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REFERENCE: U-4405

PROJECT: 39049

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.	U-4405	1	86

**CONTENTS**

LINE	STATION	PLAN	PROFILE
-L-	15+65 - 322+95.00	4 - 27	N/A
-RPB-	10+00 - 34+68.31	29 - 30, 22	32

**CROSS SECTIONS**

LINE	STATION	SHEETS
-L-	17+00, 18+50 - 25+50	33-36
-L-	27+00, 31+00	37
-L-	36+00, 41+00	38
-L-	46+00, 51+00	39
-L-	56+00, 61+00	40
-L-	66+00, 69+50 - 74+50	41- 44
-L-	75+00, 78+00, 80+00	45
-L-	82+00 - 82+50	46 - 47
-L-	85+00, 90+00	48
-L-	95+00, 100+50	49
-L-	101+50 - 107+00	50 - 52
-L-	107+50, 110+00, 115+00	53
-L-	120+00, 125+00	54
-L-	127+50, 130+00	55
-L-	135+00, 137+50	56
-L-	138+50, 143+00	57
-L-	144+00, 145+50 - 153+50	58 - 62
-L-	154+00, 161+00	63
-L-	166+00, 171+00	64
-L-	173+00, 176+00	65
-L-	181+00, 191+00	66
-L-	196+00, 201+00	67
-L-	206+00, 211+00	68
-L-	216+00, 221+00 - 221+50	69 - 70
-L-	226+00, 231+00	71
-L-	236+00, 241+00	72
-L-	246+00, 256+00	73
-L-	261+00, 266+00	74
-L-	271+00, 276+00	75
-L-	280+00, 286+50	76
-L-	291+00, 296+00	77
-L-	301+00, 305+50	78
-L-	310+50, 316+00	79
-L-	321+00	80
-RPB-	19+00	81
-RPB-	21+50	82
-RPB-	32+50	83

# ROADWAY SUBSURFACE INVESTIGATION

COUNTY CUMBERLAND  
PROJECT DESCRIPTION US401 FROM WEST OF  
HAMPTON OAKS DRIVE TO EAST OF  
FAIRWAY DRIVE IN FAYETTEVILLE

## 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.

PERSONNEL

T. HOLZAPFEL (MAD)

M. GOOGAN (MAD)

A. RIGGS (S&ME)

S. TIERNAN (S&ME)

J. GERDES (S&ME)

INVESTIGATED BY S&ME, INC.

DRAWN BY B. RATTI

CHECKED BY A.F. RIGGS JR, P.E.

SUBMITTED BY S&ME, INC.

DATE JAN 2016



DocuSigned by:

Abner F. Riggs, Jr., 1/24/2016

2C477DC1AAD5484...

SIGNATURE

DATE

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

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

GEOTECHNICAL ENGINEERING UNIT

SUBSURFACE INVESTIGATION

SOIL AND ROCK LEGEND, TERMS, SYMBOLS, AND ABBREVIATIONS

Table with 4 main columns: SOIL DESCRIPTION, GRADATION, ROCK DESCRIPTION, and TERMS AND DEFINITIONS. It includes detailed legends for soil types, gradation symbols, rock descriptions, and various geotechnical terms and symbols.

See Sheet 1-A For Index of Sheets  
See Sheet 1-B For Conventional Symbols

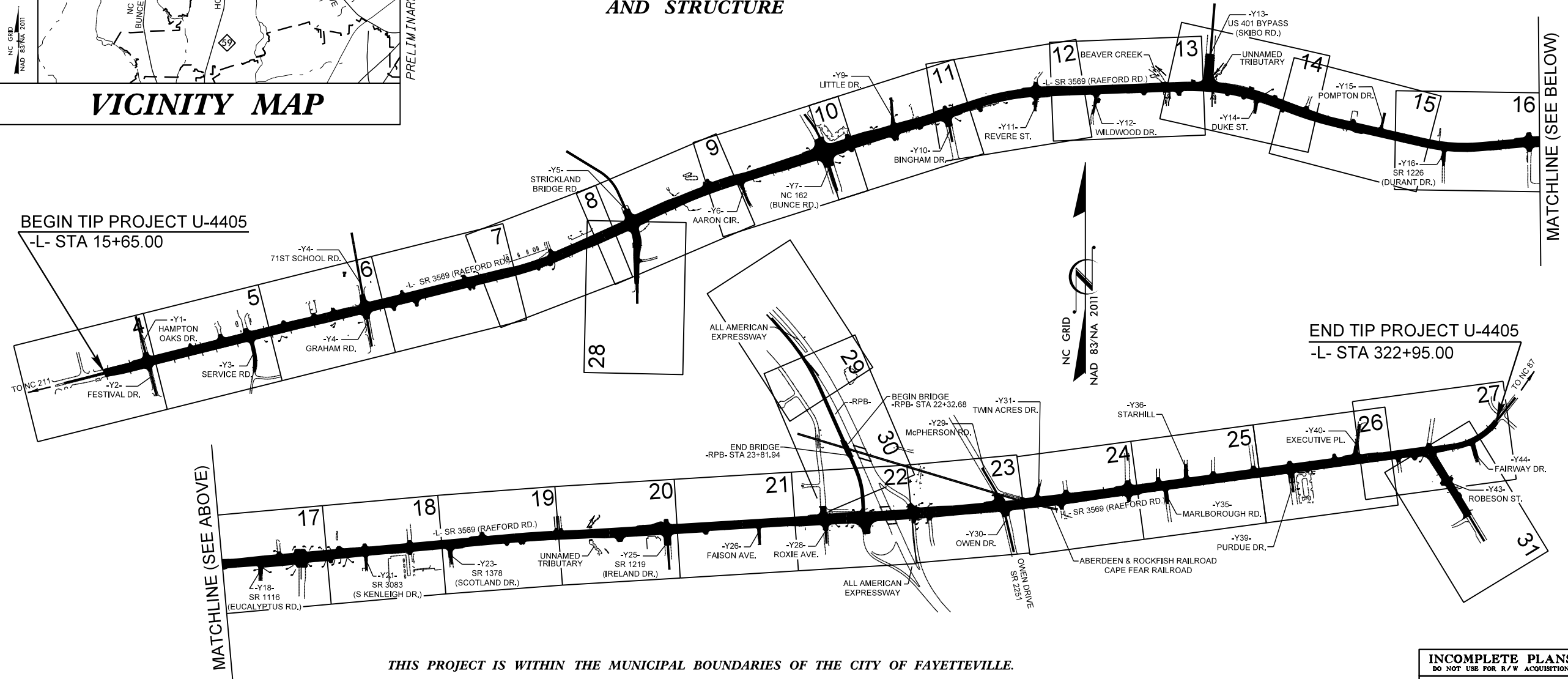
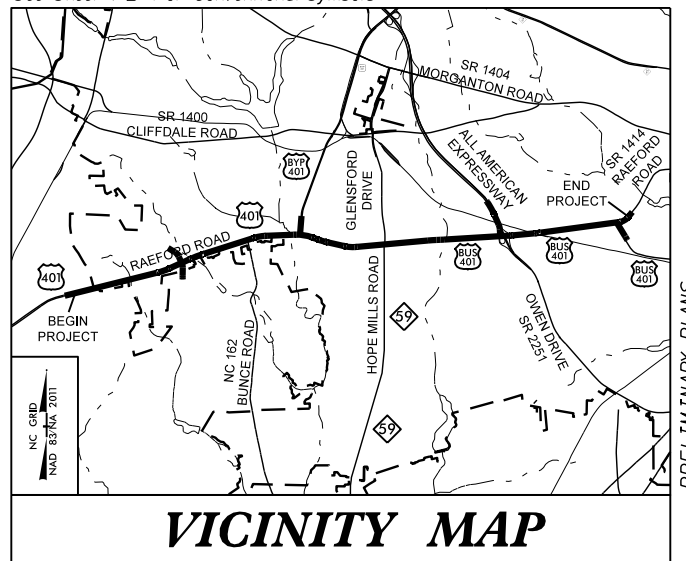
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**CUMBERLAND COUNTY**

LOCATION: US 401 FROM WEST OF HAMPTON OAKS DRIVE TO EAST OF FAIRWAY DRIVE IN FAYETTEVILLE  
TYPE OF WORK: GRADING, DRAINAGE, PAVING, SIGNALS, WIDENING, RESURFACING, AND STRUCTURE

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4405	3	86
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
39049.1.1	STPDA-0401(230)	PE	

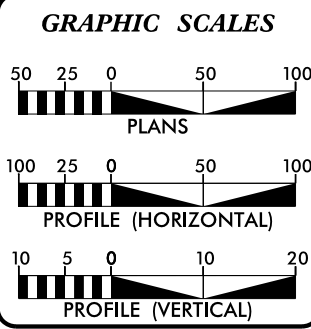
TIP PROJECT: U-4405



CONTRACT: 39049

THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF FAYETTEVILLE.  
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 2018 =	63,150
ADT 2038 =	70,975
K =	10 %
D =	60 %
T =	3 %*
V =	50 MPH
*TTST =	1% DUAL=2%
FUNC CLASS =	URBAN ARTERIAL REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-4405 =	5.820 MILES
TOTAL LENGTH TIP PROJECT U-4405 =	5.820 MILES
NCDOT CONTACT: REKHA V. PATEL, PE	

Prepared In the Office of:

**ATKINS**  
1616 EAST MILLBROOK ROAD, SUITE 310  
RALEIGH, NORTH CAROLINA 27609  
(919) 876-6888 NCBES #F-0326

2012 STANDARD SPECIFICATIONS

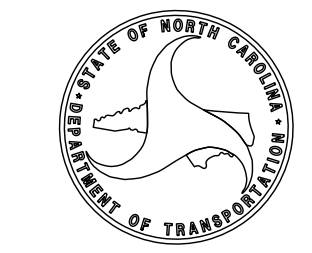
RIGHT OF WAY DATE:	CLINTON J. MORGAN, PE PROJECT ENGINEER
JULY 15, 2016	
LETTING DATE:	BRYAN LAMBETH, PE PROJECT DESIGN ENGINEER
JULY 17, 2018	

HYDRAULICS ENGINEER

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

ROADWAY DESIGN ENGINEER

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







January 26, 2016

STATE PROJECT: 39049.1.1 (U-4405)  
 FEDERAL PROJECT: STPDA-0401(230)  
 COUNTY: Cumberland  
 DESCRIPTION: US 401 from West of Hampton Oaks Drive to east of Fairway Drive in Fayetteville, North Carolina

SUBJECT: Geotechnical Report - Inventory

**Project Description**

This project consists of widening 5.82 miles of the existing roadway along US 401 (Raeford Road) Road (-L-) and construction of a new ramp (-RPB-) from the SBL of All American Freeway over the Aberdeen & Rockfish Railroad to US 401 in Fayetteville North Carolina. US 401 currently consists of 4-lanes with a grassed median along the western most section and center turn lanes along the remaining section. The roadway will be widened to include new roadway, turn lanes and sidewalks on both sides of US 401. This will also include extending 4 culverts on each side of the roadway and construction of a new bridge on ramp -RPB- over the Aberdeen & Rockfish Railroad.

The project area is comprised of rural and wooded areas with some commercial development along the western portion of the alignment and more urban commercialized areas with small businesses along the eastern portion of the alignment. The project crosses several creeks and tributaries, underneath the All American Expressway and grade crossing of the Aberdeen & Rockfish Railroad.

The geotechnical exploration was conducted in June and July of 2015. Standard penetration test (SPT) borings were advanced using a CME-45C track mounted drilling machine equipped with an automatic hammer. Standard Penetration Testing (SPT) methods utilizing wash boring techniques with casing and tri-cone roller bit were used to advance borings to the necessary depths. Additionally, hand auger borings were performed along the alignment to determine subsurface conditions and obtain soil samples. Representative soil samples were collected for visual classification in the field and selected samples were submitted for laboratory analysis by S&ME’s soil testing laboratory. Laboratory testing was performed in accordance with the AASHTO Soil Classification System.

The following alignments, totaling 6.287 miles, were investigated. Subsurface cross sections of the following alignment are included in this report.

<u>Line</u>	<u>Stations</u>
-L-	15+65 to 322+95
-RPB-	10+00 to 34+68.31

**Areas of Special Geotechnical Interest**

- 1) **Highly Plastic Soils:** Highly plastic Coastal Plain soils with plastic indices (PI) of 25 and greater with greater than 50 percent passing the #200 sieve were encountered within 3 feet of the proposed grade at the following locations:

<u>Line</u>	<u>Stations</u>	<u>Offsets (ft)</u>
-L-	19+00 to 25+00	55 LT to 55 RT
-L-	70+00 to 74+00	50 LT to 60 RT
-L-	102+00 to 107+00	75 LT to 55 RT
-L-	146+50 to 148+00	60 LT to 45 RT

A discussion of these highly plastic soils is located below in the section titled “Soil Properties”.

- 2) **Alluvial Soils:** Recent alluvial deposits typically consist of very soft to soft, wet alluvial soils (N-values less than 4) were encountered within 3 feet of proposed grades within fill extent and may impact subgrade or embankment construction. These soils were found at the following locations:

<u>Line</u>	<u>Stations</u>	<u>Offsets (ft)</u>
-L-	81+70 to 82+75	70 to 100 LT
-L-	82+70 to 85+70	70 to 80 RT
-L-	136+40 to 135+00	55 to 70 LT
-L-	137+60 to 138+30	60 RT
-L-	221+10 to 222+15	60 to 100 LT
-L-	221+10 to 223+40	60 to 80 RT

A discussion of these alluvial soils is located below in the section titled “Soil Properties”.

- 3) **Artificial Fill:** Artificial fill may contain soils placed in an uncontrolled manner and may contain unsuitable soils. Areas of artificial fill are present at the following locations:

<u>Line</u>	<u>Stations</u>	<u>Offsets (ft)</u>
-L-	78+00 to 82+70	65 RT
-L-	82+75 to 85+30	80 LT
-L-	85+65 to 87+00	70 RT
-L-	89+70 to 90+40	2 LT to 13 RT

-L-	127+35 to 128+30	35 to 50 RT
-L-	138+00 to 142+00	50 to 60 LT
-L-	138+30 to 143+30	50 to 90 RT
-L-	143+60 to 145+45	65 to 85 LT
-L-	148+70 to 149+35	30 to 70 RT
-L-	213+80 to 221+10	55 to 80 RT
-L-	218+10 to 221+10	60 to 65 LT

A discussion of these artificial fill soils is located below in the section titled "Soil Properties".

- 4) Groundwater: High water tables, seasonal high groundwater, as well as potential perched groundwater above or within 6 feet of proposed grade were encountered at the following location:

<u>Line</u>	<u>Stations</u>	<u>Offsets (ft)</u>
-L-	300+00 to 311+00	50 to 60 LT

- 5) Culverts: Culverts will be extended on both sides of the roadway within the proposed right of way at the following locations:

<u>Line</u>	<u>Station</u>	<u>Offset (ft)</u>	<u>Within Fill Extent</u>
-L-	82+40	110 LT and 90 RT	Yes
-L-	137+95	90 LT and 100 RT	Yes
-L-	143+35	130 LT and 90 RT	Yes
-L-	221+20	110 LT and 105 RT	Yes

### Physiography and Geology

The site is located in the south-western portion of the Coastal Plain Physiographic Province of North Carolina. The Coastal Plain Province is typically characterized by marine and eolian sediments that were deposited during periods of fluctuating sea levels and moving shorelines. The surface soils often consist of more recent deposits of interbedded sands, clayey sands and clays. Based on previous mapping (N.C. Geologic Map 1985) and our knowledge of the local geology, the predominant geological formation at this site is the Middendorf Formation. Portions of the Black Creek Formation which overlies the Middendorf Formation is also mapped in the eastern portion of the alignment near All American Freeway.

The Middendorf Formation consists of beds of sands and clays of alluvial origin. The lithology of the materials and mica content indicates that these sediments are derived from weathered crystalline granitic and metamorphosed gneiss rocks of the Piedmont. The sands consist of angular grains that are fine to course in texture and the clays are arenaceous.

The Black Creek Formation typically consists of dark gray to black clays with thinly bedded fine sands and often contain fine mica. The clays are often replaced abruptly in short distances both vertically and horizontally with highly cross bedded sands. Partially lignitized plant remains are also common.

### Soil Properties

Soils encountered during this investigation are separated into four categories based on their origin. They consist of roadway embankment, artificial fill, alluvial, and Coastal Plain deposited soils.

