

REFERENCE: BR-0014

PROJECT: 67014

SEE SHEET 3 FOR PLAN SHEET LAYOUT
AT TIME OF INVESTIGATION

CONTENTS

<u>LINE</u>	<u>STATION</u>	<u>PLAN</u>
-LREV-	14+42 TO 28+82	4-5

CROSS SECTIONS

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-LREV-	14+42 TO 28+82	6-19

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

ROADWAY

SUBSURFACE INVESTIGATION

COUNTY CUMBERLAND
 PROJECT DESCRIPTION BRIDGE NO. 250025 OVER
BEAVER DAM CREEK ON NC 242

INVENTORY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0014	1	19

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 1919 TOT-6850. THE SUBSURFACE PLANS AND REPORTS, FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA ARE NOT PART OF THE CONTRACT.

GENERAL SOIL AND ROCK STRATA DESCRIPTIONS AND INDICATED BOUNDARIES ARE BASED ON A GEOTECHNICAL INTERPRETATION OF ALL AVAILABLE SUBSURFACE DATA AND MAY NOT NECESSARILY REFLECT THE ACTUAL SUBSURFACE CONDITIONS BETWEEN BORINGS OR BETWEEN SAMPLED STRATA WITHIN THE BOREHOLE. THE LABORATORY SAMPLE DATA AND THE IN SITU (IN-PLACE) TEST DATA CAN BE RELIED ON ONLY TO THE DEGREE OF RELIABILITY INHERENT IN THE STANDARD TEST METHOD. THE OBSERVED WATER LEVELS OR SOIL MOISTURE CONDITIONS INDICATED IN THE SUBSURFACE INVESTIGATIONS ARE AS RECORDED AT THE TIME OF THE INVESTIGATION. THESE WATER LEVELS OR SOIL MOISTURE CONDITIONS MAY VARY CONSIDERABLY WITH TIME ACCORDING TO CLIMATIC CONDITIONS INCLUDING TEMPERATURES, PRECIPITATION AND WIND, AS WELL AS OTHER NON-CLIMATIC FACTORS.

THE BIDDER OR CONTRACTOR IS CAUTIONED THAT DETAILS SHOWN ON THE SUBSURFACE PLANS ARE PRELIMINARY ONLY AND IN MANY CASES THE FINAL DESIGN DETAILS ARE DIFFERENT. FOR BIDDING AND CONSTRUCTION PURPOSES, REFER TO THE CONSTRUCTION PLANS AND DOCUMENTS FOR FINAL DESIGN INFORMATION ON THIS PROJECT. THE DEPARTMENT DOES NOT WARRANT OR GUARANTEE THE SUFFICIENCY OR ACCURACY OF THE INVESTIGATION MADE, NOR THE INTERPRETATIONS MADE, OR OPINION OF THE DEPARTMENT AS TO THE TYPE OF MATERIALS AND CONDITIONS TO BE ENCOUNTERED. THE BIDDER OR CONTRACTOR IS CAUTIONED TO MAKE SUCH INDEPENDENT SUBSURFACE INVESTIGATIONS AS HE DEEMS NECESSARY TO SATISFY HIMSELF AS TO CONDITIONS TO BE ENCOUNTERED ON THE PROJECT. THE CONTRACTOR SHALL HAVE NO CLAIM FOR ADDITIONAL COMPENSATION OR FOR AN EXTENSION OF TIME FOR ANY REASON RESULTING FROM THE ACTUAL CONDITIONS ENCOUNTERED AT THE SITE DIFFERING FROM THOSE INDICATED IN THE SUBSURFACE INFORMATION.

- NOTES:
1. THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS ACCURATE NOR IS IT CONSIDERED PART OF THE PLANS, SPECIFICATIONS OR CONTRACT FOR THE PROJECT.
 2. BY HAVING REQUESTED THIS INFORMATION, THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.

PERSONNEL

A. N. KINTNER

D. G. PINTER

R. E. CLARKE

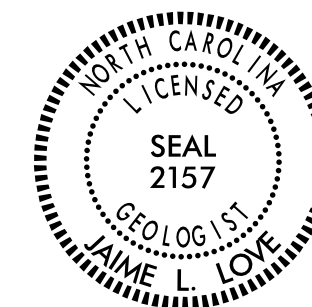
INVESTIGATED BY J. L. LOVE

DRAWN BY A. N. KINTNER

CHECKED BY N. T. ROBERSON

SUBMITTED BY N. T. ROBERSON

DATE DECEMBER 2018



DocuSigned by:
Jaime L. Love 2/15/2019
 B93571039B884B5...
 SIGNATURE DATE

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

See Sheet 1-A For Index of Sheets
 See Sheet 1-B For Conventional Symbols
 See Sheet 1C-1 TO 1C-2 For Survey Control Sheets

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

LOCATION: BRIDGE NO. 250025 OVER BEAVER DAM CREEK
 ON NC 242

TYPE OF WORK: GRADING, DRAINAGE, PAVING & STRUCTURE

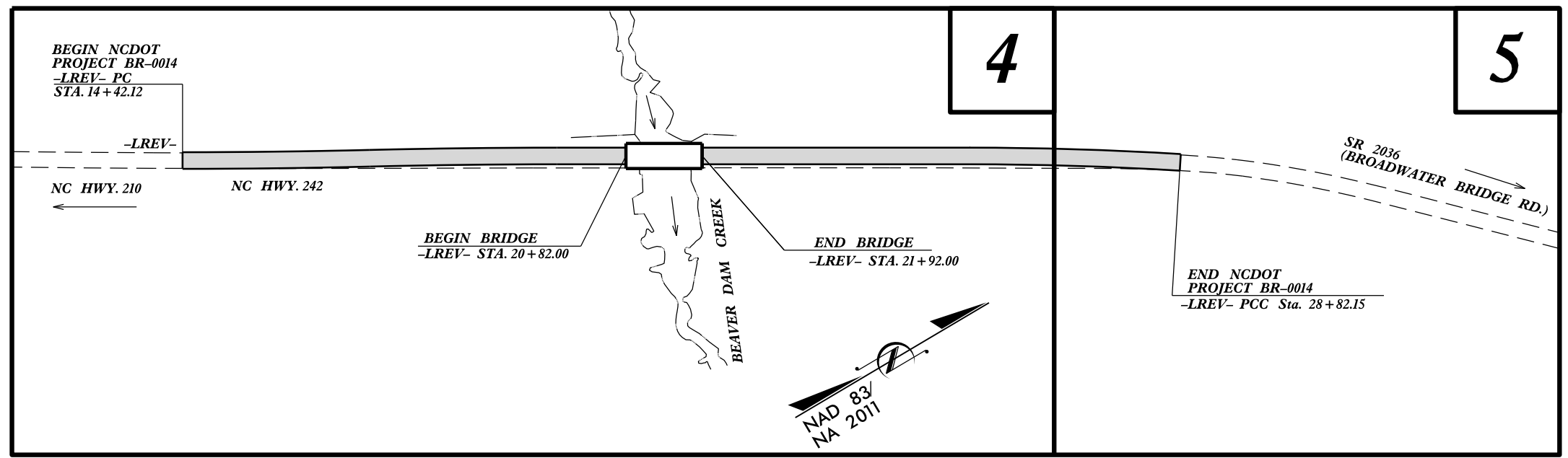
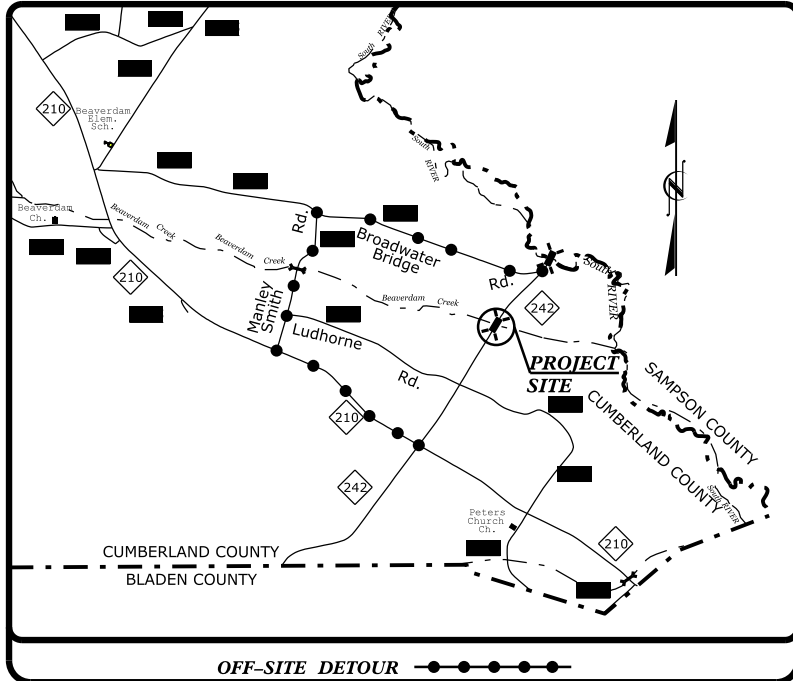
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	BR-0014	3	19
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
67014.1.1		PE	

WETHERILL ENGINEERING
 1223 Jones Franklin Rd.
 Raleigh, N.C. 27606
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 Fax: 919 851 8107

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

BRIDGE #250025

PRELIM. RDWY. PLANS

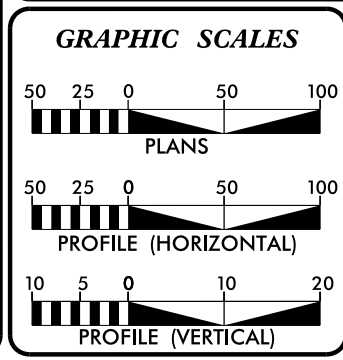


CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD
 THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

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

PROJECT: BR-0014

CONTRACT:



DESIGN DATA

ADT 2019 =	1,500
ADT 2040 =	2,200
K =	12 %
D =	55 %
T =	12 % *
V =	60 MPH

* (TTST = 8% +
 DUAL = 4%)
 FUNC CLASS =
 MAJOR COLLECTOR
 REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT BR-0014 =	0.252 MILES
LENGTH STRUCTURE PROJECT BR-0014 =	0.021 MILES
TOTAL LENGTH PROJECT BR-0014 =	0.273 MILES

NCDOT CONTACT: DAVID STUTTS, PE
 PROJECT ENGINEER - PE/PROGRAM MGT.

