings variably offset from a roadway alignment, typically to delineate rock or unsuitable materials. Usually, these borings are shown in rdwy cross sections.	6
Other Borings: borings for non-road features (eg culverts, pipes, walls, channel changes) that are included in the ROADWAY Inventory Report.	
Total Borings	6

Footage

	In-House Drillers	Consultant Drillers	Combined
Power Auger without tests			
Power Auger with tests (eg SPT)			
Rotary with tests (eg SPT)			
Core (Coastal Plain)			
Core (non-Coastal Plain)			
Other (eg DCP, CPT, hand auger, bridge rods)	36.0		36.0
Total Footage	36.0		36.0

Samples (count)

Bulk Quality (S)	5
SPT Quality (SS)	
California Bearing Ratio (CBR)	
Recompacted Triaxial (RT)	
Shelby Tube (ST, SST)	
Rock (RS)	
Other: org	4
Total Samples	9

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

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5023C	1	14
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		P.E.	
		RW & UTIL.	

CONTENTS

LINE	STATION	PLAN	PROFILE
-EL-	23+06 TO 36+34	4	5
-YI-	13+92 TO 15+94	4	6

ROADWAY  
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 43463.1.1 (R-5023C) F.A. PROJ. STP-0053(8)  
COUNTY ONSLow  
PROJECT DESCRIPTION NC 53 AT SR 1109 (HOLLY SHELTER ROAD)

CROSS SECTIONS

LINE	STATION	SHEET
-EL-	23+00 TO 37+00	7-14

INVENTORY

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING, AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES, AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N.C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT 1939 TOTTENHAM, 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.

CONTRACT: ID: R-5023C

PERSONNEL

J.D. GEMPERLINE

R.E. SMITH

INVESTIGATED BY J.L. STONE

CHECKED BY D.N. ARGENBRIGHT

SUBMITTED BY D.N. ARGENBRIGHT

DATE AUGUST 2014



DRAWN BY: J.L. STONE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N.C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT 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.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS  
GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