Roadway Embankment fill soils are present beneath the existing roadway and shoulders of the existing roadway on the project. The embankment fill materials within the widening sections extend to depths of at least 8.5 feet below existing grade. The roadway embankment fill soils generally consist of orange-brown, red-brown, tan and gray, loose to medium dense, dry to wet, coarse to fine sands (A-1-b, A-3) and silty to clayey fine to coarse sands (A-2-4, A-2-6) with trace amounts of organics and gravel. The fine grained soils in the roadway embankment fill consist of orange-brown, red-brown, tan and gray, medium stiff to stiff, moist to wet coarse to fine sandy silts (A-4) and fine to coarse sandy and silty clays (A-6) with trace of organic material. The silts and clays tested exhibit low plastic indices of no greater than 19 percent with no more than 37 percent fines passing the No. 200 sieve.

Artificial Fill soils are present within the median and outside of roadway embankment fill areas along commercial areas and sewer easements developed adjacent to the roadway. Artificial fill was encountered to depths of at least 8.0 feet beneath the ground surface. These soils consist mainly of red, tan and gray, very loose to loose fine to coarse sands and gravels, silty to clayey fine to coarse sands (A-1-b, A-2-4 and A-2-6) and soft gray and yellow-tan, moist, fine sandy clay (A-6) with trace of organics. SPT N-values in the artificial fill soils ranged from 4 to 7 blows per foot (bpf).

Alluvial soils are present at existing creek and tributary crossings where existing pipes and culverts are located as indicated by the alluvial boundary area shown on the plan sheets. Alluvial soils were also encountered beneath roadway embankment and artificial fill materials to depths of up to 22.5 feet beneath the ground surface. These soils consist of brown, tan, dark gray and black, very soft to soft, wet, coarse to fine sandy to silty clays (A-6, A-7-6) and very loose to loose, wet to saturated silty to clayey fine to coarse sands (A-2-4, A-2-6) with trace to little amounts of organic material and some small quartz gravel. The alluvial soils exhibited SPT N-values of weight-of-hammer (WOH) to 10 bpf.

Coastal Plain soils were encountered throughout the project and beneath the roadway embankment and artificial fill materials and alluvial materials. The Coastal Plain soils were derived from undifferentiated coastal plain deposits and soils characteristic of more well defined formations mapped in the project area. Formations mapped in the area are the Black Creek Formation and underlying Middendorf Formation. The undifferentiated coastal plain soils and the soils of the Middendorf Formation typically consist of orange-brown, yellow-orange, red-brown, tan and gray, loose to medium dense, dry to saturated, silty to clayey fine to coarse sands (A-2-4, A-2-6, A-2-7) with traces of mica, and moist to wet, stiff to hard fine to coarse sandy and silty clays (A-6, A-7-6) with mudstone. These soil exhibited low to high plastic indices of 3 to 34 percent with 17 to 92 percent fines passing the No. 200 sieve. SPT N-values in the Coastal Plain soils ranged from 13 bpf to 100 blows with 0.6 feet of penetration.

Soils of the Black Creek Formation were encountered along -RPB- as high as elevations 177.1 and 178.2 feet. These soils are characterized by their dark black color and consist of moist medium stiff dark gray silty clay (A-7-6) with thin lenses of fine sand and traces of mica and partially lignitized organic materials. SPT N-values in these soils ranged from 4 to 7 blows per foot (bpf).

### **Rock Properties**

Mudstone was encountered during the roadway investigation at End Bent No. 2 of the proposed bridge location over the Aberdeen & Rockfish Railroad along -RPB-. The mudstone originates in the underlying Middendorf Formation. The mudstone was encountered between approximately elevations 144.2 and 134.7 feet. SPT N-values in the mudstone range from 100 blow per 0.6 to 0.9 feet of penetration.

### **Groundwater**

Groundwater was typically greater than 6 feet below proposed grades in almost all borings throughout the project corridor. Groundwater was typically encountered in boring locations adjacent to existing culverts in alluvial soils either exposed at the ground surface or beneath fill materials at depths of about 1.4 to 10.8 feet beneath the ground surface. An exception to this was in hand auger borings HA-63 and HA-65 where groundwater was encountered at depths of 3.8 and 4.4 feet, respectively and along -RPB- where groundwater was encountered at depths of 3.1 to 22.3 feet beneath the ground surface in coastal plain soils. The depth of ground water, beneath the ground surface, will fluctuate with seasonal precipitation and may occur at higher levels at other times of the year above less permeable clayey soils or hard soils.

Prepared by,



Abner F. Riggs, Jr. P.E.  
Senior Geotechnical Engineer  
N.C. Registration No. 14155

PROJECT REFERENCE NO.	SHEET NO.
U-4405	4
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	

RONEL VILLANUEVA  
DB 8802 PG 597  
PB 57 PG 33

BEGIN TIP PROJECT U-4405  
-L- STA.15+65.00

NC GRID  
NAD 83/NA 2011

BEGIN CONSTRUCTION  
-Y1- Sta.14+20.00

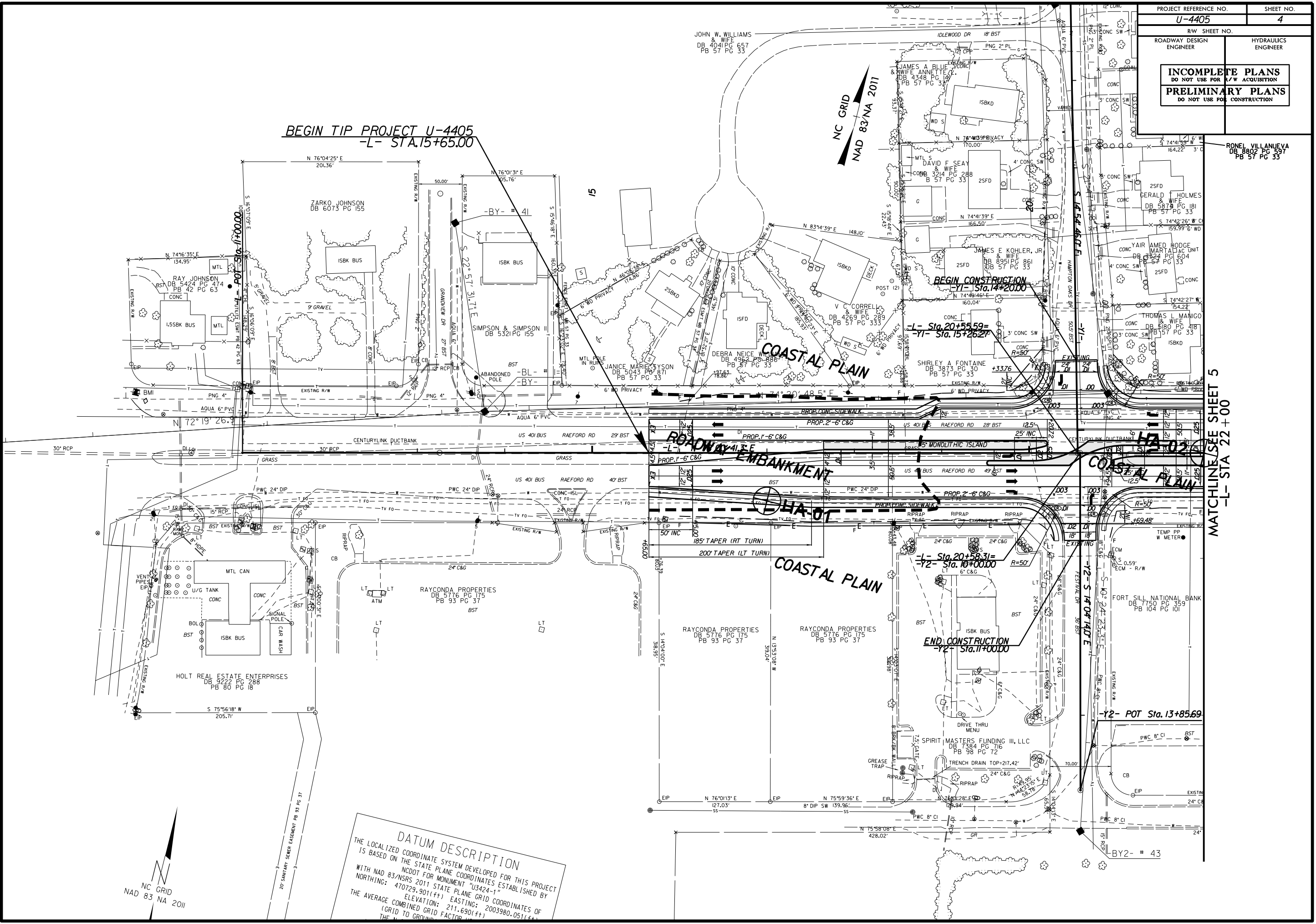
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-Y1- Sta.15+26.27

-L- Sta.20+58.31=  
-Y2- Sta.10+00.00

END CONSTRUCTION  
-Y2- Sta.11+00.00

-Y2- POT Sta.13+85.69

MATCHLINE SEE SHEET 5  
-L- STA. 22 + 00



**DATUM DESCRIPTION**  
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "U3424-1" WITH NAD 83/NSRS 2011 STATE PLANE GRID COORDINATES OF NORTHING: 470729.901(ft) EASTING: 2003980.051(ft) ELEVATION: 211.690(ft) (GRID TO GROUND) THE AVERAGE COMBINED GRID FACTOR

NC GRID  
NAD 83 NA 2011

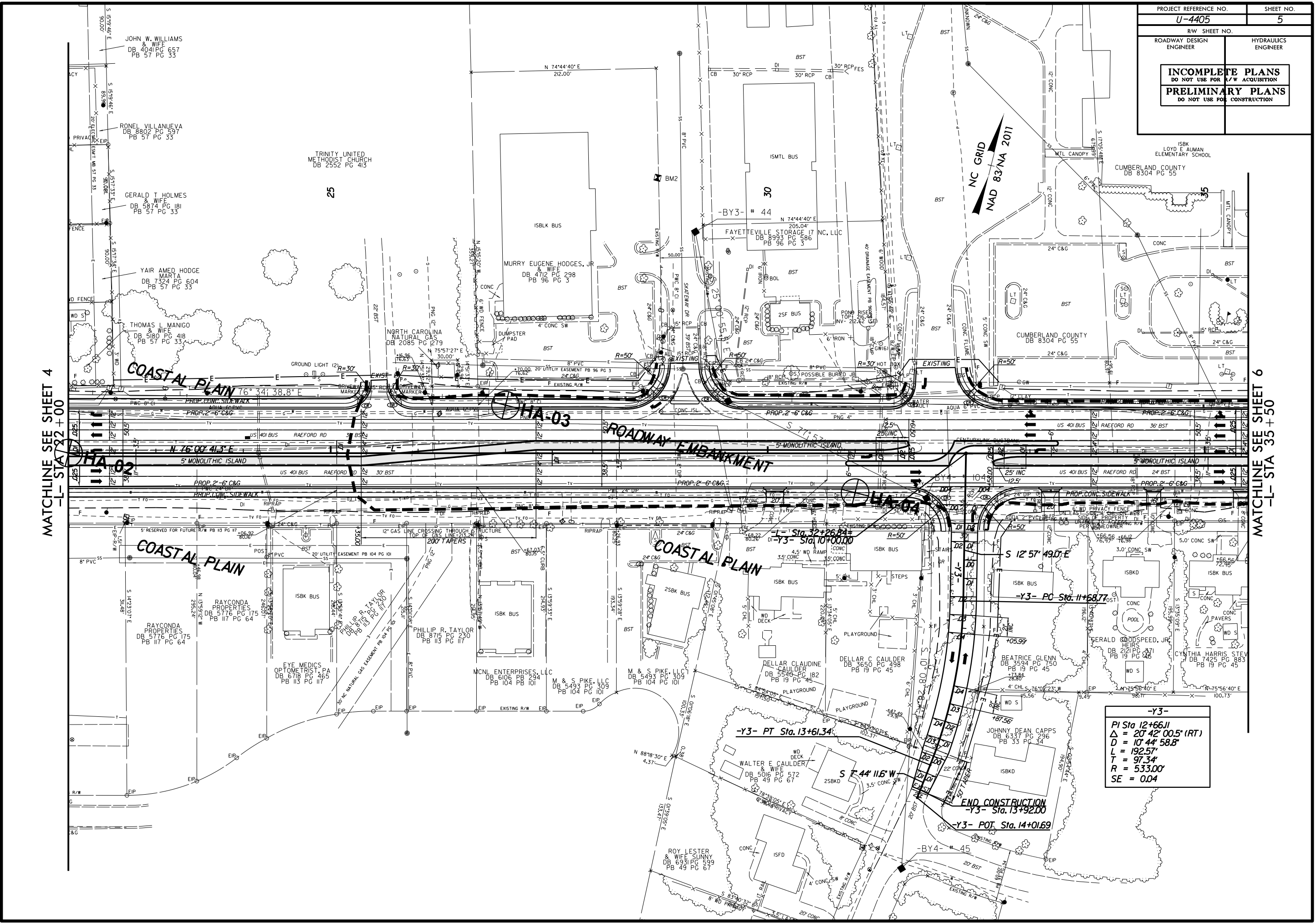
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8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-4405	5
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	

ISBK  
LOYD E ALMAN  
ELEMENTARY SCHOOL  
CUMBERLAND COUNTY  
DB 8304 PG 55

NC GRID  
NAD 83/NA 2011



MATCHLINE SEE SHEET 4  
-L- STA 22+00

MATCHLINE SEE SHEET 6  
-L- STA 35+50

-Y3-

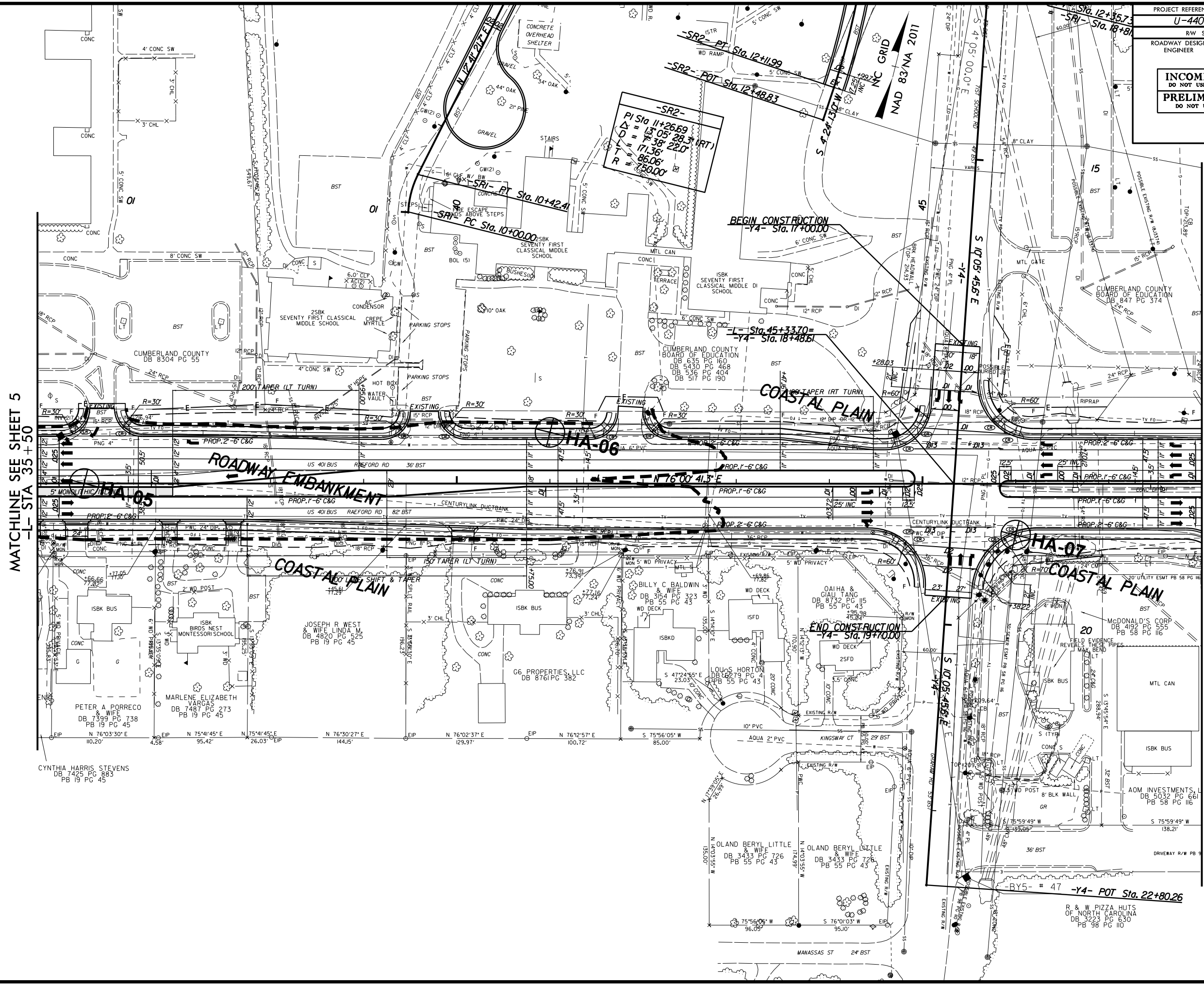
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$R = 533.00'$
$SE = 0.04$