Prepared for:
DIVISION OF HIGHWAYS
STRUCTURES MANAGEMENT UNIT
 1000 BIRCH RIDGE DRIVE RALEIGH NC, 27610

2018 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 19, 2019

LETTING DATE: JUNE 23, 2020

EDWARD G. WETHERILL, PE
 PROJECT ENGINEER

GREG S. PURVIS, PE
 PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

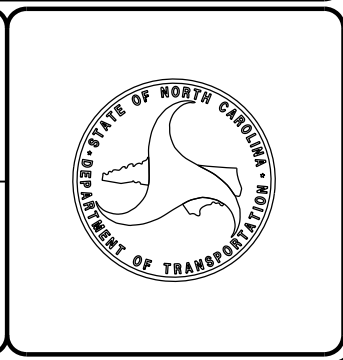
 P.E.

SIGNATURE: _____

ROADWAY DESIGN ENGINEER

 P.E.

SIGNATURE: _____



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STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

December 12, 2018

STATE PROJECT: 67014.1.1 (BR-0014)
 FEDERAL PROJECT:
 COUNTY: CUMBERLAND
 DESCRIPTION: Replace Bridge Number 250025 over Beaver Dam Creek on NC-242
 SUBJECT: Geotechnical Report – Inventory

The Geotechnical Engineering Unit has completed a subsurface investigation for this project and presents the following inventory.

Project Description

This project consists of replacing Bridge Number 250025 on NC-242 over Beaver Dam Creek and grading, drainage, and paving of NC-242. The bridge inventory will be reported separately at a later date.

A geotechnical investigation was conducted during October and November of 2018. Twelve hand auger borings and five sampler probe borings were performed by the Geotechnical Engineering Unit. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by the Materials and Tests Unit.

The following alignment, totaling 0.27 miles, was investigated. Subsurface plans and cross sections of this alignment are included in this report.

<u>Line</u>	<u>Stations</u>
-LREV-	14+42 to 28+82

Physiography and Geology

The project is located within the township of Beaver Dam, and within the Coastal Plain province of North Carolina. Alluvial deposits of sands, clays, and muck overlay clays and sands of the Undivided Coastal Plain. The terrain is relatively flat with some low-lying wetland areas. The new widening project area is a mixture of woods and wetlands, crossing over Beaver Dam Creek.

Soils Properties

Soils encountered during this investigation are Roadway Embankment, Alluvial, and Undivided Coastal Plain.

Roadway Embankment soils are present throughout the entire project. These soils primarily consist of gray, tan, brown, and orange, loose to medium dense, moist to saturated, silty and clayey sand (A-2-4, A-2-6) and coarse sand (A-1-b) with trace root fragments and organics.

Undivided Coastal Plain soils are also present throughout the entire project. These soils are characterized by orange, tan, and gray, very loose to medium dense, moist to saturated, silty and clayey sand (A-2-4, A-2-6) and coarse sand (A-3) with trace root fragments and mica, and brown and gray with tan and red mottling, stiff, moist, silty clay (A-7-6). Plastic indices for these soils range from 27 to 55.

Alluvial Soils are present along alignment -LREV- from sta. 15+75 to sta. 25+25, left and right of the alignment. These soils consist of dark gray, brown, and tan, very loose to loose, moist to saturated, silty and clayey sand (A-2-4, A-2-6) and coarse sand (A-1-b, A-3) with trace to moderate organics, and dark gray, very soft to soft, moist to saturated, muck and silty clay (A-7-6) with trace to moderate organics. Plastic indices for these soils range from 10 to 19.

Groundwater

Groundwater measurements were taken in October and November 2018 during average rainfall conditions. Groundwater was present in all borings and ranged from 0.6 to 4.1 feet from the ground surface.

Areas of Special Geotechnical Interest


- 1) High Groundwater: All borings exhibited groundwater within 6.0 feet of proposed grade.
- 2) Highly Organic Soils: Highly organics soils (muck) were encounter on the project at the following locations:

<u>Line</u>	<u>Stations</u>	<u>Offsets</u>
-LREV-	17+00	25' RT
-LREV-	19+00	20' LT
- 3) Highly Plastic Soils: Highly plastic soils (PI > 25) were encountered on the project at the following locations:

<u>Line</u>	<u>Stations</u>	<u>Offsets</u>
-LREV-	25+09	27' RT
-LREV-	25+56	14' LT
-LREV-	26+00	15' LT

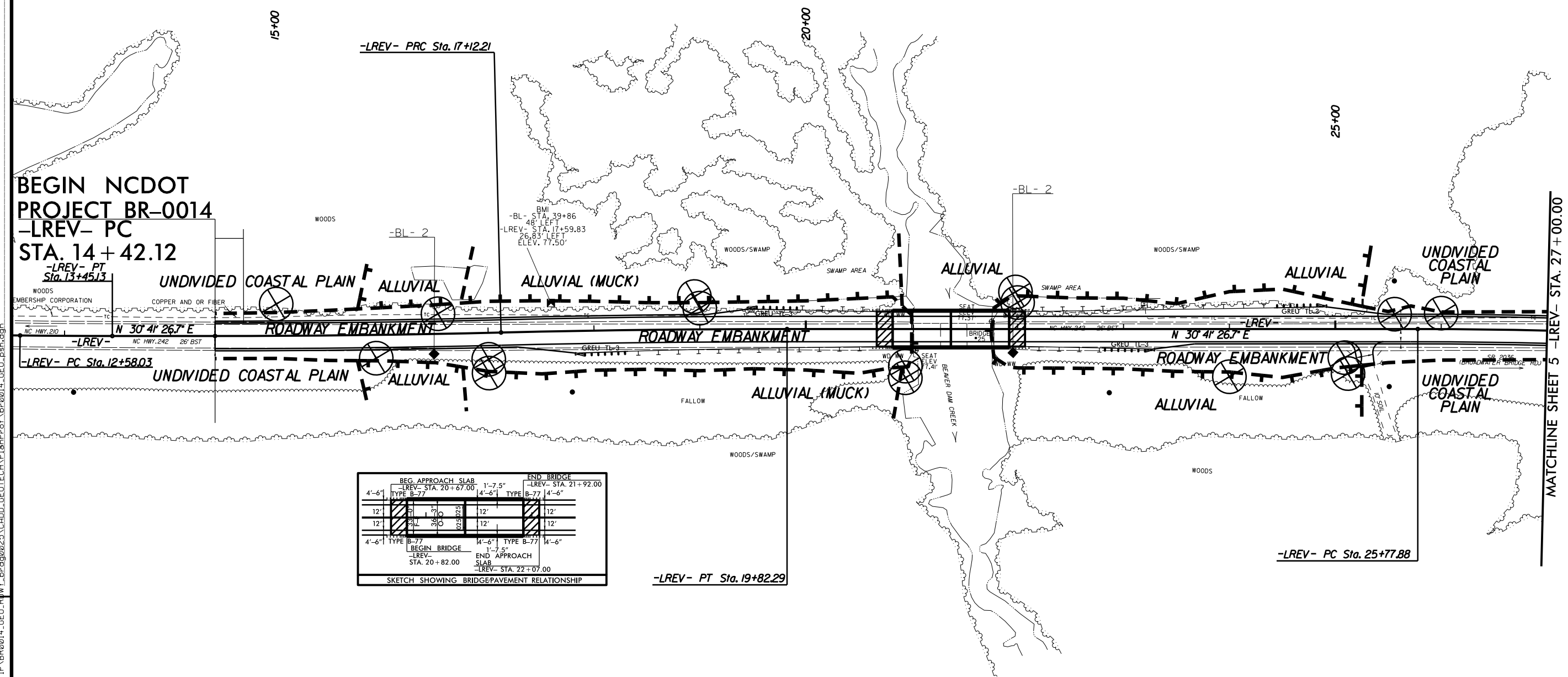
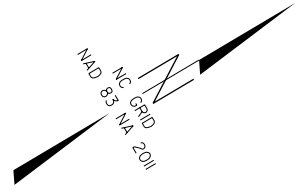
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REVISIONS


 1223 Jones Franklin Rd.
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 Fax: 919 851 8107

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

PROJECT REFERENCE NO. BR-0014	SHEET NO. 4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



SKETCH SHOWING BRIDGE/PAVEMENT RELATIONSHIP

4'-6" TYPE B-77	BEG. APPROACH SLAB -LREV- STA. 20+67.00	1'-7.5"	END BRIDGE -LREV- STA. 21+92.00	4'-6" TYPE B-77
12"	12"	12"	12"	12"
12"	12"	12"	12"	12"
4'-6" TYPE B-77	BEGIN BRIDGE -LREV- STA. 20+82.00	1'-7.5"	END APPROACH SLAB -LREV- STA. 22+07.00	4'-6" TYPE B-77