PROJECT REFERENCE NO. R-5023C SHEET NO. 2

SOIL DESCRIPTION		GRADATION		ROCK DESCRIPTION		TERMS AND DEFINITIONS					
SOIL IS CONSIDERED TO BE THE UNCONSOLIDATED, SEMI-CONSOLIDATED, OR WEATHERED EARTH MATERIALS THAT CAN BE PENETRATED WITH A CONTINUOUS FLIGHT POWER AUGER, AND YIELD LESS THAN 100 BLOWS PER FOOT ACCORDING TO STANDARD PENETRATION TEST (AASHTO T206, ASTM D-1586). SOIL CLASSIFICATION IS BASED ON THE AASHTO SYSTEM. BASIC DESCRIPTIONS GENERALLY SHALL INCLUDE: CONSISTENCY, COLOR, TEXTURE, MOISTURE, AASHTO CLASSIFICATION, AND OTHER PERTINENT FACTORS SUCH AS MINERALOGICAL COMPOSITION, ANGULARITY, STRUCTURE, PLASTICITY, ETC. EXAMPLES: <i>VERY STIFF, GRAY, SILTY CLAY, MOST WITH INTERBEDDED FINE SAND LAYERS, HIGH PLASTIC, A-7-6</i>		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. THE ANGULARITY OR ROUNDNESS OF SOIL GRAINS IS DESIGNATED BY THE TERMS: ANGULAR, SUBANGULAR, SUBROUNDED, OR ROUNDED.		HARD ROCK IS NON-COASTAL PLAIN MATERIAL THAT IF TESTED, WOULD YIELD SPT REFUSAL. AN INFERRED ROCK LINE INDICATES THE LEVEL AT WHICH NON-COASTAL PLAIN MATERIAL WOULD YIELD SPT REFUSAL. SPT REFUSAL IS PENETRATION BY A SPLIT SPOON SAMPLER EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. IN NON-COASTAL PLAIN MATERIAL, THE TRANSITION BETWEEN SOIL AND ROCK IS OFTEN REPRESENTED BY A ZONE OF WEATHERED ROCK. ROCK MATERIALS ARE TYPICALLY DIVIDED AS FOLLOWS: WEATHERED ROCK (WR) CRYSTALLINE ROCK (CR) NON-CRYSTALLINE ROCK (NCR) COASTAL PLAIN SEDIMENTARY ROCK (CP)		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 DISLOGGED FROM PARENT MATERIAL. FLOOD PLAIN (FP) - LAND BORDERING A STREAM, BUILT OF SEDIMENTS DEPOSITED BY THE STREAM. FORMATION (FM) - A MAPPABLE GEOLOGIC UNIT THAT CAN BE RECOGNIZED AND TRACED IN THE FIELD. JOINT - FRACTURE IN ROCK ALONG WHICH NO APPRECIABLE MOVEMENT HAS OCCURRED. LEDGE - A SHELF-LIKE RIDGE OR PROJECTION OF ROCK WHOSE THICKNESS IS SMALL COMPARED TO ITS LATERAL EXTENT. LENS - A BODY OF SOIL OR ROCK THAT THINS OUT IN ONE OR MORE DIRECTIONS. MOTTLED (MOT.) - IRREGULARLY MARKED WITH SPOTS OF DIFFERENT COLORS, MOTTLING IN SOILS USUALLY INDICATES POOR AERATION AND LACK OF GOOD DRAINAGE. PERCHED WATER - WATER MAINTAINED ABOVE THE NORMAL GROUND WATER LEVEL BY THE PRESENCE OF AN INTERVENING IMPERVIOUS STRATUM. RESIDUAL (RES.) SOIL - SOIL FORMED IN PLACE BY THE WEATHERING OF ROCK. ROCK QUALITY DESIGNATION (RQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF CORE RUN AND EXPRESSED AS A PERCENTAGE. SAPROLITE (SAP.) - RESIDUAL SOIL THAT RETAINS THE RELIC STRUCTURE OR FABRIC OF THE PARENT ROCK. SILL - AN INTRUSIVE BODY OF IGNEOUS ROCK OF APPROXIMATELY UNIFORM THICKNESS AND RELATIVELY THIN COMPARED WITH ITS LATERAL EXTENT, THAT HAS BEEN EMPLACED PARALLEL TO THE BEDDING OR SCHISTOSITY OF THE INTRUDED ROCKS. SLICKENSIDE - POLISHED AND STRIATED SURFACE THAT RESULTS FROM FRICTION ALONG A FAULT OR SLIP PLANE. STANDARD PENETRATION TEST (PENETRATION RESISTANCE) (SPT) - NUMBER OF BLOWS IN OR BPF OF A 140 LB. HAMMER FALLING 30 INCHES REQUIRED TO PRODUCE A PENETRATION OF 1 FOOT INTO SOIL WITH A 2 INCH OUTSIDE DIAMETER SPLIT SPOON SAMPLER. SPT REFUSAL IS PENETRATION EQUAL TO OR LESS THAN 0.1 FOOT PER 60 BLOWS. STRATA CORE RECOVERY (SREC.) - TOTAL LENGTH OF STRATA MATERIAL RECOVERED DIVIDED BY TOTAL LENGTH OF STRATUM AND EXPRESSED AS A PERCENTAGE. STRATA ROCK QUALITY DESIGNATION (SRQD) - A MEASURE OF ROCK QUALITY DESCRIBED BY TOTAL LENGTH OF ROCK SEGMENTS WITHIN A STRATUM EQUAL TO OR GREATER THAN 4 INCHES DIVIDED BY THE TOTAL LENGTH OF STRATA AND EXPRESSED AS A PERCENTAGE. TOPSOIL (TS.) - SURFACE SOILS USUALLY CONTAINING ORGANIC MATTER.					
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>		<b>MINERALOGICAL COMPOSITION</b>		<b>WEATHERING</b>							
GENERAL CLASS. GRANULAR MATERIALS (<= 35% PASSING #200) SILT-CLAY MATERIALS (> 35% PASSING #200) ORGANIC MATERIALS		MINERAL NAMES SUCH AS QUARTZ, FELDSPAR, MICA, TALC, KAOLIN, ETC. ARE USED IN DESCRIPTIONS WHENEVER THEY ARE CONSIDERED OF SIGNIFICANCE.		ROCK FRESH, CRYSTALS BRIGHT, FEW JOINTS MAY SHOW SLIGHT STAINING. ROCK RINGS UNDER HAMMER IF CRYSTALLINE. VERY SLIGHT (V SL.) 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 (SL.) ROCK GENERALLY FRESH, JOINTS STAINED AND DISCOLORATION EXTENDS INTO ROCK UP TO 1 INCH. OPEN JOINTS MAY CONTAIN CLAY. IN GRANITOID ROCKS SOME OCCASIONAL FELDSPAR CRYSTALS ARE DULL AND DISCOLORED. CRYSTALLINE ROCKS RING UNDER HAMMER BLOWS. MODERATE (MOD.) SIGNIFICANT PORTIONS OF ROCK SHOW DISCOLORATION AND WEATHERING EFFECTS. IN GRANITOID ROCKS, MOST FELDSPARS ARE DULL AND DISCOLORED, SOME SHOW CLAY. ROCK HAS DULL SOUND UNDER HAMMER BLOWS AND SHOWS SIGNIFICANT LOSS OF STRENGTH AS COMPARED WITH FRESH ROCK. MODERATELY SEVERE (MOD. SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. IN GRANITOID ROCKS, ALL FELDSPARS DULL AND DISCOLORED AND A MAJORITY SHOW KAOLINIZATION. ROCK SHOWS SEVERE LOSS OF STRENGTH AND CAN BE EXCAVATED WITH A GEOLOGIST'S PICK. ROCK GIVES "CLUNK" SOUND WHEN STRUCK. IF TESTED, WOULD YIELD SPT REFUSAL. SEVERE (SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC CLEAR AND EVIDENT BUT REDUCED IN STRENGTH TO STRONG SOIL. IN GRANITOID ROCKS ALL FELDSPARS ARE KAOLINIZED TO SOME EXTENT. SOME FRAGMENTS OF STRONG ROCK USUALLY REMAIN. IF TESTED, YIELDS SPT N VALUES > 100 BPF. VERY SEVERE (V SEV.) ALL ROCK EXCEPT QUARTZ DISCOLORED OR STAINED. ROCK FABRIC ELEMENTS ARE DISCERNIBLE BUT THE MASS IS EFFECTIVELY REDUCED TO SOIL STATUS, WITH ONLY FRAGMENTS OF STRONG ROCK REMAINING. SAPROLITE IS AN EXAMPLE OF ROCK WEATHERED TO A DEGREE SUCH THAT ONLY MINOR VESTIGES OF THE ORIGINAL ROCK FABRIC REMAIN. IF TESTED, YIELDS SPT N VALUES < 100 BPF. COMPLETE ROCK REDUCED TO SOIL. ROCK FABRIC NOT DISCERNIBLE, OR DISCERNIBLE ONLY IN SMALL AND SCATTERED CONCENTRATIONS. QUARTZ MAY BE PRESENT AS DIKES OR STRINGERS. SAPROLITE IS ALSO AN EXAMPLE.		<b>COMPRESSIBILITY</b> SLIGHTLY COMPRESSIBLE LIQUID LIMIT LESS THAN 31 MODERATELY COMPRESSIBLE LIQUID LIMIT EQUAL TO 31-50 HIGHLY COMPRESSIBLE LIQUID LIMIT GREATER THAN 50		<b>PERCENTAGE OF MATERIAL</b> ORGANIC MATERIAL GRANULAR SILT-CLAY OTHER MATERIAL TRACE OF ORGANIC MATTER 2 - 3% 3 - 5% TRACE 1 - 10% LITTLE ORGANIC MATTER 3 - 5% 5 - 12% LITTLE 10 - 20% MODERATELY ORGANIC 5 - 10% 12 - 20% SOME 20 - 35% HIGHLY ORGANIC >10% >20% HIGHLY 35% AND ABOVE		<b>GROUND WATER</b> WATER LEVEL IN BORE HOLE IMMEDIATELY AFTER DRILLING STATIC WATER LEVEL AFTER 24 HOURS PERCHED WATER, SATURATED ZONE, OR WATER BEARING STRATA SPRING OR SEEP	
<b>SOIL LEGEND AND AASHTO CLASSIFICATION</b>		<b>GROUND WATER</b>		<b>ROCK HARDNESS</b>							
GROUP CLASS. A-1, A-1.5, A-2, A-2.5, A-2.6, A-2.7, A-4, A-5, A-6, A-7, A-7.5, A-7.6, A-3, A-4, A-5, A-6, A-7		SYMBOL		VERY HARD CANNOT BE SCRATCHED BY KNIFE OR SHARP PICK. BREAKING OF HAND SPECIMENS REQUIRES SEVERAL HARD BLOWS OF THE GEOLOGIST'S PICK. HARD CAN BE SCRATCHED BY KNIFE OR PICK ONLY WITH DIFFICULTY. HARD HAMMER BLOWS REQUIRED TO DETACH HAND SPECIMEN. MODERATELY HARD CAN BE SCRATCHED BY KNIFE OR PICK. GOUGES OR GROOVES TO 0.25 INCHES DEEP CAN BE EXCAVATED BY HARD BLOW OF A GEOLOGIST'S PICK. HAND SPECIMENS CAN BE DETACHED BY MODERATE BLOWS. MEDIUM HARD CAN BE GROOVED OR GOUGED 0.05 INCHES DEEP BY FIRM PRESSURE OF KNIFE OR PICK POINT. CAN BE EXCAVATED IN SMALL CHIPS TO PEICES 1 INCH MAXIMUM SIZE BY HARD BLOWS OF THE POINT OF A GEOLOGIST'S PICK. SOFT CAN BE GROOVED OR GOUGED READILY BY KNIFE OR PICK. CAN BE EXCAVATED IN FRAGMENTS FROM CHIPS TO SEVERAL INCHES IN SIZE BY MODERATE BLOWS OF A PICK POINT. SMALL, THIN PIECES CAN BE BROKEN BY FINGER PRESSURE. VERY SOFT CAN BE CARVED WITH KNIFE. CAN BE EXCAVATED READILY WITH POINT OF PICK. PIECES 1 INCH OR MORE IN THICKNESS CAN BE BROKEN BY FINGER PRESSURE. CAN BE SCRATCHED READILY BY FINGER NAIL.		<b>MISCELLANEOUS SYMBOLS</b> ROADWAY EMBANKMENT (RE) WITH SOIL DESCRIPTION SOIL SYMBOL ARTIFICIAL FILL (AF) OTHER THAN ROADWAY EMBANKMENT INFERRED SOIL BOUNDARY INFERRED ROCK LINE ALLUVIAL SOIL BOUNDARY DIP & DIP DIRECTION OF ROCK STRUCTURES SPT TEST BORING AUGER BORING CORE BORING MONITORING WELL PIEZOMETER INSTALLATION SLOPE INDICATOR INSTALLATION CONE PENETROMETER TEST SOUNDING ROD		<b>ROCK HARDNESS</b>			
<b>CONSISTENCY OR DENSENESS</b>		<b>ABBREVIATIONS</b>		<b>FRACTURE SPACING</b>		<b>BEDDING</b>					
PRIMARY SOIL TYPE COMPACTNESS OR CONSISTENCY RANGE OF STANDARD PENETRATION RESISTANCE (N-VALUE) RANGE OF UNCONFINED COMPRESSIVE STRENGTH (TONS/FT <sup>2</sup> )		AR - AUGER REFUSAL MED. - MEDIUM MICA - MICAEOUS VST - VANE SHEAR TEST BT - BORING TERMINATED MOD. - MODERATELY WEA. - WEATHERED CL. - CLAY NP - NON PLASTIC ORG. - ORGANIC U - UNIT WEIGHT CPT - CONE PENETRATION TEST CSE. - COARSE PMT - PRESSUREMETER TEST SD. - SAND, SANDY SL. - SILT, SILTY SLL. - SLIGHTLY FOSS. - FOSSILIFEROUS TCR - TRICONE REFUSAL W - MOISTURE CONTENT DMT - DILATOMETER TEST SAP. - SAPROLITIC SD. - SAND, SANDY SL. - SILT, SILTY SLL. - SLIGHTLY FOSS. - FOSSILIFEROUS TCR - TRICONE REFUSAL W - MOISTURE CONTENT DPT - DYNAMIC PENETRATION TEST F - FINE e - VOID RATIO FRAC. - FRACTURED, FRACTURES FRAGS. - FRAGMENTS HI. - HIGHLY		S - BULK SS - SPLIT SPOON ST - SHELBY TUBE RS - ROCK RT - RECOMPACTED TRIAXIAL CBR - CALIFORNIA BEARING RATIO		TERM SPACING THICKNESS VERY WIDE MORE THAN 10 FEET WIDE 3 TO 10 FEET MODERATELY CLOSE 1 TO 3 FEET CLOSE 0.16 TO 1 FEET VERY CLOSE LESS THAN 0.16 FEET		TERM THICKNESS VERY THICKLY BEDDED > 4 FEET THICKLY BEDDED 1.5 - 4 FEET THINLY BEDDED 0.16 - 1.5 FEET VERY THINLY BEDDED 0.03 - 0.16 FEET THICKLY LAMINATED 0.008 - 0.03 FEET THINLY LAMINATED < 0.008 FEET			
<b>TEXTURE OR GRAIN SIZE</b>		<b>EQUIPMENT USED ON SUBJECT PROJECT</b>		<b>INDURATION</b>		<b>NOTES:</b>					
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		DRILL UNITS: MOBILE B- BK-51 CME-45C CME-550 PORTABLE HOIST ADVANCING TOOLS: CLAY BITS 6" CONTINUOUS FLIGHT AUGER 8" HOLLOW AUGERS HARD FACED FINGER BITS TUNG-CARBIDE INSERTS CASING w/ ADVANCER TRICONE STEEL TEETH TRICONE TUNG-CARB. CORE BIT		HAMMER TYPE: AUTOMATIC MANUAL CORE SIZE: B N H HAND TOOLS: POST HOLE DIGGER HAND AUGER SOUNDING ROD VANE SHEAR TEST		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.		BENCH MARK: ELEVATION: FT. APPROXIMATE LOCATION OF ORGANIC SOILS			
<b>SOIL MOISTURE - CORRELATION OF TERMS</b>											
SOIL MOISTURE SCALE (ATTERBERG LIMITS) FIELD MOISTURE DESCRIPTION GUIDE FOR FIELD MOISTURE DESCRIPTION											
LL LIQUID LIMIT - SATURATED - (SAT.) USUALLY LIQUID; VERY WET, USUALLY FROM BELOW THE GROUND WATER TABLE PL PLASTIC LIMIT - WET - (W) SEMISOLID; REQUIRES DRYING TO ATTAIN OPTIMUM MOISTURE OM OPTIMUM MOISTURE - MOIST - (M) SOLID; AT OR NEAR OPTIMUM MOISTURE SL SHRINKAGE LIMIT - DRY - (D) REQUIRES ADDITIONAL WATER TO ATTAIN OPTIMUM MOISTURE											
<b>PLASTICITY</b>											
NONPLASTIC 0-5 VERY LOW LOW PLASTICITY 6-15 SLIGHT MED. PLASTICITY 16-25 MEDIUM HIGH PLASTICITY 26 OR MORE HIGH											
<b>COLOR</b>											
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.											