REVISIONS

20-MAN-2016 1458  
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 8/17/99



PROJECT REFERENCE NO.	SHEET NO.
U-4405	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	



MATCHLINE SEE SHEET 5  
-L- STA 35+50

MATCHLINE SEE SHEET 7  
-L- STA 48+00

REVISIONS

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 8/17/99

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 $T = 86.06'$   
 $R = 759.00'$

HA-06

HA-07

CYNTHIA HARRIS STEVENS  
 DB 7425 PG 883  
 PB 19 PG 45

PETER A PORRECO  
 & WIFE  
 DB 7399 PG 738  
 PB 19 PG 45

MARLENE ELIZABETH  
 VARGAS  
 DB 7487 PG 273  
 PB 19 PG 45

JOSEPH R WEST  
 & WIFE LINDA M  
 DB 4820 PG 525  
 PB 19 PG 45

G6 PROPERTIES, LLC  
 DB 8761 PG 382

BILLY C BALDWIN  
 & WIFE  
 DB 3154 PG 323  
 PB 55 PG 43

OAIHA &  
 GIALI TANG  
 DB 8732 PG 115  
 PB 55 PG 43

LOUIS HORTON  
 DB 6279 PG 4  
 PB 55 PG 43

OLAND BERYL LITTLE  
 & WIFE  
 DB 3433 PG 726  
 PB 55 PG 43

OLAND BERYL LITTLE  
 & WIFE  
 DB 3433 PG 426  
 PB 55 PG 43

McDONALD'S CORP  
 DB 4192 PG 555  
 PB 58 PG 116

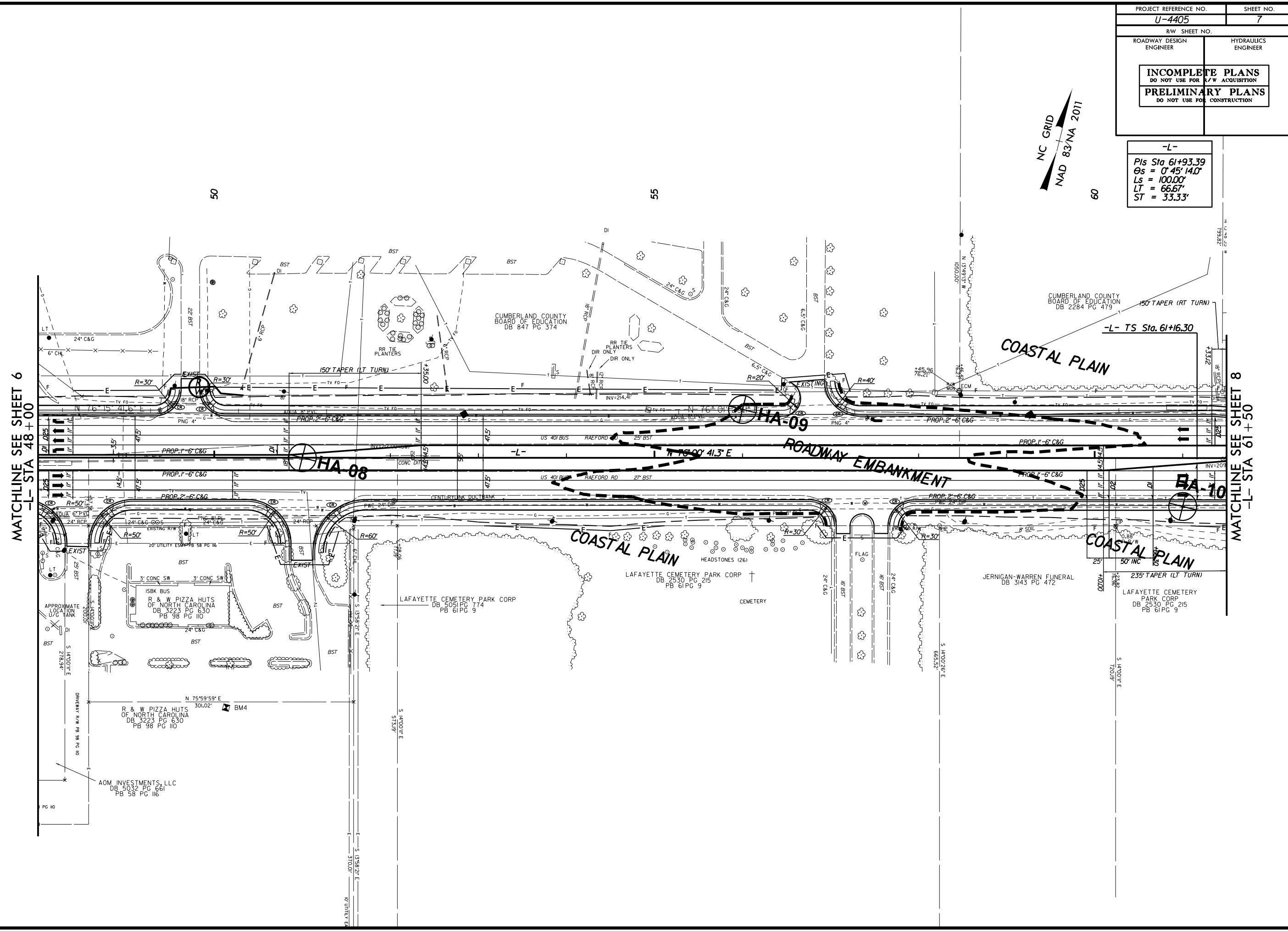
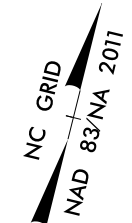
AOM INVESTMENTS, L  
 DB 5032 PG 661  
 PB 58 PG 116

R & W PIZZA HUTS  
 OF NORTH CAROLINA  
 DB 3223 PG 630  
 PB 98 PG 110

PROJECT REFERENCE NO. <b>U-4405</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	

-L-

Pls Sta 61+93.39  
 $\Theta_s = 0^\circ 45' 14.0''$   
 $L_s = 100.00'$   
 $LT = 66.67'$   
 $ST = 33.33'$



MATCHLINE SEE SHEET 6  
-L- STA 48+00

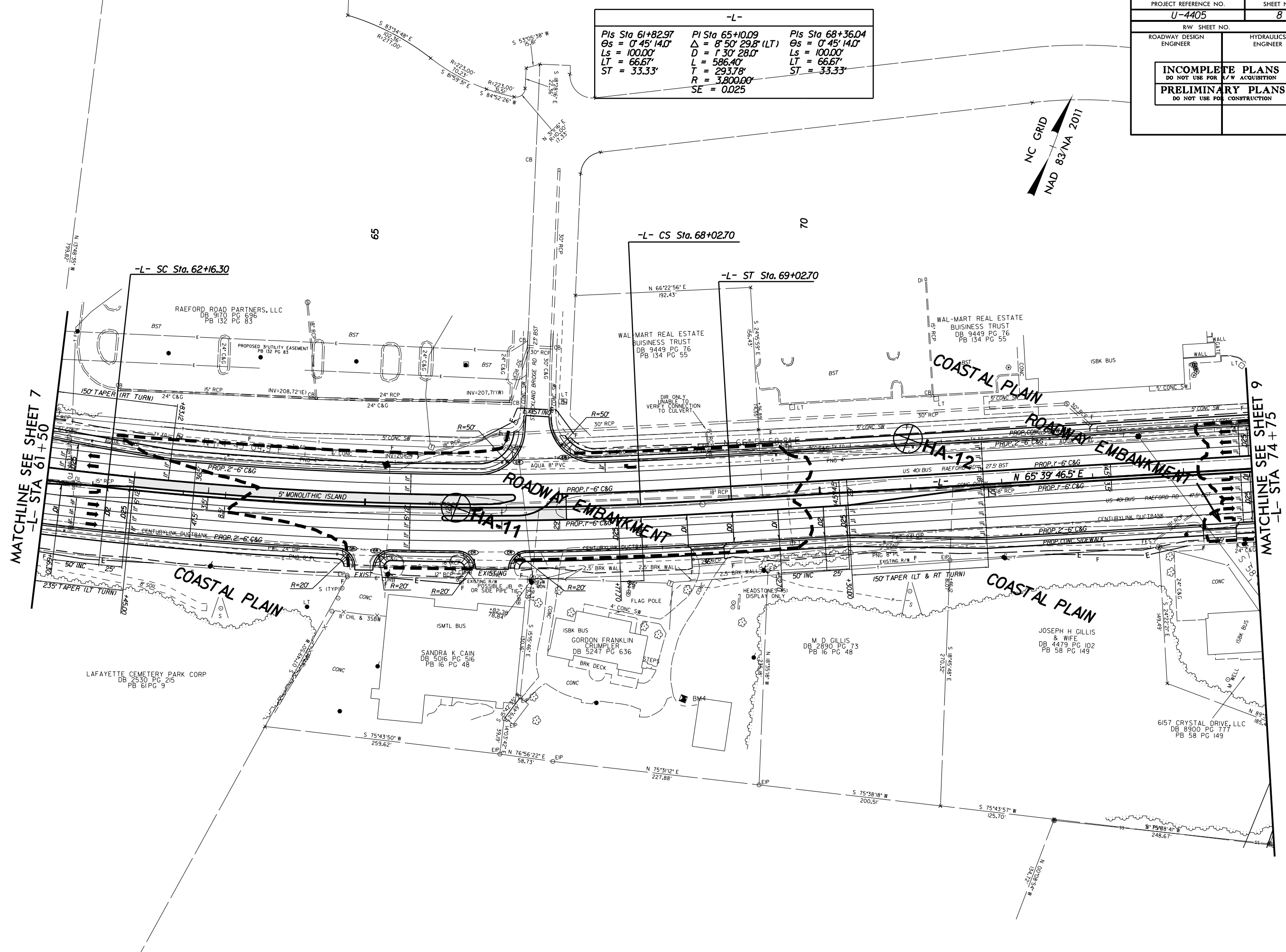
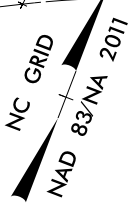
MATCHLINE SEE SHEET 8  
-L- STA 61+50

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-4405	8
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

-L-		
Pls Sta 61+82.97	Pls Sta 65+10.09	Pls Sta 68+36.04
$\Theta_s = 0^\circ 45' 14.0''$	$\Delta = 8^\circ 50' 29.8''$ (LT)	$\Theta_s = 0^\circ 45' 14.0''$
$L_s = 100.00'$	$D = 1^\circ 30' 28.0''$	$L_s = 100.00'$
$LT = 66.67'$	$L = 586.40'$	$LT = 66.67'$
$ST = 33.33'$	$T = 293.78'$	$ST = 33.33'$
	$R = 3,800.00'$	
	$SE = 0.025$	



MATCHLINE SEE SHEET 7  
-L- STA 61+50

MATCHLINE SEE SHEET 9  
-L- STA 74+75

REVISIONS

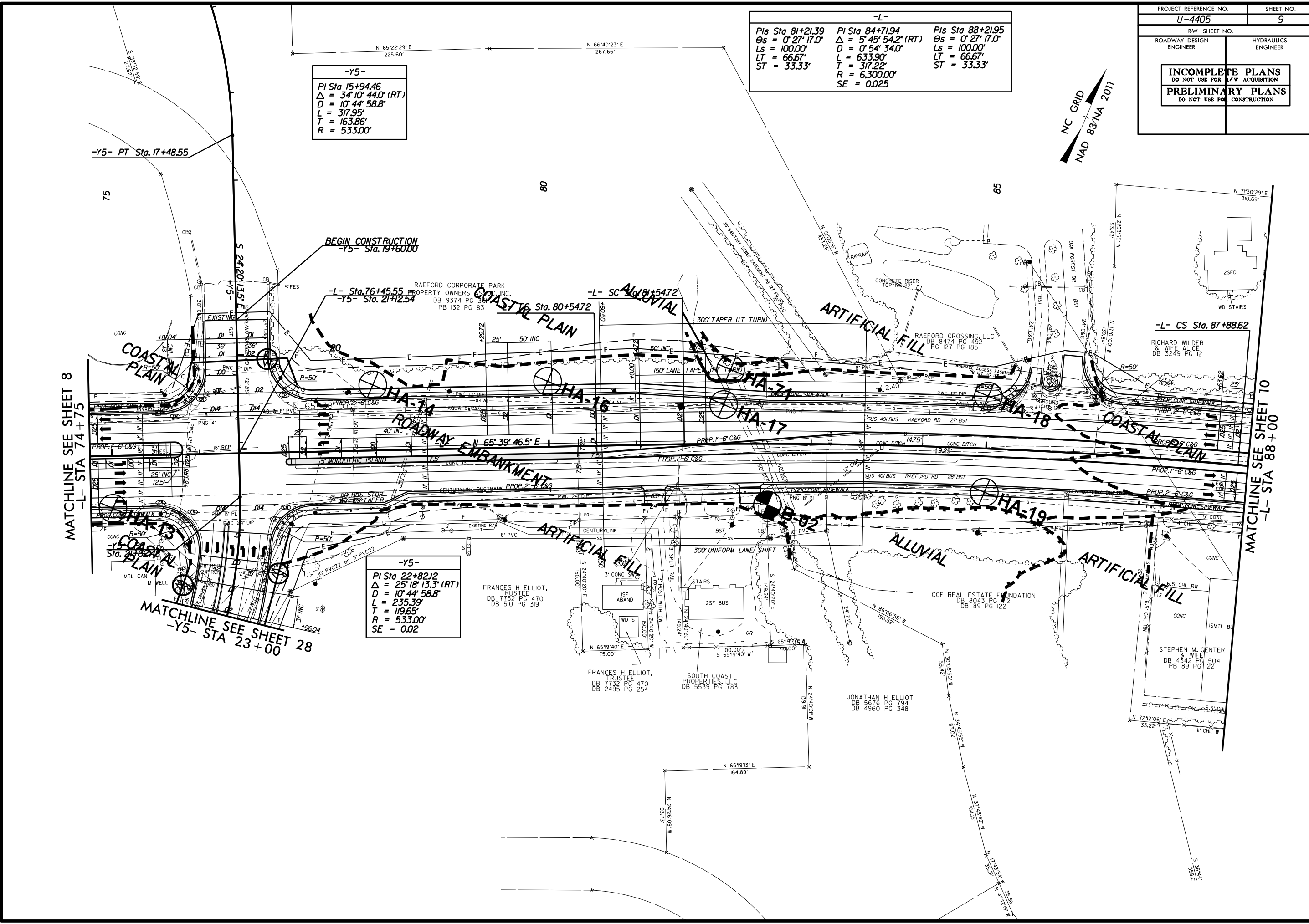
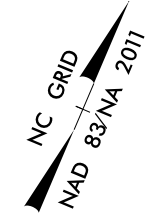
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PROJECT REFERENCE NO.	SHEET NO.
U-4405	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

-L-		
Pls Sta 81+21.39	PI Sta 84+71.94	Pls Sta 88+21.95
$\Delta = 0' 27' 17.0"$	$\Delta = 5' 45' 54.2" (RT)$	$\Delta = 0' 27' 17.0"$
LS = 100.00'	D = 0' 54' 34.0"	LS = 100.00'
LT = 66.67'	L = 633.90'	LT = 66.67'
ST = 33.33'	T = 317.22'	ST = 33.33'
	R = 6,300.00'	
	SE = 0.025	

-Y5-	
PI Sta 15+94.46	
$\Delta = 34' 10' 44.0" (RT)$	
D = 10' 44' 58.8"	
L = 317.95'	
T = 163.86'	
R = 533.00'	

-Y5-	
PI Sta 22+82.12	
$\Delta = 25' 18' 13.3" (RT)$	
D = 10' 44' 58.8"	
L = 235.39'	
T = 119.65'	
R = 533.00'	
SE = 0.02	



REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-4405	10
RW SHEET NO.	HYDRAULICS ENGINEER
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	

