

SEE SHEET 3 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.	B-4929	01	34

CONTENTS

LINE	STATION (+/-)	PLAN	PROFILE
-L1-	13+25 TO 16+00	04	10
-L2-	16+00 TO 59+06	04 TO 07	11 TO 12
-RA1-	10+00 TO 14+08	04	13
-RA2-	10+00 TO 14+08	07	14
-SL1-	10+00 TO 12+25	07	15
-SL2-	10+00 TO 13+09	07	16
-Y1-	10+62 TO 17+50	04	17
-Y1-	20+78 TO 21+63	08	17
-Y1-	31+95 TO 53+75	07 TO 09	18 TO 20
-Y1A-	12+90 TO 15+05	04	21
-Y2-	10+00 TO 12+35	04	22
-Y3-	10+00 TO 15+86	07	23
-Y4-	10+00 TO 14+35	07	24

**ROADWAY  
SUBSURFACE INVESTIGATION**

COUNTY PENDER  
PROJECT DESCRIPTION REPLACE BR NO 16 ON NC 50  
- 210 OVER THE INTRACOASTAL WATERWAY

**INVENTORY**

CAUTION NOTICE

THE SUBSURFACE INFORMATION AND THE SUBSURFACE INVESTIGATION ON WHICH IT IS BASED WERE MADE FOR THE PURPOSE OF STUDY, PLANNING AND DESIGN, AND NOT FOR CONSTRUCTION OR PAY PURPOSES. THE VARIOUS FIELD BORING LOGS, ROCK CORES AND SOIL TEST DATA AVAILABLE MAY BE REVIEWED OR INSPECTED IN RALEIGH BY CONTACTING THE N. C. DEPARTMENT OF TRANSPORTATION, GEOTECHNICAL ENGINEERING UNIT AT (919) 707-6850. 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.

CROSS SECTIONS

LINE	STATION	SHEETS
-Y1-	12+50 TO 16+00	25 TO 32
-Y4-	11+50, 14+00	33 TO 34

PERSONNEL

STEVEN HUDSON, LG

JACOB C. WESSELL, PE

SHAWN MCGUIRE

MICHAEL D. MASON

D. T. CHALMERS, CWC

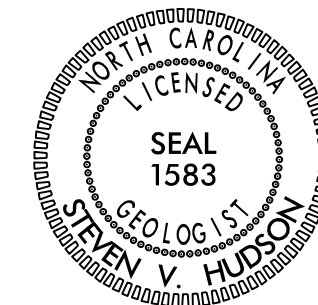
INVESTIGATED BY CATLIN

DRAWN BY STEVEN HUDSON, LG

CHECKED BY JACOB C. WESSELL, PE

SUBMITTED BY STEVEN HUDSON, LG

DATE AUGUST 2015



DocuSigned by:

Steven V. Hudson

8/28/2015

62EFD88181E445F

SIGNATURE

DATE

REFERENCE: B-4929

PROJECT: 40233

NOT CONSIDERED FINAL UNLESS ALL SIGNATURES ARE COMPLETED

SIGNATURE

DATE



31-JUL-2015 14:31 S:\wpmk\p\PROJECT\2015\215037 NCDOT-B-4929-SURF-CITY BRIDGE ROADWAY\B4929\B4929-CAD\GEO\RDY\GEO\_RDY\_IGND-TITLE.dgn  
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 09/08/99

**CONTRACT:** TIP PROJECT: B-4929

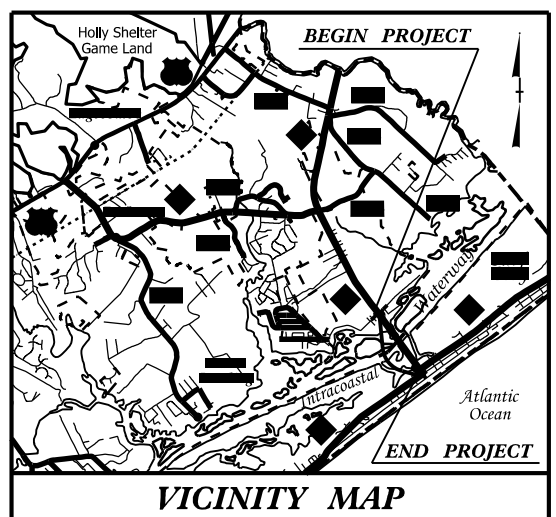
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**PENDER COUNTY**

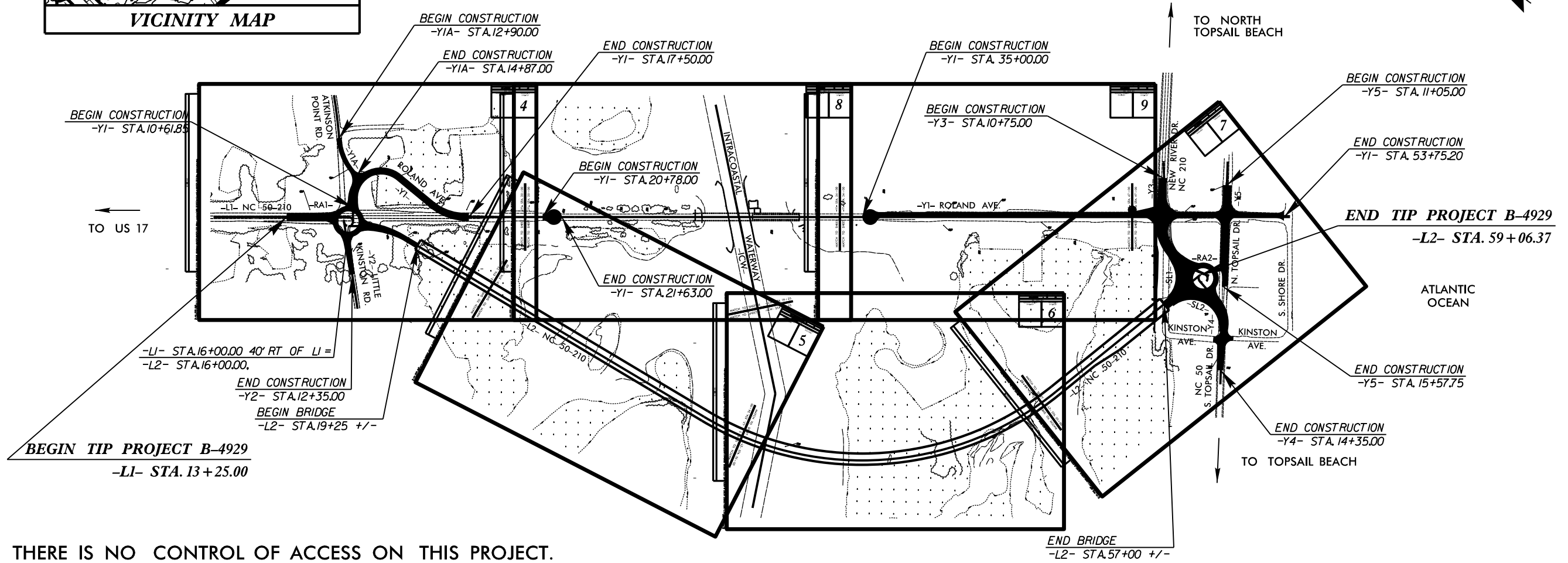
LOCATION: BRIDGE NO. 16 OVER THE INTRACOASTAL WATERWAY ON NC 50-210

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

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-4929	3	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
40233.1.1	BRSTP-0050(10)	PE	

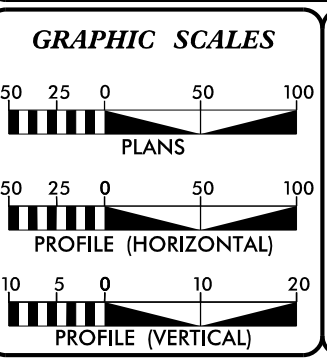


25% PRELIMINARY PLANS



THERE IS NO CONTROL OF ACCESS ON THIS PROJECT.  
 THIS PROJECT IS WITHIN THE MUNICIPAL ETJ BOUNDARIES OF SURF CITY.  
 CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD \_\_.

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



**DESIGN DATA**

ADT 2017 =	17,200
ADT 2035 =	30,000
K =	9 %
D =	55 %
T =	3 % *
V =	40 MPH
* TTST =	1% DUAL = 2%
FUNC CLASS =	MAJOR COLLECTOR STATEWIDE TIER

**PROJECT LENGTH**

LENGTH ROADWAY =	0.153 MILES
LENGTH STRUCTURE =	0.715 MILES
TOTAL LENGTH =	0.868 MILES

-L1- AND -L2- USED TO CALCULATE PROJECT LENGTH

PLANS PREPARED BY:

8601 SIX FORKS ROAD, SUITE 260  
RALEIGH, NC 27615  
919-926-4100

FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: AUGUST 2015

LETTING DATE: FEBRUARY 21, 2017

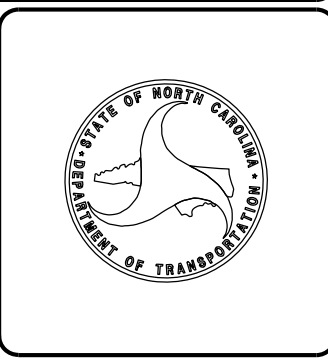
JENNIFER FARINO, PE PROJECT ENGINEER
SEAN KORTOVICH, EI PROJECT DESIGNER
TONY HOUSER, PE NCDOT CONTACT

**HYDRAULICS ENGINEER**

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

**ROADWAY DESIGN ENGINEER**

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



AUGUST 2015

WBS PROJECT: 40233.1.1  
TIP NUMBER: B-4929  
PROJECT ID: 24763  
COUNTY: PENDER

DESCRIPTION: Replace Br. No. 16 on NC 50-210 over the Intracoastal Waterway

SUBJECT: Geotechnical Inventory Report

**PROJECT DESCRIPTION**

The proposed project is located in Pender County in the central portion of Topsail Island and consists of replacing an existing swing span bridge over the Intracoastal Waterway on NC 50/210 (-Y1-) in Surf City.

A geotechnical investigation was conducted by CATLIN Engineers and Scientists (CATLIN) in March through June 2015. Standard penetration test borings were advanced under the direct supervision of a North Carolina Licensed Well Contractor with a Central Mine Equipment (CME) 550 drilling rig equipped with an automatic hammer. Standard penetration testing was conducted in general accordance with American Society for Testing and Materials (ASTM) D-1586-84, "Penetration Test and Split Barrel Sampling of Soils" or American Association of State Highway and Transportation Officials (AASHTO) Standard Method T206-81.

Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by CATLIN Geotechnical Laboratory located in Wilmington, North Carolina. Samples were prepared and analyzed in accordance with one or more of the following AASHTO Standards as modified by NCDOT:

- T 87-86 (Dry Preparation of Disturbed Soil)
- T 88-93 (Particle Size Analysis)
- T 89-94 (Liquid Limit)
- T 90-94 (Plastic Limit)
- T 265-93 (Soil Moisture Content)
- T 267 (Organic Content)

Proposed drilling locations as well as drilled locations were determined in the field by CATLIN personnel using a survey grade Global Positioning System (GPS) capable of vertical and horizontal accuracy of less than 0.01 feet or a mapping grade GPS capable of horizontal accuracies of less than three feet. All horizontal locations were recorded to the nearest foot and are presented in the North Carolina State Plane (NCSP), North American Datum 1983

(NAD 83) system. Vertical control was measured to the nearest 0.01 foot and referenced to the National Geodetic Vertical Datum 1988. All measurements were recorded and reported in United States Survey Feet.

The following alignments were investigated. Plan sheets, subsurface profiles, and selected cross sections of the alignment are included in this report.

<u>Line</u>	<u>Station (±)</u>
-L1-	13+25 to 16+00
-L2-	16+00 to 59+06
-RA1-	10+00 to 14+08
-RA2-	10+00 to 14+08
-SL1-	10+00 to 12+25
-SL2-	10+00 to 13+09
-Y1-	10+62 to 17+50
-Y1-	20+78 to 21+63
-Y1-	31+95 to 53+75
-Y1A-	12+90 to 15+05
-Y2-	10+00 to 12+35
-Y3-	10+00 to 15+86
-Y4-	10+00 to 14+35

The project reportedly will consist of 0.868 miles of roadway and bridge.

**AREAS OF SPECIAL GEOTECHNICAL INTEREST**

- 1) **GROUNDWATER:** As approximately one half of this project is located within a barrier island environment with relatively low topography, seasonal high groundwater, or the potential for groundwater related construction problems may exist. Although specific instances of such conditions were not identified during this investigation, it should be noted that the investigation was conducted during seasonal low groundwater conditions.

Standing water with depths of up to two feet was noted along the following section:

<u>Line</u>	<u>Station (±)</u>
-Y1-	13+20 to 15+85

The standing water appears to be either an ephemeral pond or the result of surficial drainage into the low lying, poorly draining organic soils and may be tidally influenced.

- 2) **COHESIVE SOILS:** Clay soils which may have the potential to cause embankment/subgrade and or slope stability problems during construction was encountered within portions of this project at the following sections:

<u>Line</u>	<u>Station (±)</u>
-L1-	12+25 to 15+38
-L2-	16+62 to 19+27
-RA1-	10+00 to 14+08
-Y1-	10+62 to 13+80
-Y1A-	12+90 to 14+87
-Y2-	10+62 to 12+35

- 3) **ORGANIC SOILS:** Organic material (root mat and organic topsoil) that may cause construction related issues was identified at the following sections on the project:

<u>Line</u>	<u>Station (±)</u>
-Y1-	12+22 to 16+18
-Y1-	33+65 to 38+60
-Y1-	47+57 to 49+40
-Y3-	11+63 to 13+68

Material within the identified organic soil area consisted of approximately three feet (land surface to elevation of approximately zero feet) of root mat and organic debris (muck with reported organic content ranging from 20.0% to 49.9%) underlain by silty sand with trace to moderate organic content (organic granular with reported organic contents ranging from 2.8% to 9.9%) to a depth of approximately six feet below land surface (approximate elevation of -8 feet). The organic material appears to have accumulated in a relic low feature as the organics are thickest in the central portion of the area and “pinch out” at the surface near the estimated areal extent.

- 4) **WATER WELLS:** No water wells were identified within the proposed construction limits. Potable water is supplied to residences in the vicinity by a public water supply.

Water supply wells may be present along the project corridors that were not detected.

## **PHYSIOGRAPHY AND GEOLOGY**

The project is located within the eastern most portion of the North Carolina Coastal Plain physiographic province. Geology in the vicinity of Surf City is dominated by Undivided Coastal Plain (U.C.P.) materials which are noted as Quaternary Surficial Deposits on the Geologic Map of North Carolina. Coastal Plain materials are described as sand, clay, gravel, and peat deposits which were deposited in marine, fluvial, eolian, and lacustrine environments. Sediments of the River Bend, Castle Hayne, and Peedee Formations are reported to underlay the U.C.P. deposits in the vicinity of Surf City.

Land use in the area is primarily residential, commercial, and recreational. The land surface in the project vicinity is dominated by flat to gently rolling terrain typical of coastal environments with land surface elevations ranging from approximately one foot along the Intracoastal Waterway to approximately 14 feet along the existing bridge embankments. According to available data, The Intracoastal Waterway and surrounding waters in the area are tidally influenced with tidal fluctuations of approximately four feet between low and high tides. As the project is located in a Barrier Island environment, no discernible flood plain was noted. Highway NC 50/210 is oriented approximately south southeast with existing bridge embankments at roughly 2 to 10 feet above surrounding existing grade. Numerous underground and overhead utilities exist in the vicinity of the proposed project. The project is primarily drained by surficial runoff which drains into the Intracoastal Waterway.

## **GROUNDWATER**

Groundwater data was collected from open boreholes, where possible, during the field investigation conducted during March and April 2015. According to available data, rainfall in Holly Ridge, North Carolina, located approximately five miles west of the project, was reported as follows:

<u>MONTH</u> <u>(2015)</u>	<u>RECORDED RAINFALL</u> <u>(inches)</u>	<u>AVERAGE RAINFALL</u> <u>(inches)</u>
February	4.87	3.42
March	2.98	4.04
April	2.41	2.98

Measured groundwater elevations (24 hour measurements) ranged from elevation -0.4 feet to 3.6 feet with an average elevation of 1.3 feet. Depth to groundwater measurements ranged from 2.6 feet to 6.8 feet (below existing land surface), with an average depth to water of 4.2 feet. Formational material in which groundwater was typically observed was found to be predominantly sandy material with an assumed moderate to high permeability.

### SOIL PROPERTIES

Soils encountered at the project site include roadway embankment, artificial fill, alluvial, and undifferentiated coastal plain sediments.

Roadway Embankment soils were identified beneath and adjacent to existing roadways and consists of loose to medium dense, sand and silty sand (A-3 and A-2-4). Field observations indicate that a large portion of the roadway embankment was constructed with material obtained on site or from the immediate vicinity and therefore is difficult to discern from in situ U.C.P. materials.

Artificial fill consisting of loose to medium dense sand and silty sand was encountered adjacent to wooded areas and low lying areas next to roadway embankments. Artificial fill consisting of moderately organic fine sand was encountered along -Y1- from Station 12+22 to 13+00 from land surface to a depth of approximately one foot. As with the embankment material, the artificial fill appears to have been obtained on site or locally and is hard to discern from in situ material except in areas where the fill is in contact with organic soils.

The predominant alluvial material identified along the project consists of organic materials that appear to have been deposited upon a relic flood plain. These materials occur within the thickly wooded area along -Y1- from approximate stations 12+50 to 16+00. All of the wooded area in the vicinity was found to contain a minimum of 0.3 feet to one foot and up to approximately three feet of muck (root mat and organic topsoil previously discussed in the Organic Soils Section). Organic granular material was encountered beneath the muck at an approximate average elevation of zero feet along -Y1- from approximate station 12+50 to roughly 17+00. This same organic stratigraphy was identified on the eastern side of the Intracoastal Waterway to approximate -Y1- station 38+00. However, the only construction related activities proposed in this area are associated with removal of the existing bridge embankment.