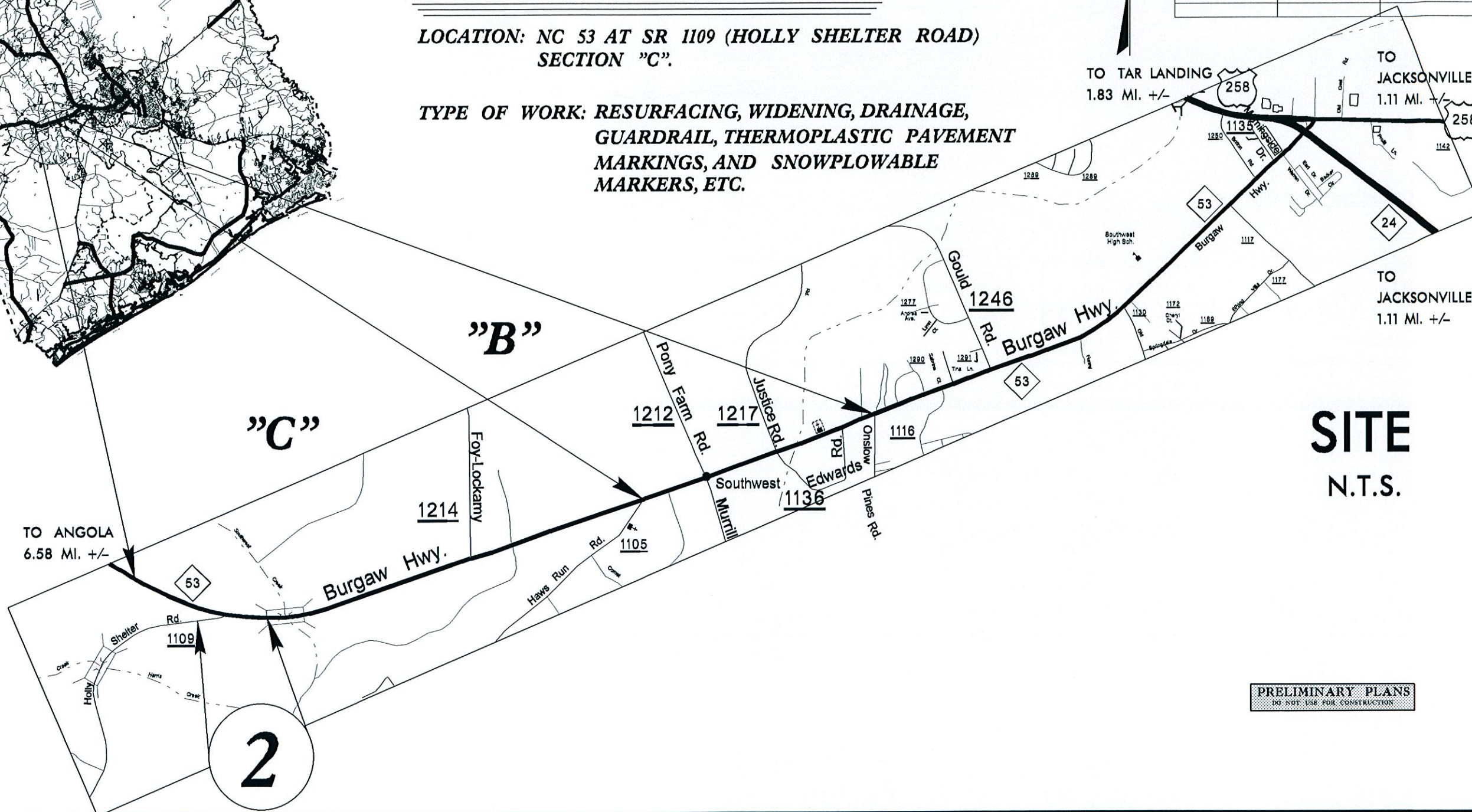
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**ONSLOW COUNTY**

LOCATION: NC 53 AT SR 1109 (HOLLY SHELTER ROAD)  
SECTION "C".

TYPE OF WORK: RESURFACING, WIDENING, DRAINAGE,  
GUARDRAIL, THERMOPLASTIC PAVEMENT  
MARKINGS, AND SNOWPLOWABLE  
MARKERS, ETC.

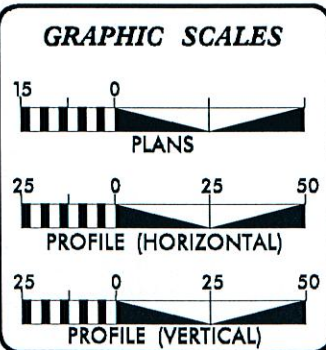
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	WBS: 43463.1.1	2A	14
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
43463.1.1	STP-0053(B)		



**SITE**  
N.T.S.

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

**CONTRACT: C-XXXXX**      **TIP PROJECT: R-5023C**



**DESIGN DATA**

ADT	=	
ADT	=	
DHV	=	%
D	=	%
T	=	% *
V	=	MPH
* TTST		DUAL

**PROJECT LENGTH**

MAP NO. 2 = 0.15 MILES (WBS NO. 43463.1.1)

Prepared In the Office of:  
**DIVISION OF HIGHWAYS**  
124 Division Dr., Wilmington, NC 28401

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: \_\_\_\_\_

LETTING DATE: \_\_\_\_\_

**HYDRAULICS ENGINEER**

\_\_\_\_\_  
P.E.

**ROADWAY DESIGN TECHNICIAN**

DNL

\_\_\_\_\_  
SIGNATURE:

\_\_\_\_\_  
SIGNATURE:

**DIVISION OF HIGHWAYS**  
STATE OF NORTH CAROLINA

\_\_\_\_\_  
DIVISION DESIGN ENGINEER





STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY  
GOVERNOR

ANTHONY J. TATA.  
SECRETARY

August 6, 2014

STATE PROJECT: 43463.1.1 (R-5023C)  
F.A. PROJECT: STP-0053(8)  
COUNTY: Onslow  
DESCRIPTION: NC 53 at SR 1109 (Holly Shelter Rd.)  
SUBJECT: Geotechnical Inventory Report

**Project Description**

This project begins on NC 53, approximately 400 feet west of the existing NC 53 / SR 1109 intersection and extends 1,300± feet east along NC 53. This geotechnical investigation was confined to the areas of proposed construction.