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 \$\$\$\$ USER NAME \$\$\$

MATCHLINE SHEET 5 -LREV- STA. 27+00.00

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REVISIONS

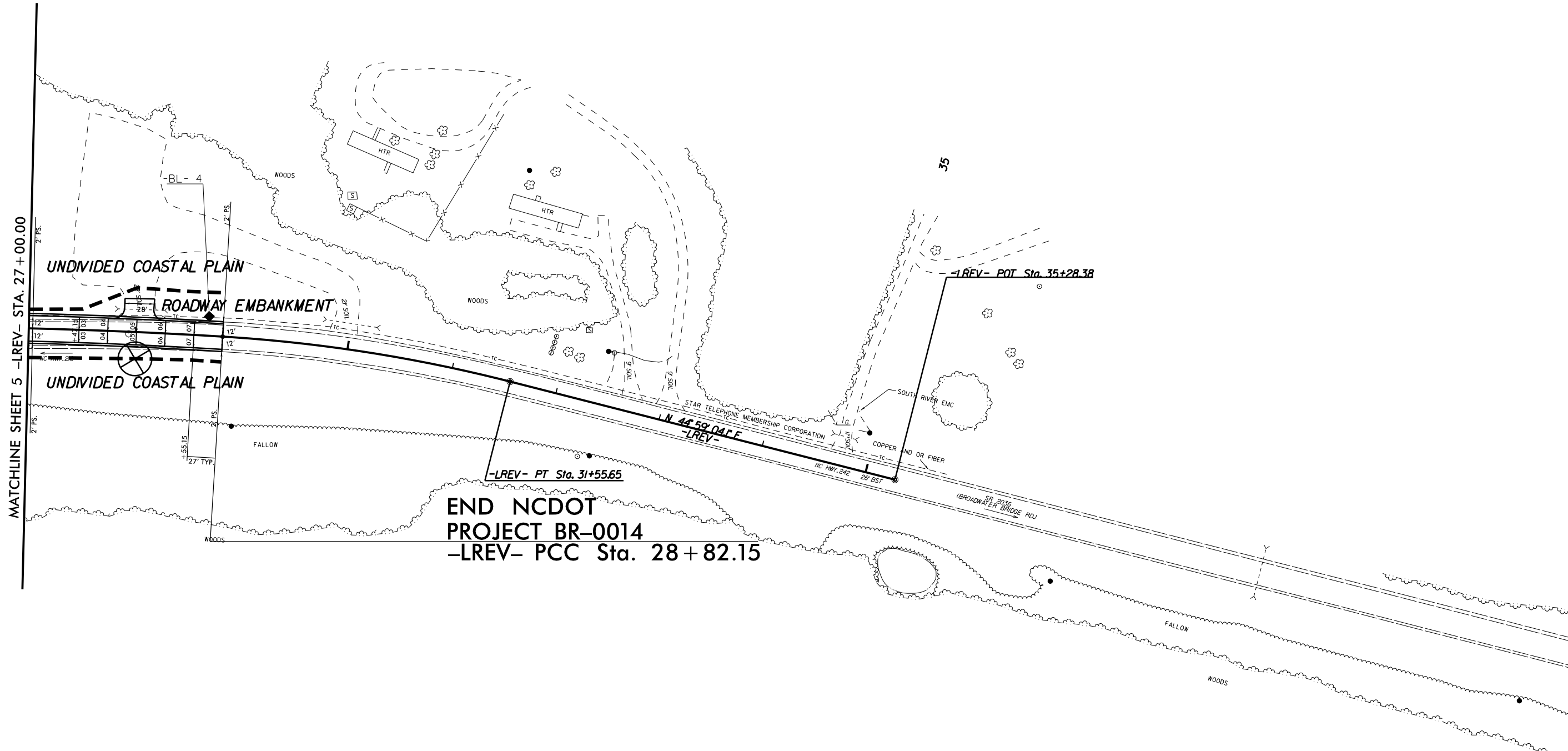
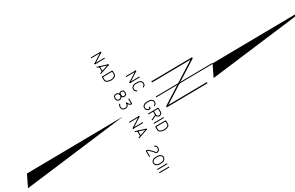
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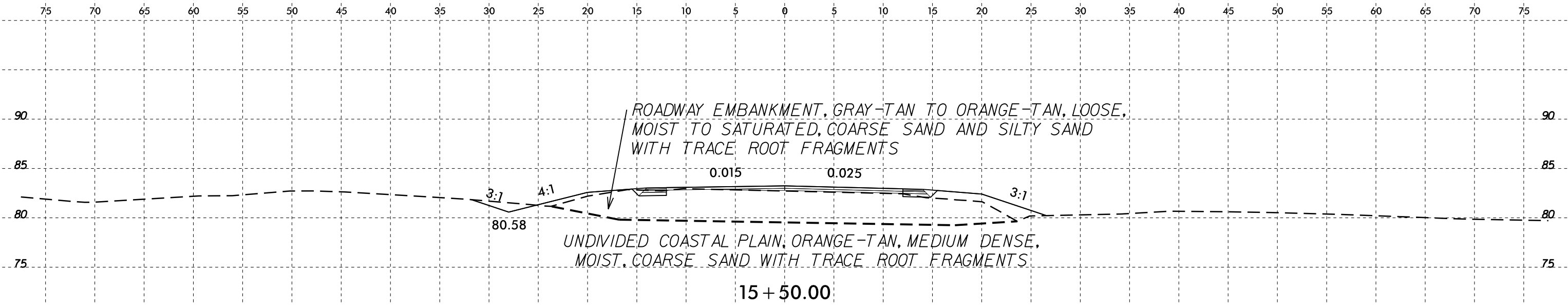
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TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/GPS - CONSTRUCTION OBSERVATION

PROJECT REFERENCE NO. BR-0014	SHEET NO. 5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
INCOMPLETE PLANS DO NOT USE FOR R/W ACQUISITION	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

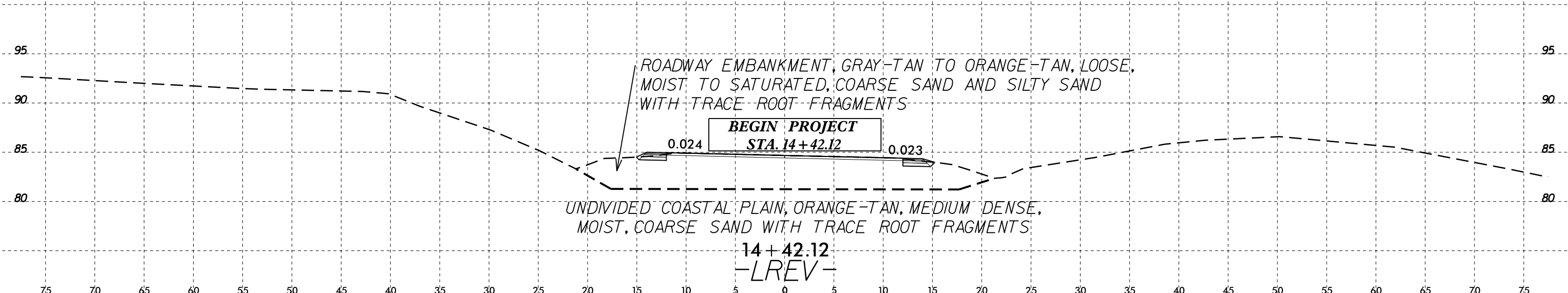
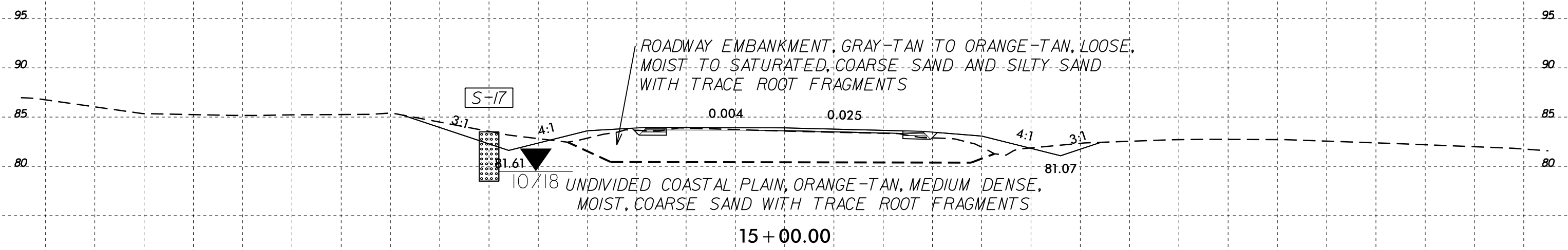


END NCDOT
PROJECT BR-0014
-LREV- PCC Sta. 28+82.15



SOIL TEST RESULTS

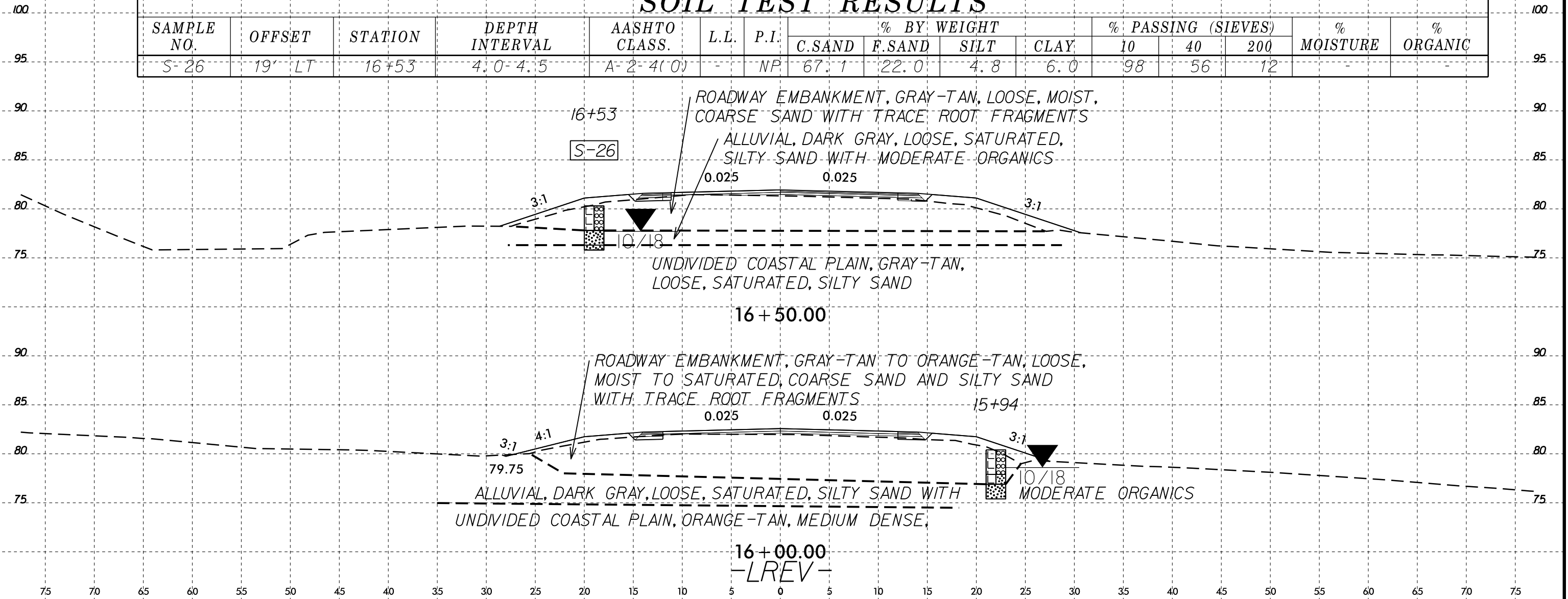
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-17	30' LT	15+00	2.0-2.5'	A-3(0)	-	NP	71.8	18.3	3.8	6.0	96	51	10	-	-