Undivided coastal plain material is between and beneath the roadway embankment and alluvial material. The dominant material is brown to gray, very loose to loose, fine to coarse sand and silty sand (A-3 and A-2-4) with trace to some shell fragments and well-rounded rock fragments. A thin layer (0.5 to two feet) of very soft to medium stiff, clay and clayey to sandy silt (A-7-6, A-6, and A-4) was identified in some areas along -L1-, -L2-, -RA1-, -Y1-, -Y1A-, and -Y2- at an average elevation of approximately -4 feet. Laboratory analysis of three samples collected within the silt and clay material reported liquid limits ranging from 30 to 48 (38 average) and plasticity indices ranging from 10 to 29 (20 average).

Prepared by,  
DocuSigned by:

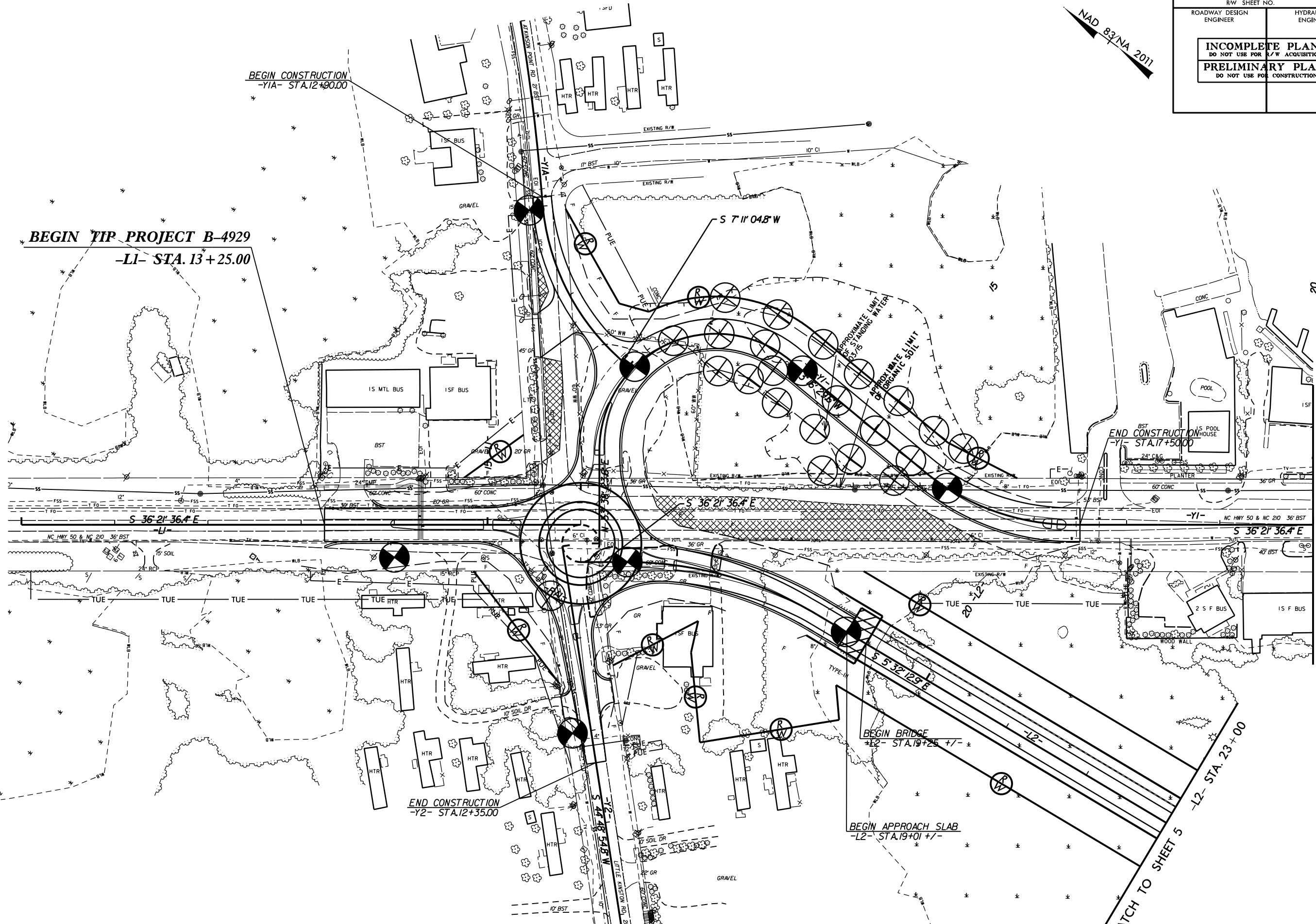
*Steven V. Hudson*

62EFD881816445E  
Steven V. Hudson, L.G.  
Project Geologist



PROJECT REFERENCE NO.	SHEET NO.
B-4929	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	

NAD 83/NA 2011



REVISIONS

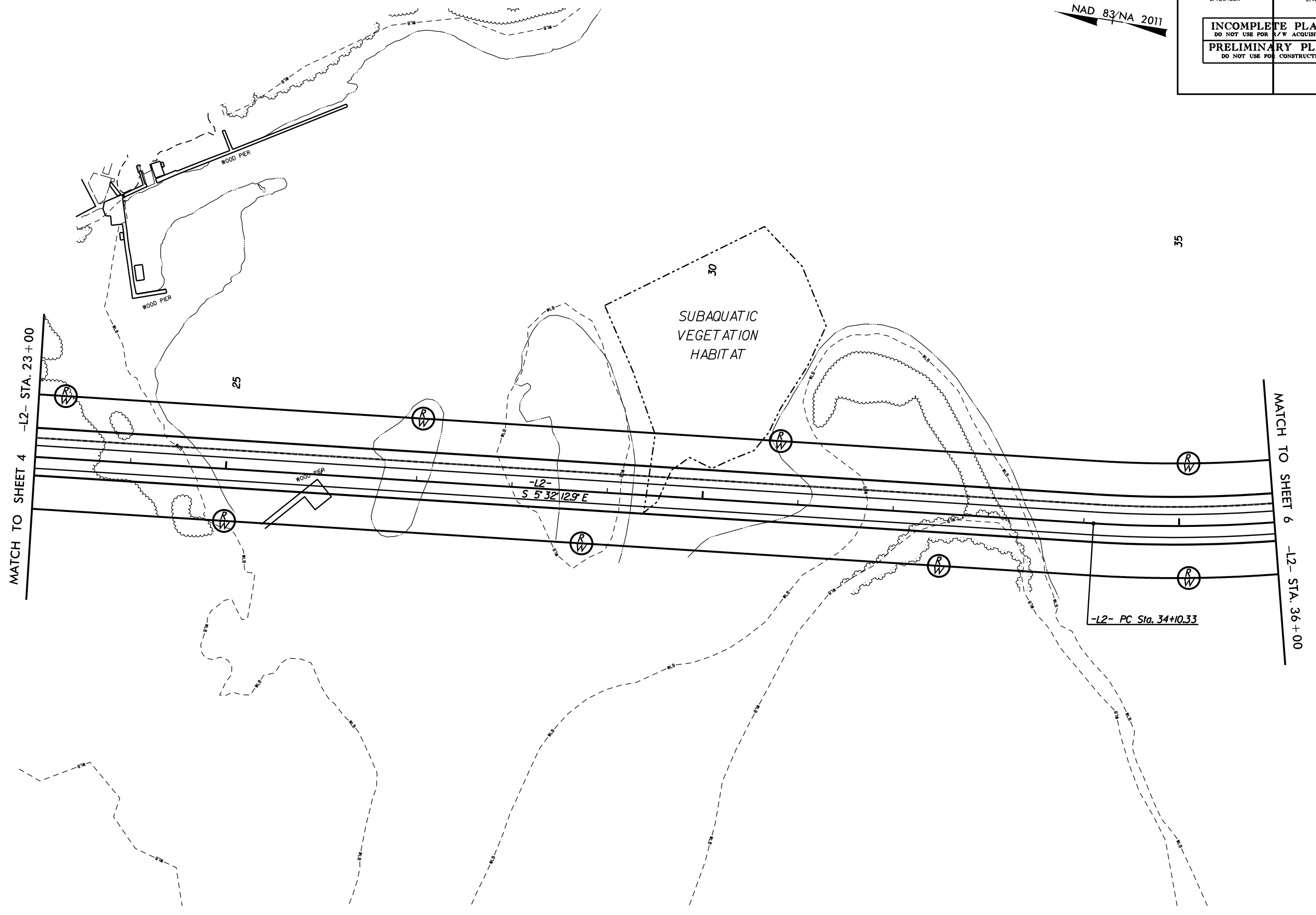
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MATCH TO SHEET 8 -Y1- STA. 20+00

MATCH TO SHEET 5 -L2- STA. 23+00

PROJECT REFERENCE NO.	SHEET NO.
B-4929	5
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	

NAD 83/NA 2011



MATCH TO SHEET 4 -L2- STA. 23+00

MATCH TO SHEET 6 -L2- STA. 36+00

-L2- PC Sta. 34+10.33

SUBAQUATIC VEGETATION HABITAT

25

30

35



REVISIONS  
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PROJECT REFERENCE NO.	SHEET NO.
B-4929	6
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	

NAD 83/NA 2011

**-L2- CURVE DATA**  
 PI Sta 43+66.28  
 $\Delta = 69^\circ 48' 47''$  (LT)  
 $D = 4^\circ 10' 55.8''$   
 $L = 1,669.30'$   
 $T = 955.96'$   
 $R = 1,370.00'$   
 $V = 40$  MPH  
 $SE = 03$   
 $RO = \text{SEE PLANS}$

MATCH TO SHEET 8 -ICW- STA. 19+25

MATCH TO SHEET 5 -L2- STA. 36+00

MATCH TO SHEET 7 -L2- STA. 50+00

S 64° 54' 03.9" W  
 -ICW-  
 EXIST. 90' CHANNEL

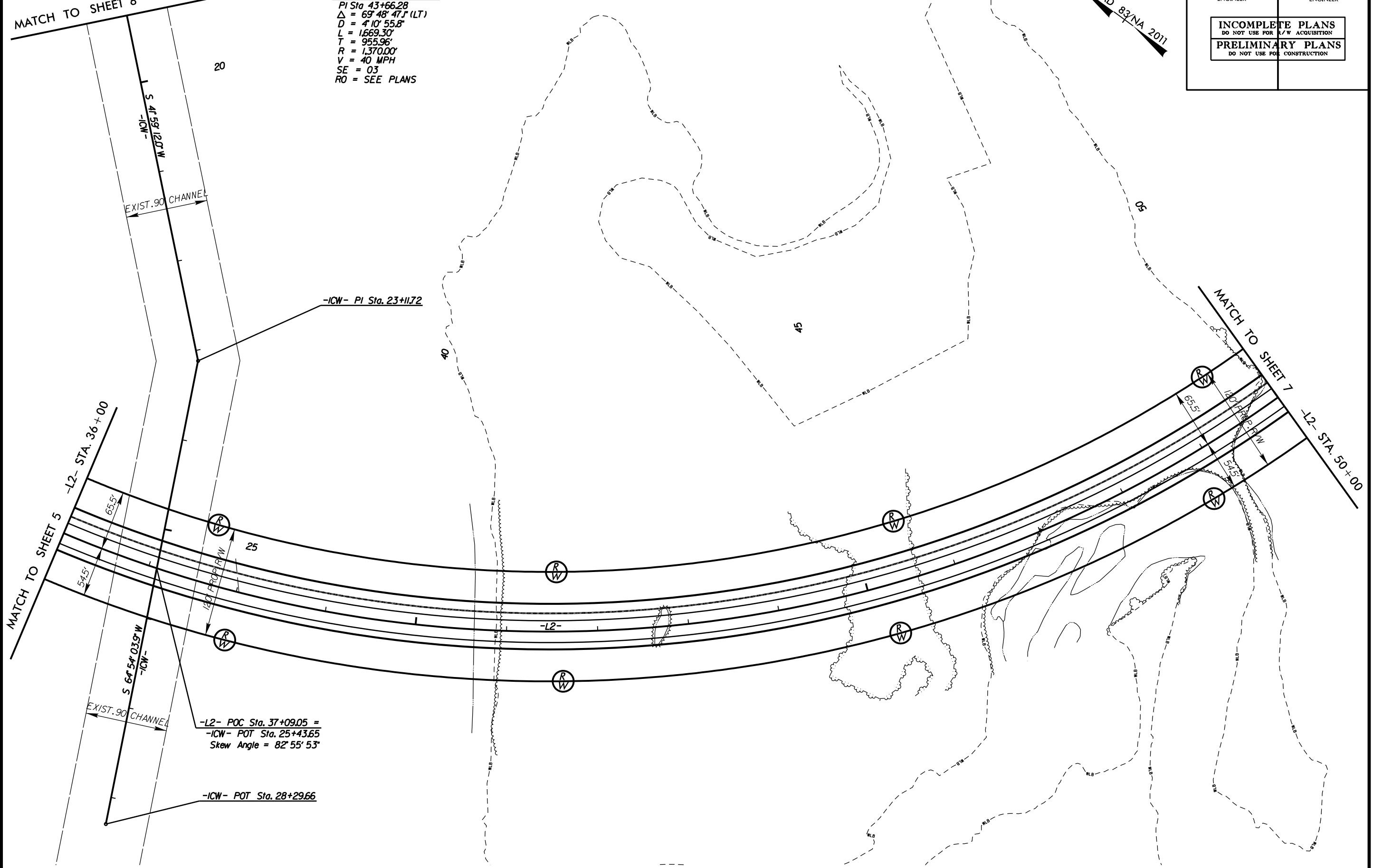
S 41° 59' 12.0" W  
 -ICW-  
 EXIST. 90' CHANNEL

-L2- POC Sta. 37+09.05 =  
 -ICW- POT Sta. 25+43.65  
 Skew Angle = 82° 55' 53"

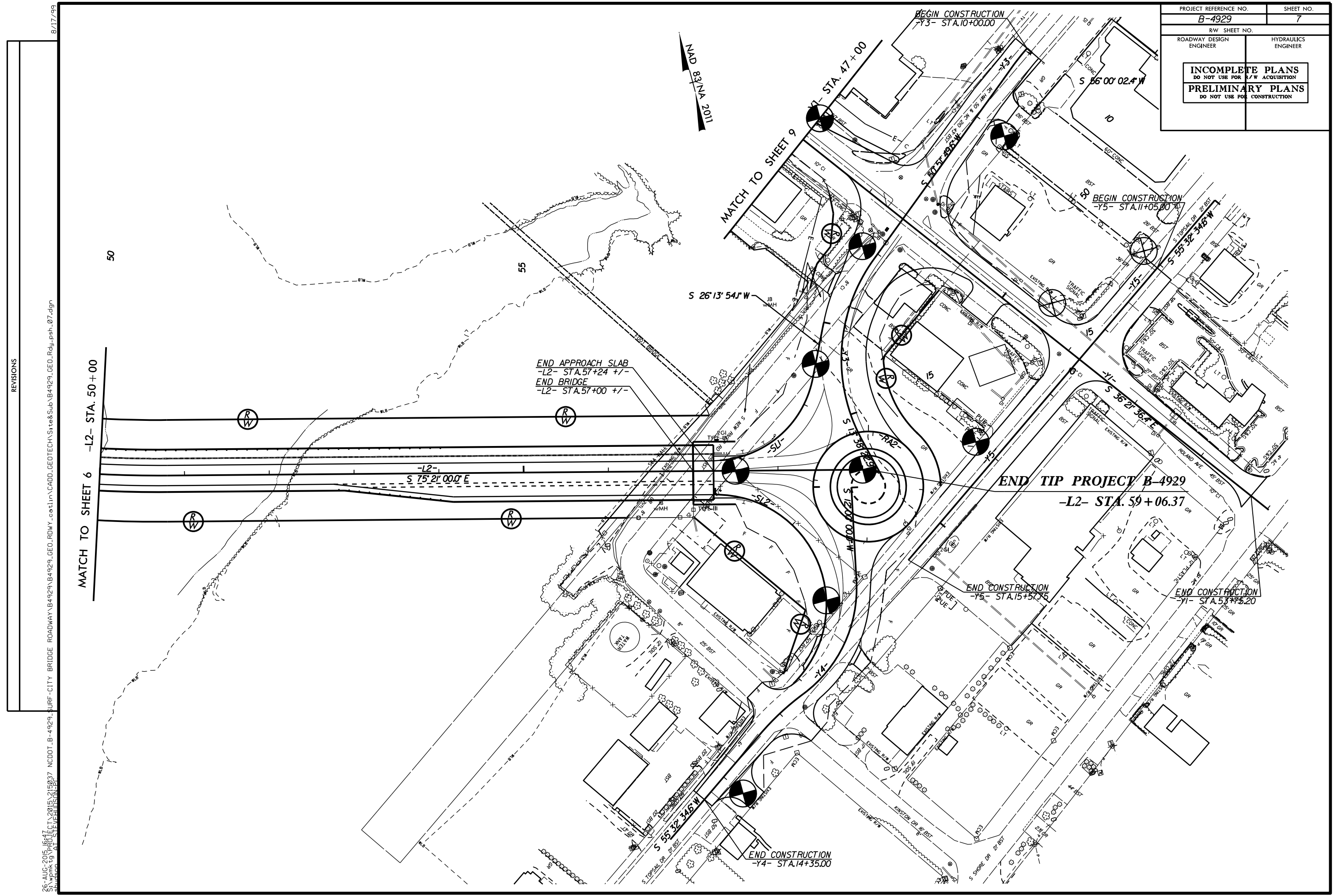
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 8/17/99

REVISIONS



PROJECT REFERENCE NO. <b>B-4929</b>	SHEET NO. <b>7</b>
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	