Fieldwork was conducted in April 2014. Hand auger borings were completed at various offsets along the project corridor. Representative soil samples were collected for visual classification in the field and for laboratory analysis by the Materials and Tests Unit.

The following alignments were investigated. Subsurface profiles and selected cross sections of these alignments are included in this report.

<u>Line</u>	<u>Station(±)</u>
-EL-	23+06 to 36+34
-Y1-	13+92 to 15+94

**Areas of Special Geotechnical Interest**

- 1) The entire project was found to exhibit seasonal high ground water.
- 2) The following sections contain cohesive soils which have the potential to cause embankment/subgrade and or slope stability problems during construction.

<u>Line</u>	<u>Station(±)</u>
-EL-	23+06 to 29+92
-Y1-	13+92 to 15+94

- 3) The following sections contain organic soils that have the potential to cause embankment/subgrade and or slope stability problems during construction.

<u>Line</u>	<u>Station(±)</u>
-EL-	23+06 to 27+40
-EL-	28+83 to 36+34
-Y1-	13+92 to 15+94

**Physiography and Geology**

This project corridor is located within the Coastal Plain Physiographic Province. Topography along the project is nearly flat to gently sloping. Ground elevations ranged from 18± to 43± feet above sea level.

Surficial soils in this area are generally classified as undivided coastal plain sediments.

**Ground Water**

Ground water data was collected in April 2014, during a time of normal precipitation. Ground water elevations ranged from 26± to 38 ± feet above sea level.

**Soils**

Soils encountered within this project area have been divided into two categories, undivided coastal plain soils and roadway embankment.

Soils identified as undivided coastal plain are composed of 1± to 3± feet of medium stiff sandy silt (A-4), 1± to 2± feet of very soft muck, 6 or more feet of loose sand (A-2-4, A-3) and 1± to 3± feet of loose sand (A-2-4) with trace to moderate organics. Organic samples taken within these soils returned organic percentages ranging from 2% to 6%.

Roadway embankment soils were found within the existing NC 53 and SR 1109 embankment. Where encountered it is composed of 1± to 3± feet of loose sand (A-2-4, A-3).

MAILING ADDRESS:  
NC DEPARTMENT OF TRANSPORTATION  
GEOTECHNICAL ENGINEERING UNIT  
1589 MAIL SERVICE CENTER  
RALEIGH NC 27699-1589

TELEPHONE: 919-707-6850  
FAX: 919-250-4237

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

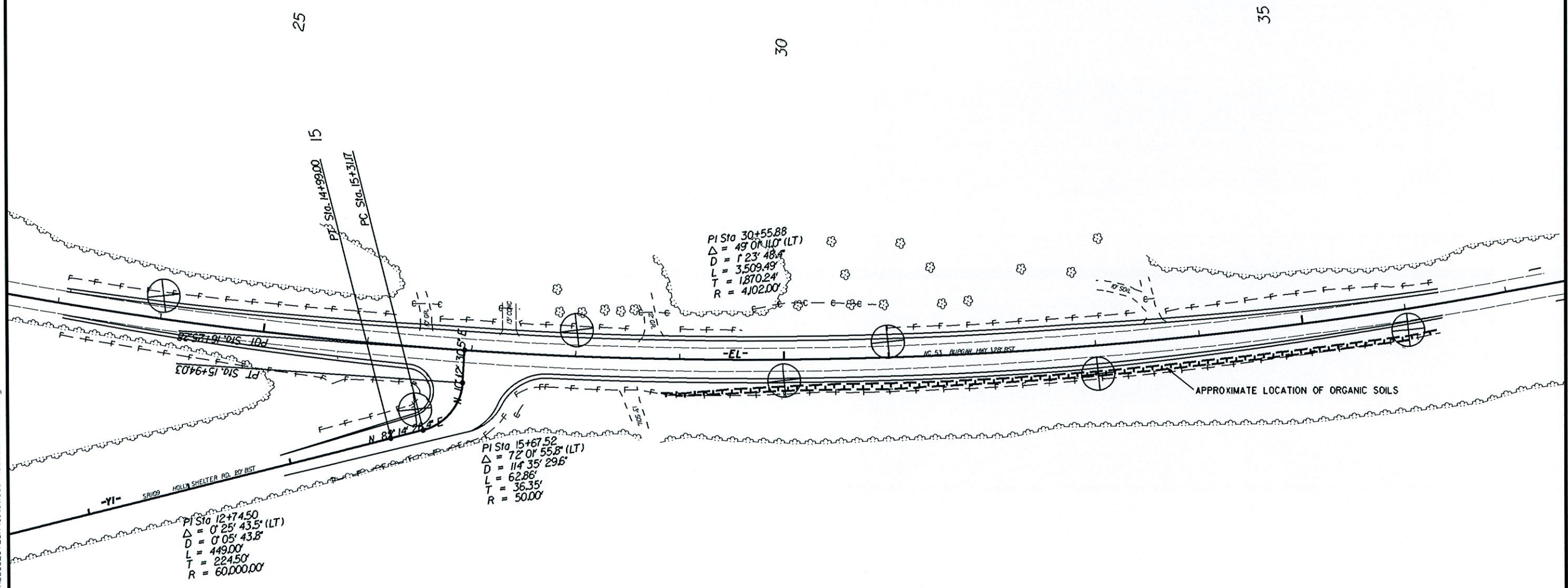
LOCATION:  
CENTURY CENTER COMPLEX  
ENTRANCE B-2  
1020 BIRCH RIDGE DRIVE  
RALEIGH NC



8/17/99

03-JUN-2014 10:29  
L:\ERD\Greenville\_Investigation\TIP\R5023C.GEO.RDW\Y\CADD\_GEO\TECH\Site&Sub\R5023C.GEO.GTM.dgn

PROJECT REFERENCE NO. R-5023C	SHEET NO. 4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



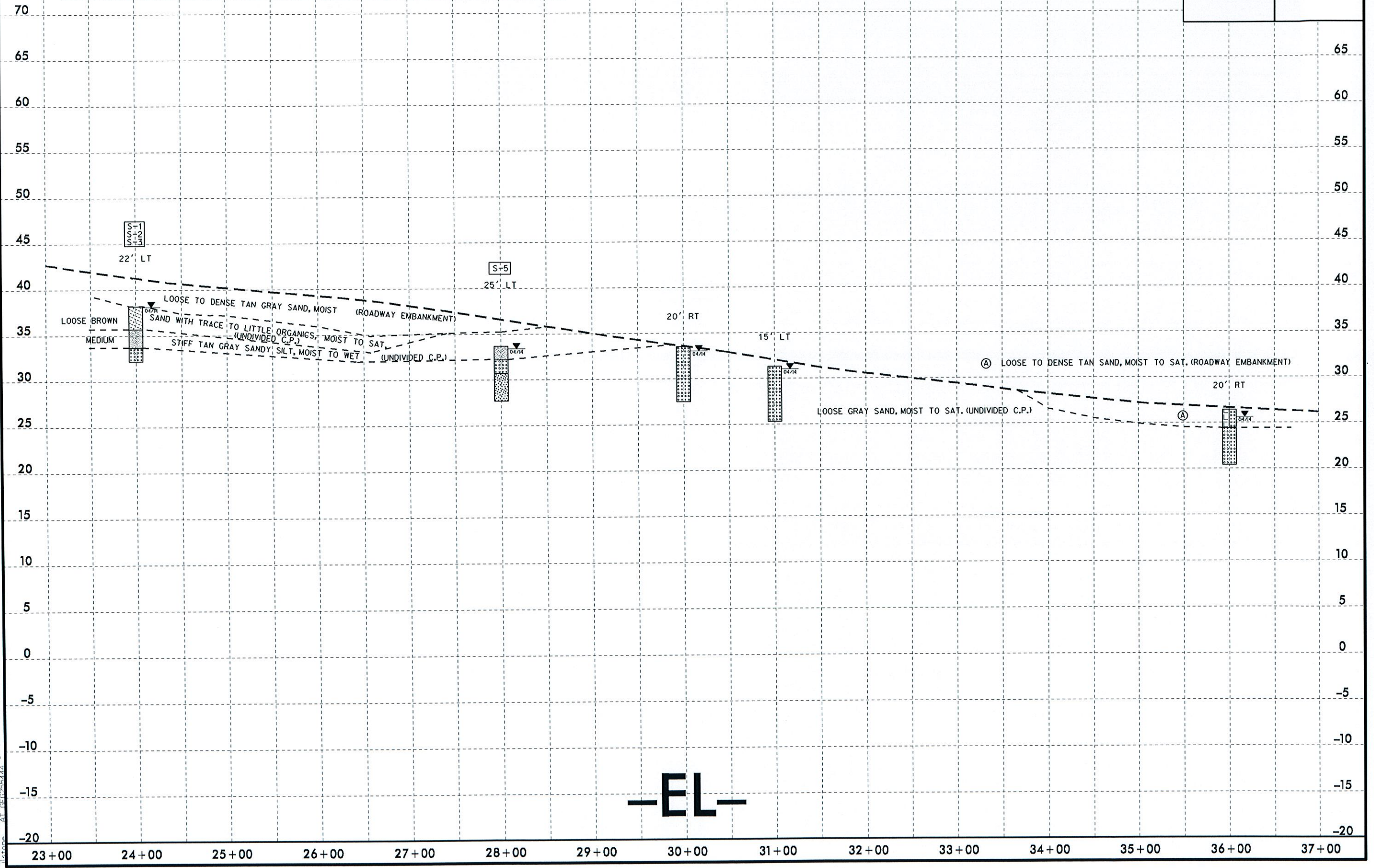
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PROJECT REFERENCE NO. <b>R-5023C</b>	SHEET NO. <b>5</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