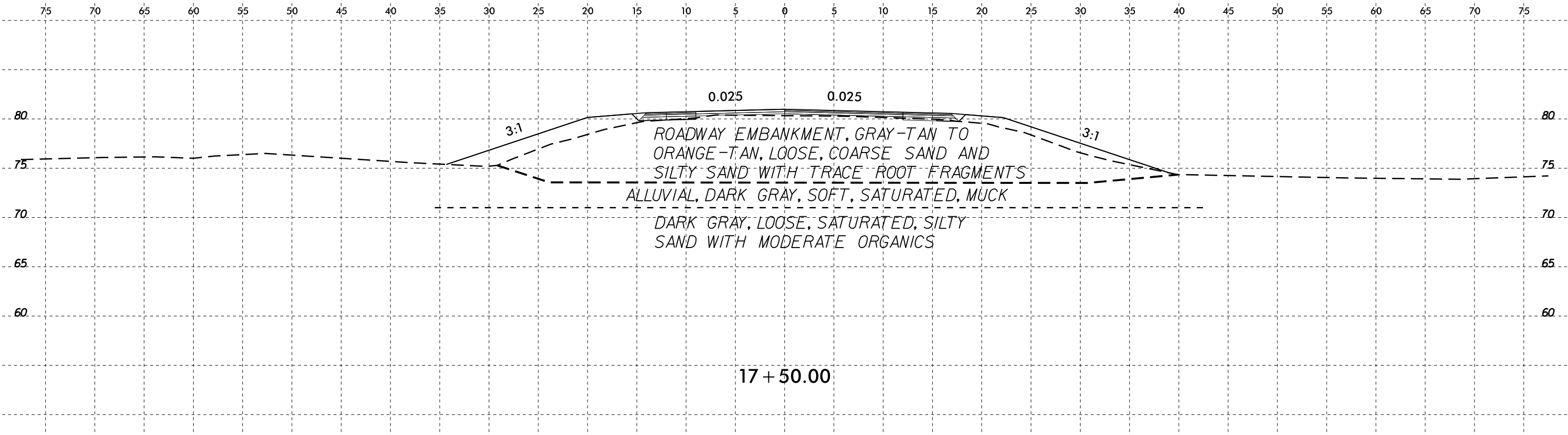
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SYNOPSIS
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75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

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-26	19' LT	16+53	4.0-4.5	A-2-4(0)	-	NP	67.1	22.0	4.8	6.0	98	56	12	-	-



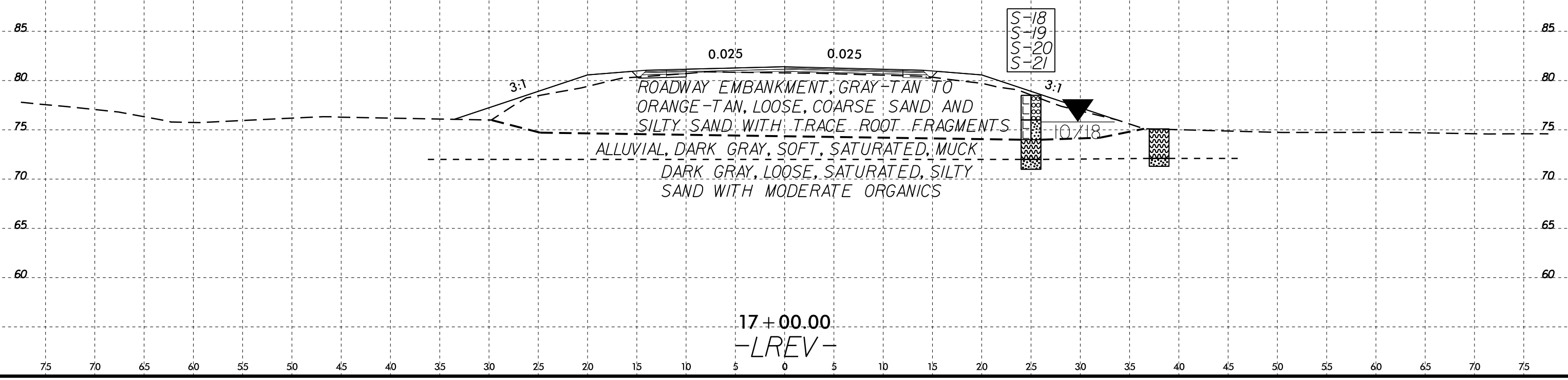
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-LREV-



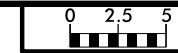
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SOIL TEST RESULTS

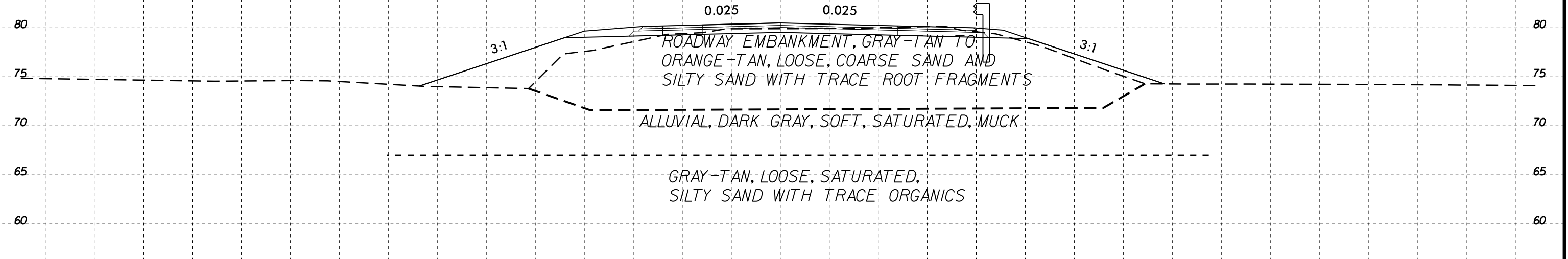
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							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-18	25' RT	17+00	1.5-2.0	A-1-b(0)	-	NP	85.1	8.1	0.8	6.0	97	38	7	-	-
S-19	25' RT	17+00	3.0-3.5	A-2-4(0)	-	NP	74.8	8.1	9.1	8.1	97	55	17	-	-
S-20	25' RT	17+00	4.5-5.0	-	-	-	41.1	19.0	23.8	16.1	96	71	40	-	20
S-21	25' RT	17+00	6.5-7.0	A-2-4(0)	-	NP	66.1	20.6	1.2	12.1	95	57	14	-	3.1



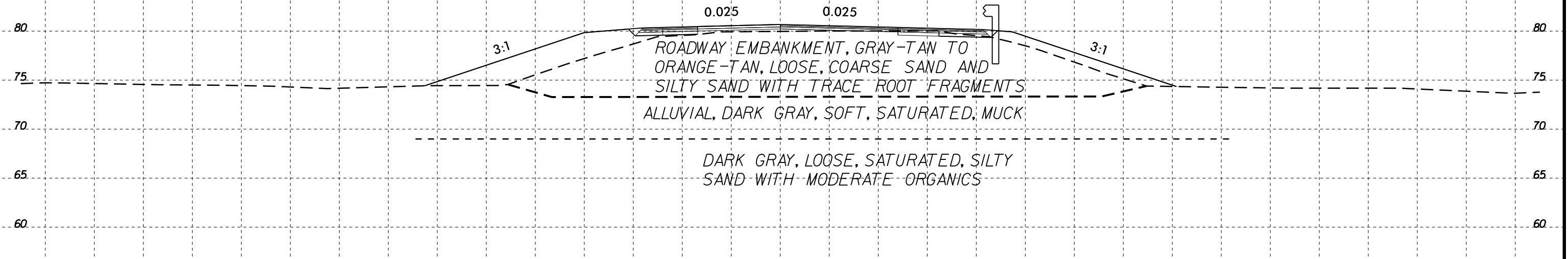
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18 + 50.00