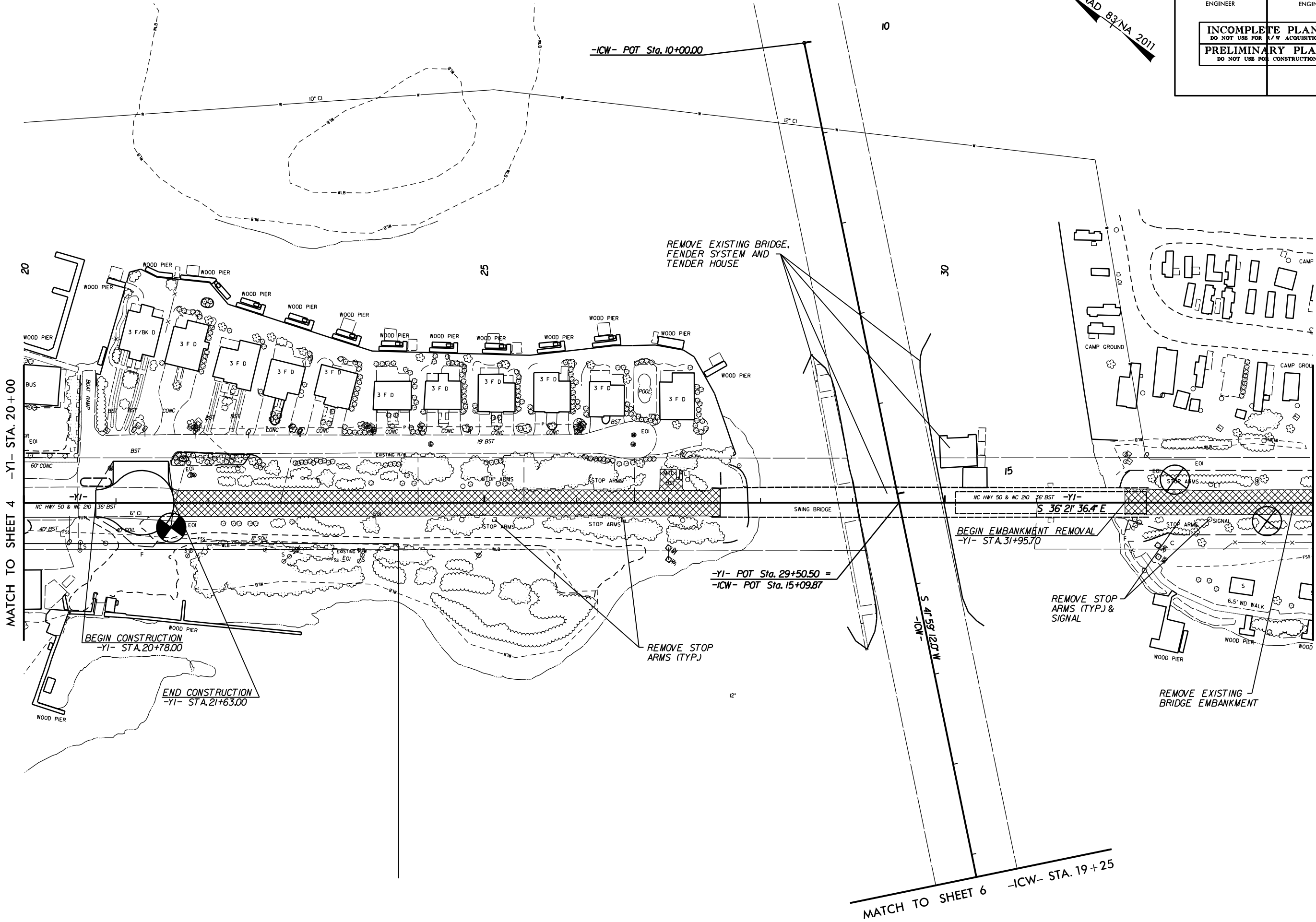
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PROJECT REFERENCE NO. <b>B-4929</b>	SHEET NO. <b>8</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

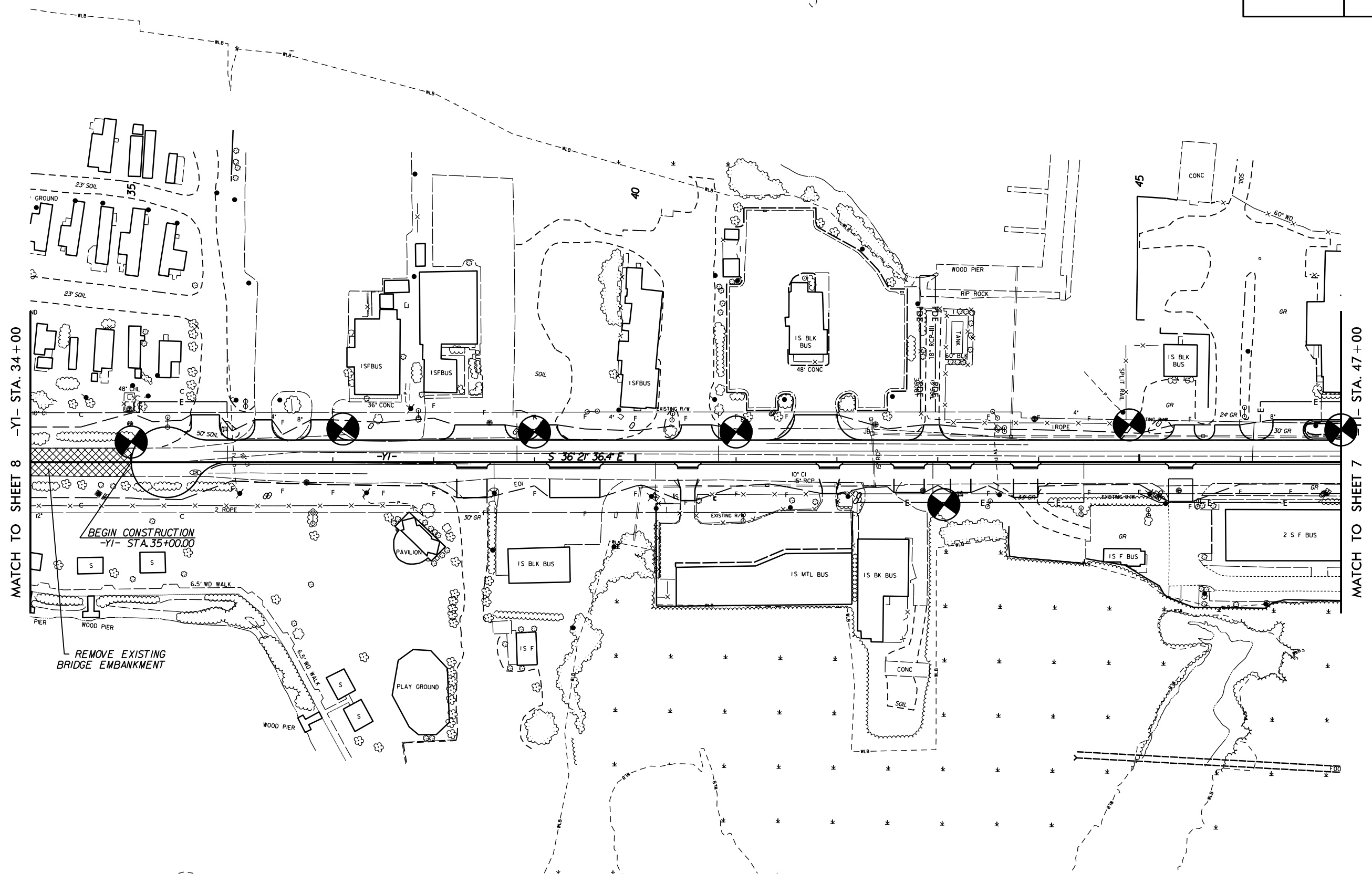
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 REVISIONS



PROJECT REFERENCE NO. <b>B-4929</b>	SHEET NO. <b>9</b>
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	

NAD 83/NA 2011



MATCH TO SHEET 8 -Y1- STA. 34+00

MATCH TO SHEET 7 - STA. 47+00

BEGIN CONSTRUCTION  
-Y1- STA. 35+00.00

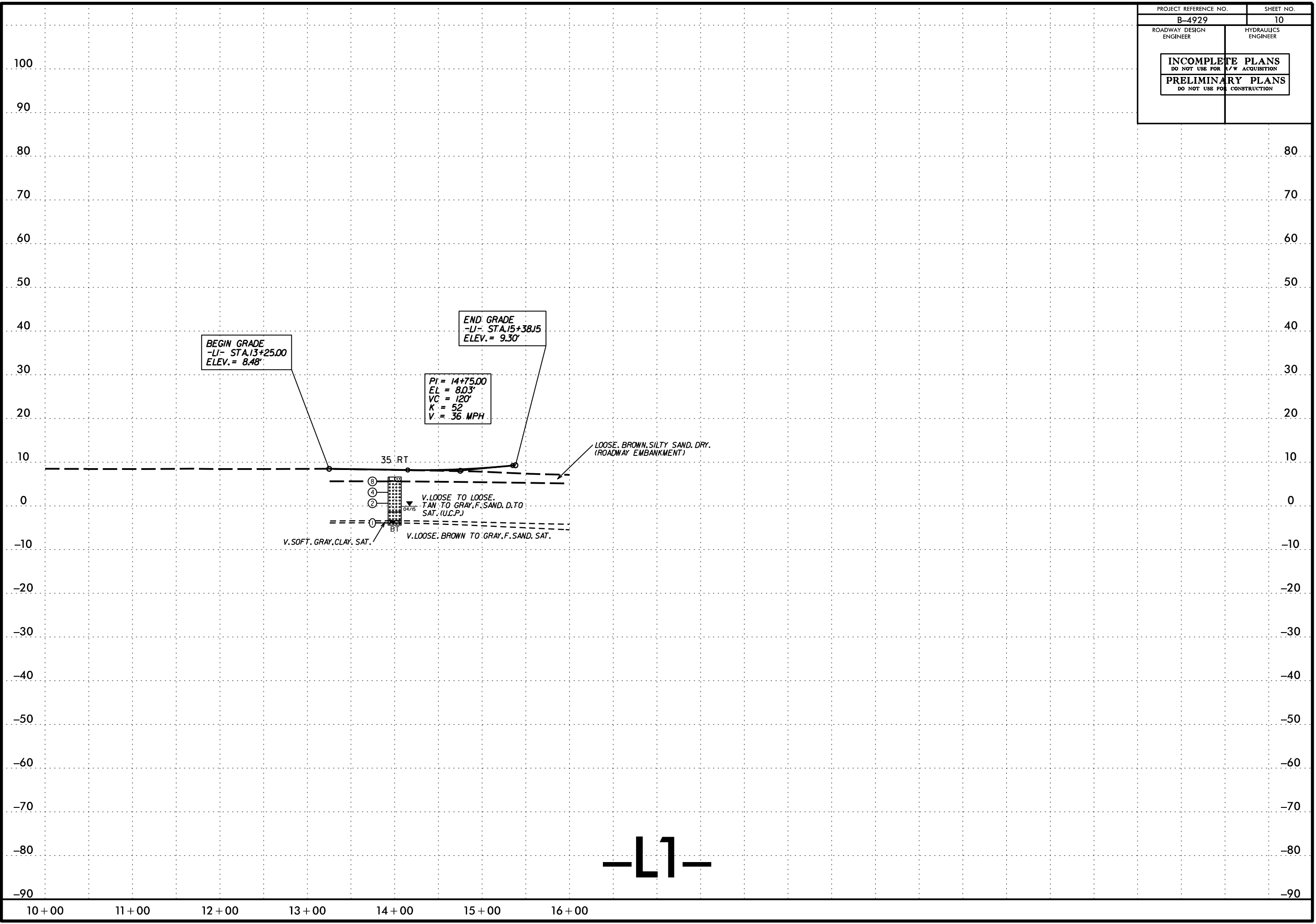
REMOVE EXISTING  
BRIDGE EMBANKMENT

REVISIONS

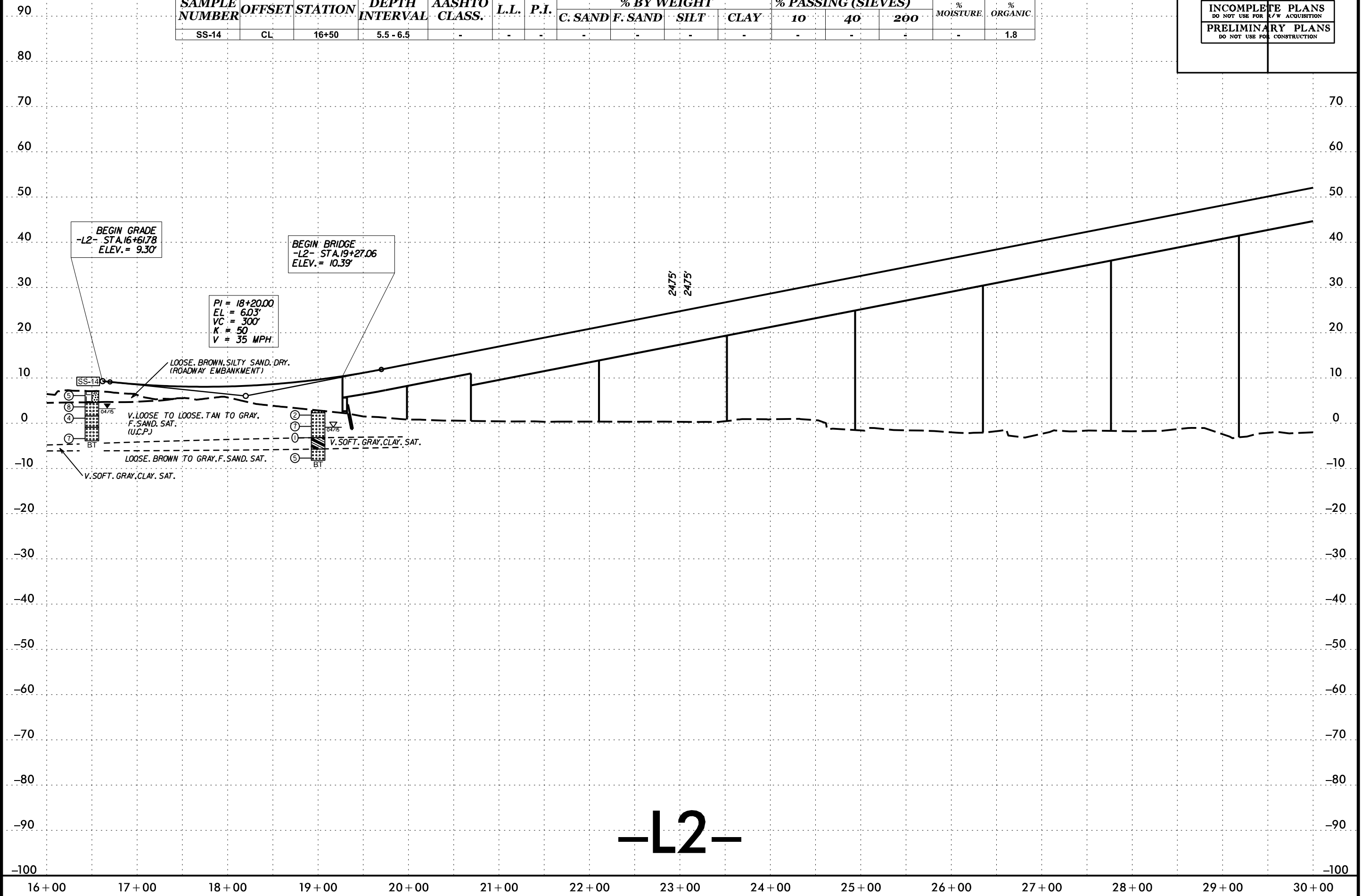
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PROJECT REFERENCE NO.	SHEET NO.
B-4929	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

5/14/99  
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 10:11:51 AM  
 AT: STEPHENSON



SOIL TEST RESULTS															
SAMPLE NUMBER	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-14	CL	16+50	5.5 - 6.5	-	-	-	-	-	-	-	-	-	-	-	1.8

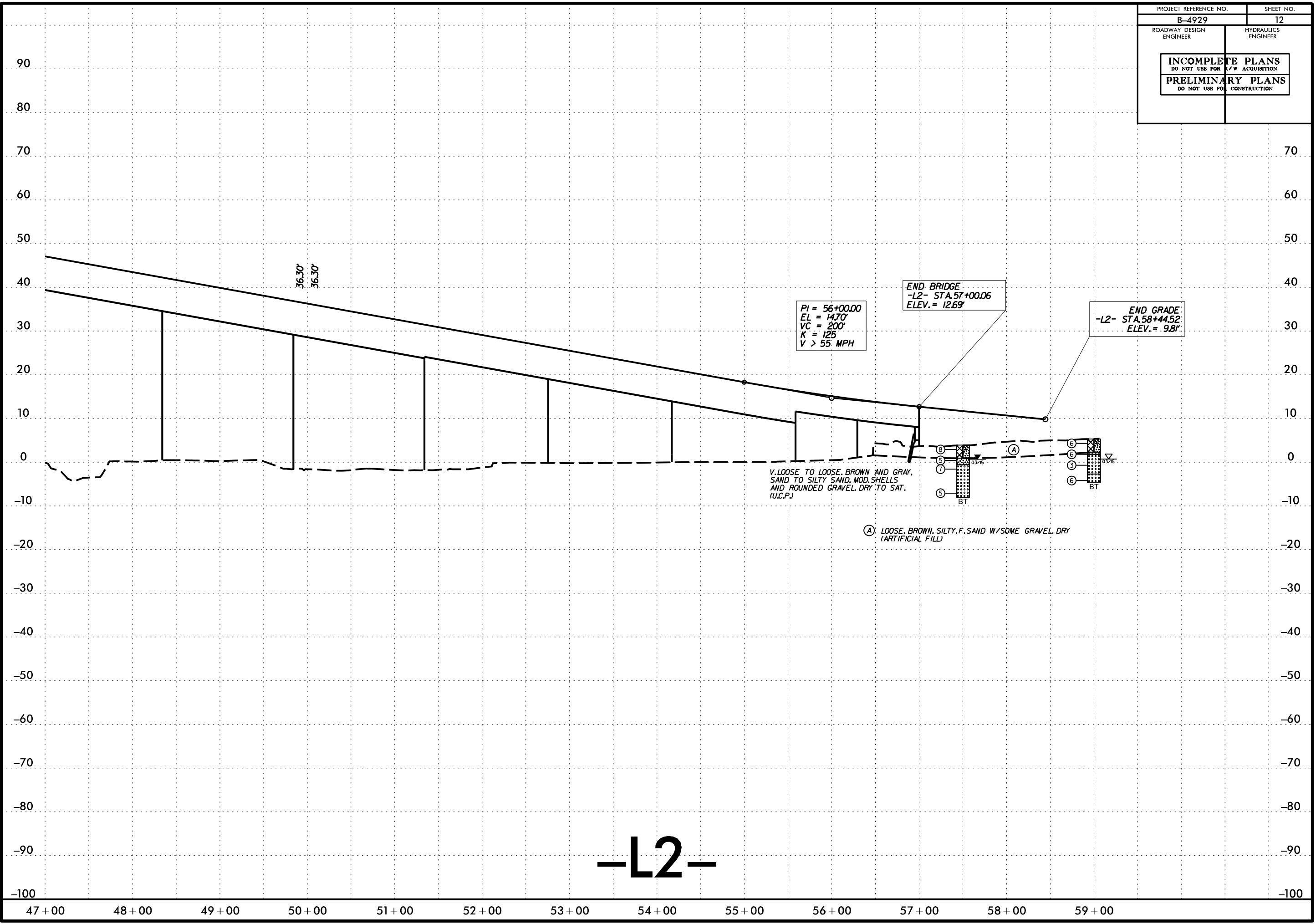


-L2-

5/14/99  
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 AT: STEPHENSON.PT