-Y7-

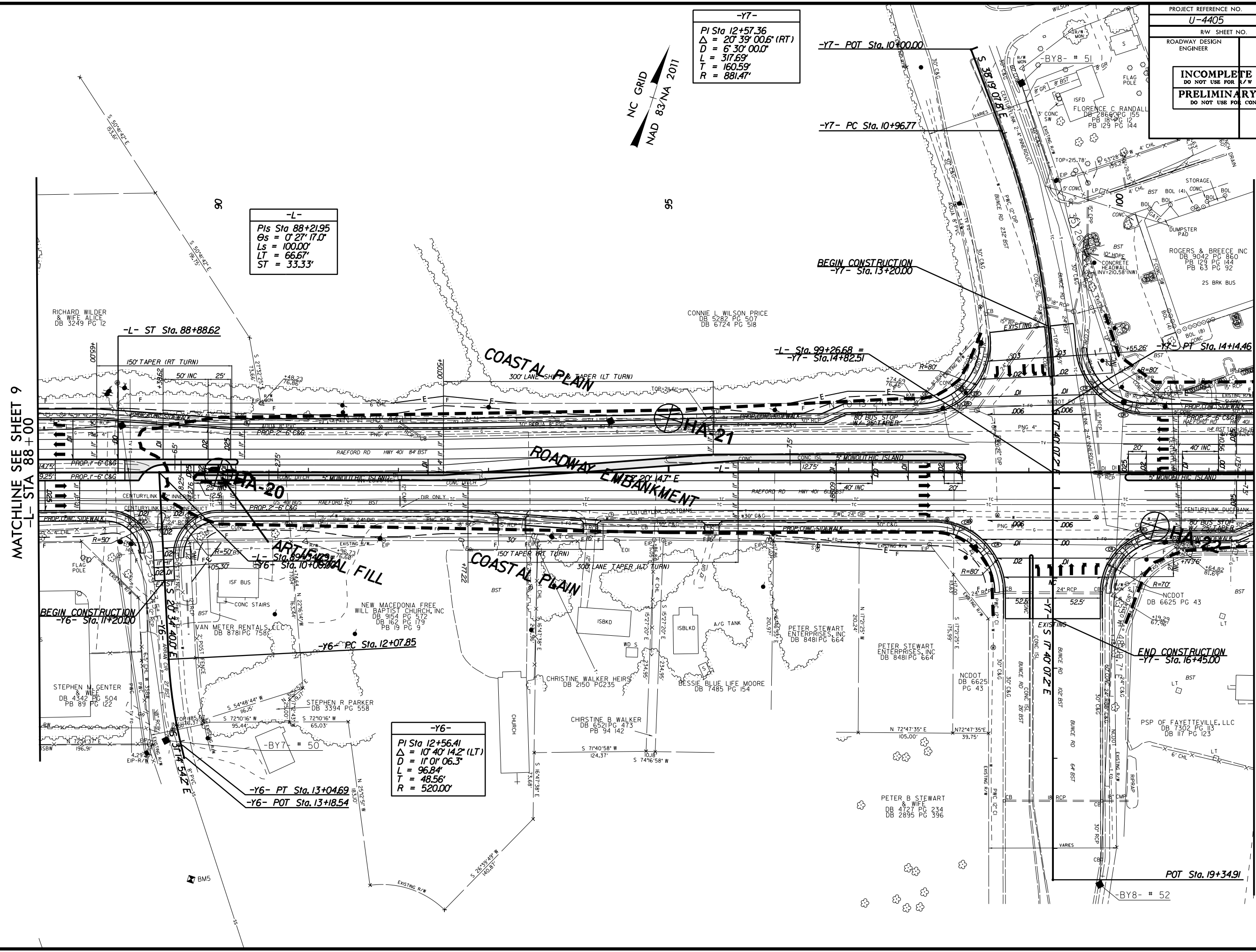
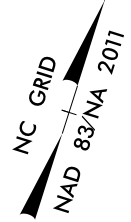
PI Sta 12+57.36  
 $\Delta = 20' 39' 00.6''$  (RT)  
 $D = 6' 30' 00.0''$   
 $L = 317.69'$   
 $T = 160.59'$   
 $R = 881.47'$

-L-

PIs Sta 88+21.95  
 $\Theta_s = 0' 27' 17.0''$   
 $L_s = 100.00'$   
 $LT = 66.67'$   
 $ST = 33.33'$

-Y6-

PI Sta 12+56.41  
 $\Delta = 10' 40' 14.2''$  (LT)  
 $D = 11' 01' 06.3''$   
 $L = 96.84'$   
 $T = 48.56'$   
 $R = 520.00'$



MATCHLINE SEE SHEET 9  
-L- STA 88+00

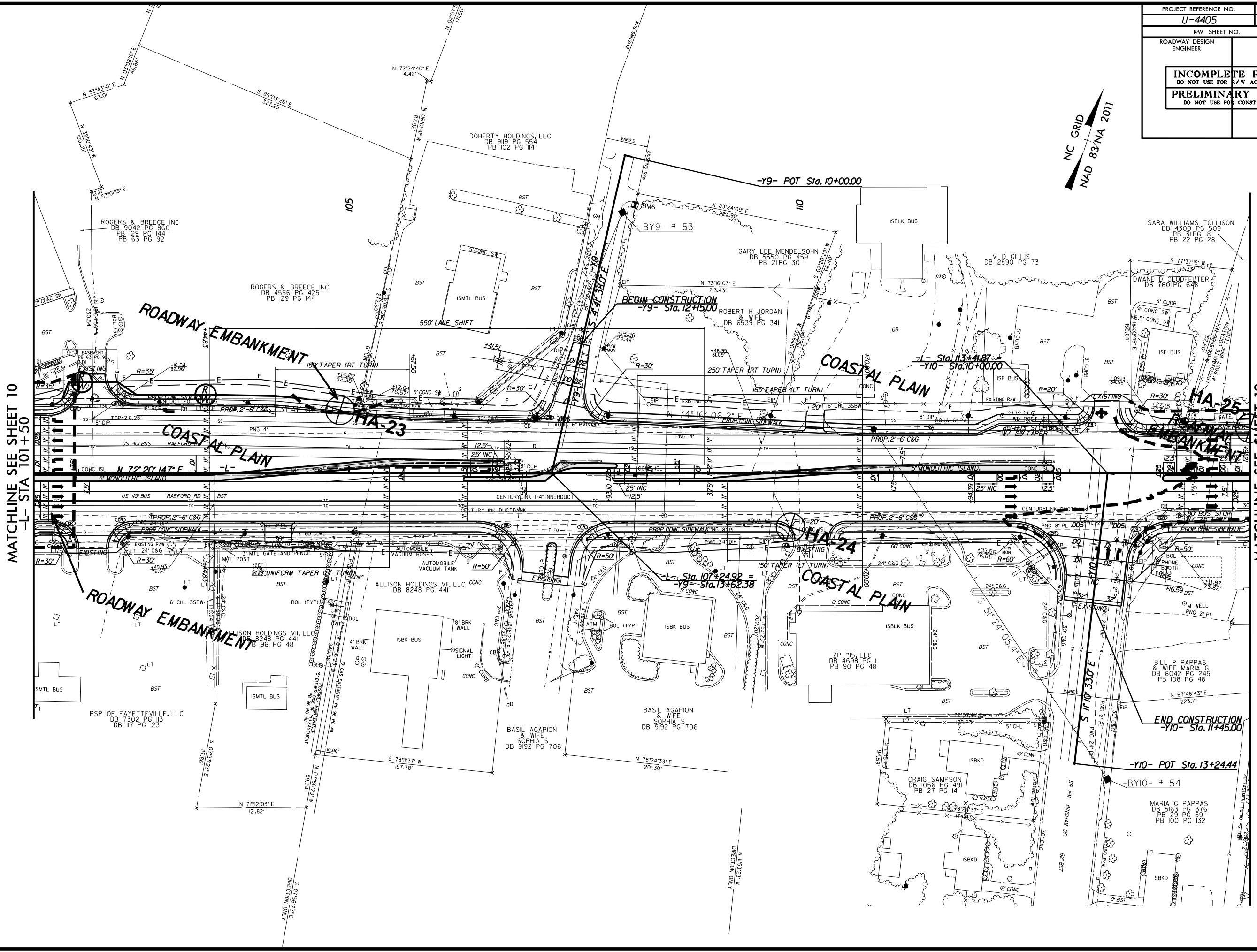
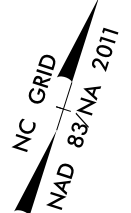
MATCHLINE SEE SHEET 11  
-L- STA 101+50

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-4405	11
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	



REVISIONS

MATCHLINE SEE SHEET 10  
-L- STA 101 + 50

MATCHLINE SEE SHEET 12  
-L- STA 115 + 00

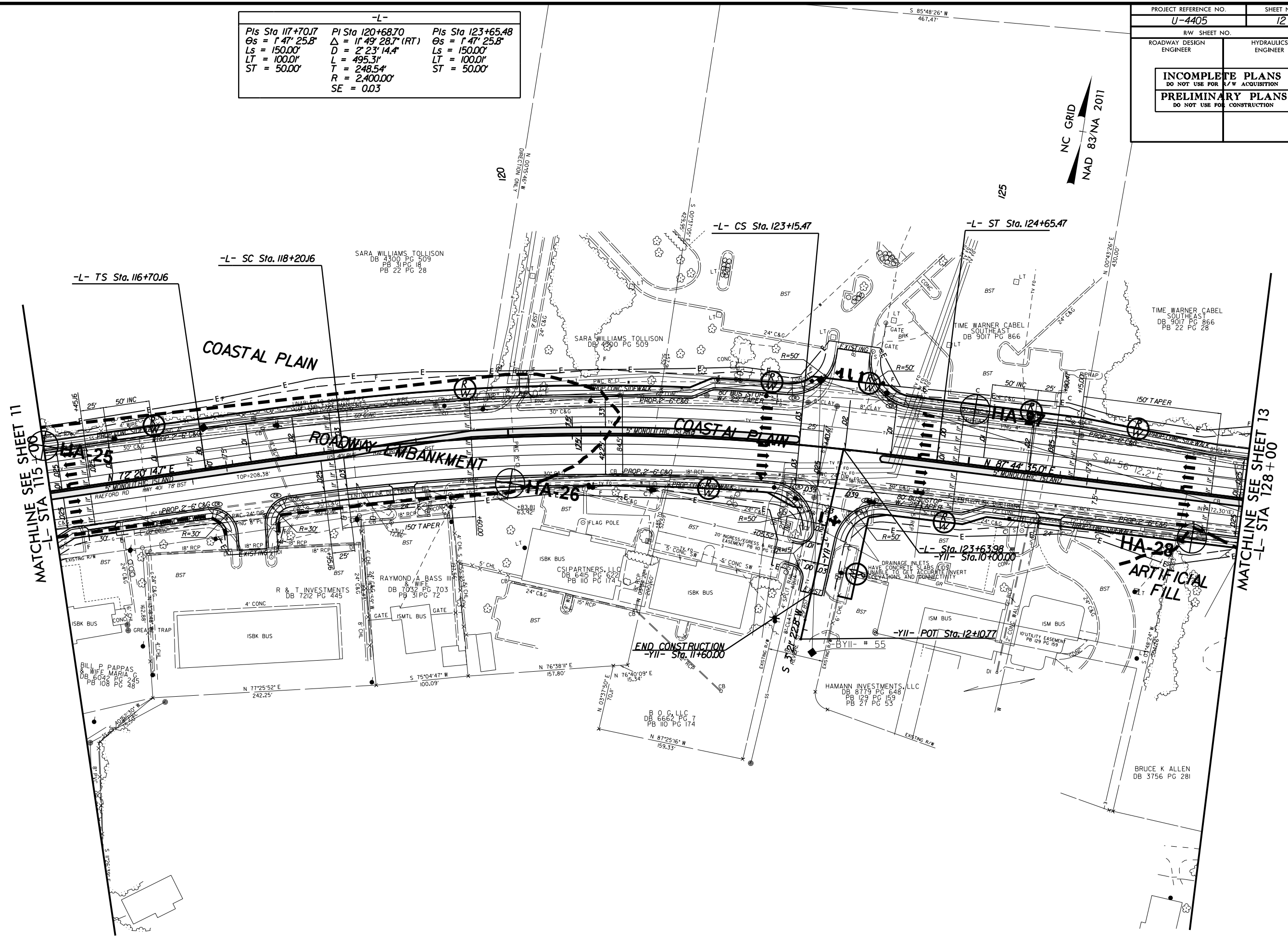
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PROJECT REFERENCE NO. U-4405	SHEET NO. 12
R/W SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	CONSTRUCTION

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

-L-		
Pis Sta 117+70.17	PI Sta 120+68.70	Pis Sta 123+65.48
Os = 1' 47" 25.8"	Δ = 1' 49" 28.7" (RT)	Os = 1' 47" 25.8"
Ls = 150.00'	D = 2' 23" 14.4"	Ls = 150.00'
LT = 100.00'	L = 495.31'	LT = 100.00'
ST = 50.00'	T = 248.54'	ST = 50.00'
	R = 2,400.00'	
	SE = 0.03	

S 85°48'26" W 467.47'  
NAD 83/NA 2011  
NC GRID



MATCHLINE SEE SHEET 11  
-L- STA 115+00

MATCHLINE SEE SHEET 13  
-L- STA 128+00

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REVISIONS

REVISIONS

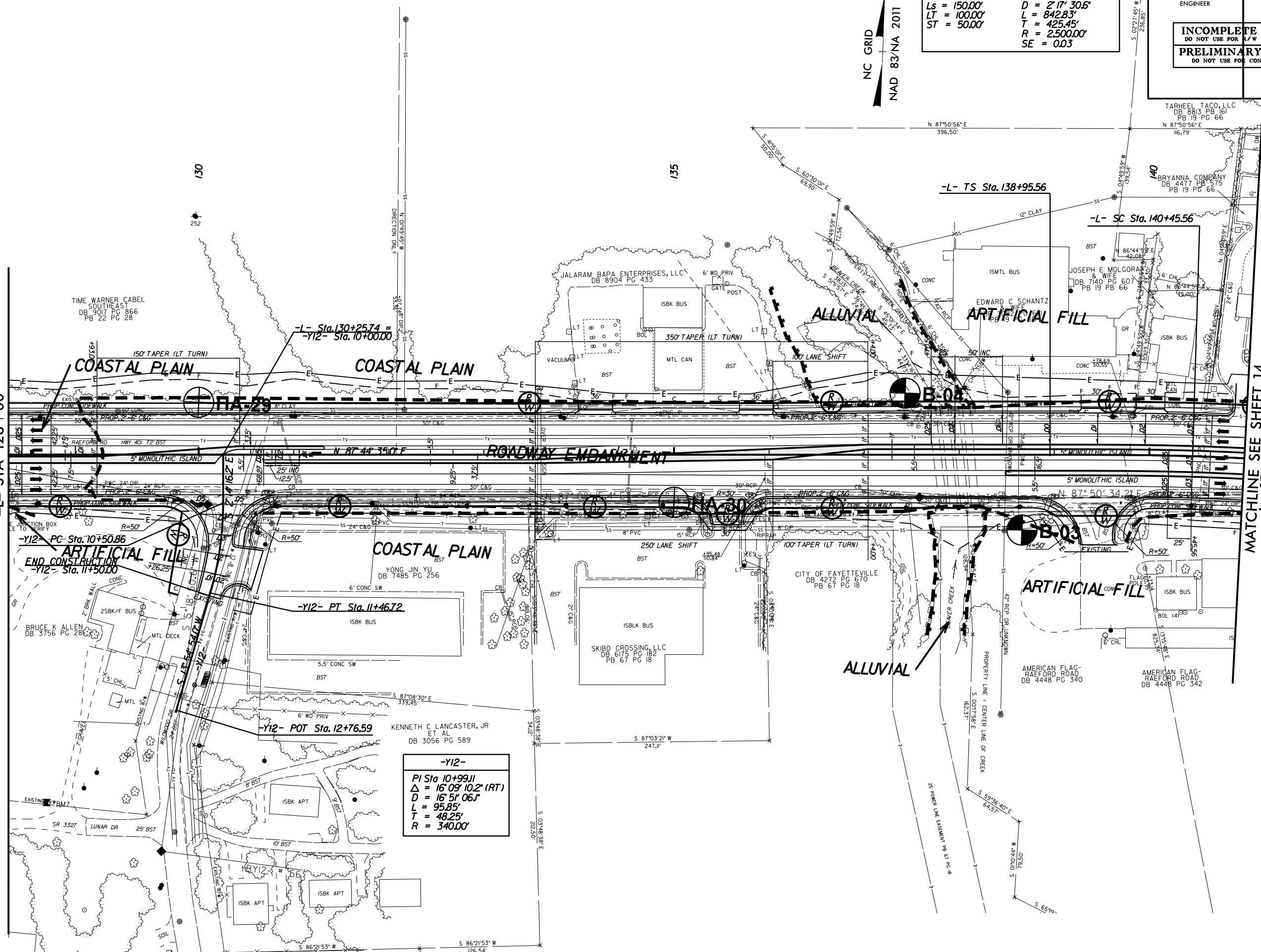
PROJECT REFERENCE NO.	SHEET NO.
U-4405	13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

-L-  
 PIs Sta 139+95.56 PI Sta 144+71.01  
 $\Delta = 19' 18" 58.8" (RT)$   
 $L_s = 150.00'$   $D = 2' 17" 30.6"$   
 $LT = 100.00'$   $L = 842.83'$   
 $ST = 50.00'$   $T = 425.45'$   
 $R = 2,500.00'$   
 $SE = 0.03$