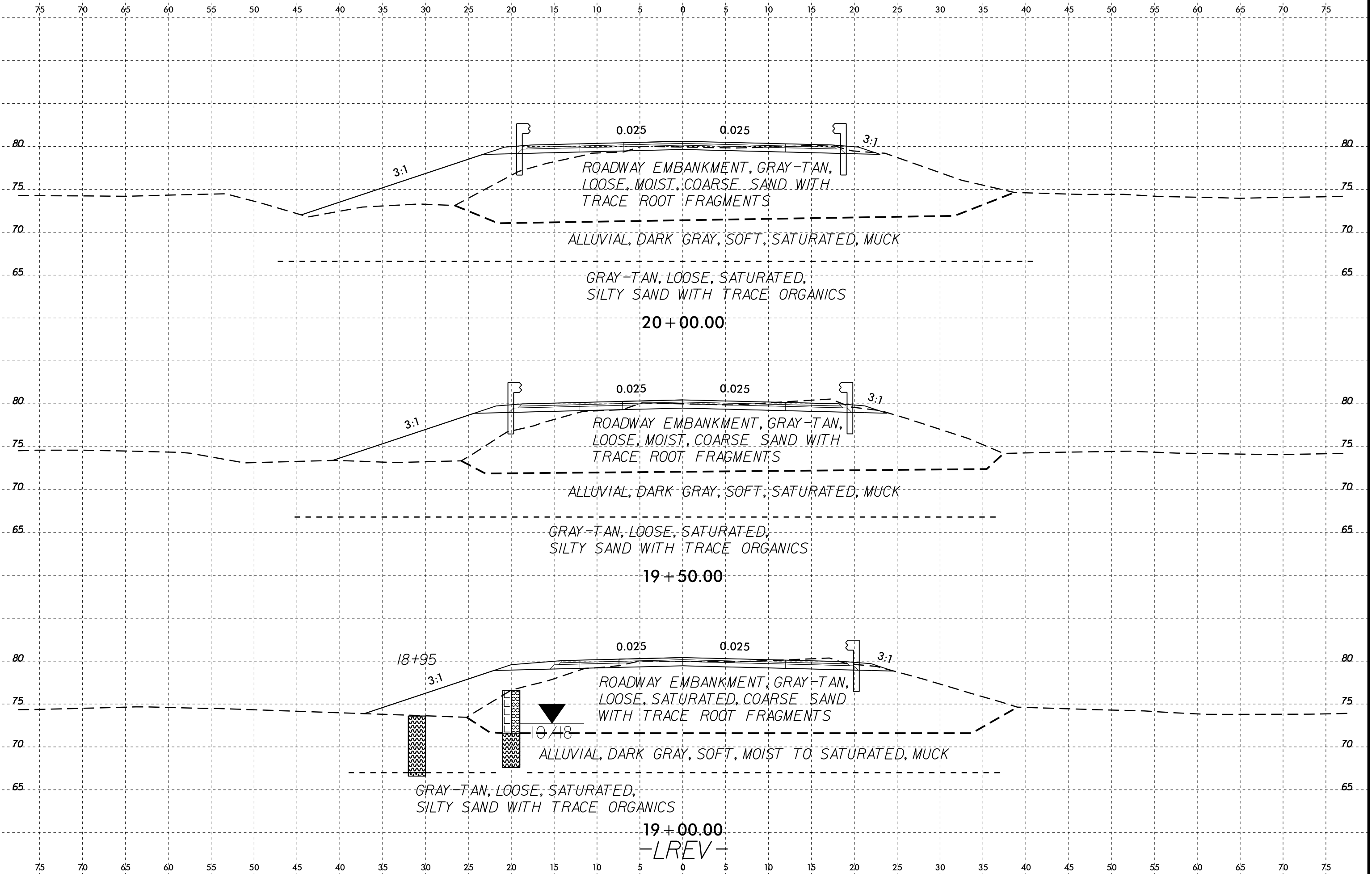


18 + 00.00

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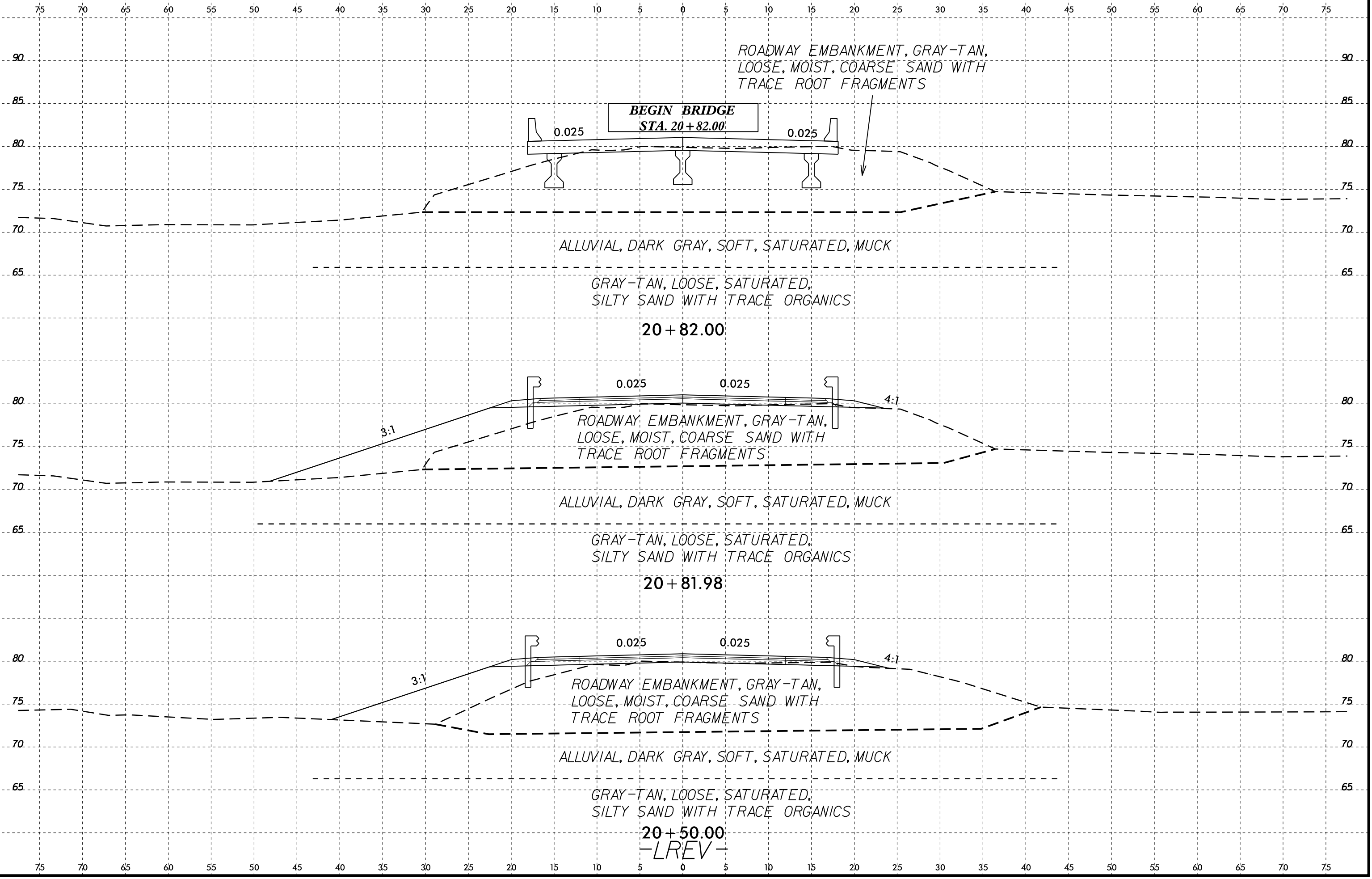
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ROADWAY EMBANKMENT, GRAY-TAN,
LOOSE, MOIST, COARSE SAND WITH
TRACE ROOT FRAGMENTS

BEGIN BRIDGE
STA. 20+82.00

ALLUVIAL, DARK GRAY, SOFT, SATURATED, MUCK

GRAY-TAN, LOOSE, SATURATED,
SILTY SAND WITH TRACE ORGANICS

20+82.00

ROADWAY EMBANKMENT, GRAY-TAN,
LOOSE, MOIST, COARSE SAND WITH
TRACE ROOT FRAGMENTS

ALLUVIAL, DARK GRAY, SOFT, SATURATED, MUCK

GRAY-TAN, LOOSE, SATURATED,
SILTY SAND WITH TRACE ORGANICS

20+81.98

ROADWAY EMBANKMENT, GRAY-TAN,
LOOSE, MOIST, COARSE SAND WITH
TRACE ROOT FRAGMENTS

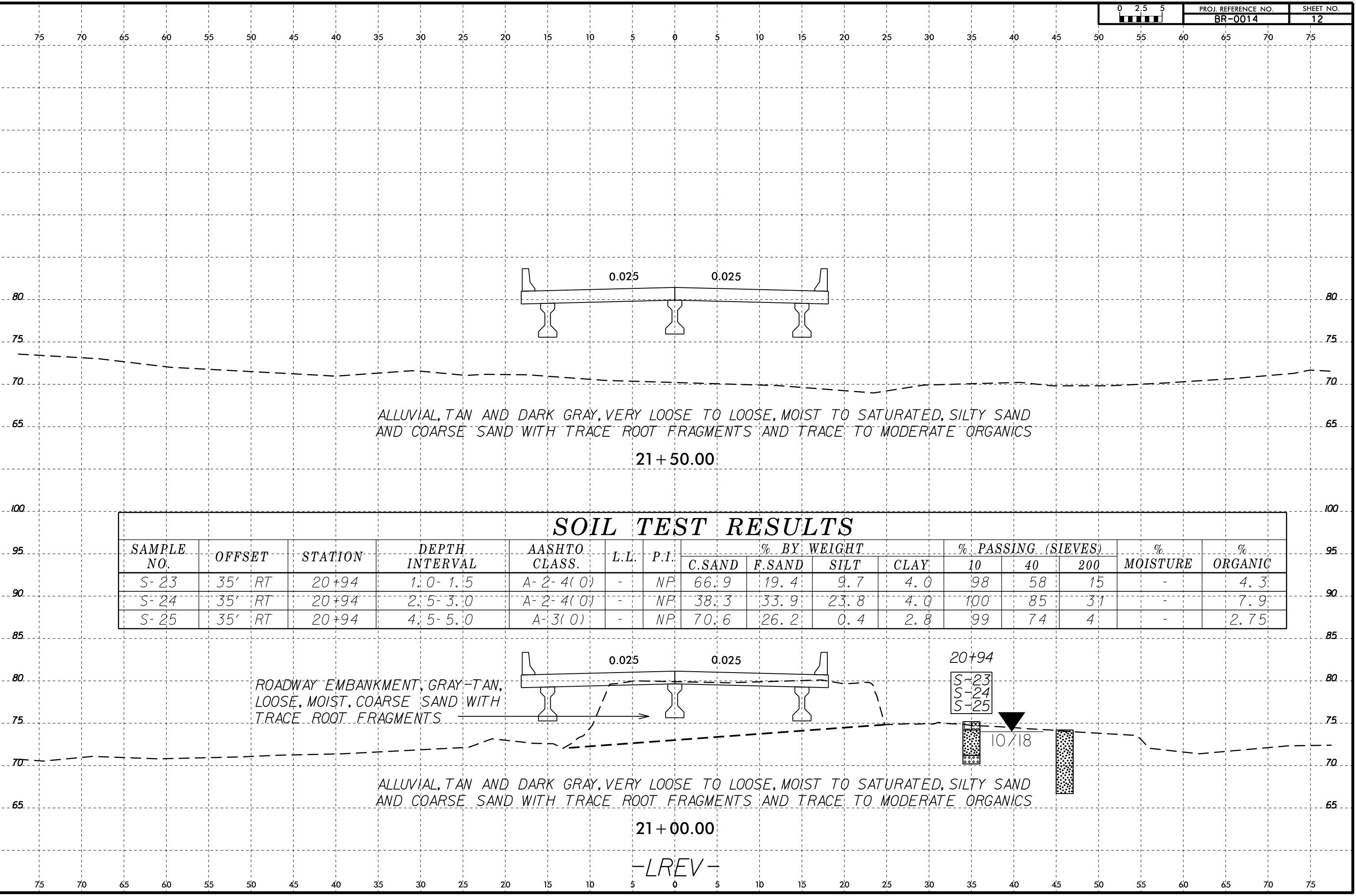
ALLUVIAL, DARK GRAY, SOFT, SATURATED, MUCK