PROJECT REFERENCE NO.	SHEET NO.
B-4929	12
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	

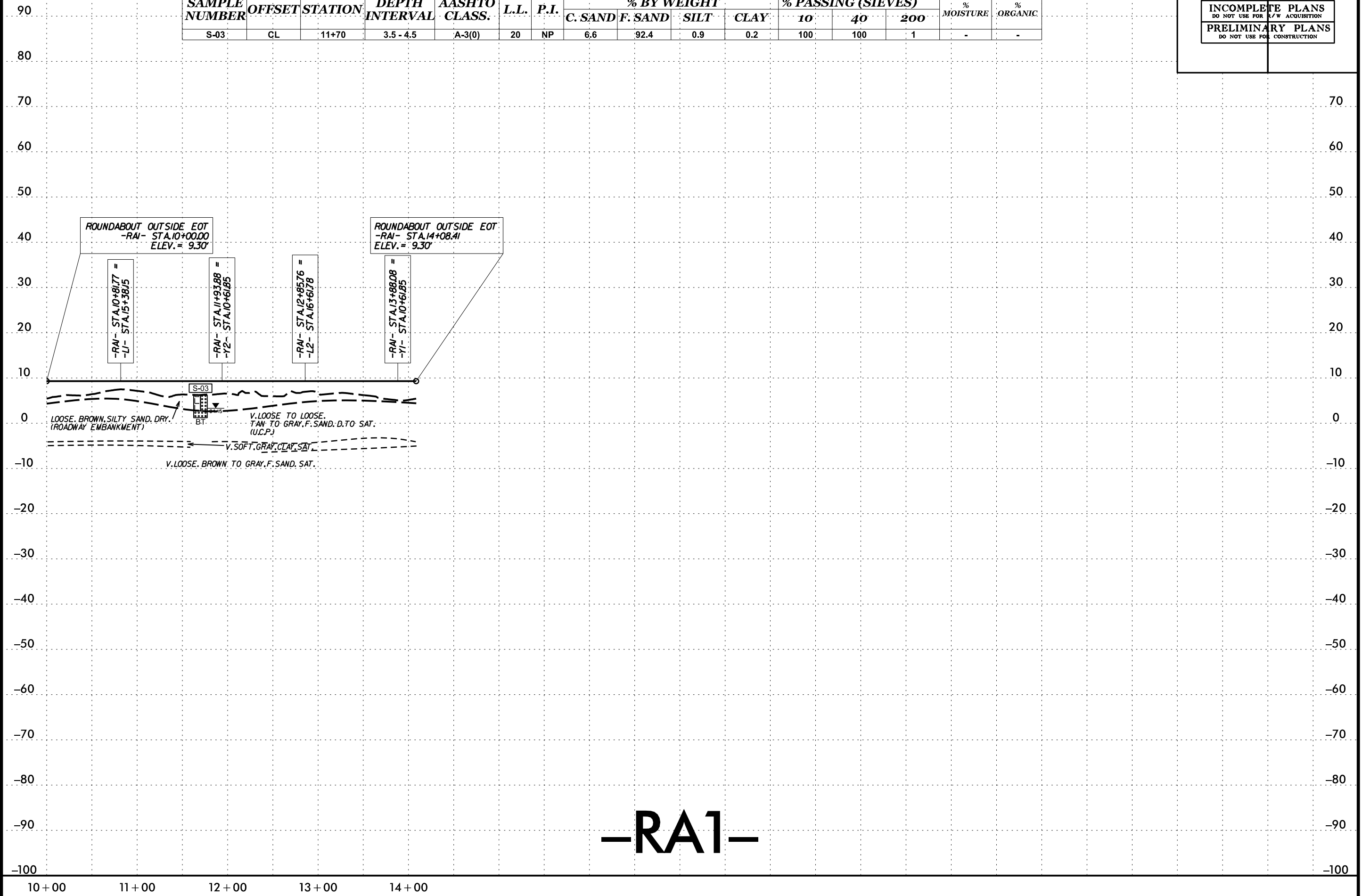
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-L2-

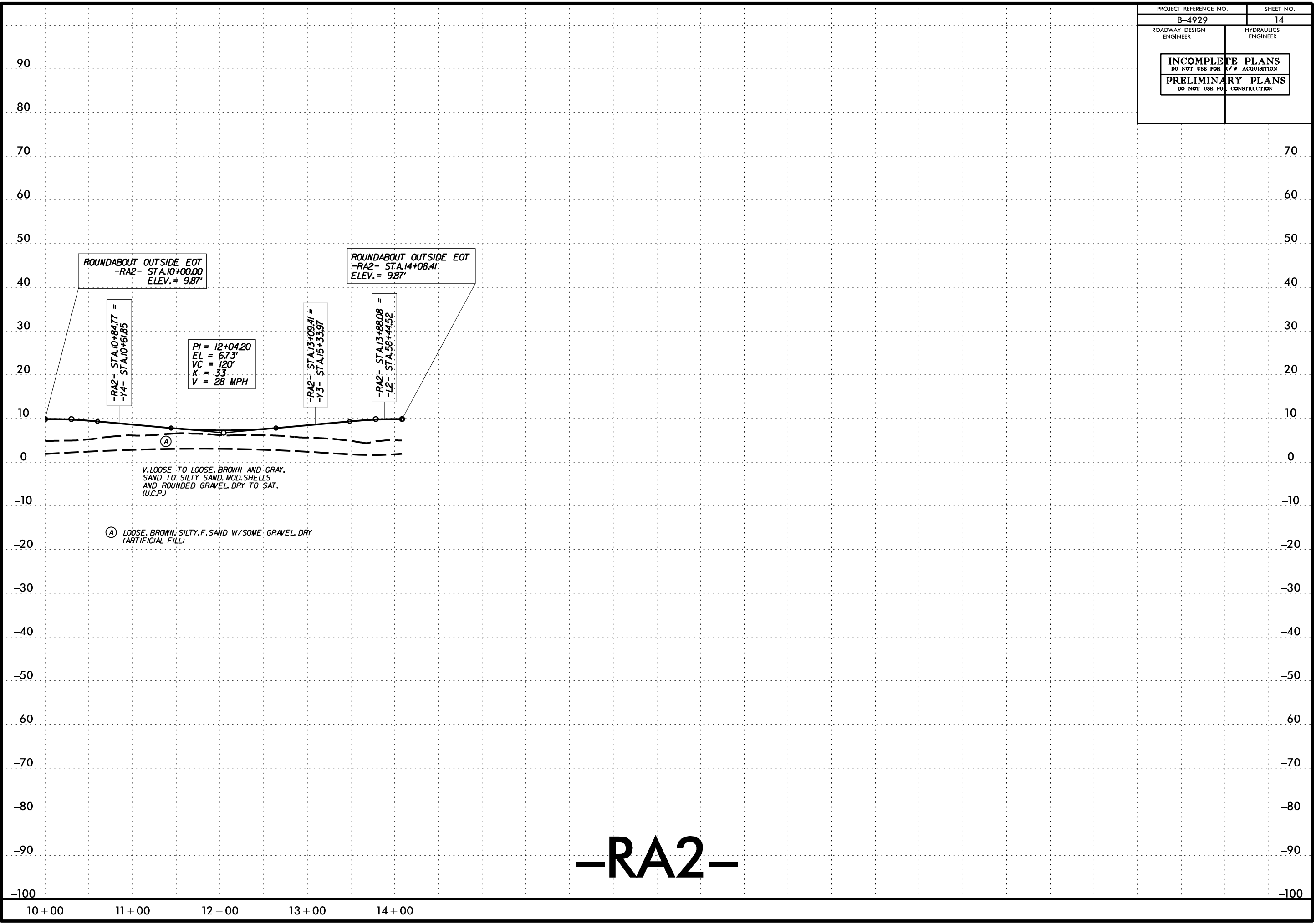


<b>SOIL TEST RESULTS</b>															
SAMPLE NUMBER	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-03	CL	11+70	3.5 - 4.5	A-3(0)	20	NP	6.6	92.4	0.9	0.2	100	100	1	-	-



5/14/99  
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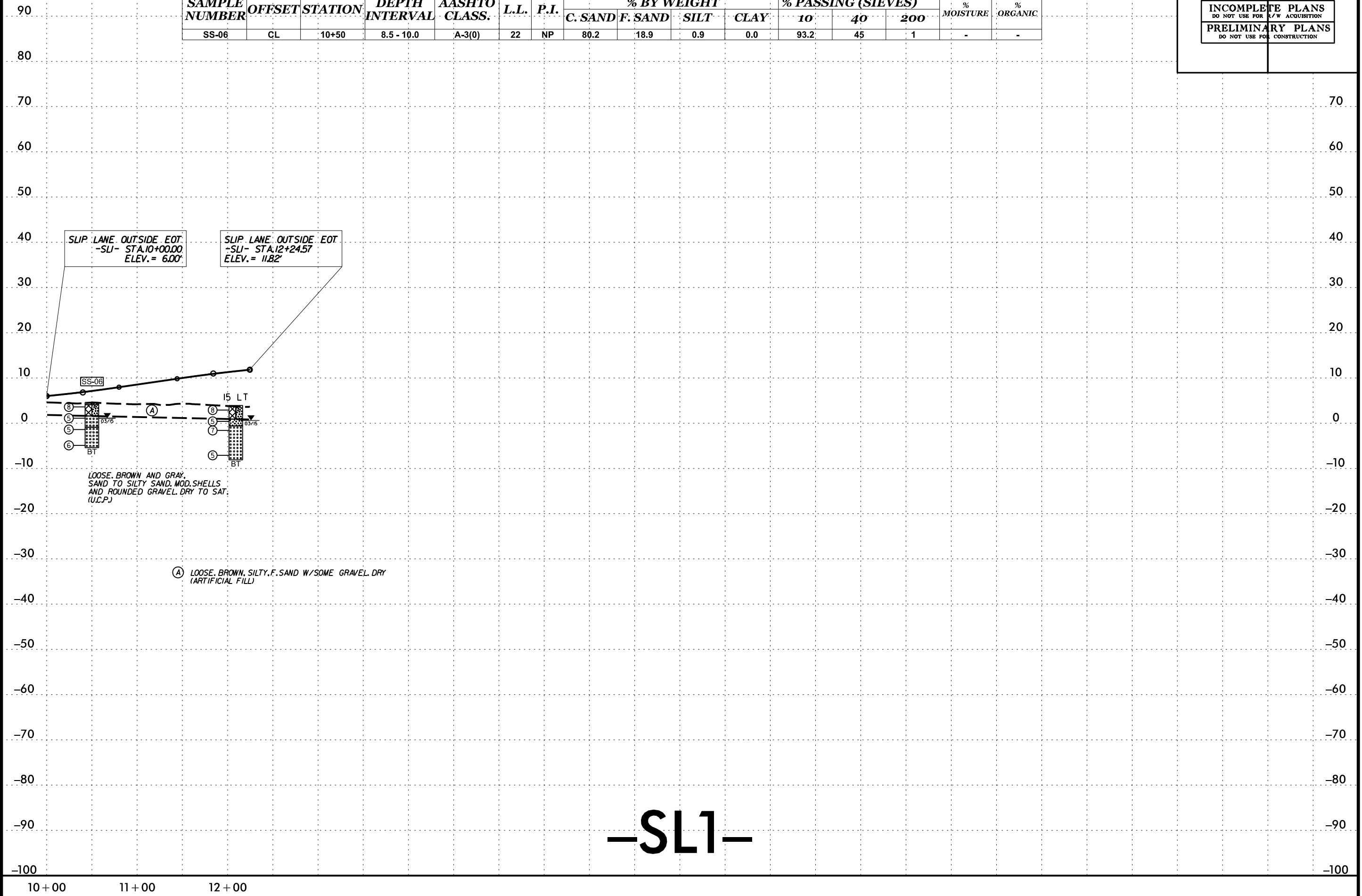
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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



**-RA2-**

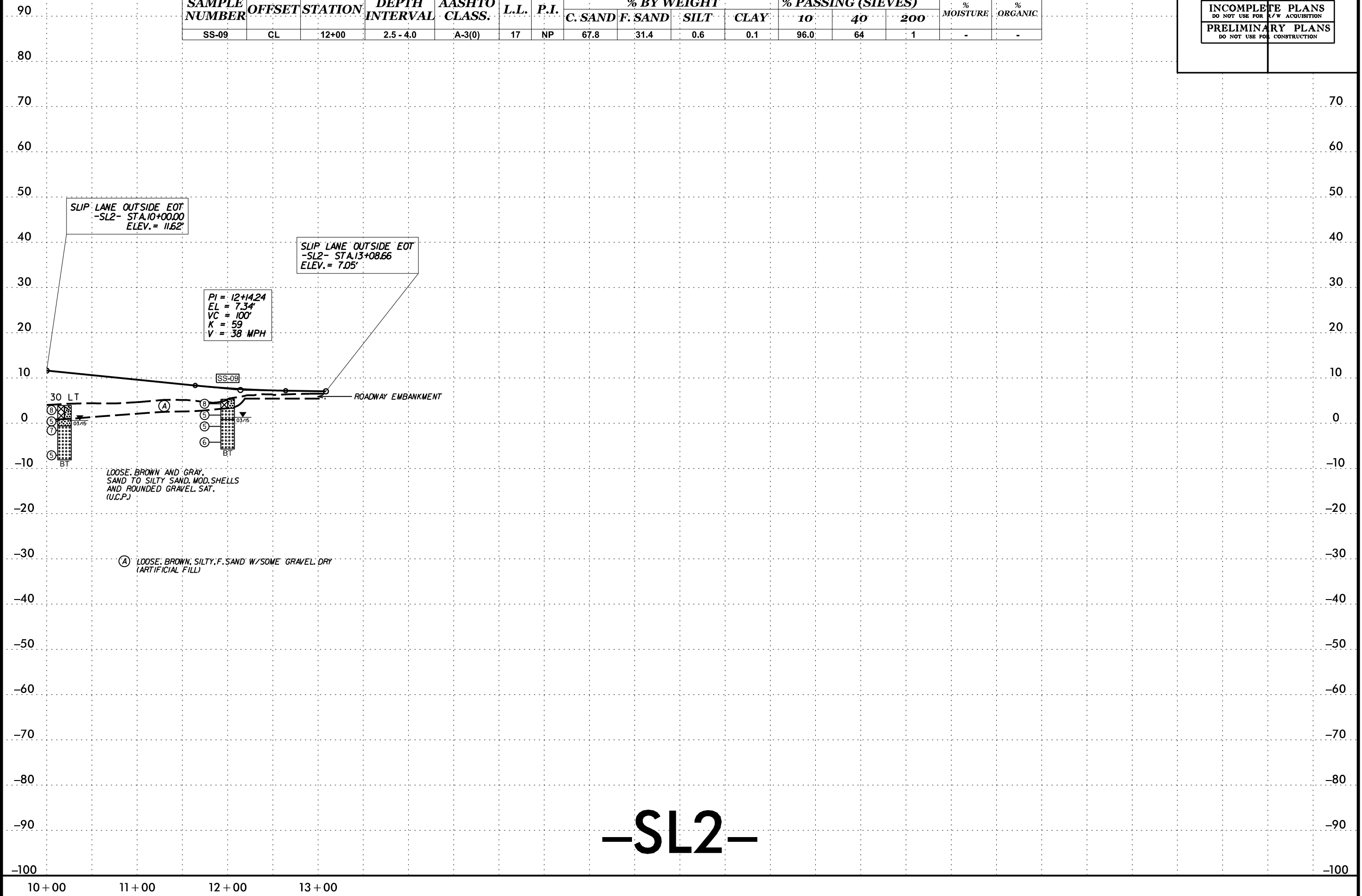
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 5/14/99

<b>SOIL TEST RESULTS</b>															
SAMPLE NUMBER	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-06	CL	10+50	8.5 - 10.0	A-3(0)	22	NP	80.2	18.9	0.9	0.0	93.2	45	1	-	-



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<b>SOIL TEST RESULTS</b>															
SAMPLE NUMBER	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-09	CL	12+00	2.5 - 4.0	A-3(0)	17	NP	67.8	31.4	0.6	0.1	96.0	64	1	-	-