NC GRID  
 NAD 83/NA 2011

MATCHLINE SEE SHEET 12  
 -L- STA 128+00

MATCHLINE SEE SHEET 14  
 -L- STA 141+00



-Y12-  
 PI Sta 10+99.11  
 $\Delta = 16' 09" 10.2" (RT)$   
 $D = 16' 51" 06.1"$   
 $L = 95.85'$   
 $T = 48.25'$   
 $R = 340.00'$

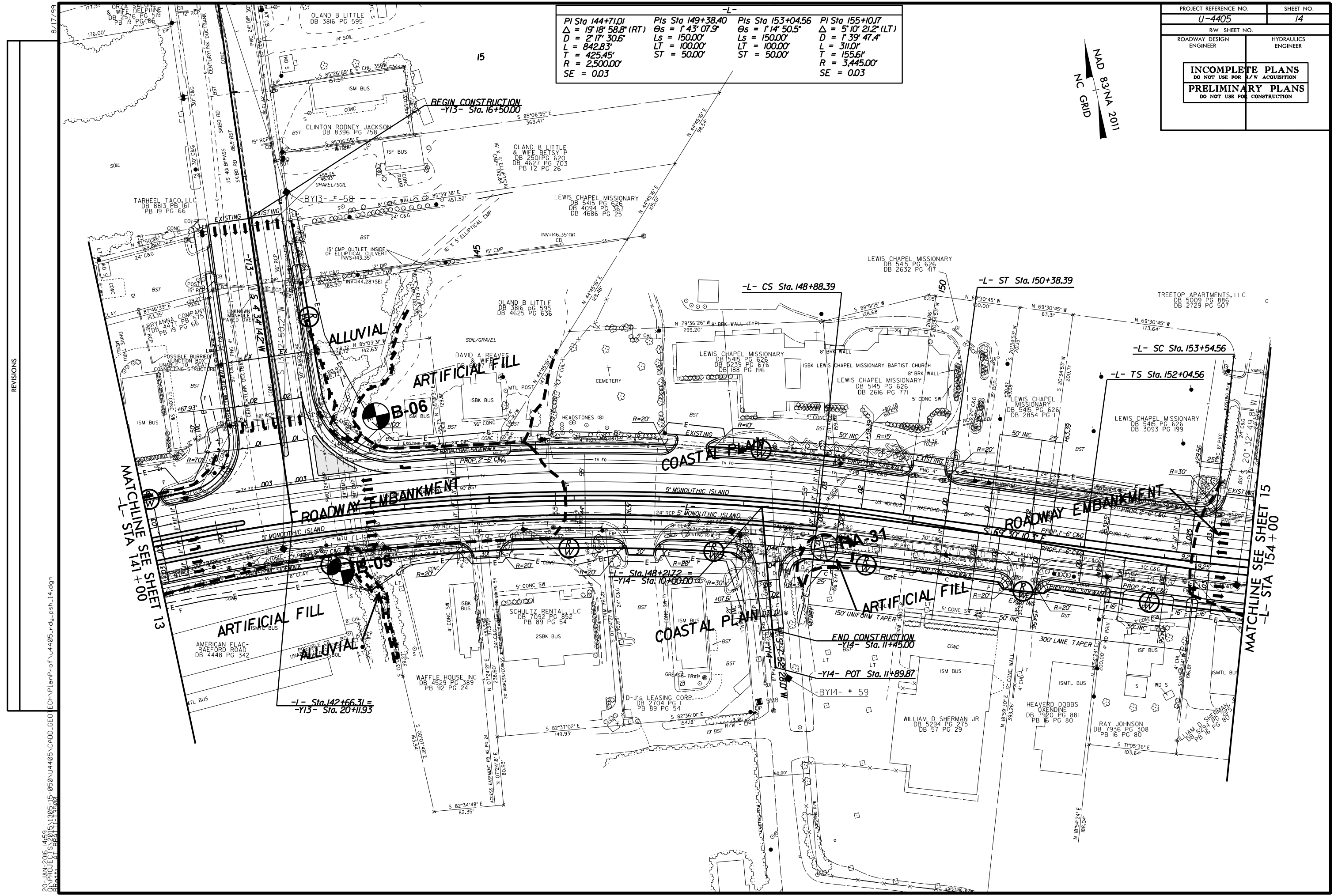
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 8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-4405	14
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	

PI Sta 144+71.01 $\Delta = 19^{\circ}18'58.8"$ (RT) $D = 2^{\circ}17'30.6"$ $L = 842.83'$ $T = 425.45'$ $R = 2,500.00'$ $SE = 0.03$	PIs Sta 149+38.40 $\Theta_s = 1^{\circ}43'07.9"$ $L_s = 150.00'$ $LT = 100.00'$ $ST = 50.00'$	PIs Sta 153+04.56 $\Theta_s = 1^{\circ}14'50.5"$ $L_s = 150.00'$ $LT = 100.00'$ $ST = 50.00'$	PI Sta 155+10.17 $\Delta = 5^{\circ}10'21.2"$ (LT) $D = 1^{\circ}39'47.4"$ $L = 311.01'$ $T = 155.61'$ $R = 3,445.00'$ $SE = 0.03$
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NAD 83/NA 2011  
NC GRID

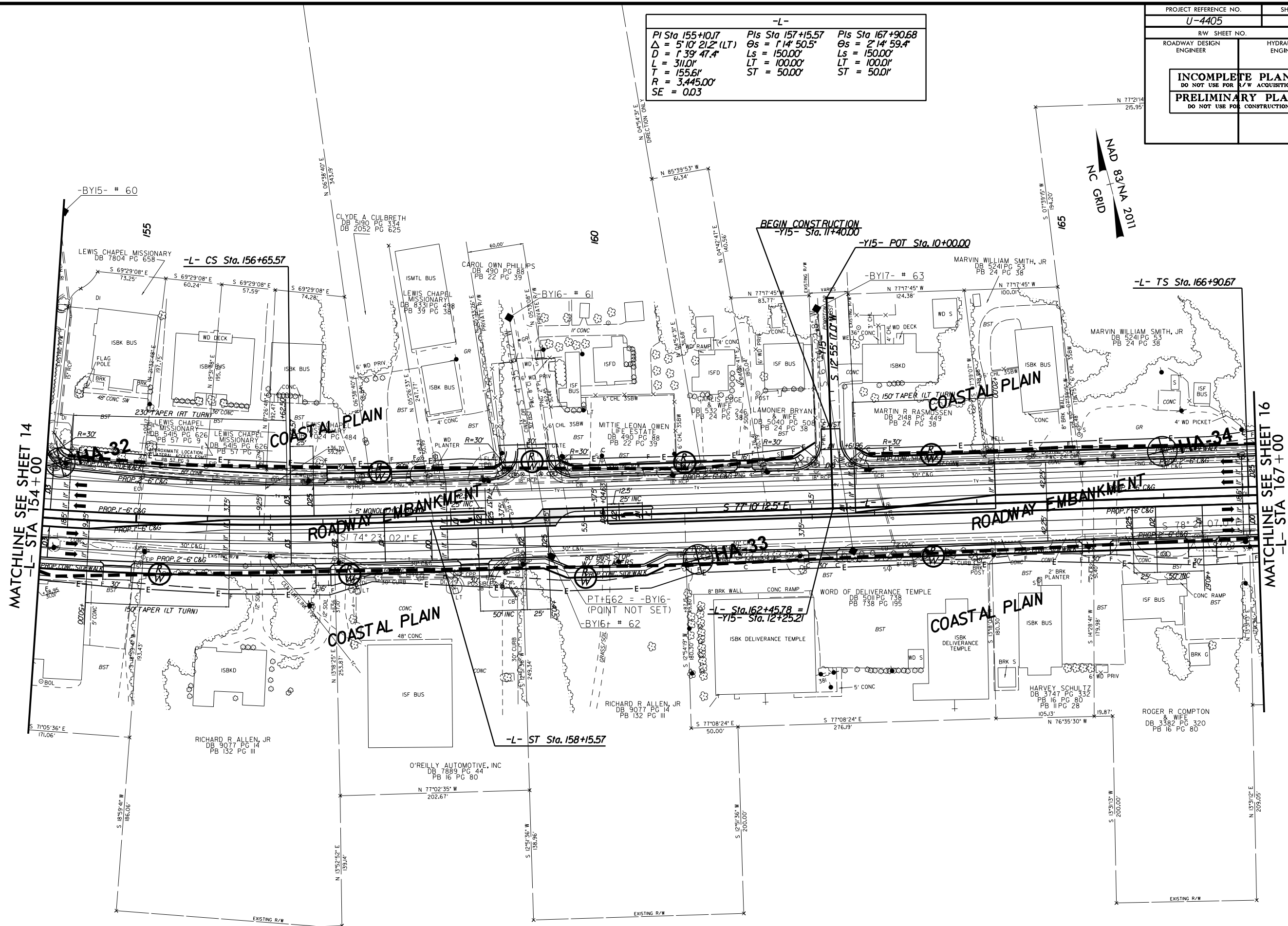
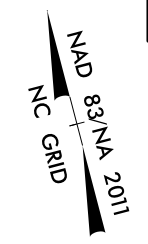


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PROJECT REFERENCE NO.	SHEET NO.
U-4405	15
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

-L-		
PI Sta 155+10.17	PIs Sta 157+15.57	PIs Sta 167+90.68
$\Delta = 5' 10' 21.2" (LT)$	$\Theta s = 1' 14' 50.5"$	$\Theta s = 2' 14' 59.4"$
$D = 1' 39' 47.4"$	$Ls = 150.00'$	$Ls = 150.00'$
$L = 311.01'$	$LT = 100.00'$	$LT = 100.01'$
$T = 155.61'$	$ST = 50.00'$	$ST = 50.01'$
$R = 3,445.00'$		
$SE = 0.03$		



MATCHLINE SEE SHEET 14  
-L- STA 154+00

MATCHLINE SEE SHEET 16  
-L- STA 167+00

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-4405	16
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	

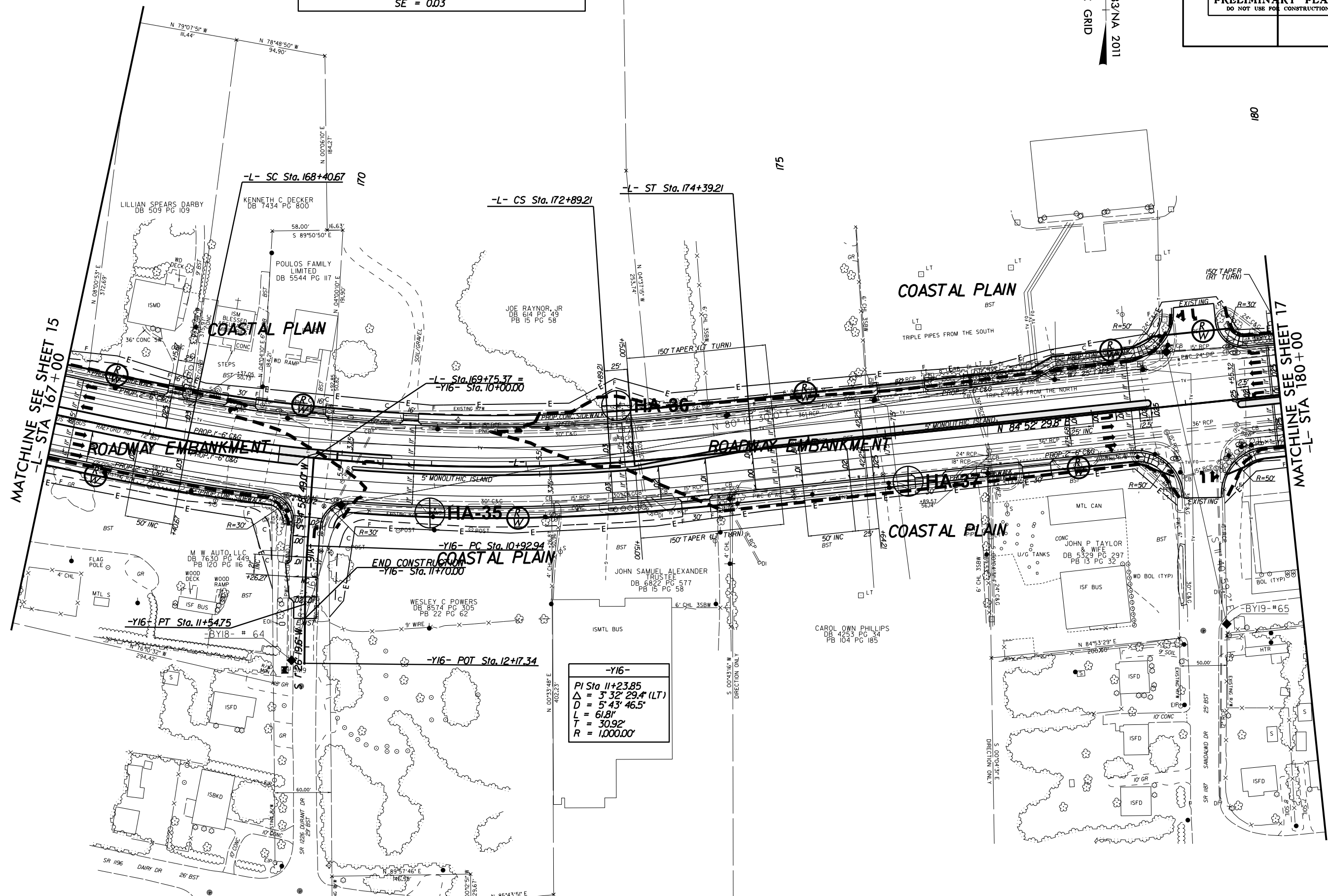
NAD 83/NA 2011  
NC GRID

-L-

PIs Sta 167+90.68 Os = 2°14'59.4" Ls = 150.00' LT = 100.01' ST = 50.01'	PI Sta 170+65.98 Δ = 13°27'18.9" (LT) D = 2°59'59.2" L = 448.54' T = 225.31' R = 1,910.00' SE = 0.03	PIs Sta 173+39.22 Os = 2°14'59.4" Ls = 150.00' LT = 100.01' ST = 50.01'
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-Y16-

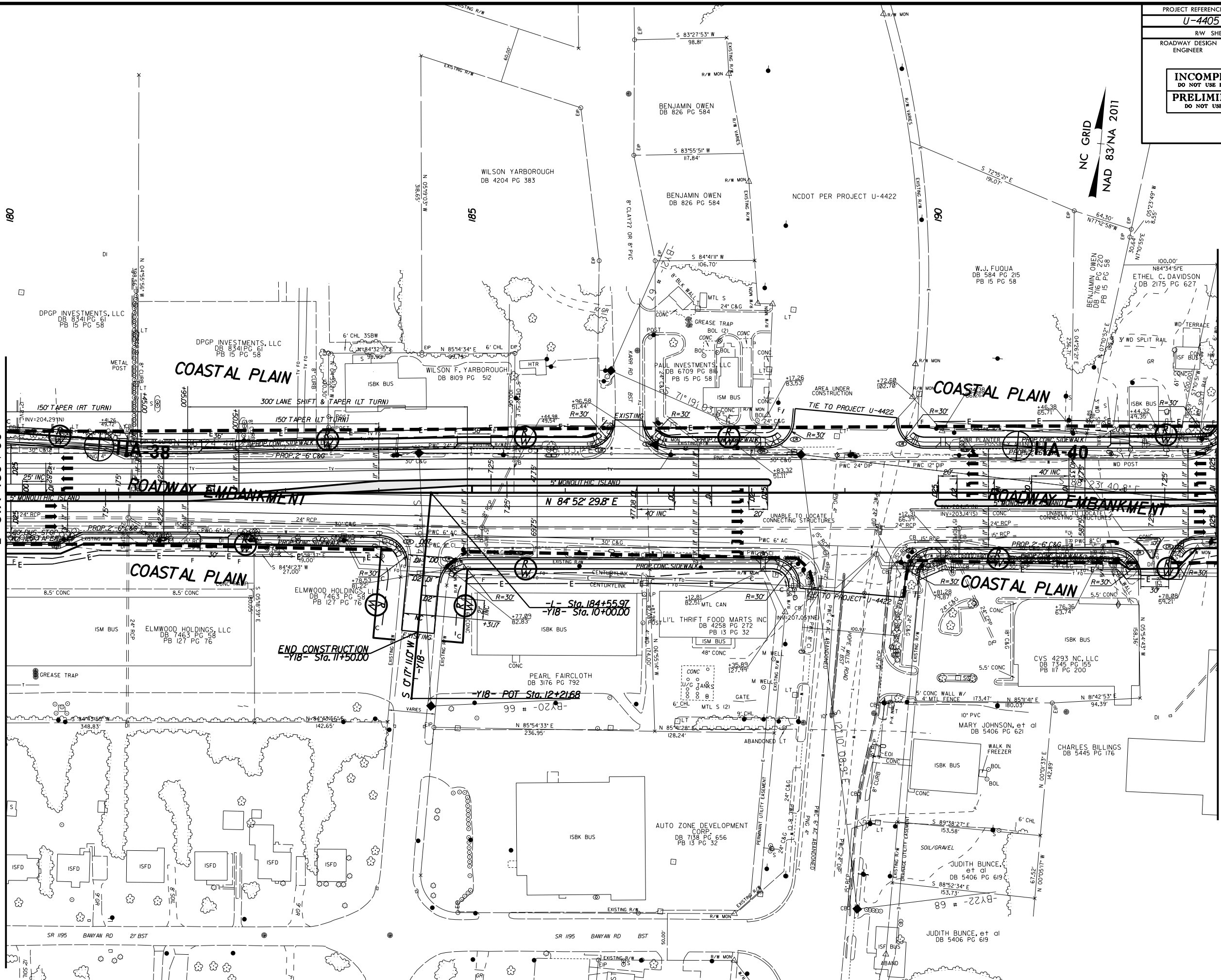
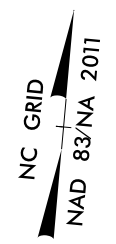
PI Sta 11+23.85 Δ = 3°32'29.4" (LT) D = 5°43'46.5" L = 61.81' T = 30.92' R = 1,000.00'
---



REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-4405	17
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	



MATCHLINE SEE SHEET 16  
-L- STA 180+00

MATCHLINE SEE SHEET 18  
-L- STA 193+00

REVISIONS

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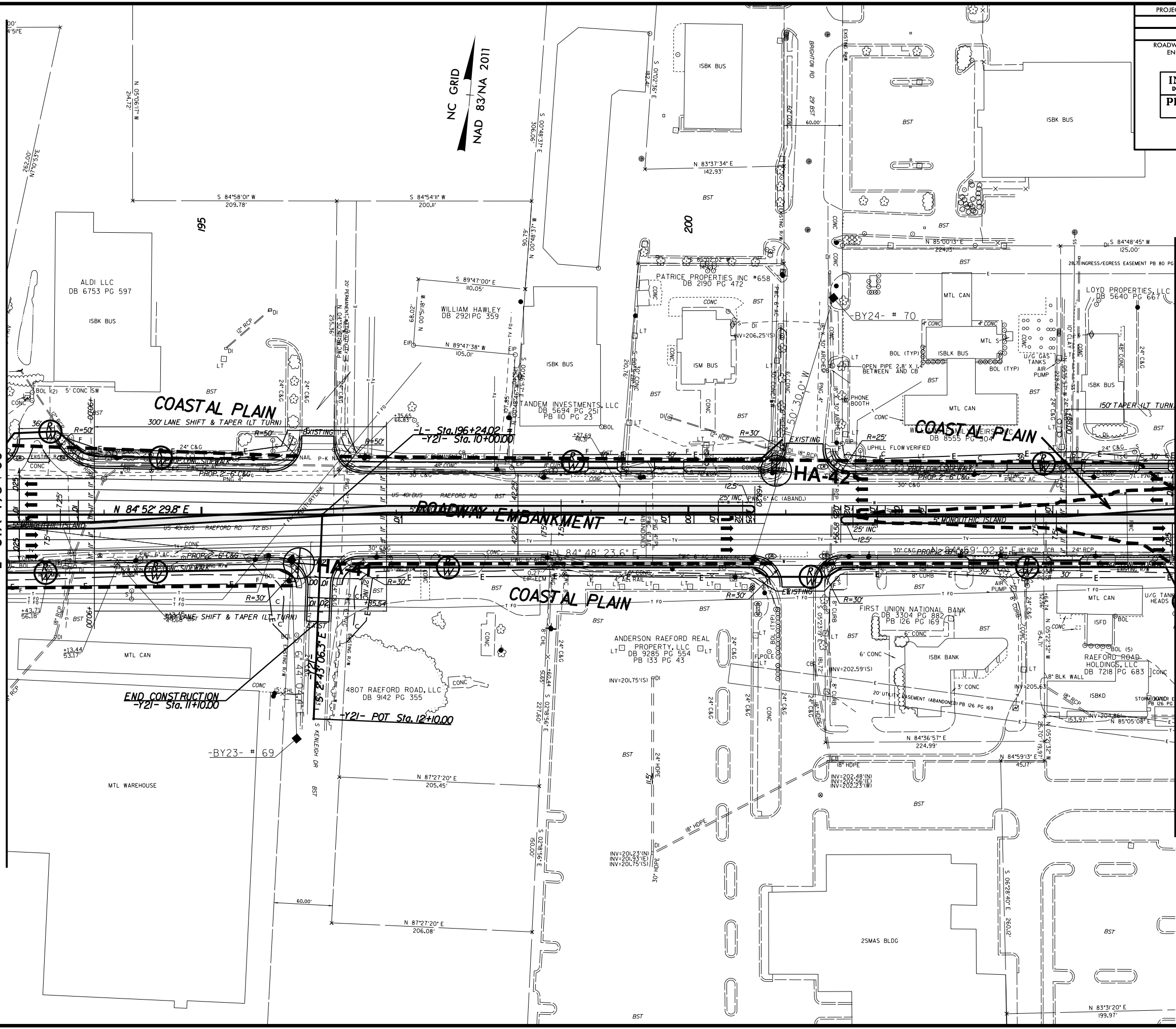
PROJECT REFERENCE NO.	SHEET NO.
U-4405	18
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

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MATCHLINE SEE SHEET 17  
 -L- STA 193+00

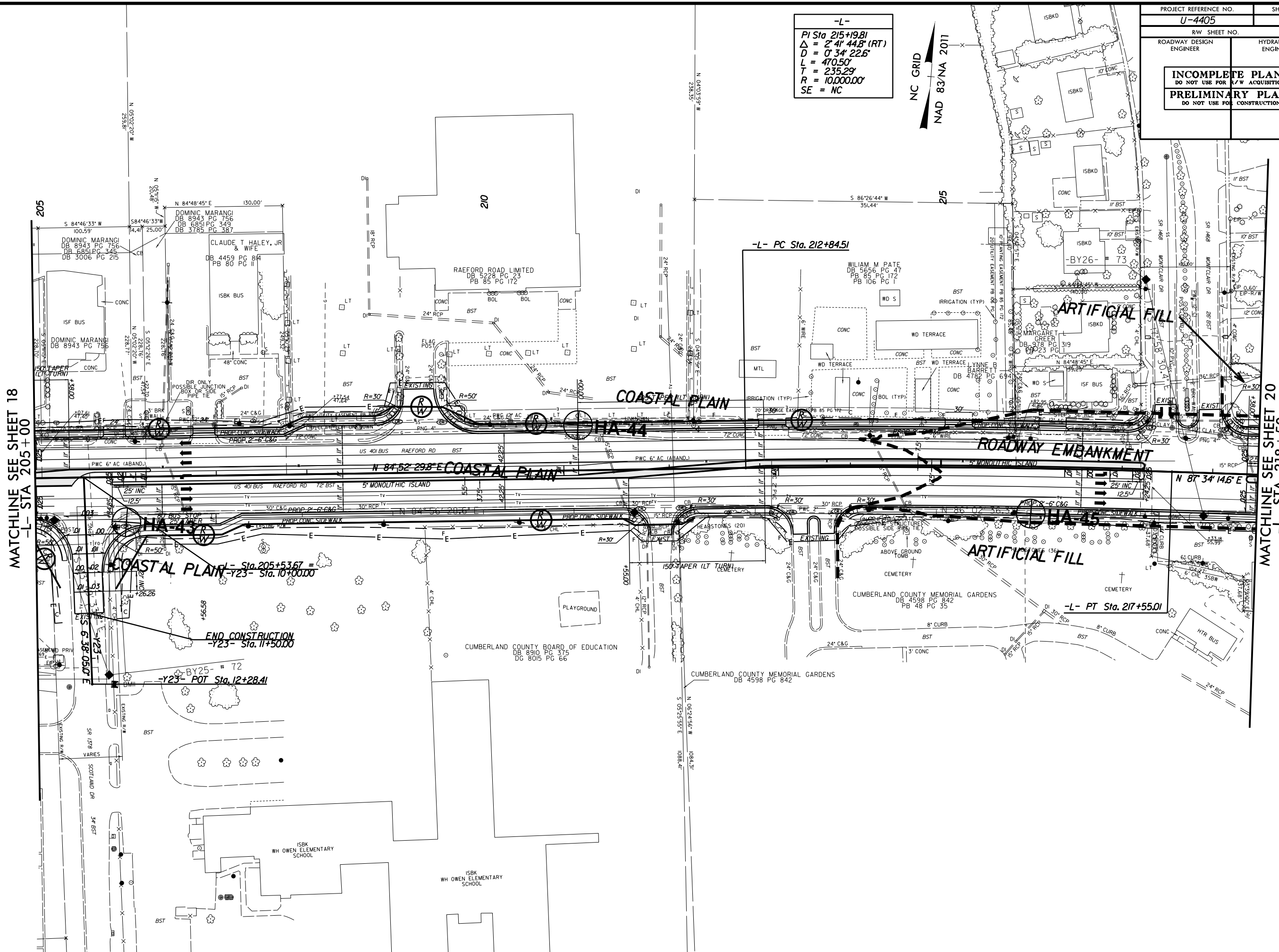
MATCHLINE SEE SHEET 19  
 -L- STA 205+00



PROJECT REFERENCE NO.	SHEET NO.
U-4405	19
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	

-L-  
 PI Sta 215+19.81  
 $\Delta = 2' 41'' 44.8'' (RT)$   
 $D = 0' 34'' 22.6''$   
 $L = 470.50'$   
 $T = 235.29'$   
 $R = 10,000.00'$   
 SE = NC

NC GRID  
 NAD 83/NA 2011



MATCHLINE SEE SHEET 18  
 -L- STA 205+00

MATCHLINE SEE SHEET 20  
 -L- STA 218+50

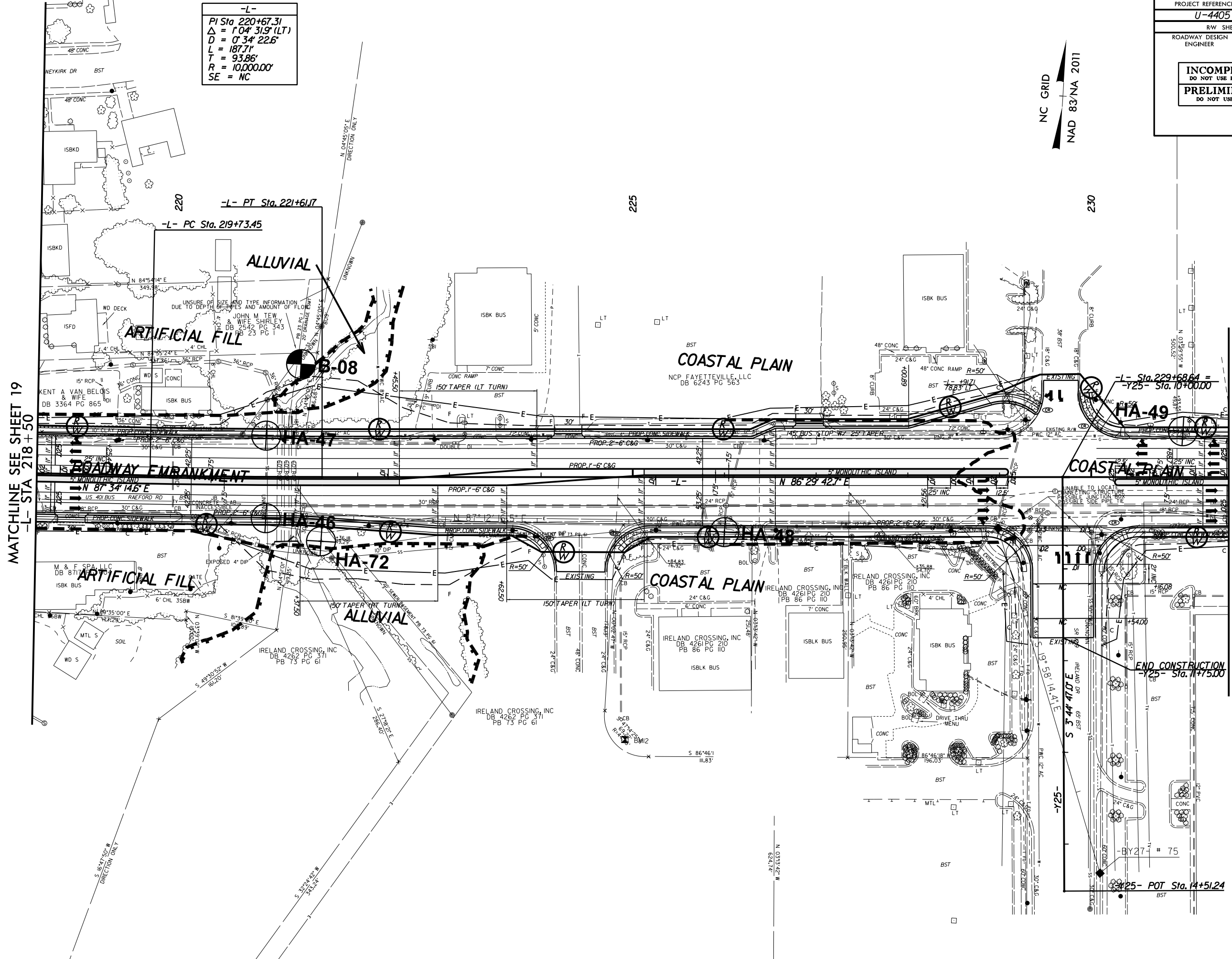
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PROJECT REFERENCE NO.	SHEET NO.
U-4405	20
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

NC GRID  
 NAD 83/NA 2011

-L-  
 PI Sta 220+67.31  
 $\Delta = 1^{\circ}04'31.9"$  (LT)  
 $D = 0^{\circ}34'22.6"$   
 $L = 187.71'$   
 $T = 93.86'$   
 $R = 10,000.00'$   
 SE = NC



MATCHLINE SEE SHEET 19  
 -L- STA 218 + 50

MATCHLINE SEE SHEET 21  
 -L- STA 231 + 50

END CONSTRUCTION  
 -Y25- Sta. 11+75.00

-Y25- POT Sta. 14+51.24

REVISIONS

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 8/17/99

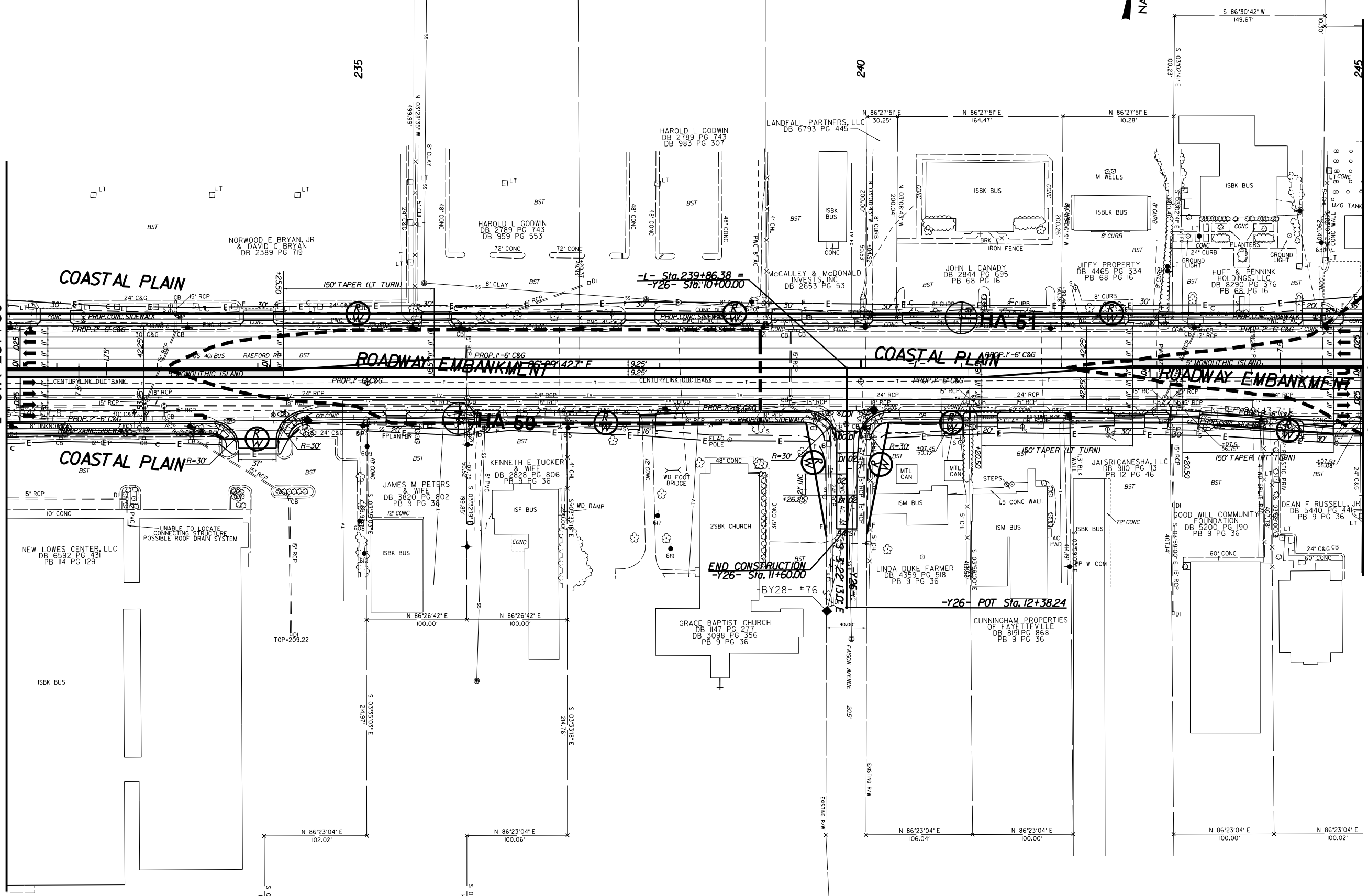


PROJECT REFERENCE NO.	SHEET NO.
U-4405	21
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