GRAY-TAN, LOOSE, SATURATED,
SILTY SAND WITH TRACE ORGANICS

20+50.00

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ALLUVIAL, TAN AND DARK GRAY, VERY LOOSE TO LOOSE, MOIST TO SATURATED, SILTY SAND
 AND COARSE SAND WITH TRACE ROOT FRAGMENTS AND TRACE TO MODERATE ORGANICS
 21 + 50.00

SOIL TEST RESULTS

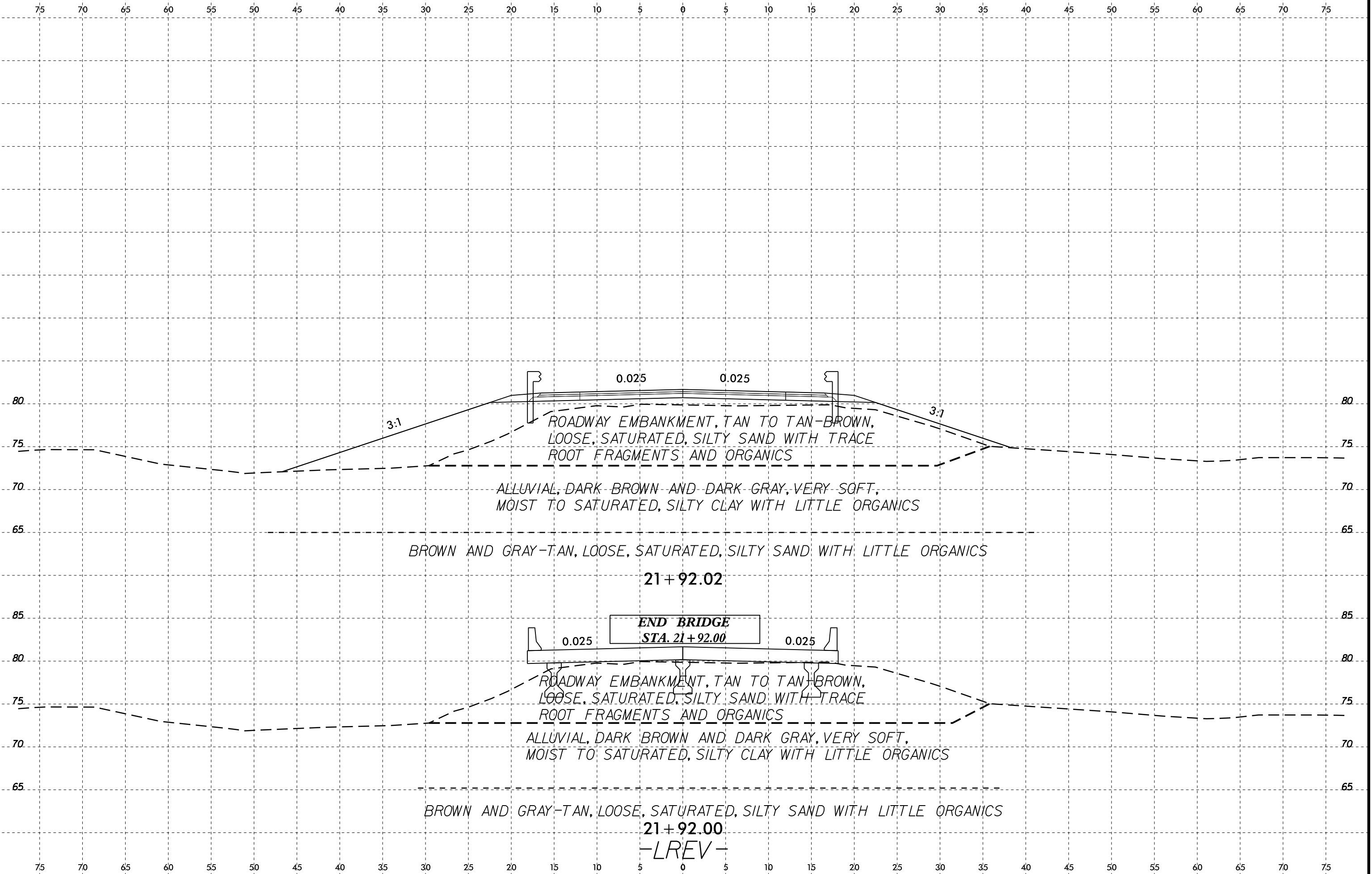
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							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-23	35' RT	20+94	1.0-1.5	A-2-4(0)	-	NP	66.9	19.4	9.7	4.0	98	58	15	-	4.3
S-24	35' RT	20+94	2.5-3.0	A-2-4(0)	-	NP	38.3	33.9	23.8	4.0	100	85	31	-	7.9
S-25	35' RT	20+94	4.5-5.0	A-3(0)	-	NP	70.6	26.2	0.4	2.8	99	74	4	-	2.75

ROADWAY EMBANKMENT, GRAY-TAN,
 LOOSE, MOIST, COARSE SAND WITH
 TRACE ROOT FRAGMENTS

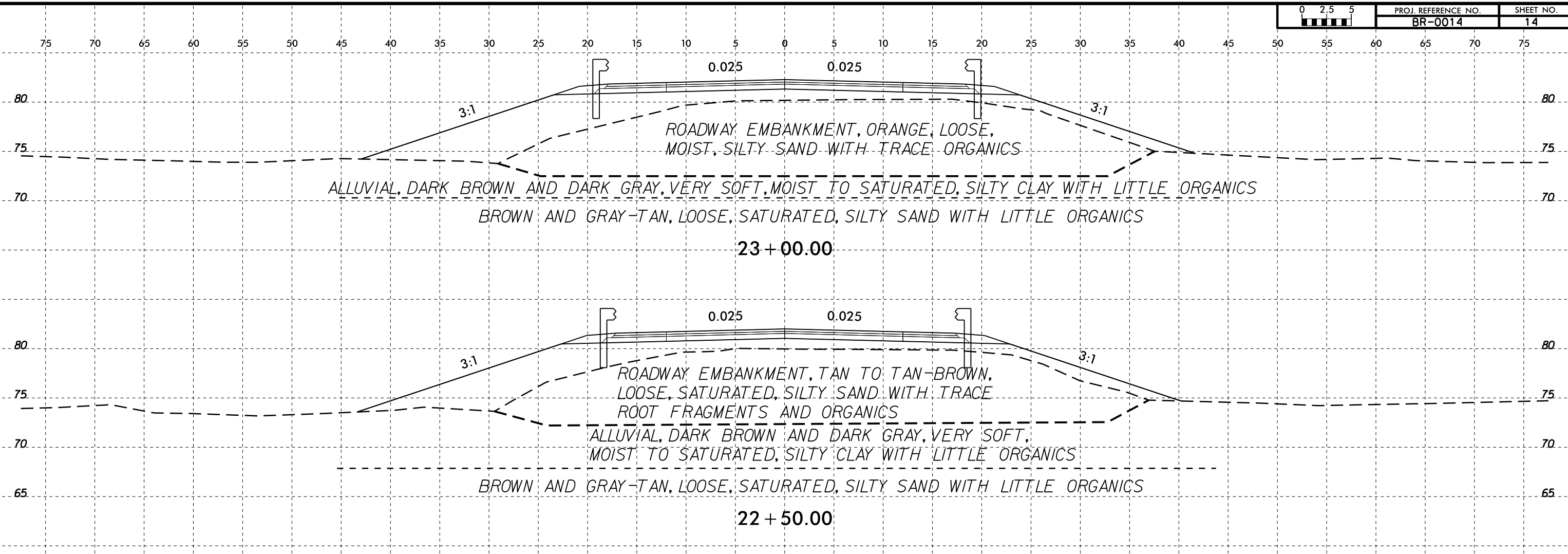
ALLUVIAL, TAN AND DARK GRAY, VERY LOOSE TO LOOSE, MOIST TO SATURATED, SILTY SAND
 AND COARSE SAND WITH TRACE ROOT FRAGMENTS AND TRACE TO MODERATE ORGANICS
 21 + 00.00