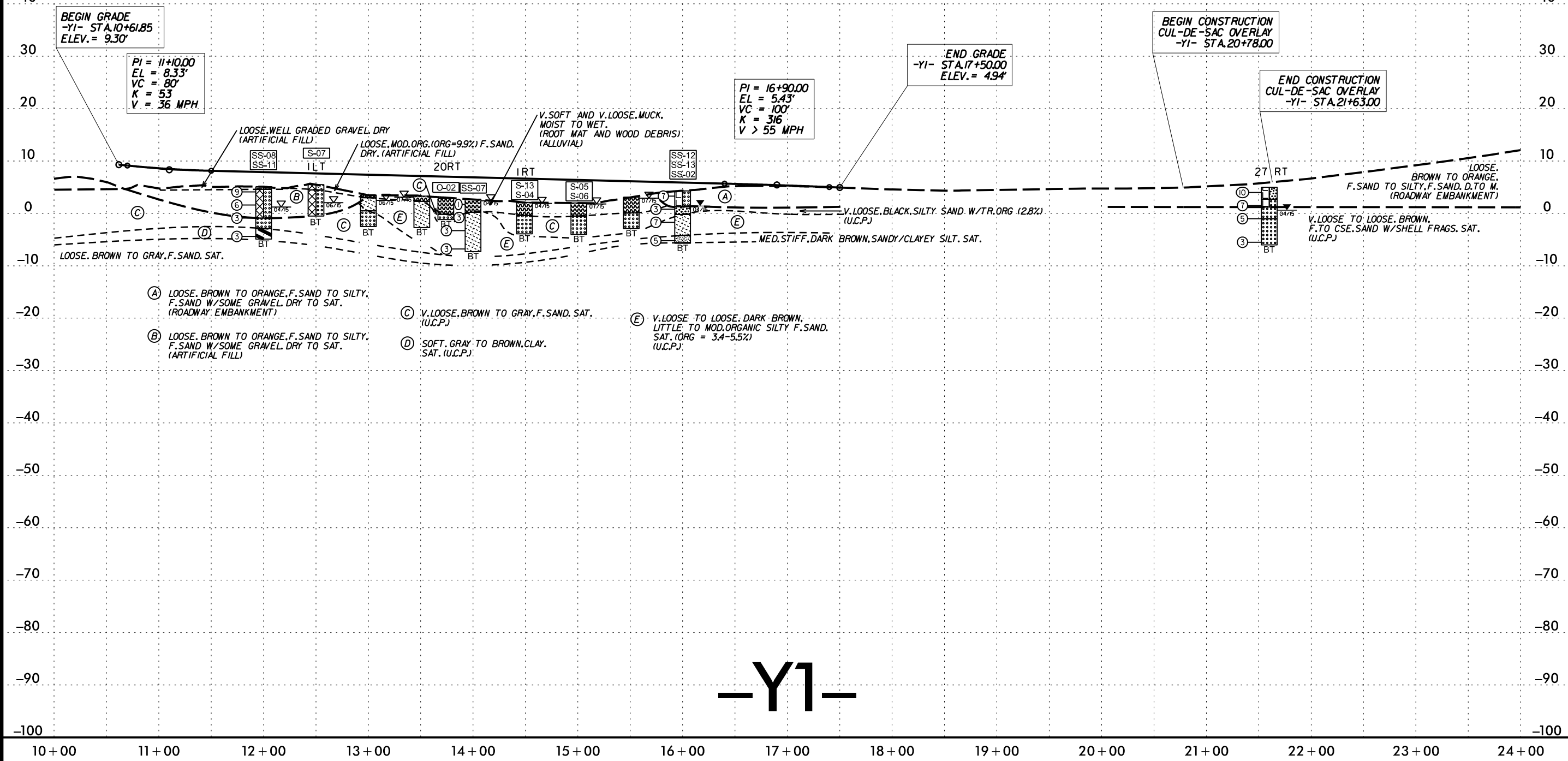
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-SL2-

### SOIL TEST RESULTS

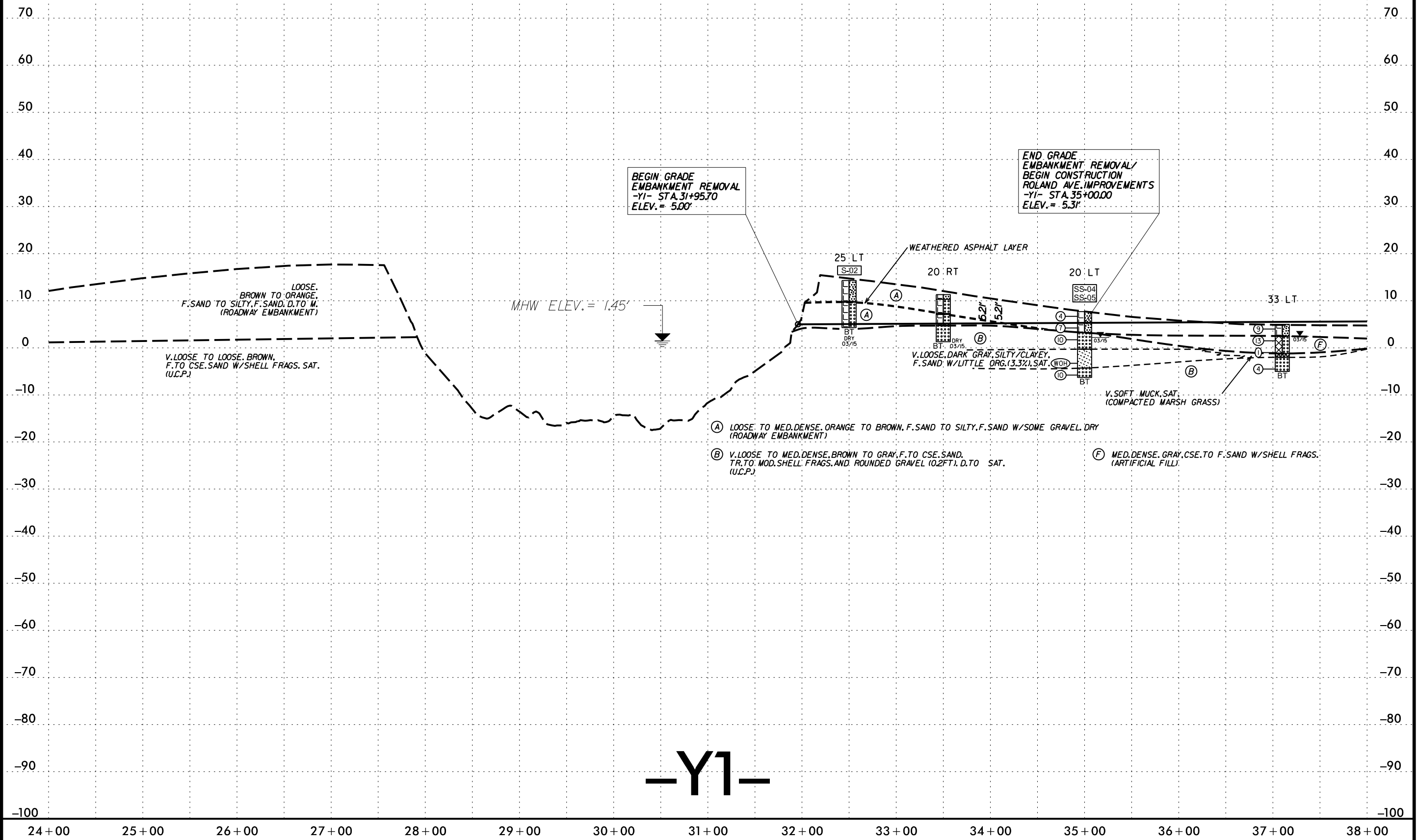
SAMPLE NUMBER	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-08	CL	12+00	5.0 - 6.0	A-3(0)	22	NP	52.1	44.5	2.4	1.0	98.1	78	4	-	-
SS-11	CL	12+00	8.5 - 10.0	A-7-6(29)	48	29	0.6	6.2	32.8	60.4	100	100	94	-	-
S-07	1ft LT	12+50	0.5 - 1.0	A-3(0)	28	NP	32.4	63.0	4.6	0.0	99.7	92	5	-	9.9
O-02	20ft RT	13+74	3.0 - 3.5	-	-	-	-	-	-	-	-	-	-	-	1.3
SS-07	CL	14+00	2.5 - 4.0	A-3(0)	32	NP	31.2	63.3	4.3	1.2	98.7	94	6	-	5.5
S-13	1ft RT	14+49	2.0 - 2.5	A-5(0)	97	NP	32.6	28.4	30.3	8.7	100	84	41	-	49.9
S-04	1ft RT	14+49	2.5 - 3.0	A-3(0)	17	NP	27.3	63.6	4.1	5.0	100	97	9	-	1.5
S-05	CL	15+01	0.0 - 2.5	A-2-5(0)	49	NP	39.3	41.9	14.7	4.1	99.6	86	20	-	20.0
S-06	CL	15+01	2.5 - 3.0	A-3(0)	17	NP	52.9	43.3	1.8	2.0	99.6	85	4	-	1.9
SS-12	CL	16+00	3.0 - 4.0	-	-	-	-	-	-	-	-	-	-	-	2.8
SS-13	CL	16+00	5.0 - 7.5	-	-	-	-	-	-	-	-	-	-	-	3.4
SS-02	CL	16+00	8.5 - 9.9	A-4(5)	30	10	6.0	32.1	27.1	34.8	100	99	67	-	-

26-AUG-2015 17:03 S:\pwork\proj\PROJECT\_2015\215037 NCDOT\_B-4929\_SURF-CITY BRIDGE ROADWAY\B4929\GEO\RDWY\cadd\CADD\_GEO\TECH\Plan\Prof\B4929\_GEO\_pf\_17\_Y1.dgn  
 5/14/99



-Y1-

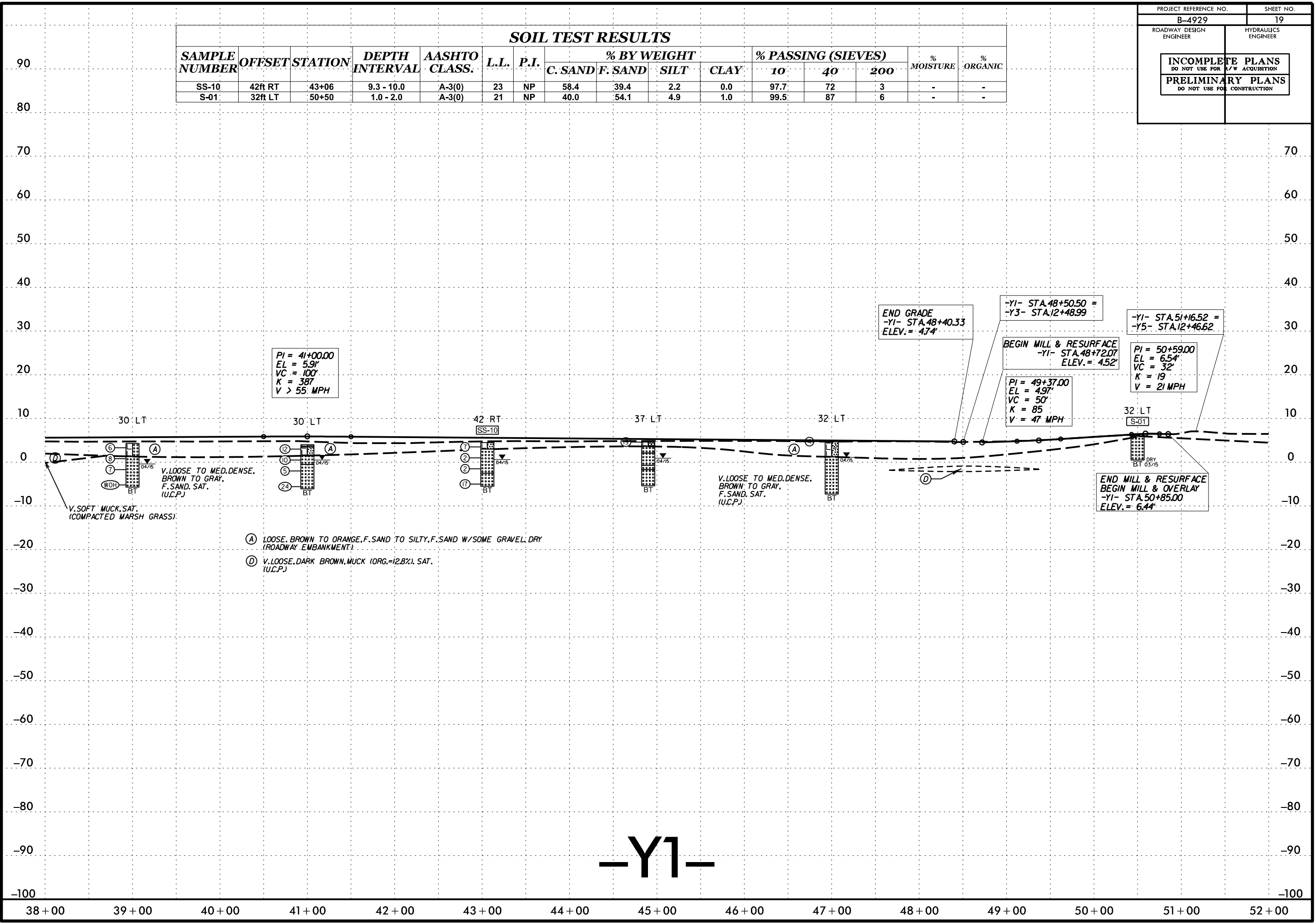
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							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-02	25ft LT	32+50	2.5 - 3.5	A-3(0)	17	NP	19.4	76.0	2.6	2.0	99.6	98	5	-	-
SS-04	20ft LT	35+00	10.0 - 11.5	A-2-4(0)	31	NP	9.1	68.3	12.5	10.1	100	98	27	-	3.3
SS-05	20ft LT	35+00	12.5 - 14.0	A-3(0)	23	NP	2.5	93.2	4.3	0.0	100	100	5	-	-



-Y1-

5/14/99  
 26-AUG-2015 17:04  
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 AT: STEPHENSON

SAMPLE NUMBER	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-10	42ft RT	43+06	9.3 - 10.0	A-3(0)	23	NP		
S-01	32ft LT	50+50	1.0 - 2.0	A-3(0)	21	NP	40.0	54.1	4.9	1.0	99.5	87	6	-	-



PI = 41+00.00  
 EL = 5.9'  
 VC = 100'  
 K = 387  
 V > 55 MPH

END GRADE  
 -Y1- STA. 48+40.33  
 ELEV. = 47.4'

-Y1- STA. 48+50.50 =  
 -Y3- STA. 42+48.99

BEGIN MILL & RESURFACE  
 -Y1- STA. 48+72.07  
 ELEV. = 45.2'

PI = 49+37.00  
 EL = 49.7'  
 VC = 50'  
 K = 85  
 V = 47 MPH

-Y1- STA. 51+16.52 =  
 -Y5- STA. 42+46.62

PI = 50+59.00  
 EL = 6.54'  
 VC = 32'  
 K = 19  
 V = 21 MPH

END MILL & RESURFACE  
 BEGIN MILL & OVERLAY  
 -Y1- STA. 50+85.00  
 ELEV. = 6.44'

- (A) LOOSE, BROWN TO ORANGE, F. SAND TO SILTY, F. SAND W/SOME GRAVEL; DRY (ROADWAY EMBANKMENT)
- (D) V. LOOSE, DARK BROWN, MUCK (ORG. = 12.8%); SAT. (U.C.P.)