NC GRID  
NAD 83/NA 2011

MATCHLINE SEE SHEET 20  
-L- STA 231+50

MATCHLINE SEE SHEET 22  
-L- STA 245+00



REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-4405	22
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	

-RPB-	
PI Sta 17+61.56	PI Sta 25+80.73
$\Theta_s = 1' 30' 27.7''$	$\Delta = 20' 28' 11.6''$ (RT)
Ls = 199.99'	D = 7' 09' 43.1'
LT = 133.33'	L = 285.81'
ST = 66.67'	T = 144.45'
	R = 800.00'
	SE = 0.08

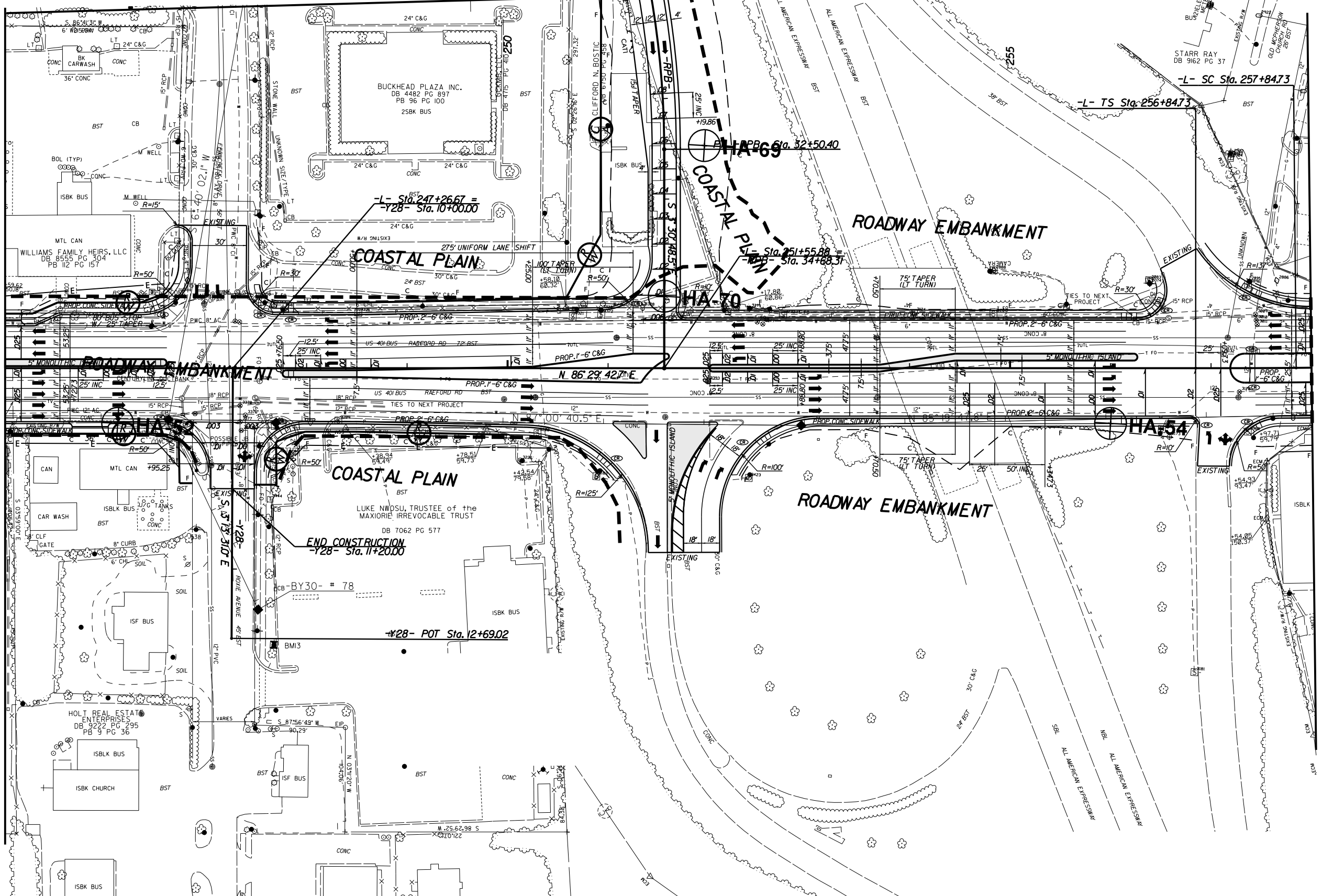
-L-	
PI Sta 257+51.40	PI Sta 258+20.74
$\Theta_s = 0' 31' 15.1''$	$\Delta = 0' 45' 00.9''$ (LT)
Ls = 100.00'	D = 1' 02' 30.3'
LT = 66.67'	L = 72.02'
ST = 33.33'	T = 36.01'
	R = 5,500.00'
	SE = 0.025

NC GRID  
NAD 83/NA 2011

MATCHLINE SEE SHEET 30  
-RPB- STA 30+96

MATCHLINE SEE SHEET 21  
-L- STA 245+00

MATCHLINE SEE SHEET 23  
-L- STA 258+00



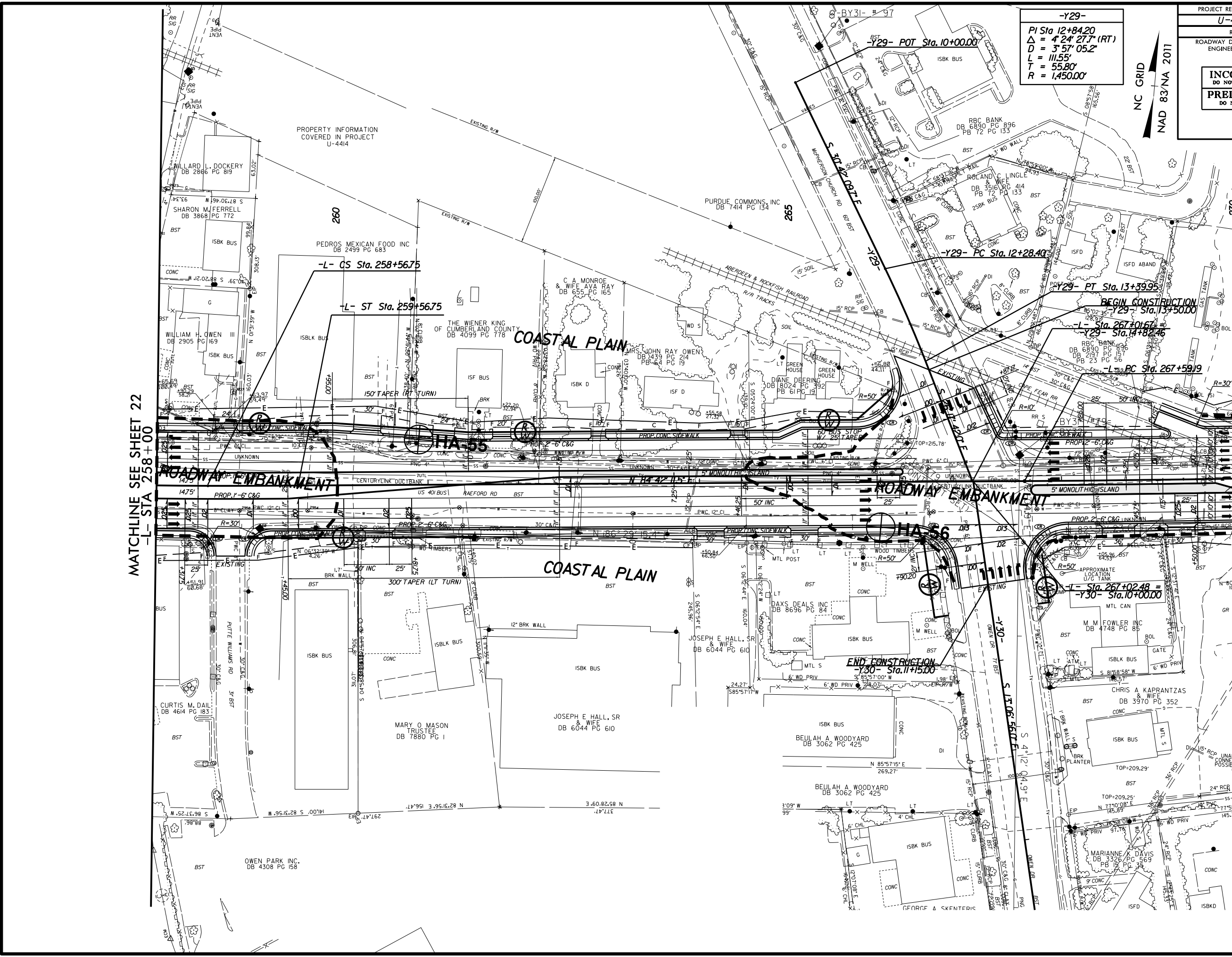
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 8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-4405	23
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	

-Y29-  
 PI Sta 12+84.20  
 $\Delta = 4' 24' 27.7''$  (RT)  
 $D = 3' 57' 05.2''$   
 $L = 111.55'$   
 $T = 55.80'$   
 $R = 1,450.00'$

NC GRID  
 NAD 83/NA 2011



MATCHLINE SEE SHEET 22  
 -L- STA 258+00

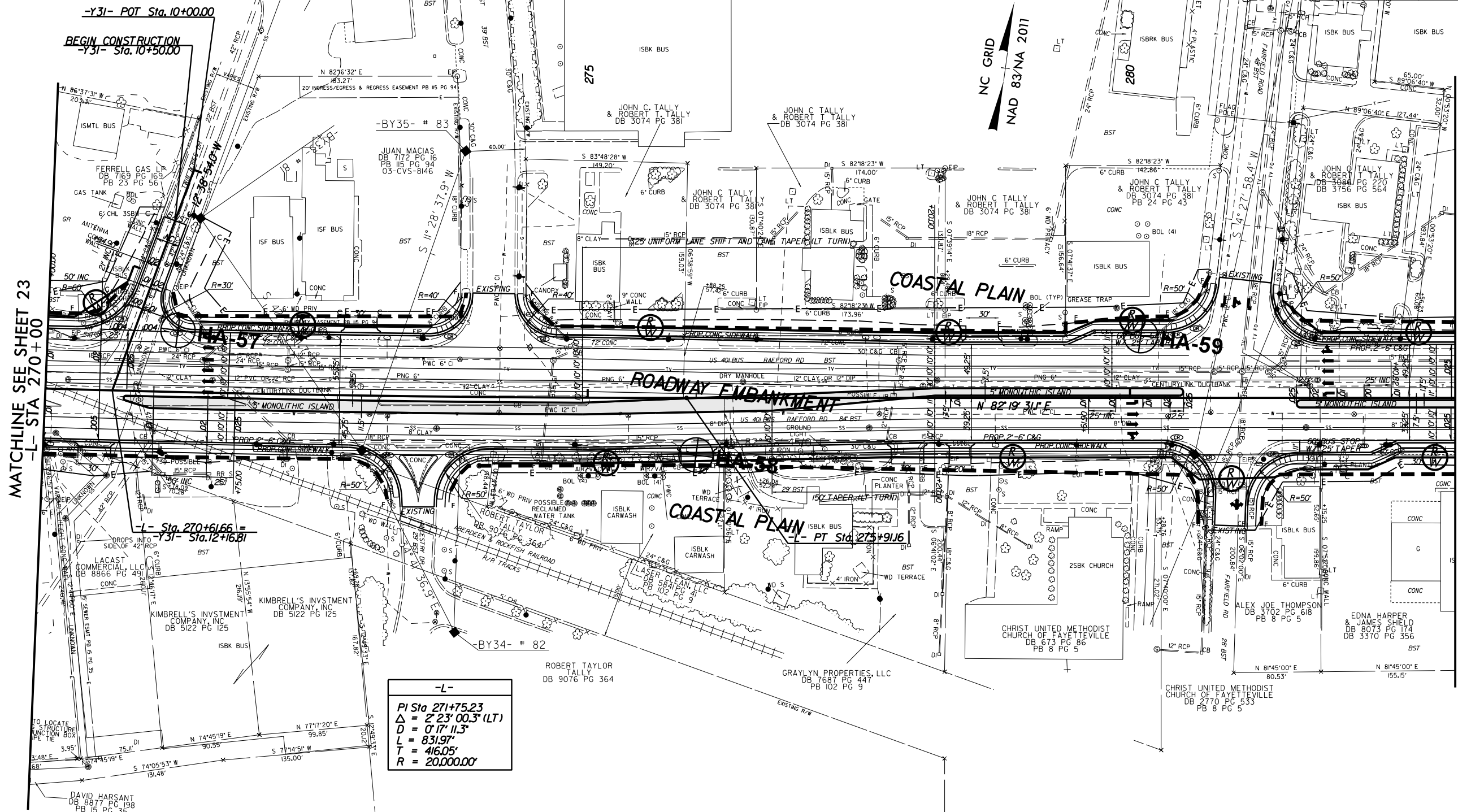
MATCHLINE SEE SHEET 24  
 -L- STA 270+00

REVISIONS

8/17/99

20-JAN-2016 15:00  
 PROJECT U-4405  
 2015.1.305.15-050 U4405\CADD\_GEO\_ECH\P1anPof\_u4405\_r.dwg\_psh\_23.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-4405	24
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



MATCHLINE SEE SHEET 23  
-L- STA 270+00

MATCHLINE SEE SHEET 25  
-L- STA 283+00

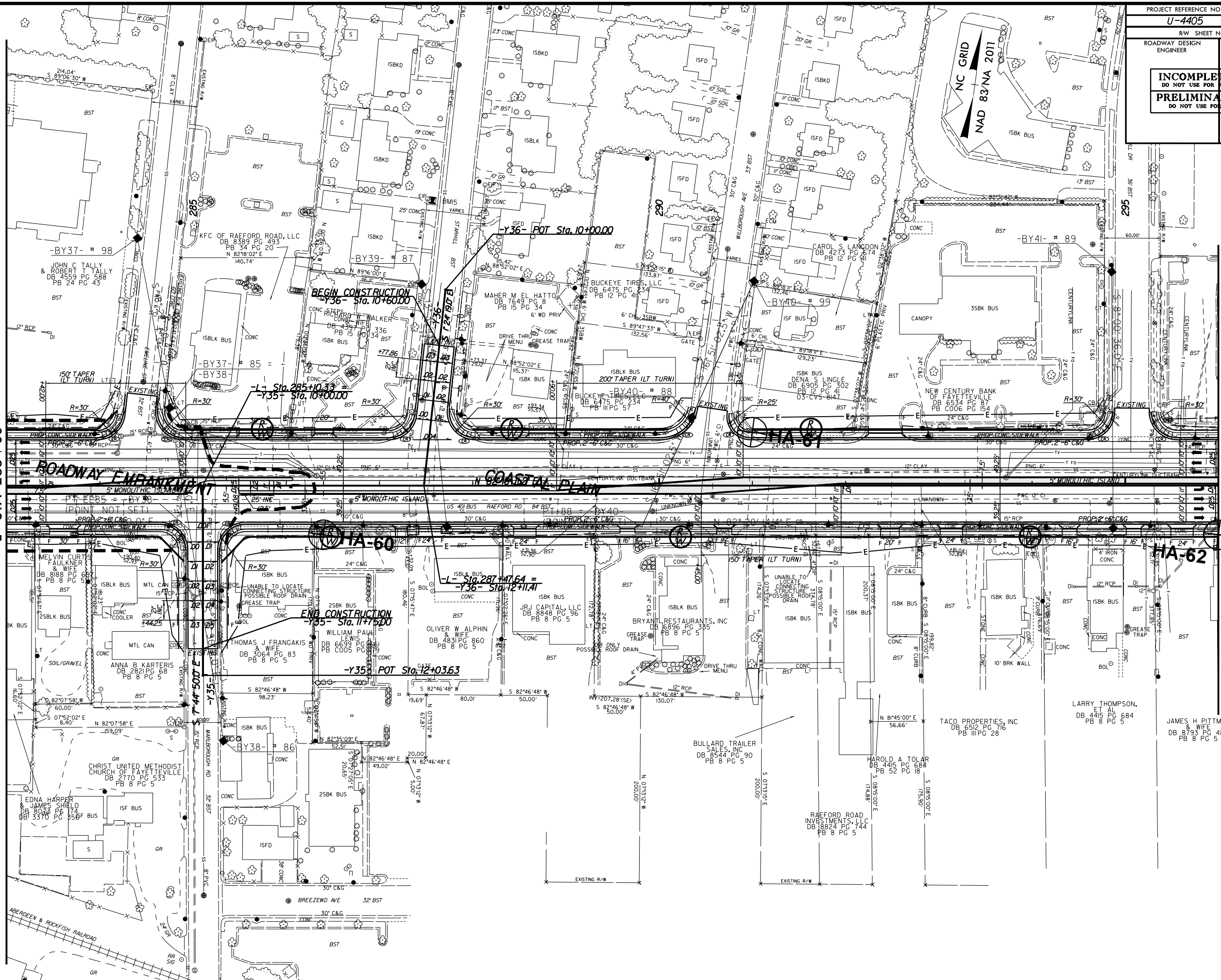
-L-  
 PI Sta 271+75.23  
 $\Delta = 2' 23'' 00.3''$  (LT)  
 $D = 0' 17'' 11.3''$   
 $L = 831.97'$   
 $T = 416.05'$   
 $R = 20,000.00'$