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-1	22 LT	24+00	0.0-1.0	A-2-4(0)	34	NP	15.5	69.9	12.6	2.0	97	92	19	-	4.3
S-2	22 LT	24+00	1.0-2.5	A-2-4(0)	27	NP	13.2	75.9	8.8	2.0	100	96	18	-	2.4
S-3	22 LT	24+00	2.5-4.5	A-4(0)	20	5	13.1	90.6	16.1	20.2	99	92	41	-	-
S-5	25 LT	28+00	0.0-1.5	A-4(3)	27	9	1.6	48.5	25.6	24.3	100	100	59	-	-



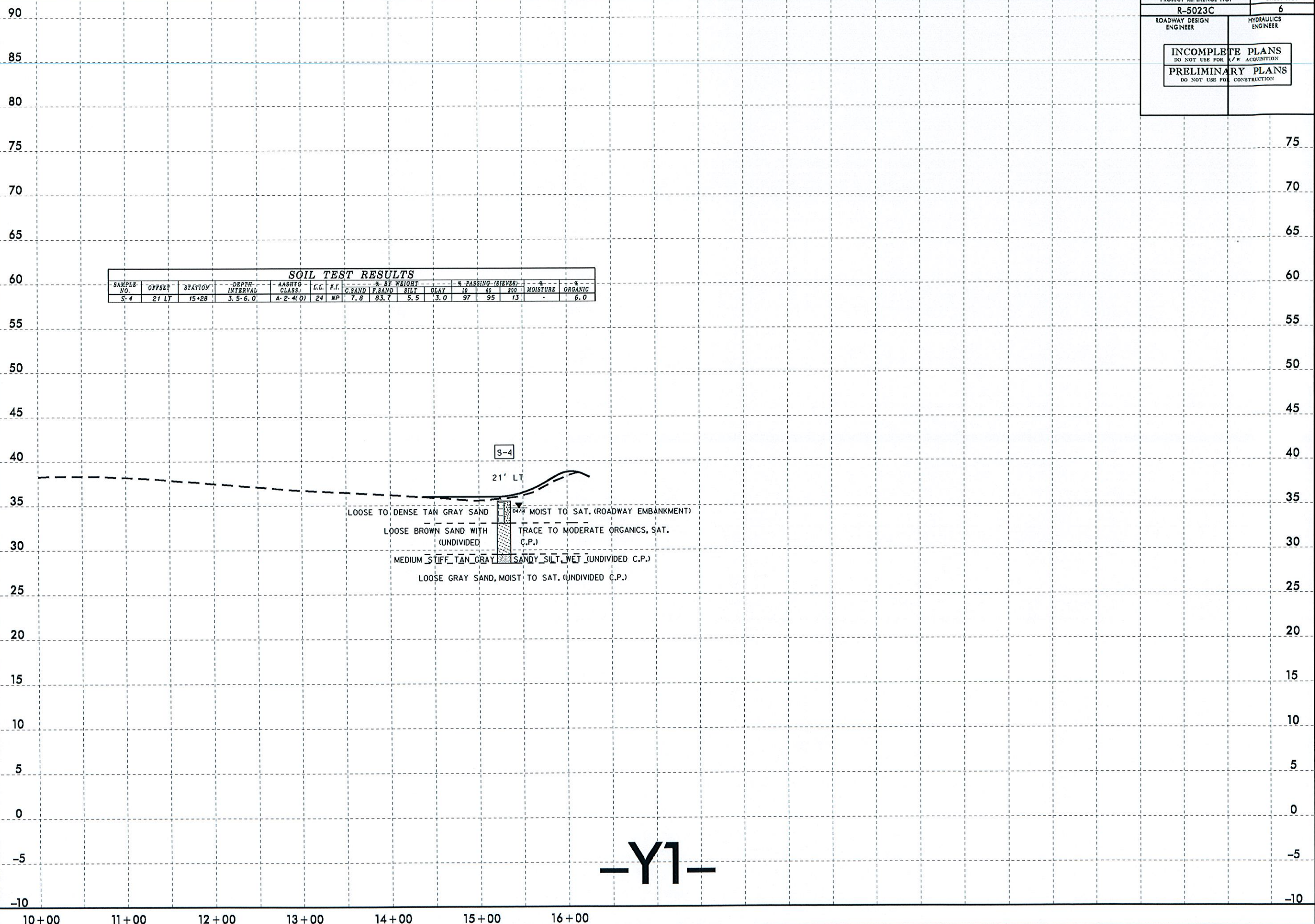
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PROJECT REFERENCE NO. <b>R-5023C</b>	SHEET NO. <b>6</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.L.	% BY WEIGHT				% PASSING (SIEVES)			MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-4	21 LT	15+28	3.5-6.0	A-2-4(0)	24	NP	7.8	83.7	5.5	3.0	97	95	13	-	6.0

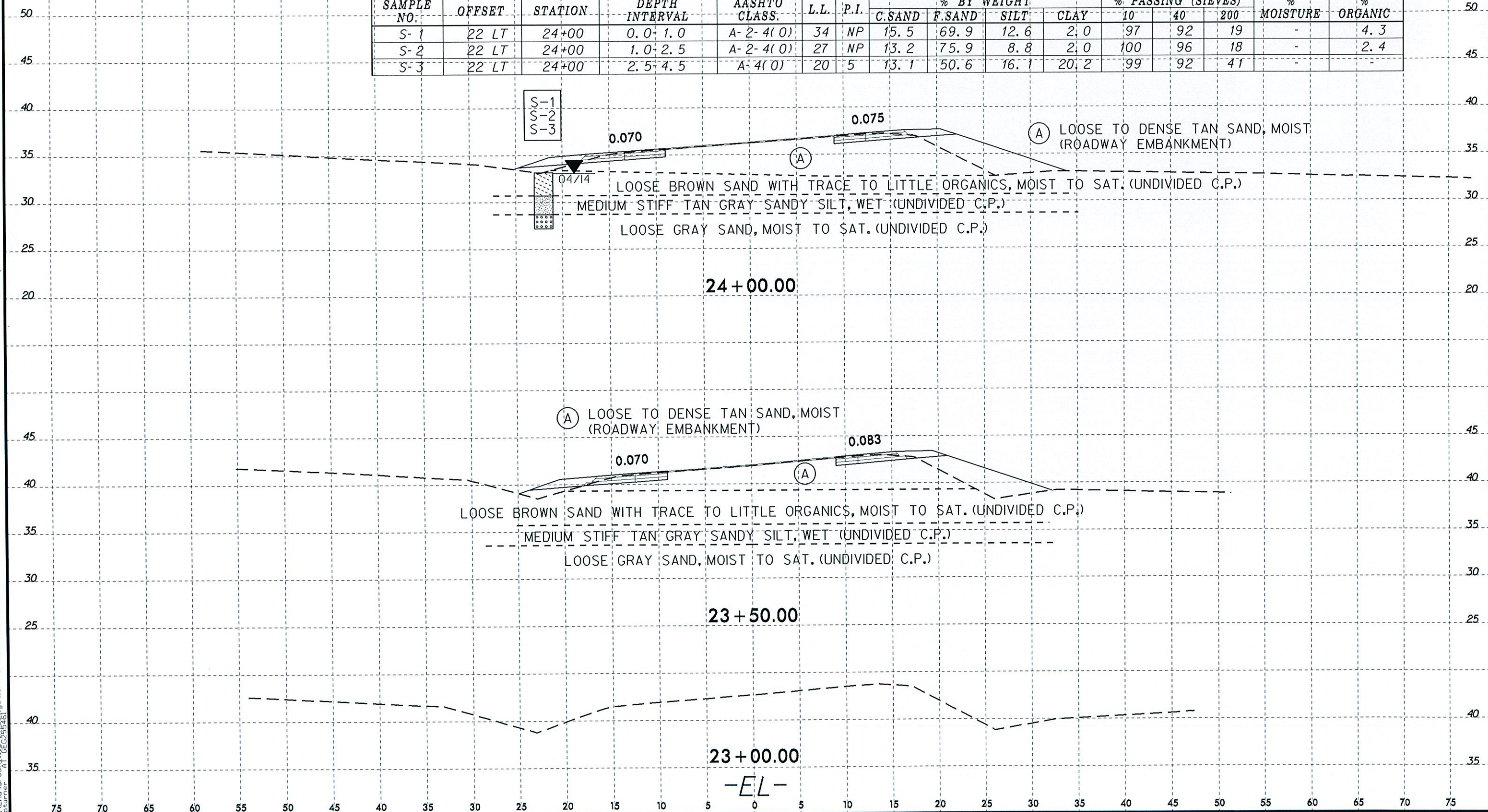
LOOSE TO DENSE TAN GRAY SAND  
 LOOSE BROWN SAND WITH (UNDIVIDED)  
 MEDIUM STIFF TAN GRAY  
 LOOSE GRAY SAND, MOIST TO SAT. (UNDIVIDED C.P.)  
 MOIST TO SAT. (ROADWAY EMBANKMENT)  
 TRACE TO MODERATE ORGANICS, SAT. (C.P.)  
 SANDY SILT, WET (UNDIVIDED C.P.)