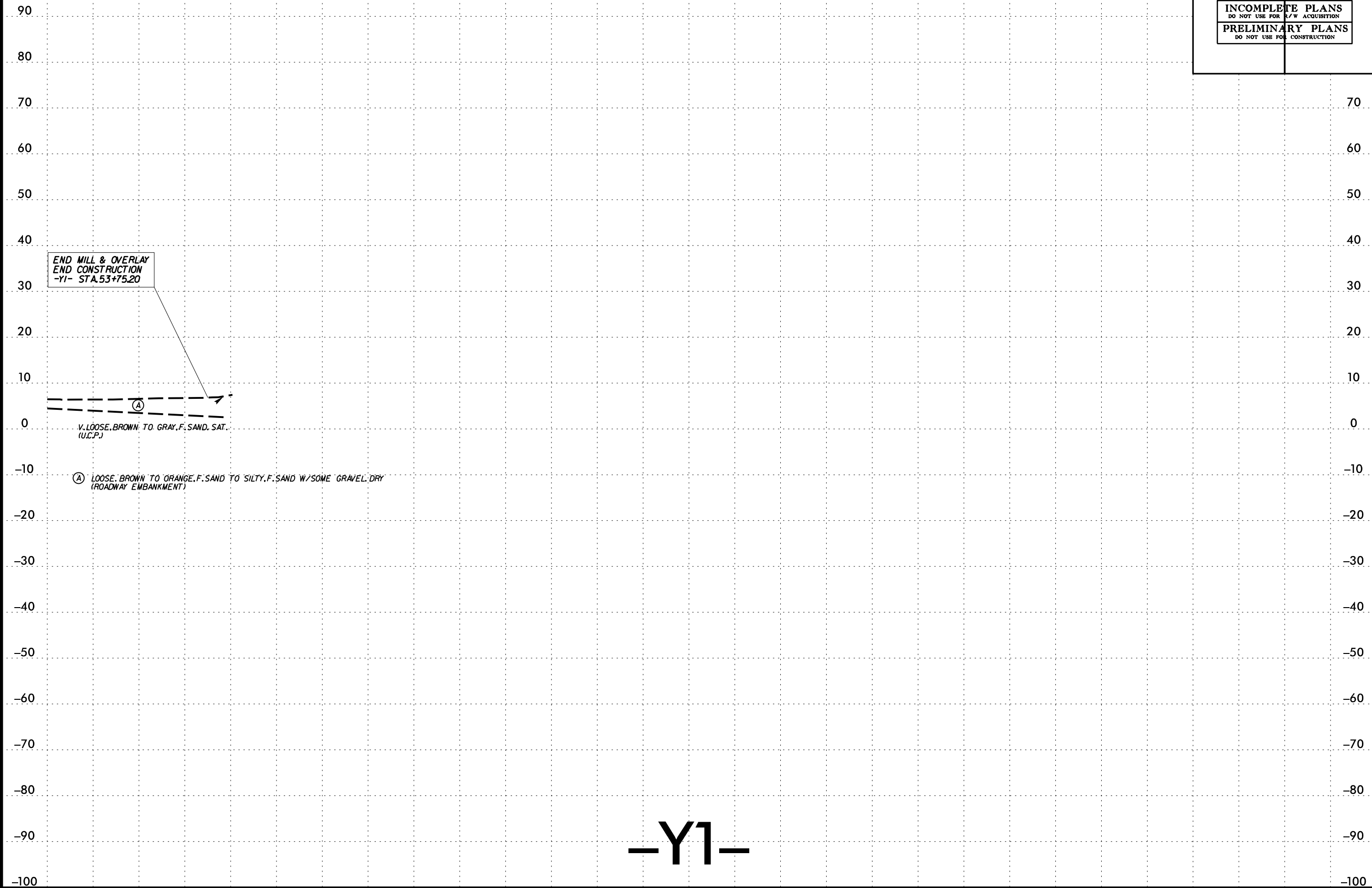
-Y1-

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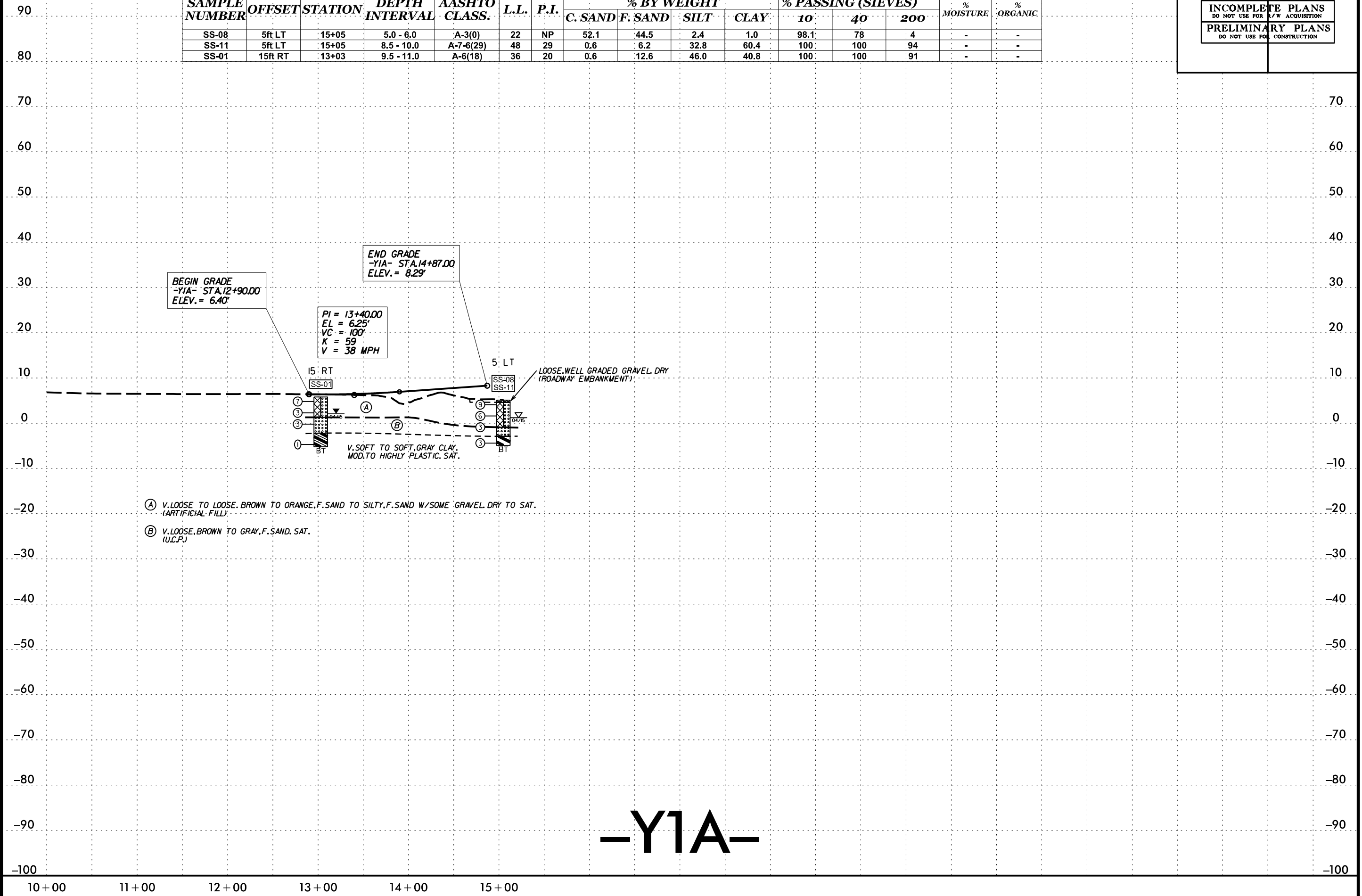
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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
B-4929	20
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	



-Y1-

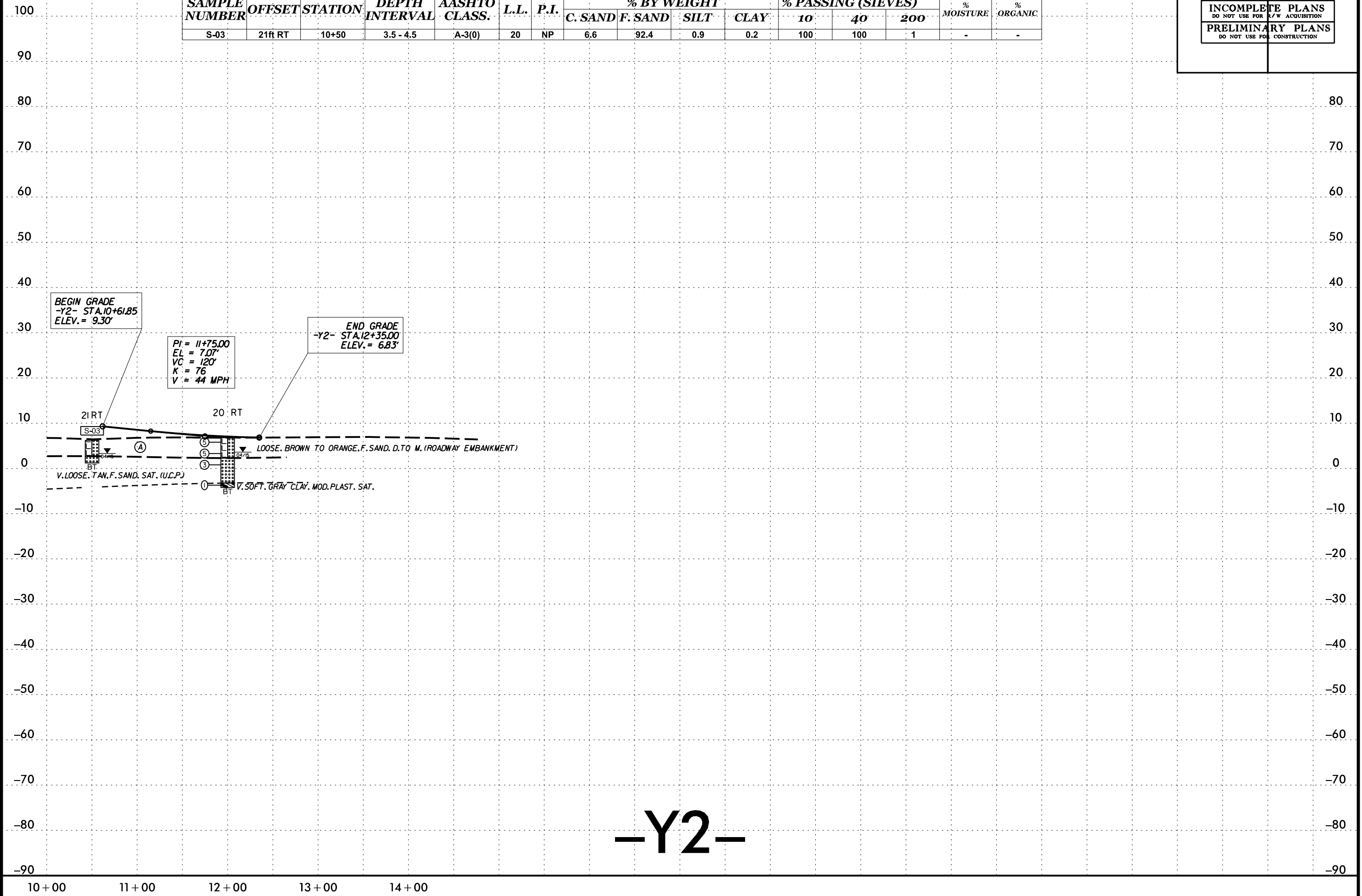
SAMPLE NUMBER	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-08	5ft LT	15+05	5.0 - 6.0	A-3(0)	22	NP	52.1	44.5	2.4	1.0	98.1	78	4	-	-
SS-11	5ft LT	15+05	8.5 - 10.0	A-7-6(29)	48	29	0.6	6.2	32.8	60.4	100	100	94	-	-
SS-01	15ft RT	13+03	9.5 - 11.0	A-6(18)	36	20	0.6	12.6	46.0	40.8	100	100	91	-	-



-Y1A-

5/14/99  
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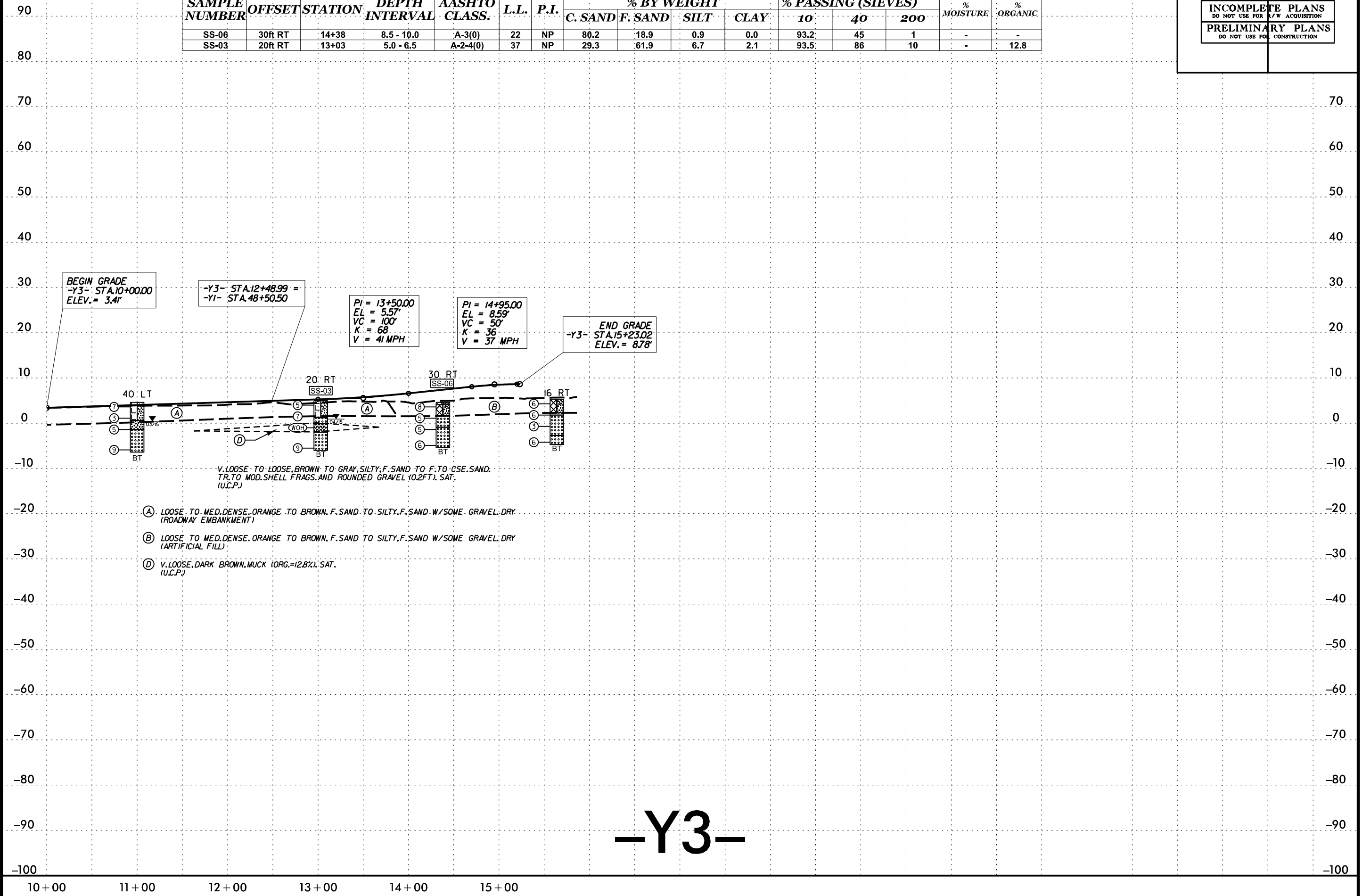
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SAMPLE NUMBER	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-03	21ft RT	10+50	3.5 - 4.5	A-3(0)	20	NP	6.6	92.4	0.9	0.2	100	100	1	-	-



-Y2-

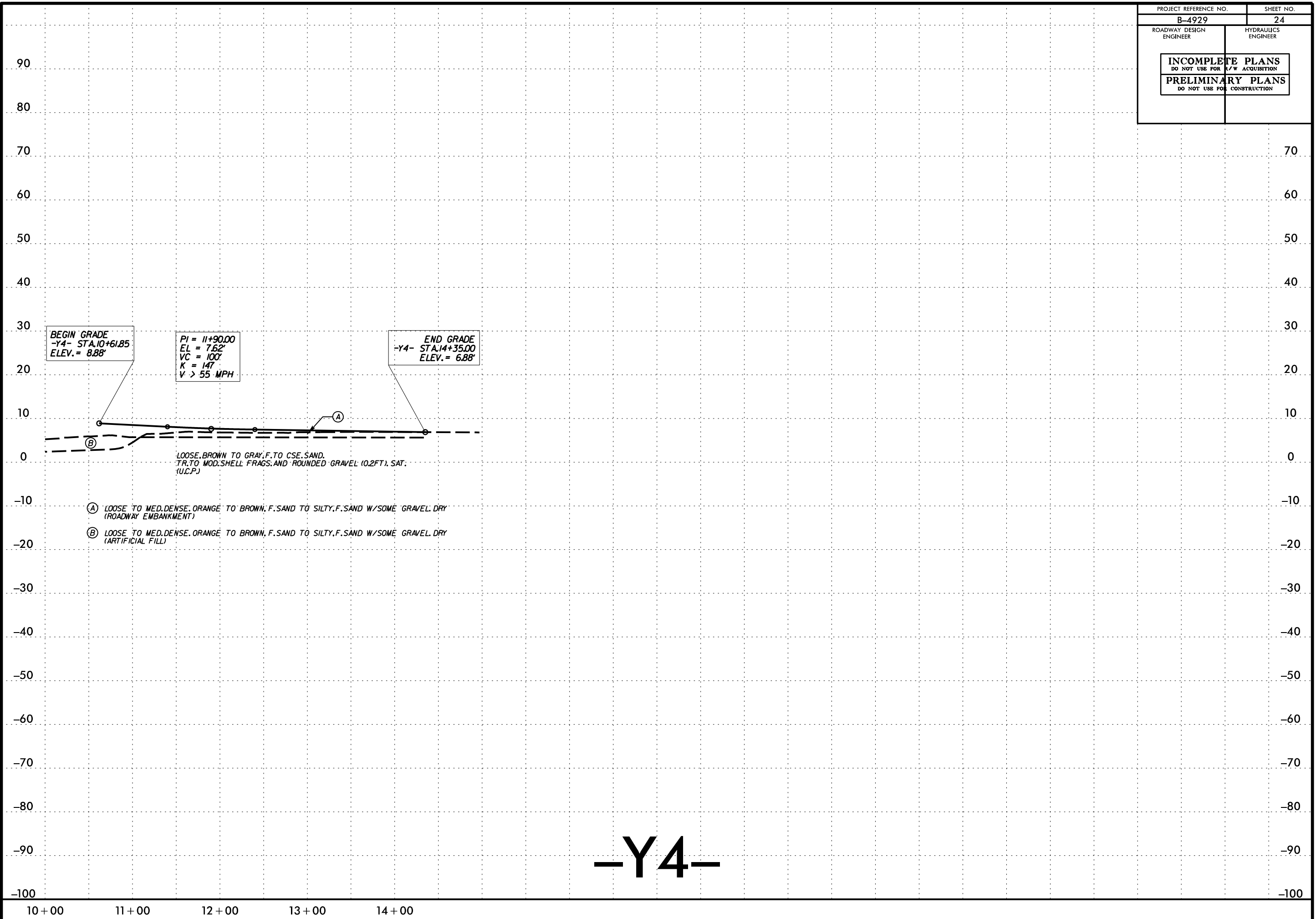
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 SURF-CITY BRIDGE ROADWAY\B4929\GEO\RDWY\GEO\GEO\TECH\Plan\Prof\B4929\_GEO\_pf\_22\_Y2.dgn

SAMPLE NUMBER	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-06	30ft RT	14+38	8.5 - 10.0	A-3(0)	22	NP	80.2	18.9	0.9	0.0	93.2	45	1	-	-
SS-03	20ft RT	13+03	5.0 - 6.5	A-2-4(0)	37	NP	29.3	61.9	6.7	2.1	93.5	86	10	-	12.8