-LREV-

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\$\$\$\$SUBNAME\$\$\$\$

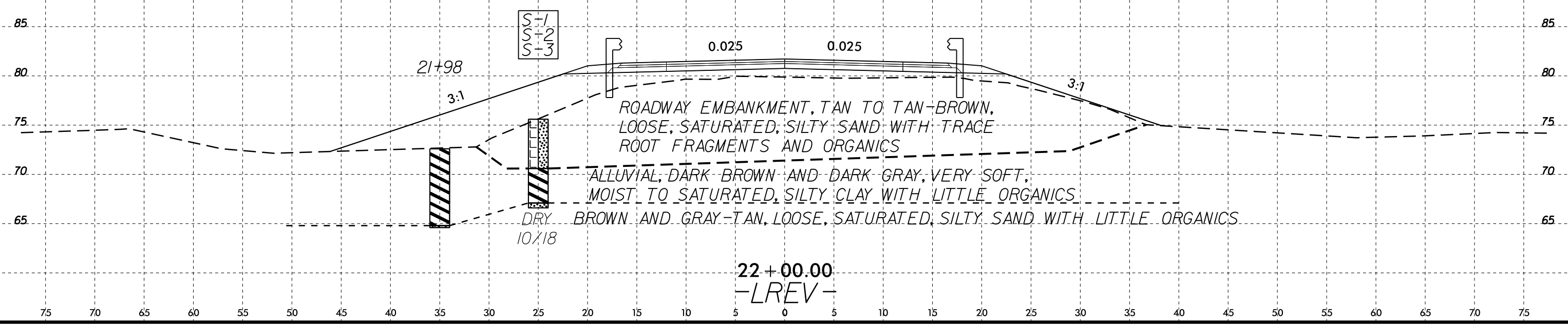


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 \$\$\$\$SUBERRNAME\$\$\$\$



SOIL TEST RESULTS

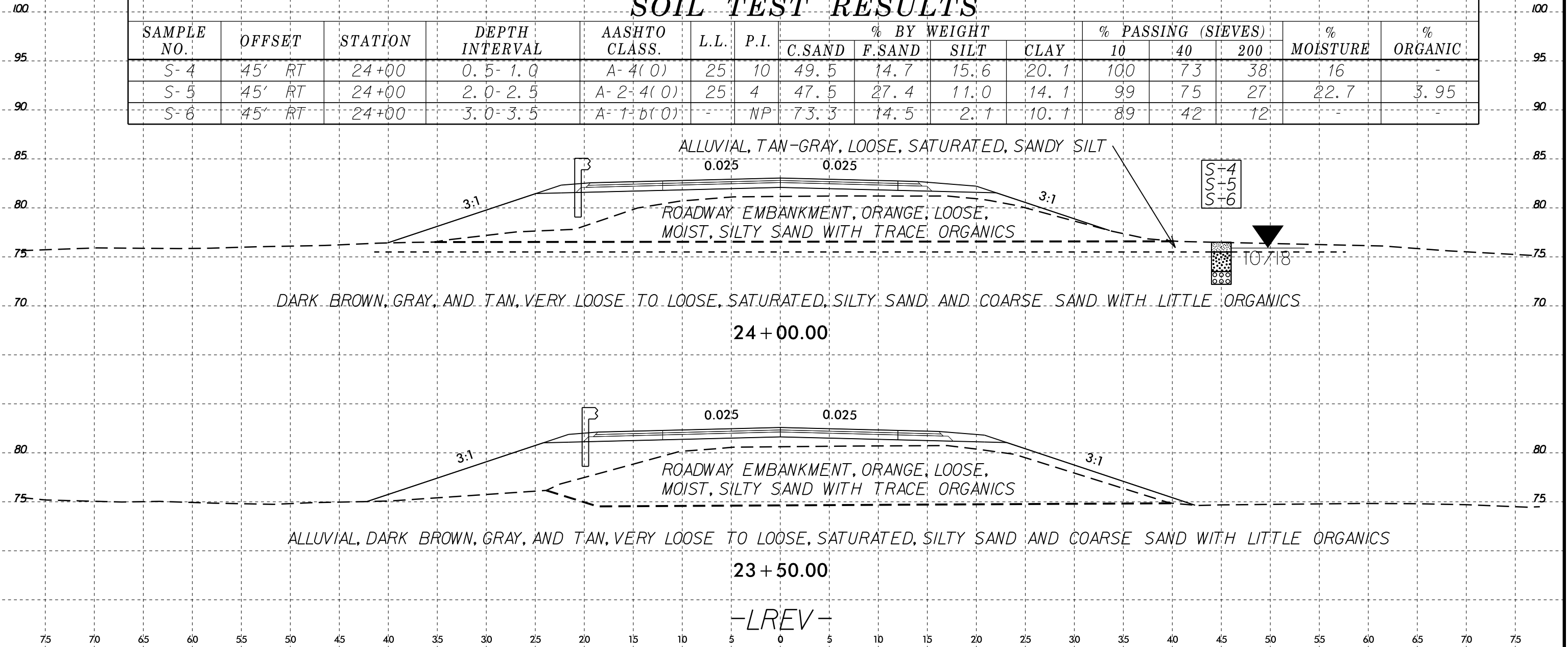
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-1	25' LT	22+00	1.5-2.0	A-2-4(0)	-	NP	48.7	28.4	10.8	12.1	99	77	26	18.6	-
S-2	25' LT	22+00	5.5-6.0	A-7-5(8)	45	14	22.6	16.9	38.4	22.2	100	89	64	63	10.1
S-3	25' LT	22+00	7.0-7.5	A-7-6(14)	41	19	10.1	15.1	24.5	50.4	100	96	78	-	8.6



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 \$\$\$\$SUBPROGRAM\$\$\$\$

SOIL TEST RESULTS

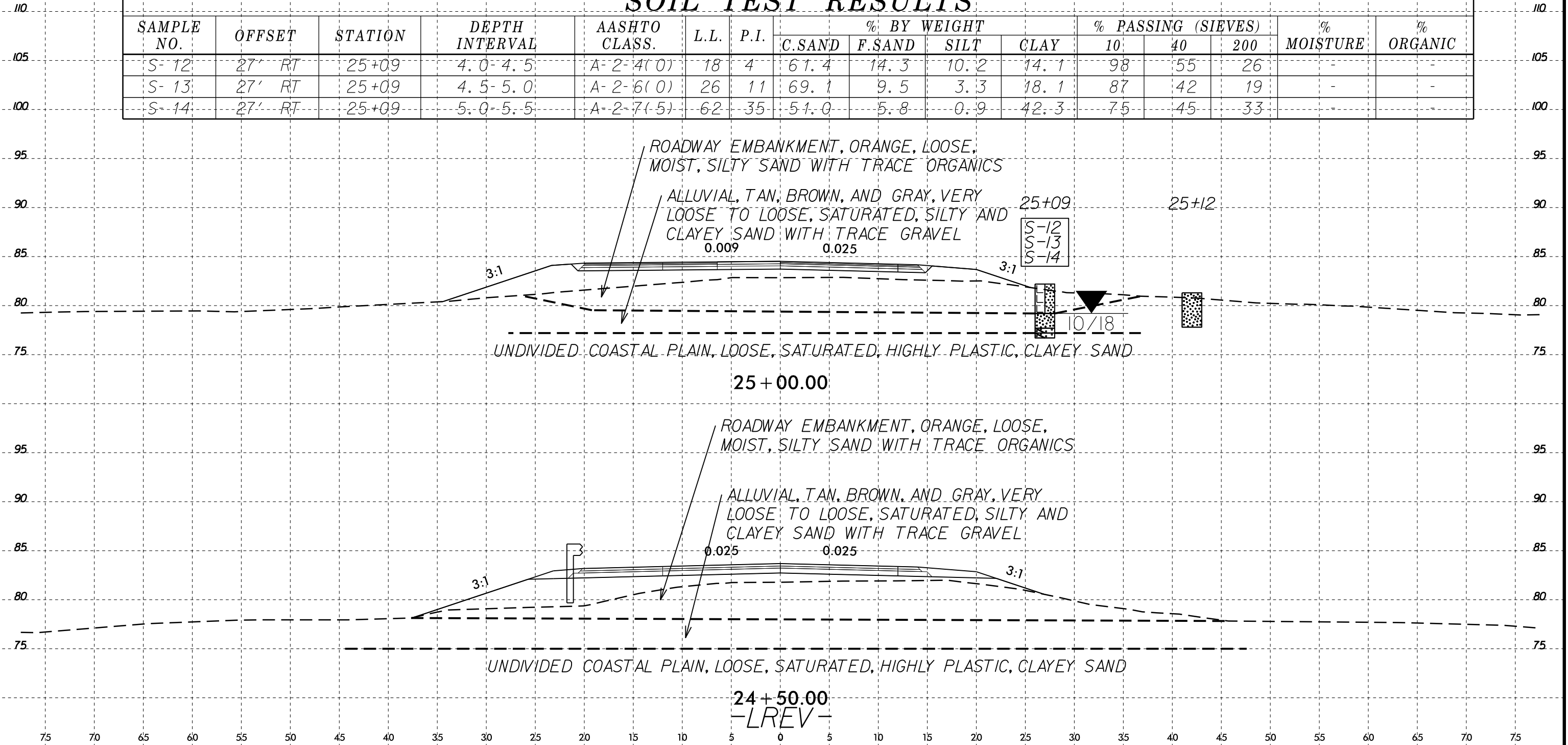
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-4	45' RT	24+00	0.5-1.0	A-4(0)	25	10	49.5	14.7	15.6	20.1	100	73	38	16	-
S-5	45' RT	24+00	2.0-2.5	A-2-4(0)	25	4	47.5	27.4	11.0	14.1	99	75	27	22.7	3.95
S-6	45' RT	24+00	3.0-3.5	A-1-b(0)	-	NP	73.3	14.5	2.1	10.1	89	42	12	-	-



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SOIL TEST RESULTS

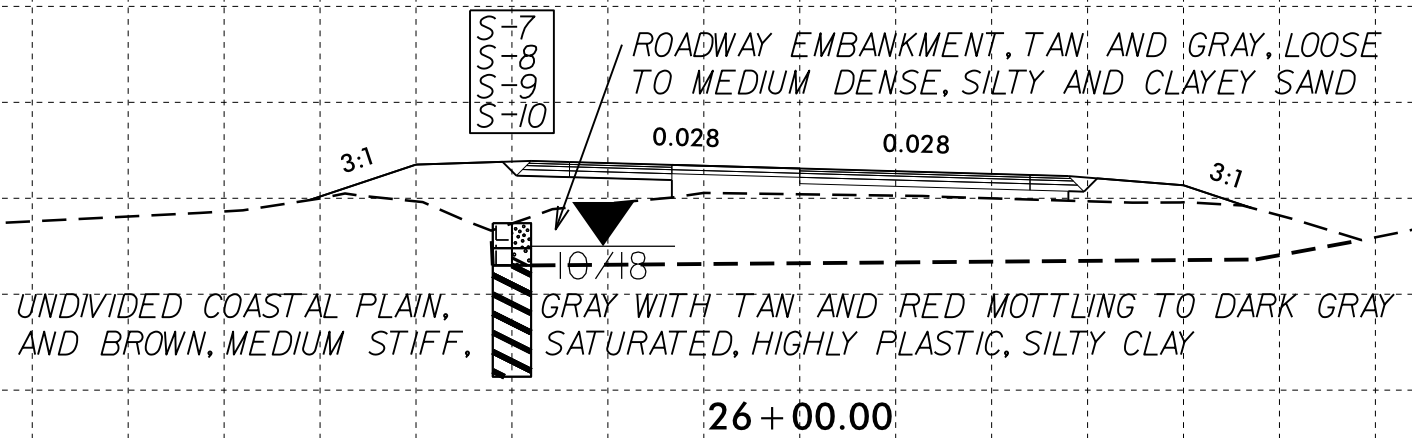
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C.SAND	F.SAND	SILT	CLAY	10	40	200		
S-12	27' RT	25+09	4.0-4.5	A-2-4(0)	18	4	61.4	14.3	10.2	14.1	98	55	26	-	-
S-13	27' RT	25+09	4.5-5.0	A-2-6(0)	26	11	69.1	9.5	3.3	18.1	87	42	19	-	-
S-14	27' RT	25+09	5.0-5.5	A-2-7(-5)	62	35	51.0	5.8	0.9	42.3	75	45	33	-	-