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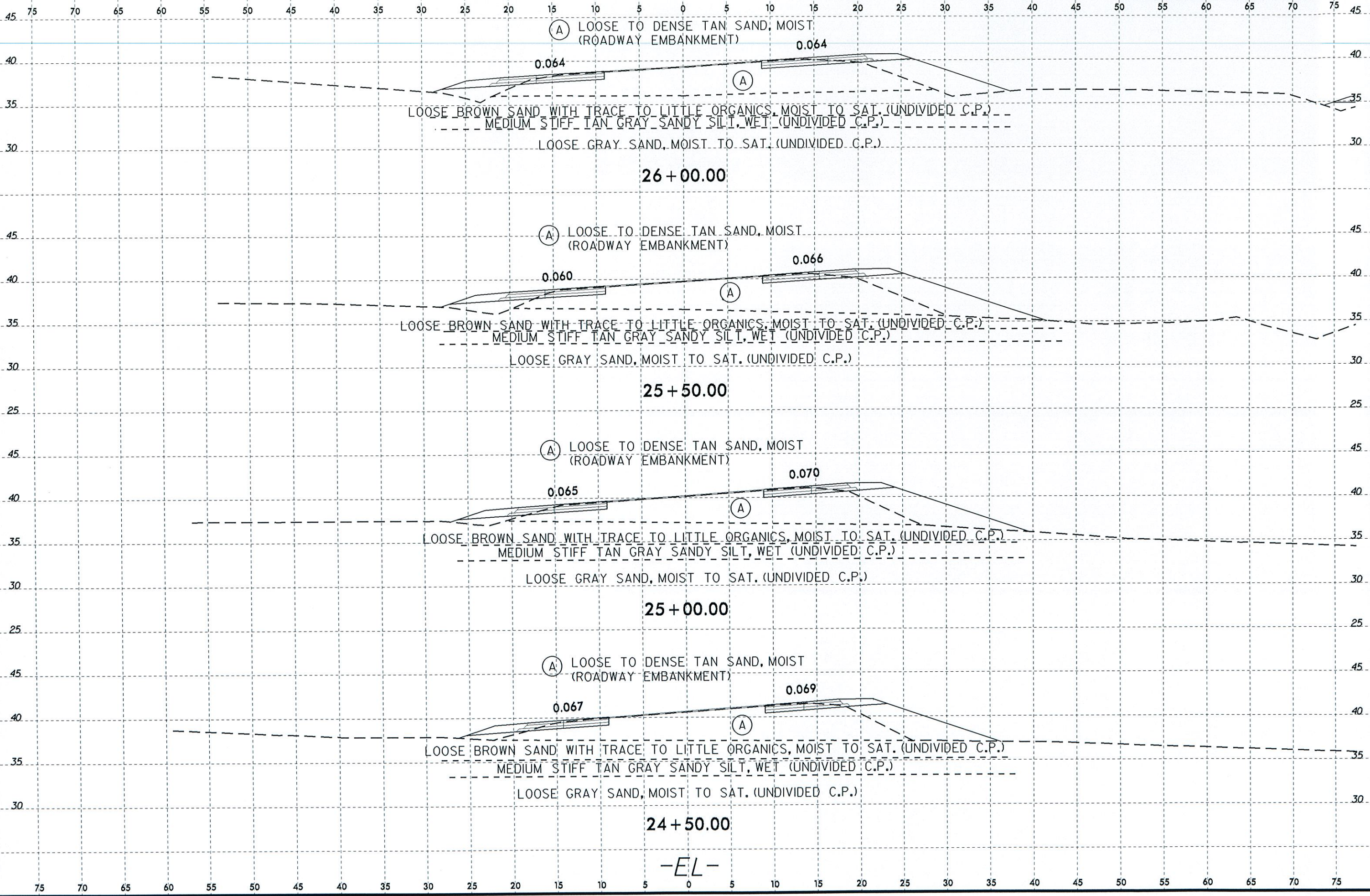


### SOIL TEST RESULTS

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-1	22 LT	24+00	0.0-1.0	A-2-4(0)	34	NP	15.5	69.9	12.6	2.0	97	92	19	-	4.3
S-2	22 LT	24+00	1.0-2.5	A-2-4(0)	27	NP	13.2	75.9	8.8	2.0	100	96	18	-	2.4
S-3	22 LT	24+00	2.5-4.5	A-4(0)	20	5	13.1	50.6	16.1	20.2	99	92	41	-	-