5/14/99  
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 AT: STEPHENSON

PROJECT REFERENCE NO.	SHEET NO.
B-4929	24
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	

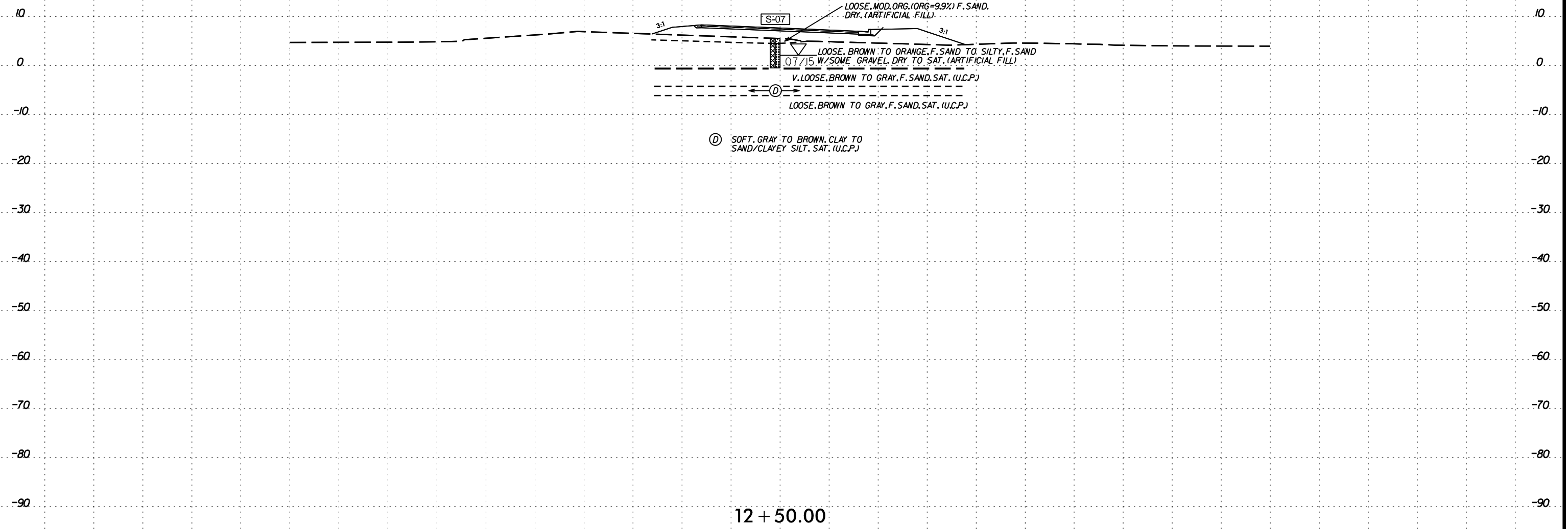


-Y4-

5/14/99  
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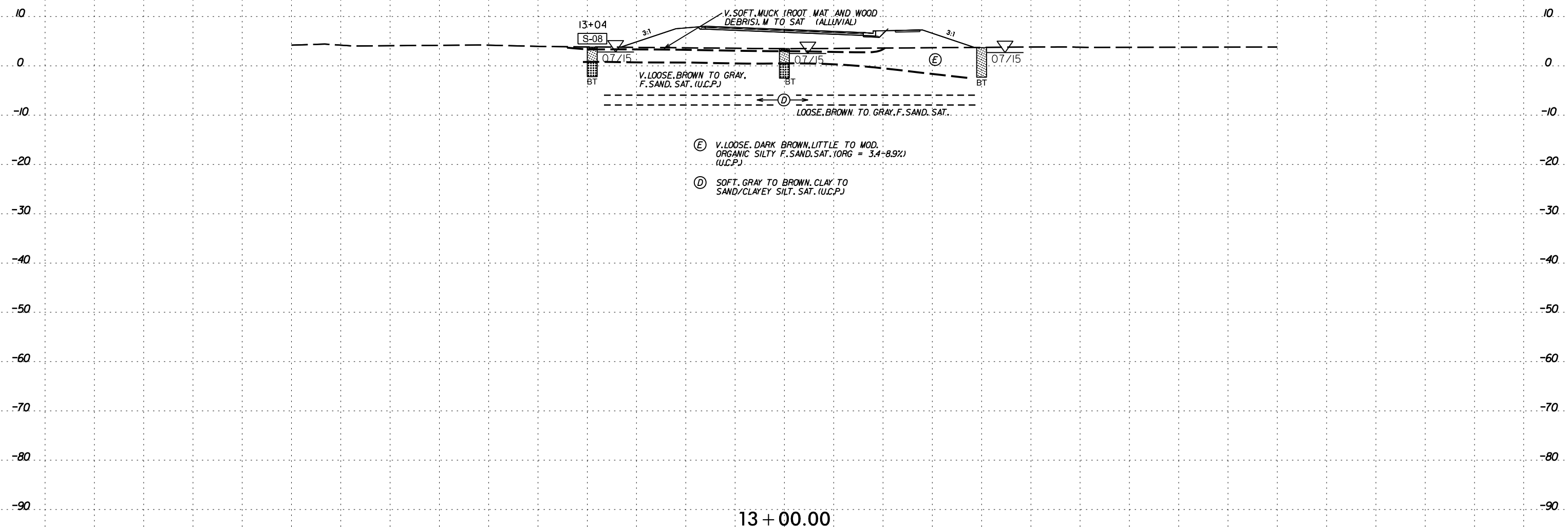
SOIL TEST RESULTS															
SAMPLE NUMBER	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-07	1ft LT	12+50	0.5 - 1.0	A-3(0)	28	NP	32.4	63.0	4.6	0.0	99.7	92	5	-	9.9



27-AUG-2015 14:20  
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 shudson

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

SOIL TEST RESULTS															
SAMPLE NUMBER	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-08	39ft LT	13+04	1.0 - 1.5	A-3(0)	31	NP	31.9	62.8	4.3	1.0	99.0	91	6	-	8.9

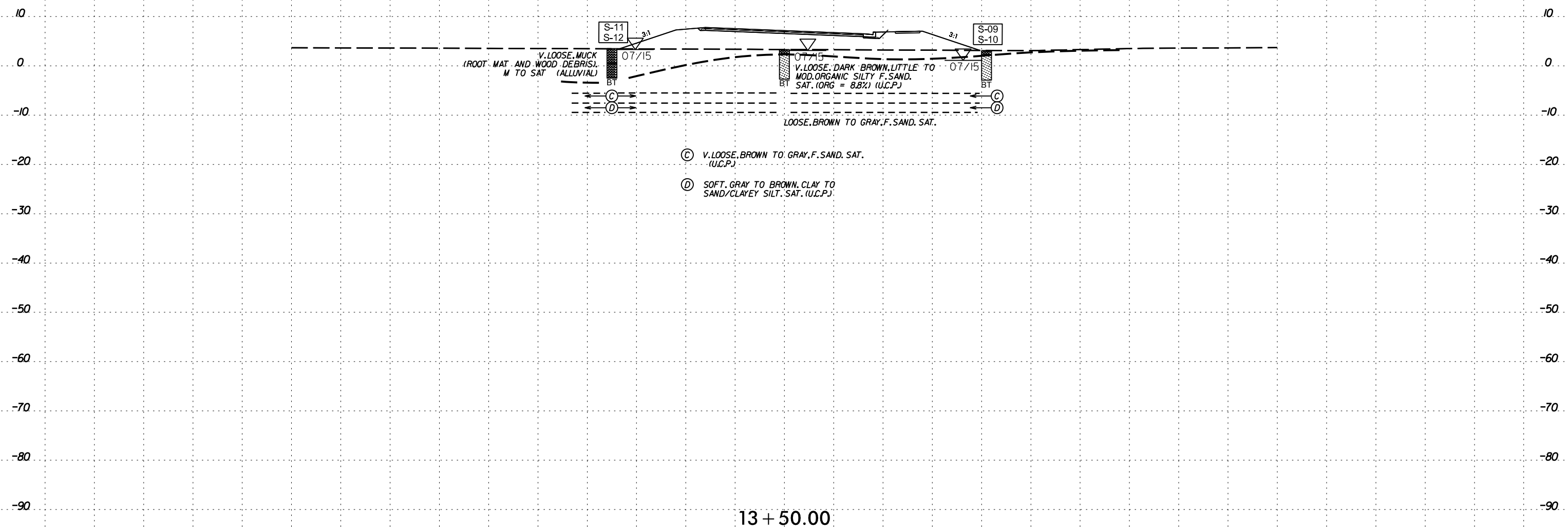


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 shudson



150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

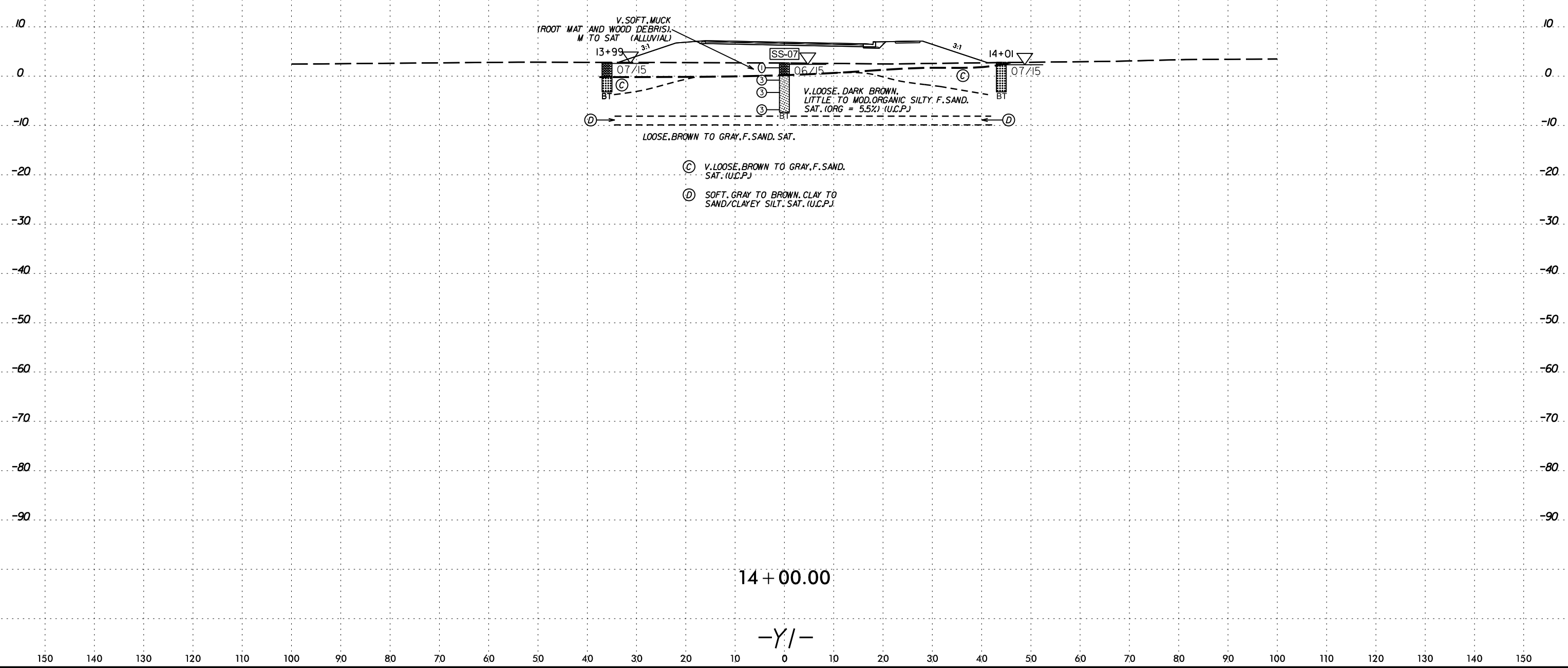
SAMPLE NUMBER	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-11	35ft LT	13+50	1.0 - 3.0	A-2-5(0)	77	NP	33.1	38.8	21.7	6.4	99.8	83	29	-	32.0
S-12	35ft LT	13+50	3.0 - 6.0	A-3(0)	36	NP	39.2	52.2	5.5	3.1	99.8	89	9	-	12.5
S-09	41ft RT	13+50	0.0 - 0.7	-	-	-	-	-	-	-	-	-	-	-	36.1
S-10	41ft RT	13+50	1.5 - 2.0	A-3(0)	37	NP	44.7	46.3	6.1	2.9	94.3	73	10	-	8.8



26-AUG-2015 17:26  
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 SHUDSON  
 NCDOT\_B-4929\_SURF-CITY BRIDGE ROADWAY\B4929\GEO\_ROW\contlin\CADD\_GEO\TECH\B4929\_GEO\_Row\_xst\_11.dgn

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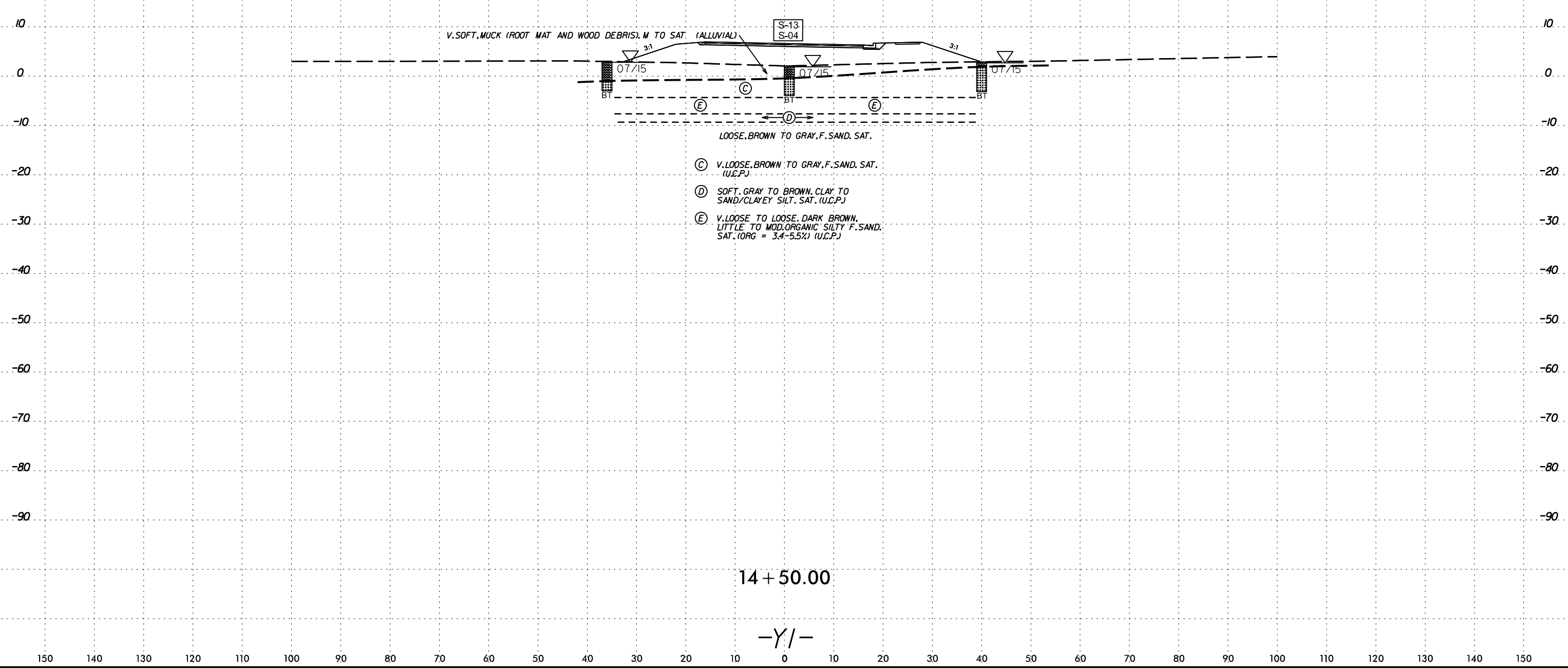
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							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-07	CL	14+00	2.5 - 4.0	A-3(0)	32	NP	31.2	63.3	4.3	1.2	98.7	94	6	-	5.5



26-AUG-2015 17:45  
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 shudson

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

SAMPLE NUMBER	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-13	1ft RT	14+49	2.0 - 2.5	A-5(0)	97	NP		
S-04	1ft RT	14+49	2.5 - 3.0	A-3(0)	17	NP	27.3	63.6	4.1	5.0	100	97	9	-	1.5