75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

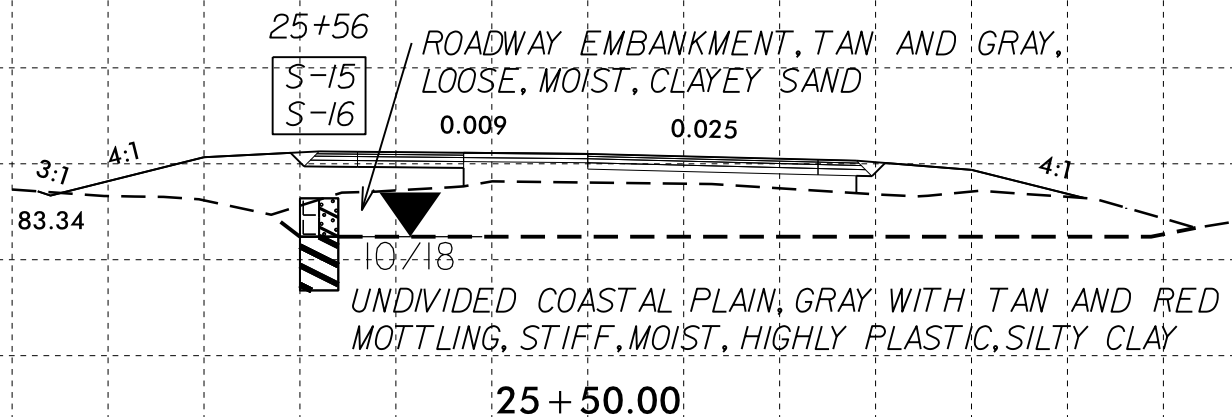
SOIL TEST RESULTS

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-7	15' LT	26+00	0.5-1.0	A-2-4(0)	23	7	73.7	4.4	5.7	16.1	65	23	15	-	-
S-8	15' LT	26+00	1.5-2.0	A-2-6(0)	32	15	75.9	6.8	1.1	16.1	83	41	15	14.9	-
S-9	15' LT	26+00	2.2-2.5	A-7-5(57)	83	51	3.4	3.2	14.8	78.5	100	98	94	-	-
S-10	15' LT	26+00	4.5-5.0	A-7-5(36)	73	33	9.3	3.4	30.9	56.4	100	93	88	64.7	-



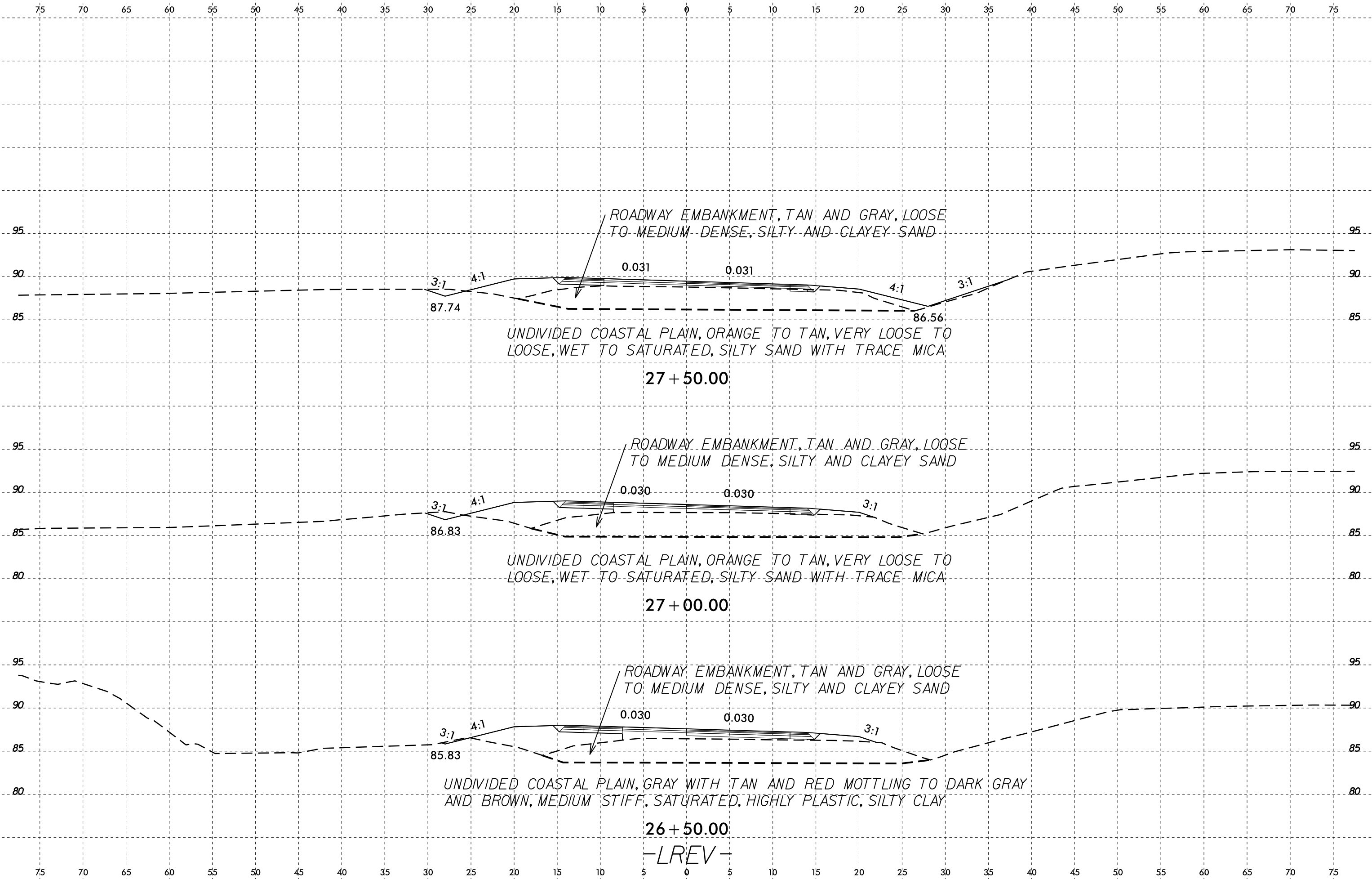
SOIL TEST RESULTS

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-15	14' LT	25+56	2.0-2.5	A-7-6(8)	52	27	45.8	7.5	14.5	32.3	96	68	46	-	-
S-16	14' LT	25+56	3.0-3.5	A-7-5(51)	91	55	15.9	3.4	18.1	62.5	100	88	81	-	-



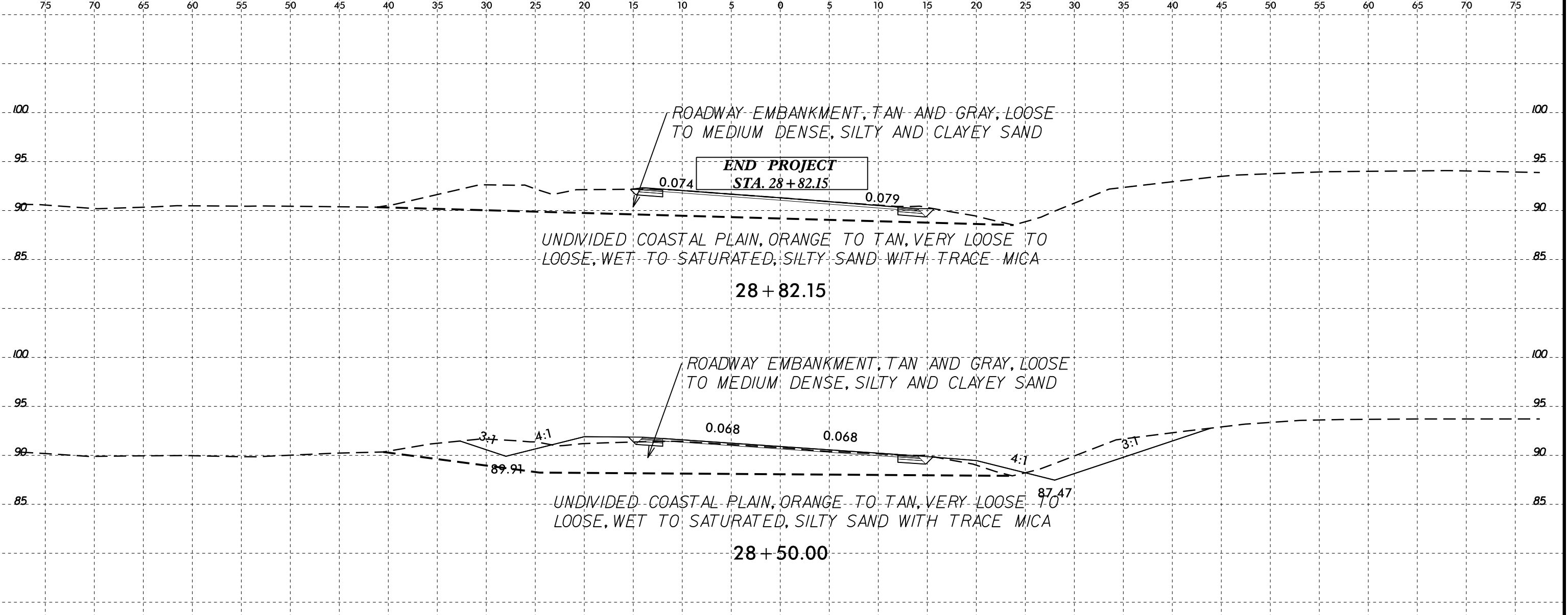
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 \$\$\$SUBPROGRAM\$\$\$



SOIL TEST RESULTS

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-11	30' RT	28+00	1.5-2.0	A-2-4(0)	NP	NP	75.5	11.5	0.9	12.1	97	7.1	13	-	-
S-12A	30' RT	28+00	4.0-4.5	A-2-4(0)	23	7	75.3	10.1	4.5	10.1	85	36	13	-	-