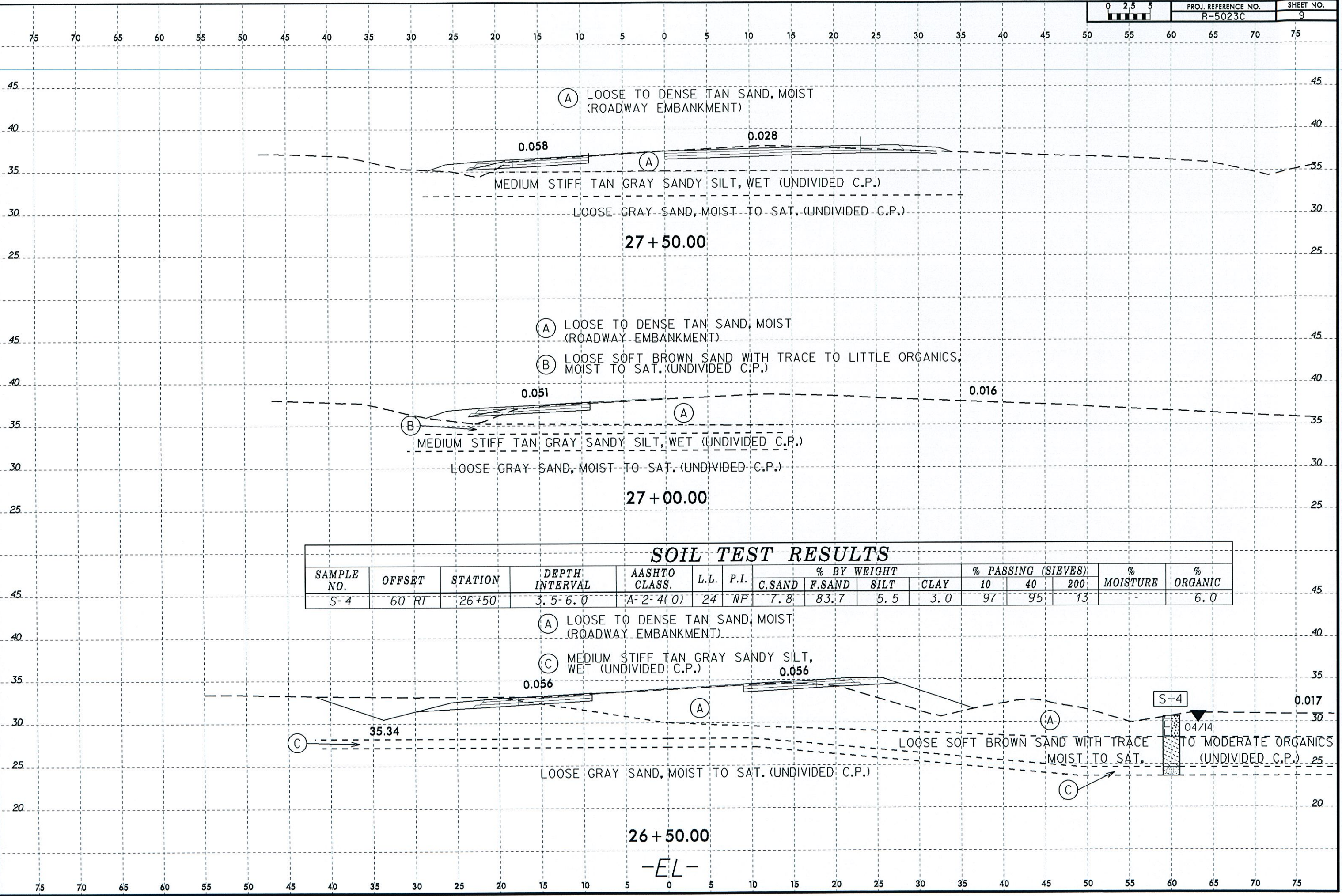




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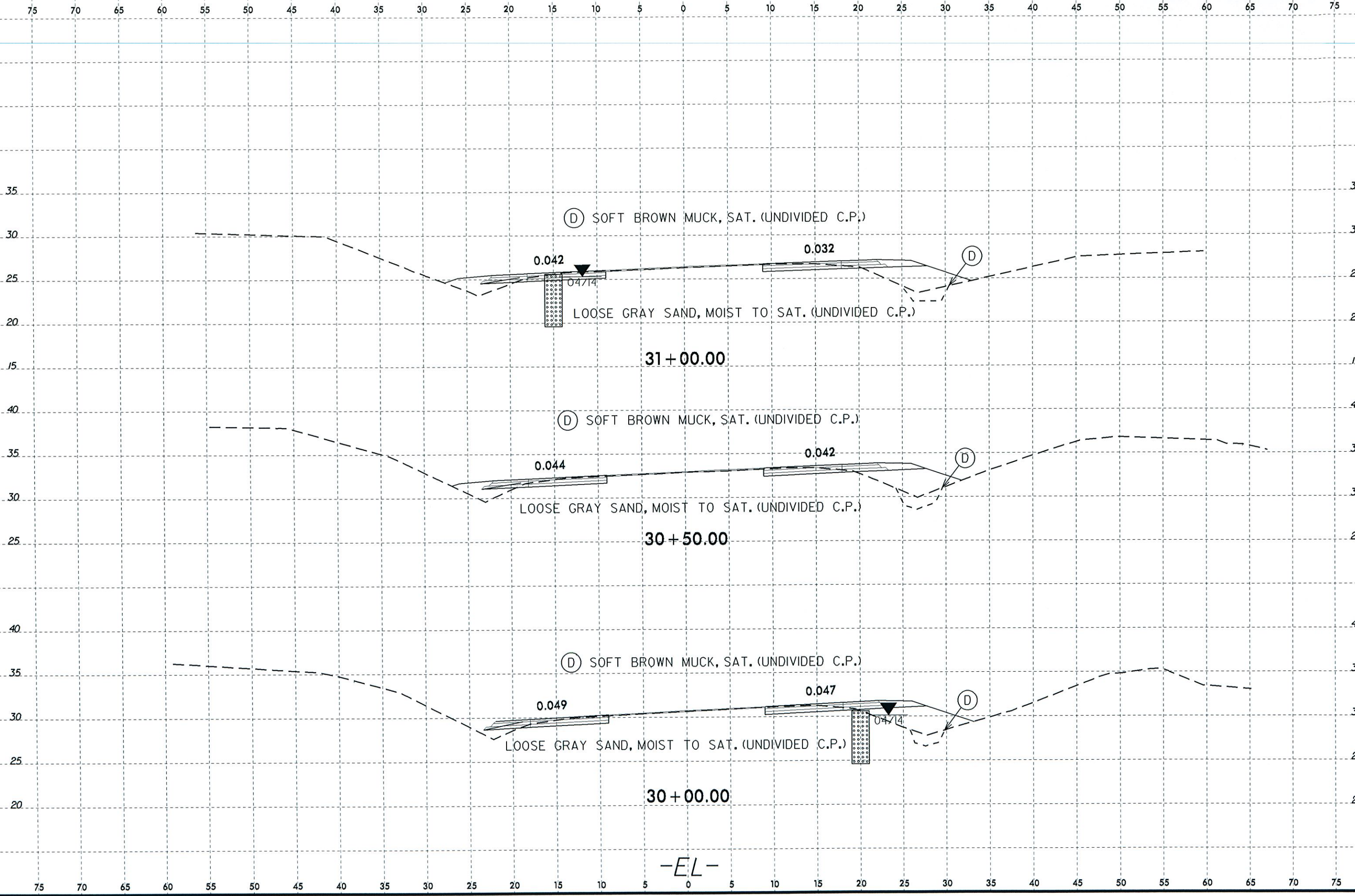
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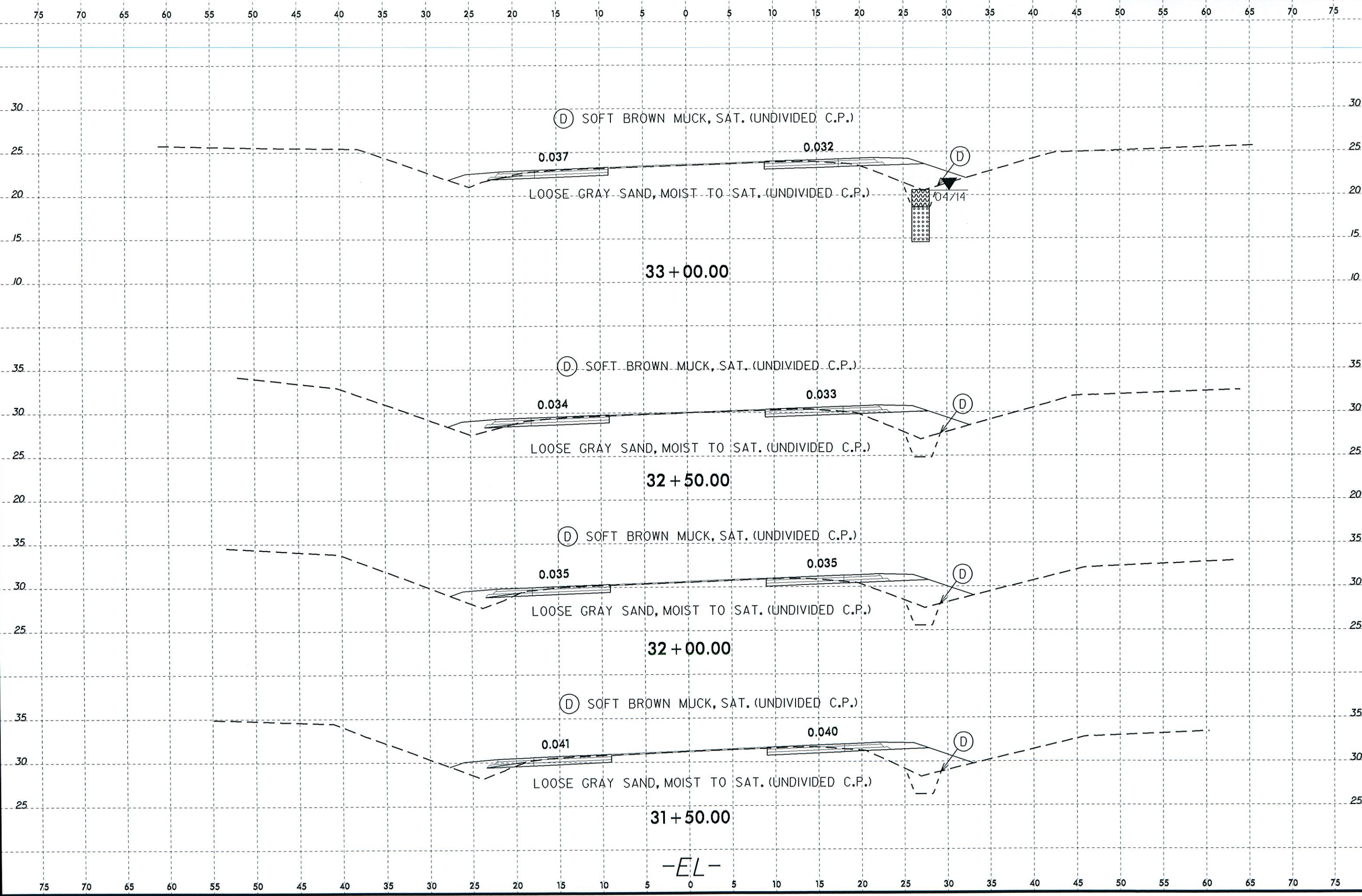