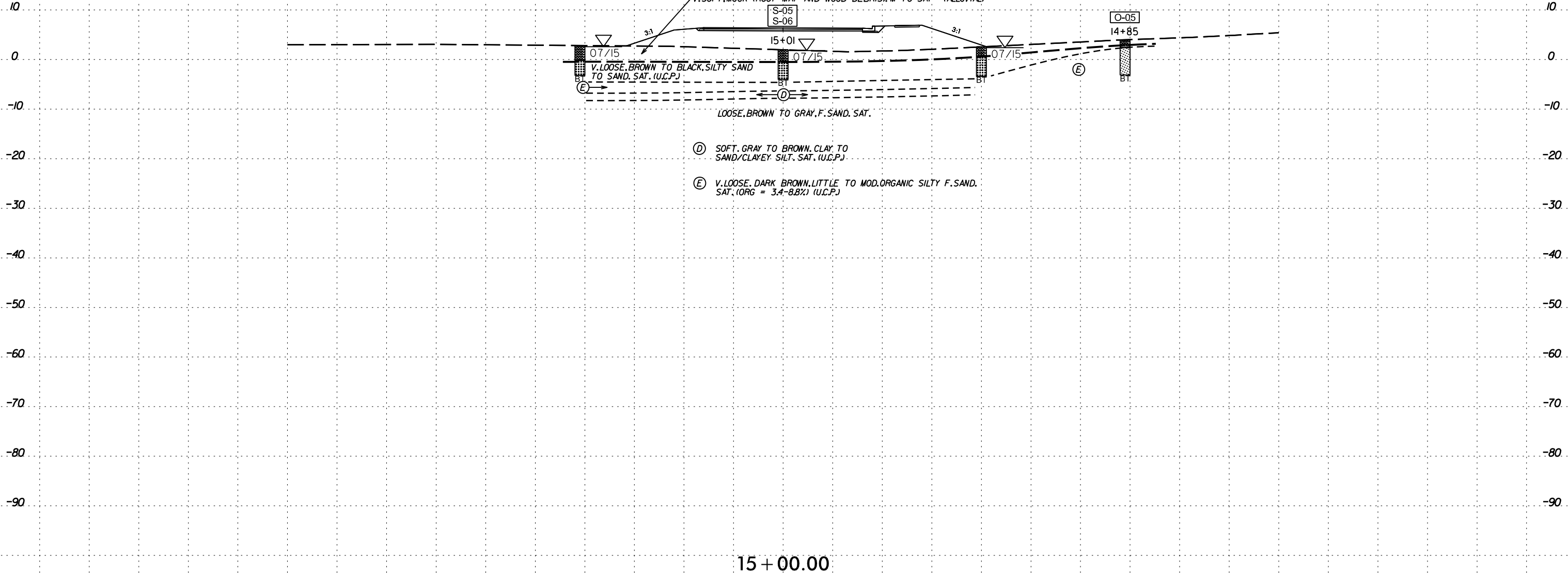


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 shudson

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

### SOIL TEST RESULTS

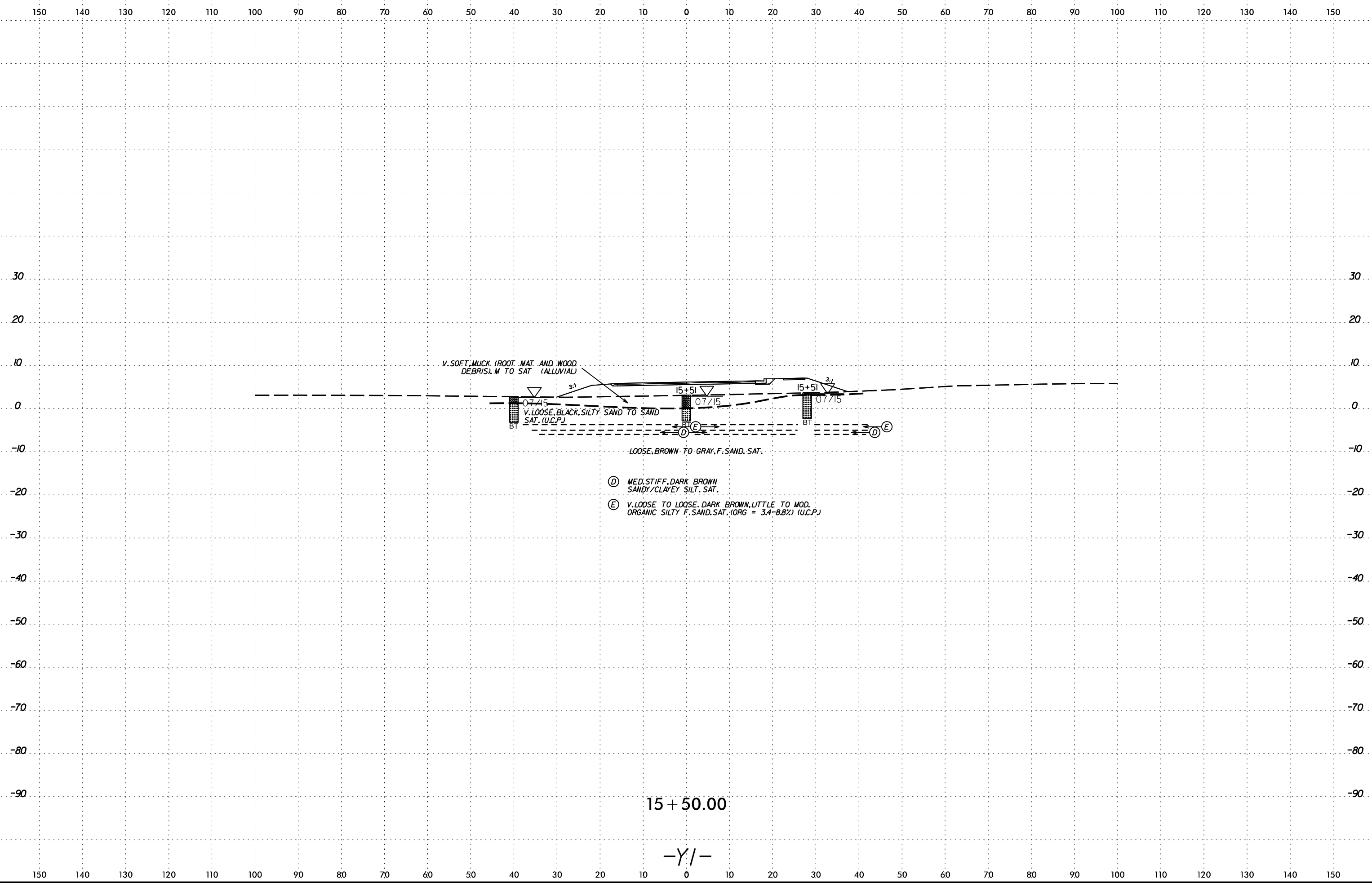
SAMPLE NUMBER	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
O-05	69ft RT	14+85	1.0 - 1.5	-	-	-	-	-	-	-	-	-	-	1.5	
S-05	CL	15+01	0.0 - 2.5	A-2-5(0)	49	NP	39.3	41.9	14.7	4.1	99.6	86	20	20.0	
S-06	CL	15+01	2.5 - 3.0	A-3(0)	17	NP	52.9	43.3	1.8	2.0	99.6	85	4	1.9	



15 + 00.00

-Y/-

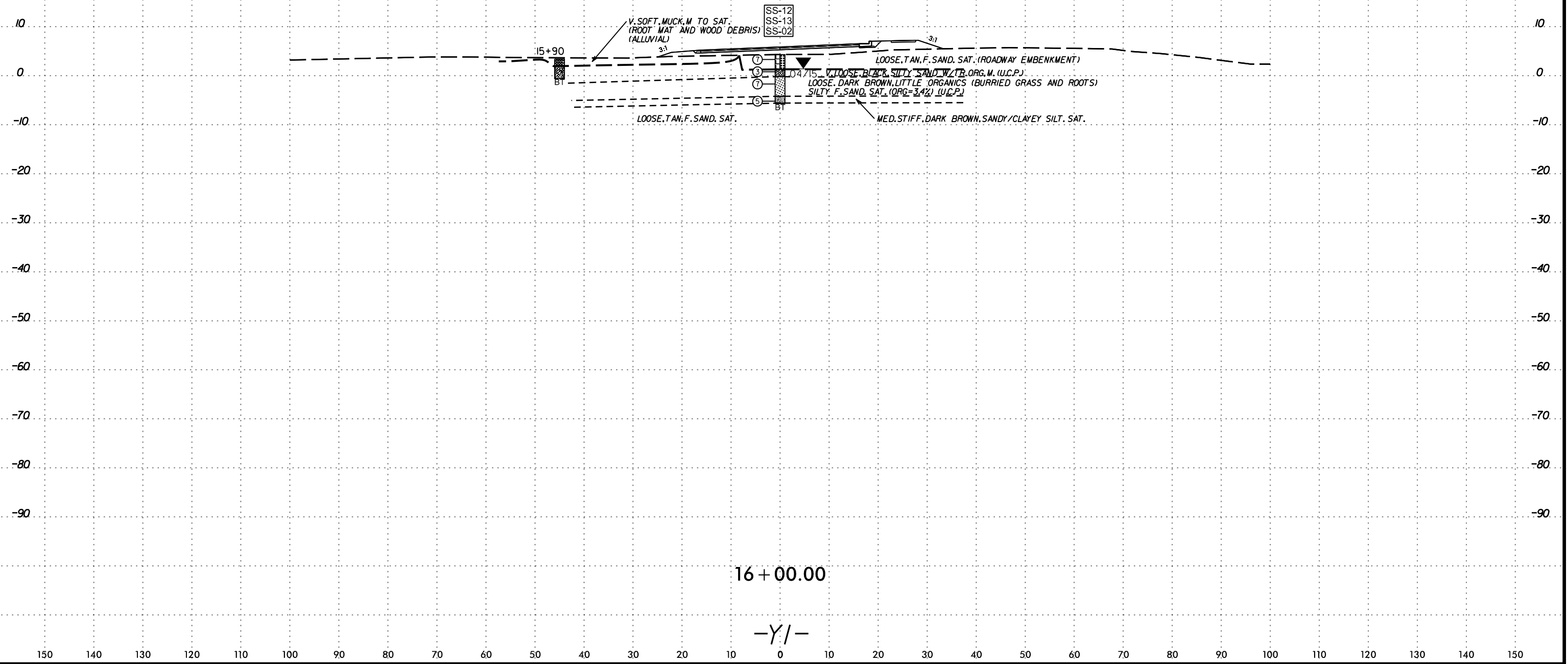
150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150



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 shudson

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

SOIL TEST RESULTS															
SAMPLE NUMBER	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-12	CL	16+00	3.0 - 4.0	-	-	-	-	-	-	-	-	-	-	-	2.8
SS-13	CL	16+00	5.0 - 7.5	-	-	-	-	-	-	-	-	-	-	-	3.4
SS-02	CL	16+00	8.5 - 9.9	A-4(5)	30	10	6.0	32.1	27.1	34.8	100	99	67	-	-

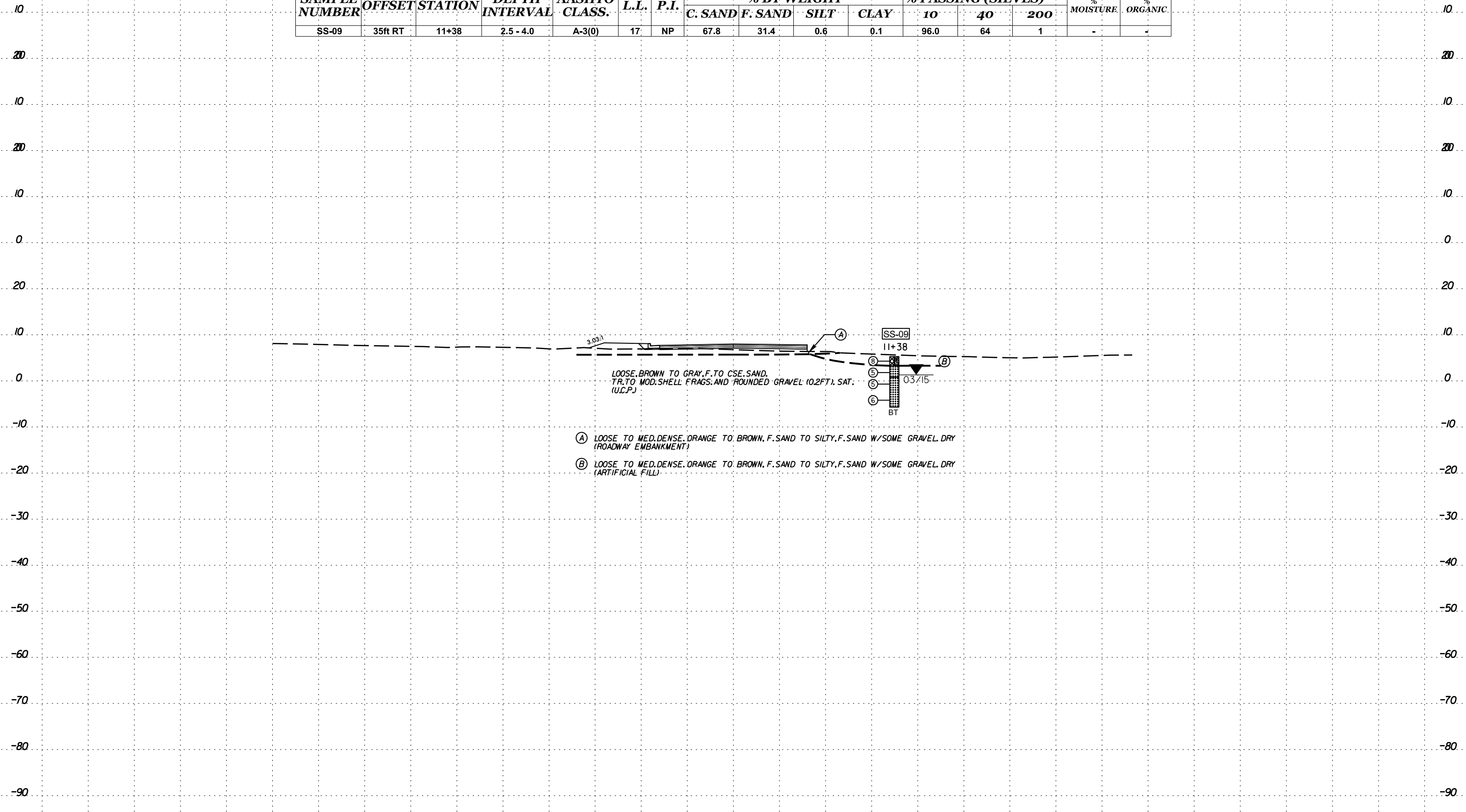


26-AUG-2015 17:17  
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 shudson

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150

### SOIL TEST RESULTS

SAMPLE NUMBER	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-09	35ft RT	11+38	2.5 - 4.0	A-3(0)	17	NP	67.8	31.4	0.6	0.1	96.0	64	1	-	-

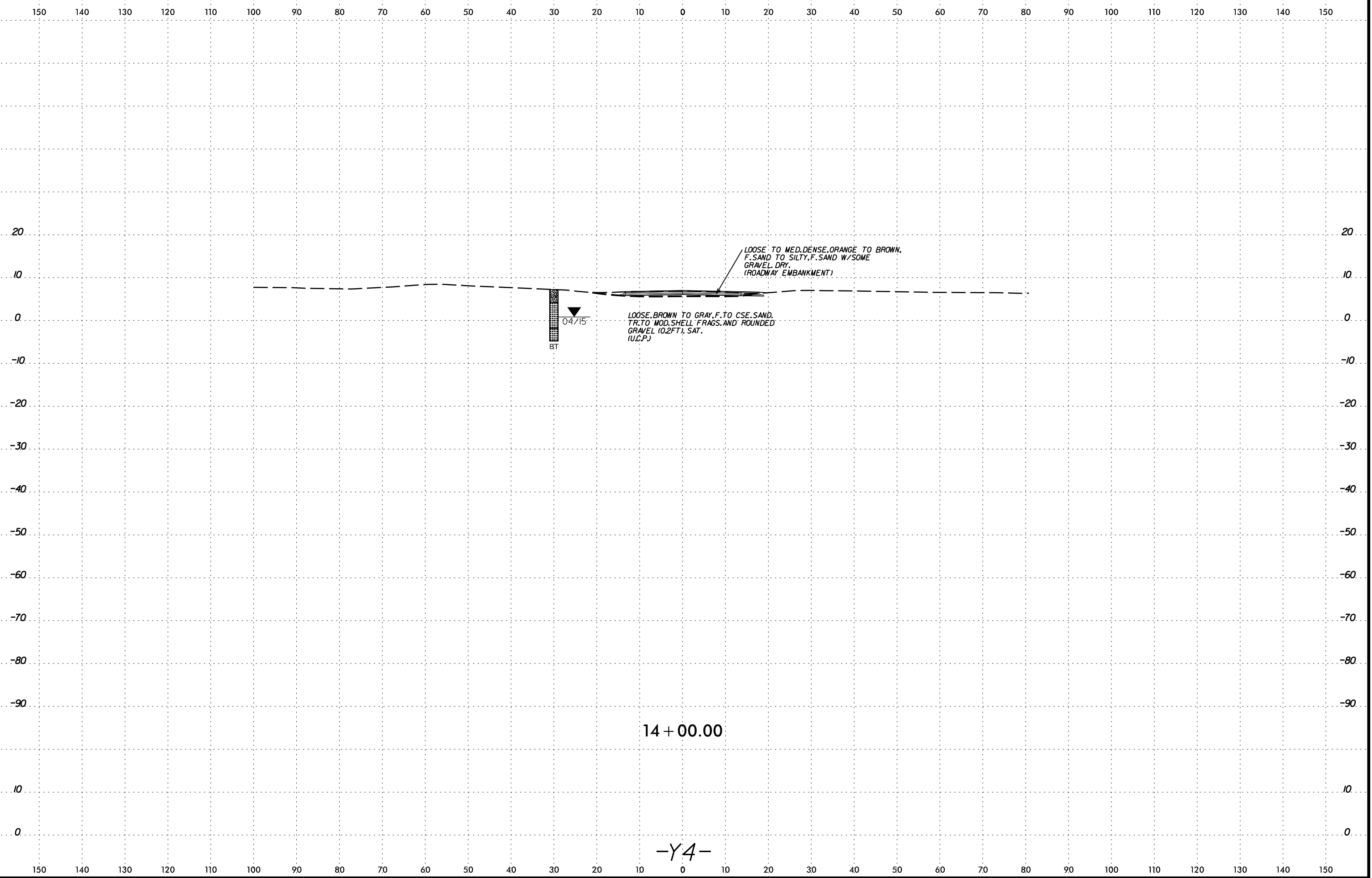


11 + 50.00

-Y4-

150 140 130 120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150





LOOSE TO MED. DENSE. ORANGE TO BROWN.  
F. SAND TO SILTY. F. SAND W/SOME  
GRAVEL. DRY.  
(ROADWAY EMBANKMENT)

LOOSE, BROWN TO GRAY. F. TO CSE. SAND.  
TR. TO MOD. SHELL FRAGS. AND ROUNDED  
GRAVEL (0.2 FT). SAT.  
(U.C.P.)

04/15  
BT

14 + 00.00

-Y4-