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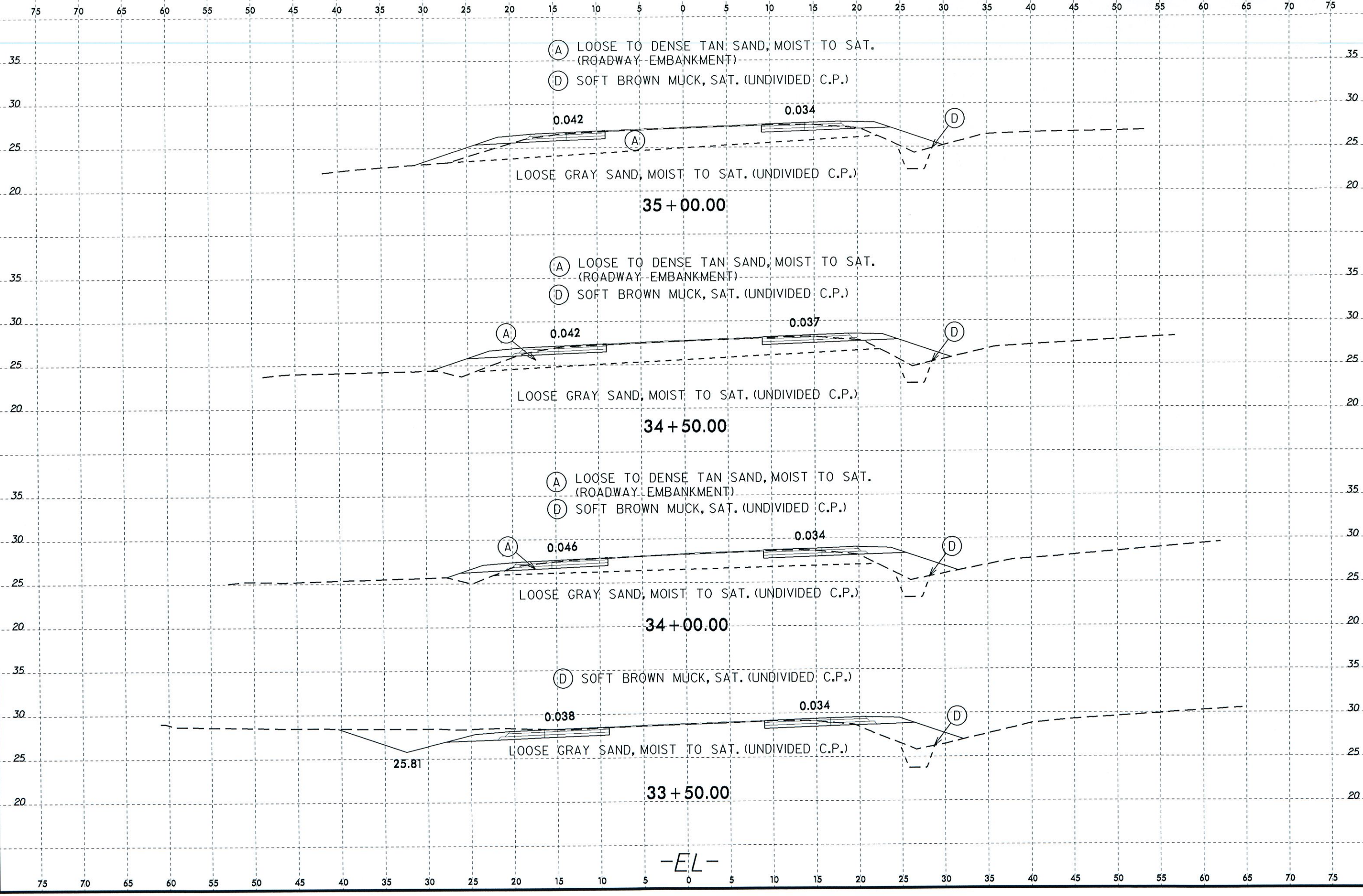
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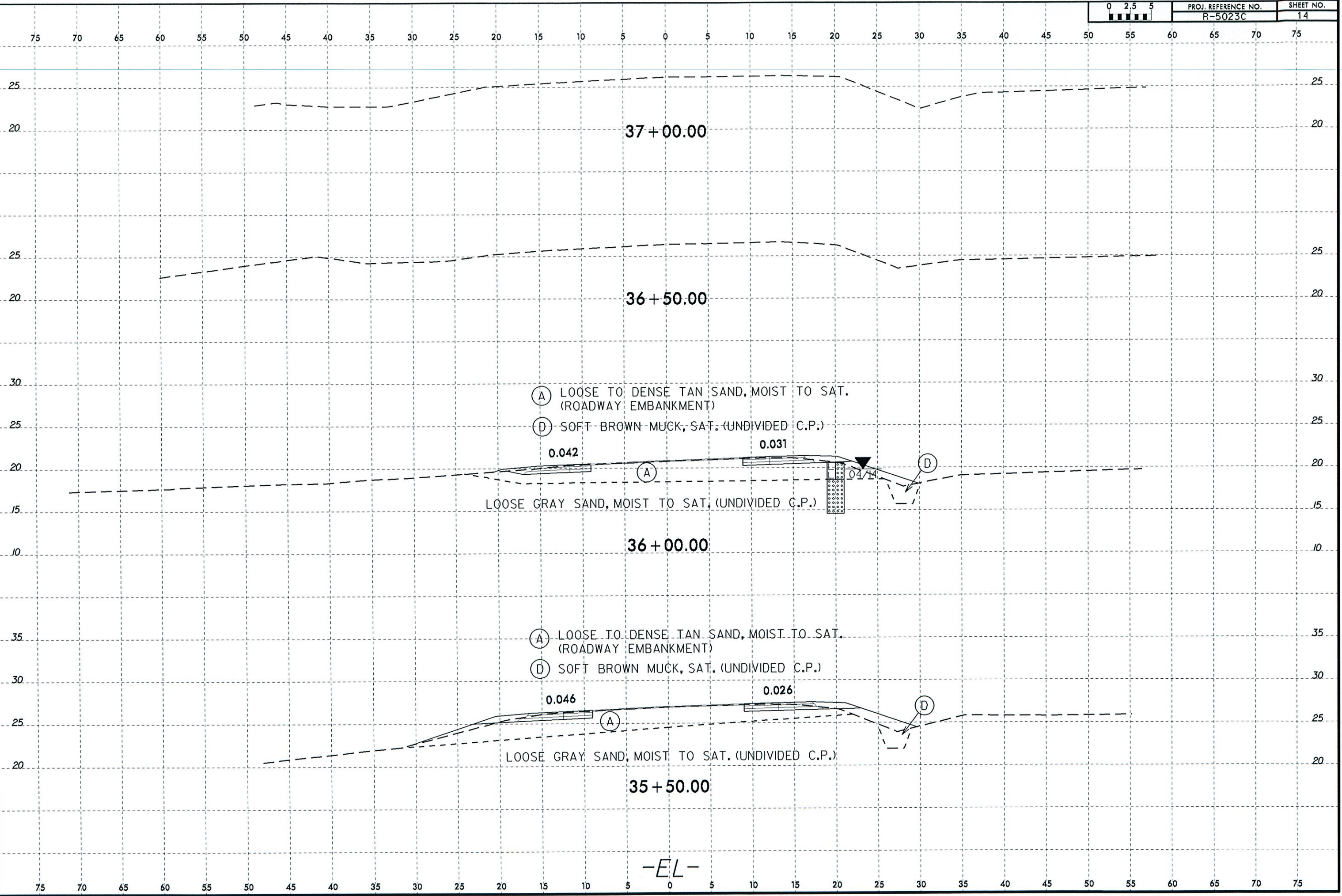








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