REVISIONS

20-JAN-2016 15:00  
 U:\PROJECTS\2015\1305\15-050\U4405\CADD\_GEO\ECH\Plan\Prof\U4405-r.dwg.pst.24.dgn  
 8/17/99



PROJECT REFERENCE NO. <b>U-4405</b>	SHEET NO. <b>25</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



MATCHLINE SEE SHEET 24  
-L- STA 283+00

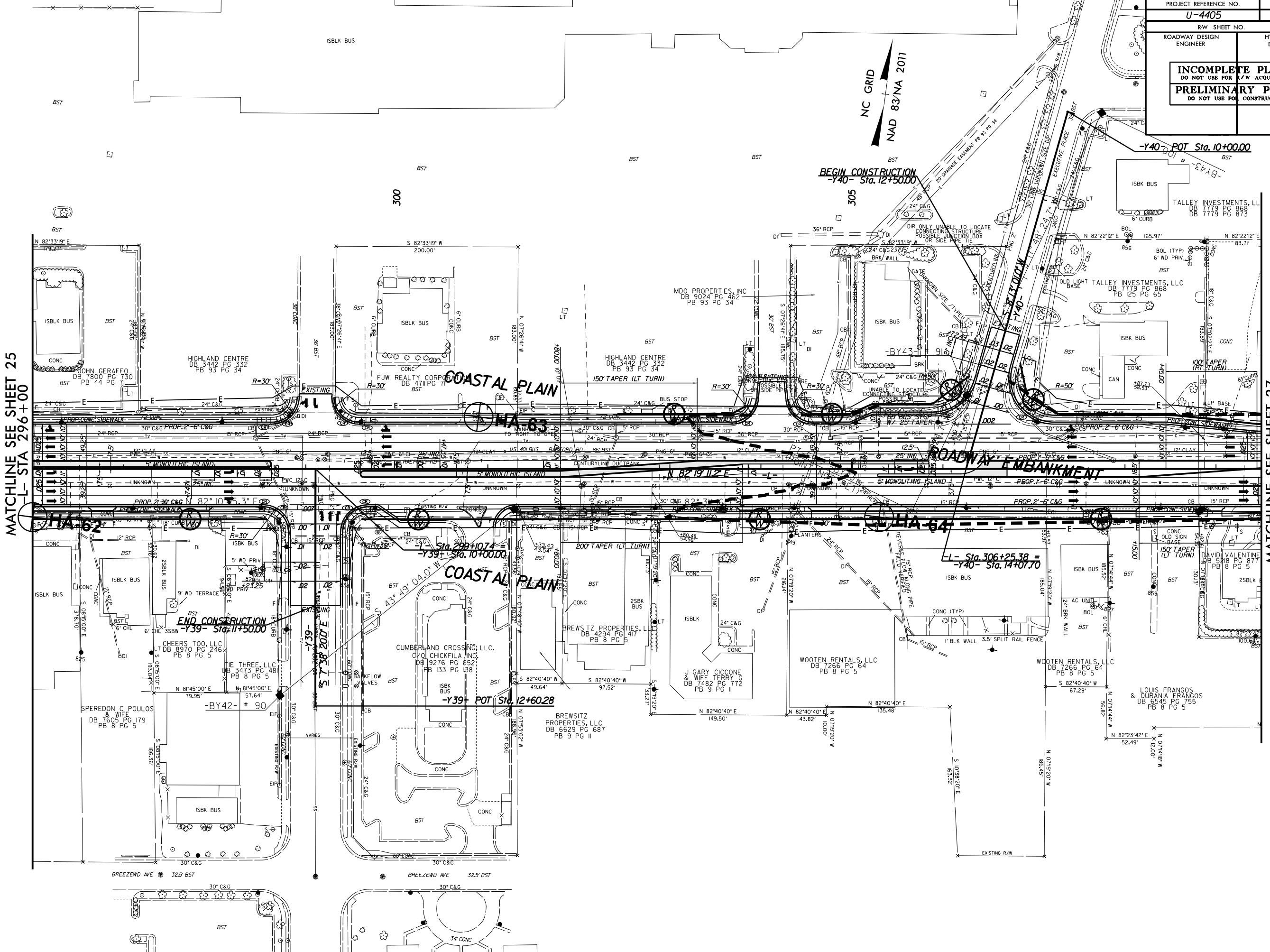
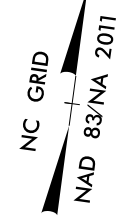
MATCHLINE SEE SHEET 26  
-L- STA 296+00

REVISIONS

20-MAN-2016\_15100  
PROJECTS 2015\_1305\_15-050 U4405\CADD\_GEO\_ECH\Plan\Prof\_U4405\_rdy\_psh\_25.dgn  
8/17/99



PROJECT REFERENCE NO.	SHEET NO.
U-4405	26
RW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



MATCHLINE SEE SHEET 25  
-L- STA 296+00

MATCHLINE SEE SHEET 27  
-L- STA 309+50

REVISIONS

20-JAN-2016 15:00  
PROJECTS\2015\130515-050 U4405\CADD\_GEO\ECH\PlanProf\U4405\_rdy.pst,26.dgn  
8/17/99

PROJECT REFERENCE NO.		SHEET NO.	
U-4405		27	
RW SHEET NO.		HYDRAULICS	
ROADWAY DESIGN ENGINEER		ENGINEER	
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION			

NC GRID  
NAD 83/NA 2011

**-L-**  
 PI Sta 320+13.00  
 $\Delta = 43^{\circ} 34' 29.9" (LT)$   
 $D = 8^{\circ} 00' 48.2"$   
 $L = 543.78'$   
 $T = 285.80'$   
 $R = 715.00'$   
 $SE = 0.04$

END TIP PROJECT U-4405  
-L- Sta. 322+95.00

-L- PT Sta. 322+70.97

-L- Sta. 319+48.88 =  
-Y44- Sta. 10+00.00

-L- PC Sta. 317+27.20

END CONSTRUCTION  
-Y44- Sta. 11+90.00

-Y44- POT Sta. 12+38.14

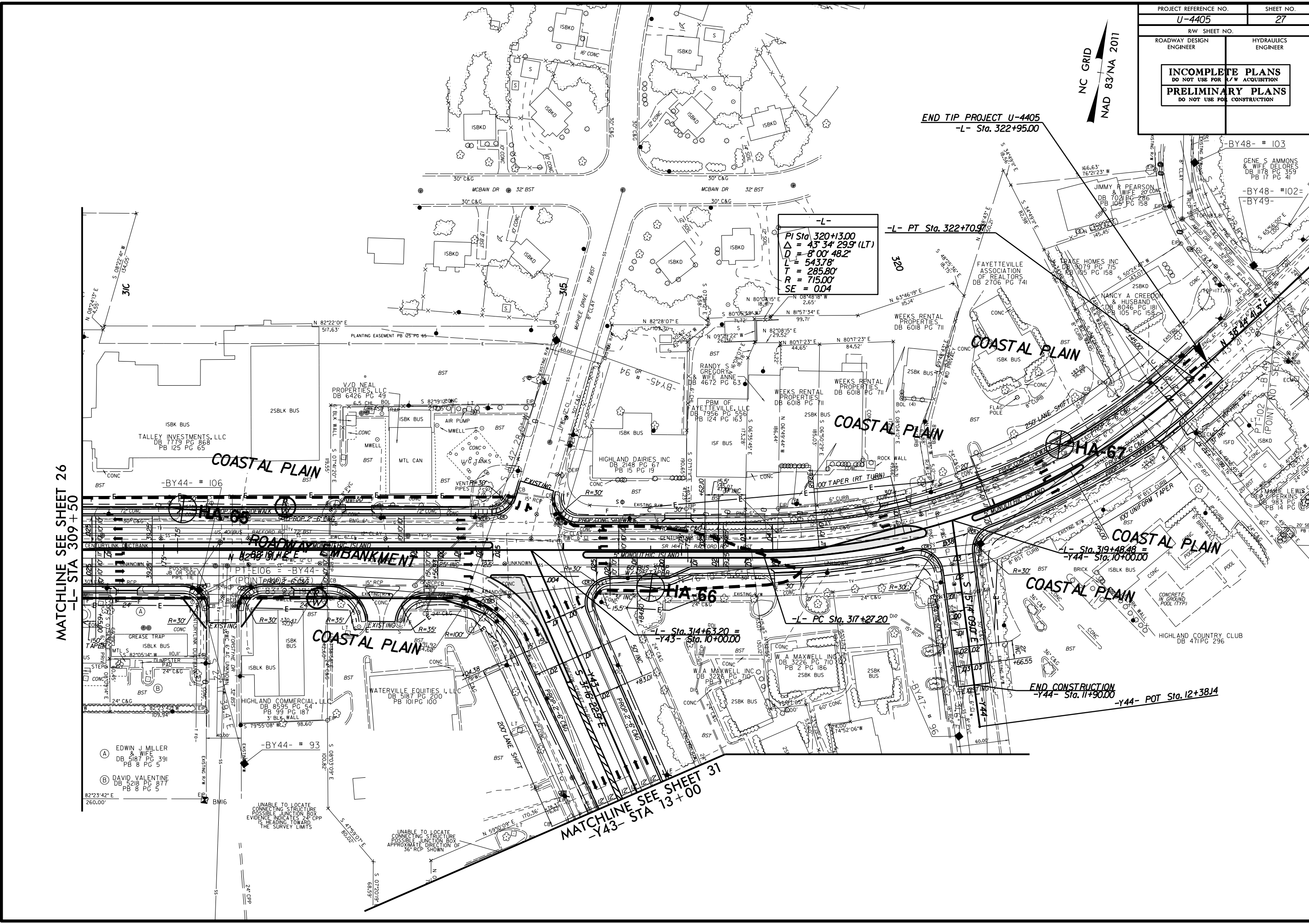
MATCHLINE SEE SHEET 31  
-Y43- STA 13+00

MATCHLINE SEE SHEET 26  
-L- STA 309+50

REVISIONS

8/17/99

20-JAN-2016 15:00  
 G:\PROJECTS\2015\1305\15-050 U4405\CADD\_GEO\ECH\Plan\Prof\U4405-rdy.psh.27.dgn  
 15:00  
 15:00  
 15:00



PROJECT REFERENCE NO.	SHEET NO.
U-4405	28
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	

NC GRID  
NAD 83/NA 2011

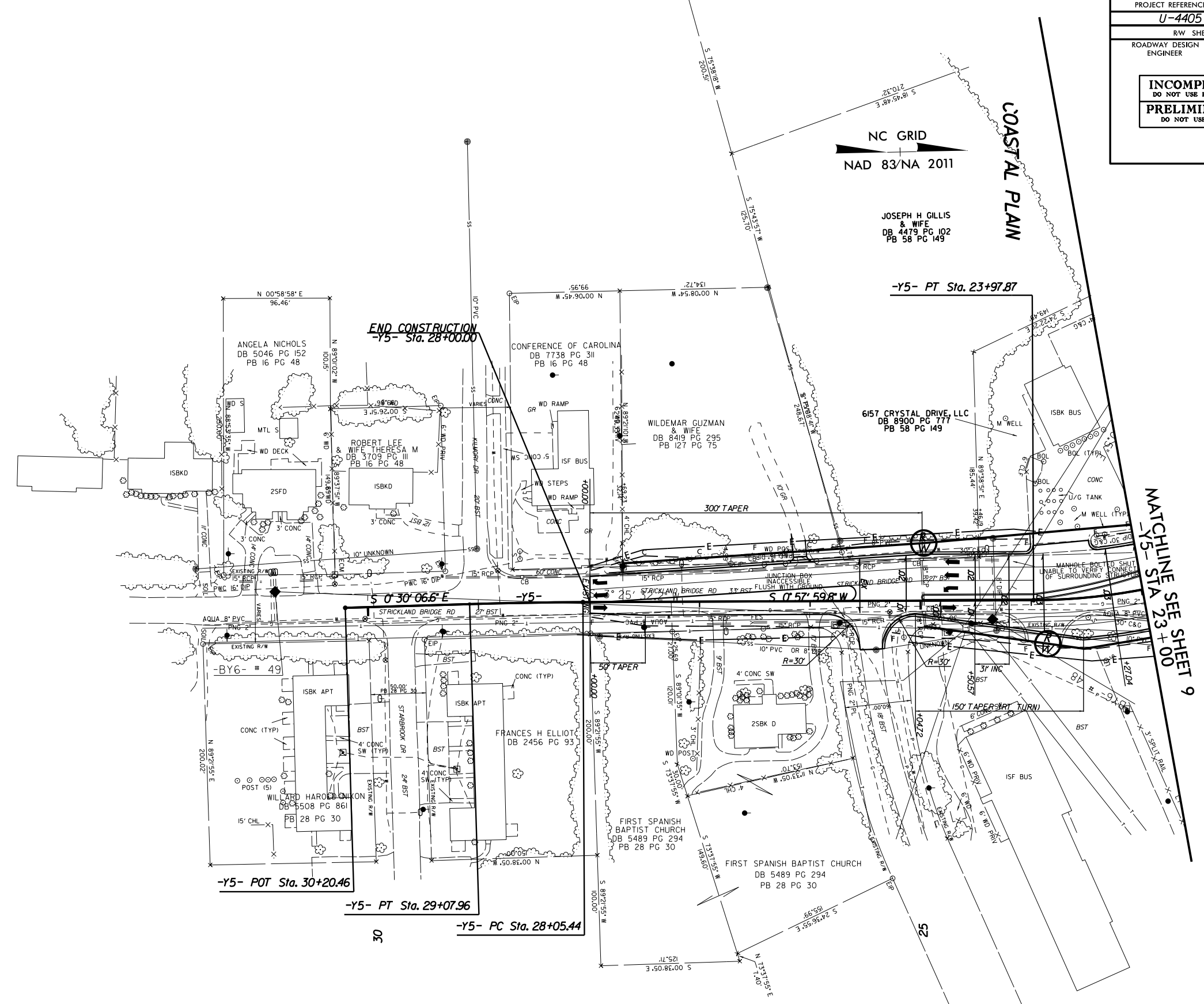
JOSEPH H GILLIS  
& WIFE  
DB 4479 PG 102  
PB 58 PG 149

COASTAL PLAN

-Y5- PT Sta. 23+97.87

END CONSTRUCTION  
-Y5- Sta. 28+00.00

MATCHLINE SEE SHEET 9  
-Y5- STA 23+00



-Y5-	
PI Sta 28+56.71	PI Sta 22+82.12
$\Delta = 1' 28' 06.4''$ (LT)	$\Delta = 25' 18' 13.3''$ (RT)
$D = 1' 25' 56.6''$	$D = 10' 44' 58.8''$
$L = 102.52'$	$L = 235.39'$
$T = 51.26'$	$T = 119.65'$
$R = 4000.00'$	$R = 533.00'$
	$SE = 0.02$

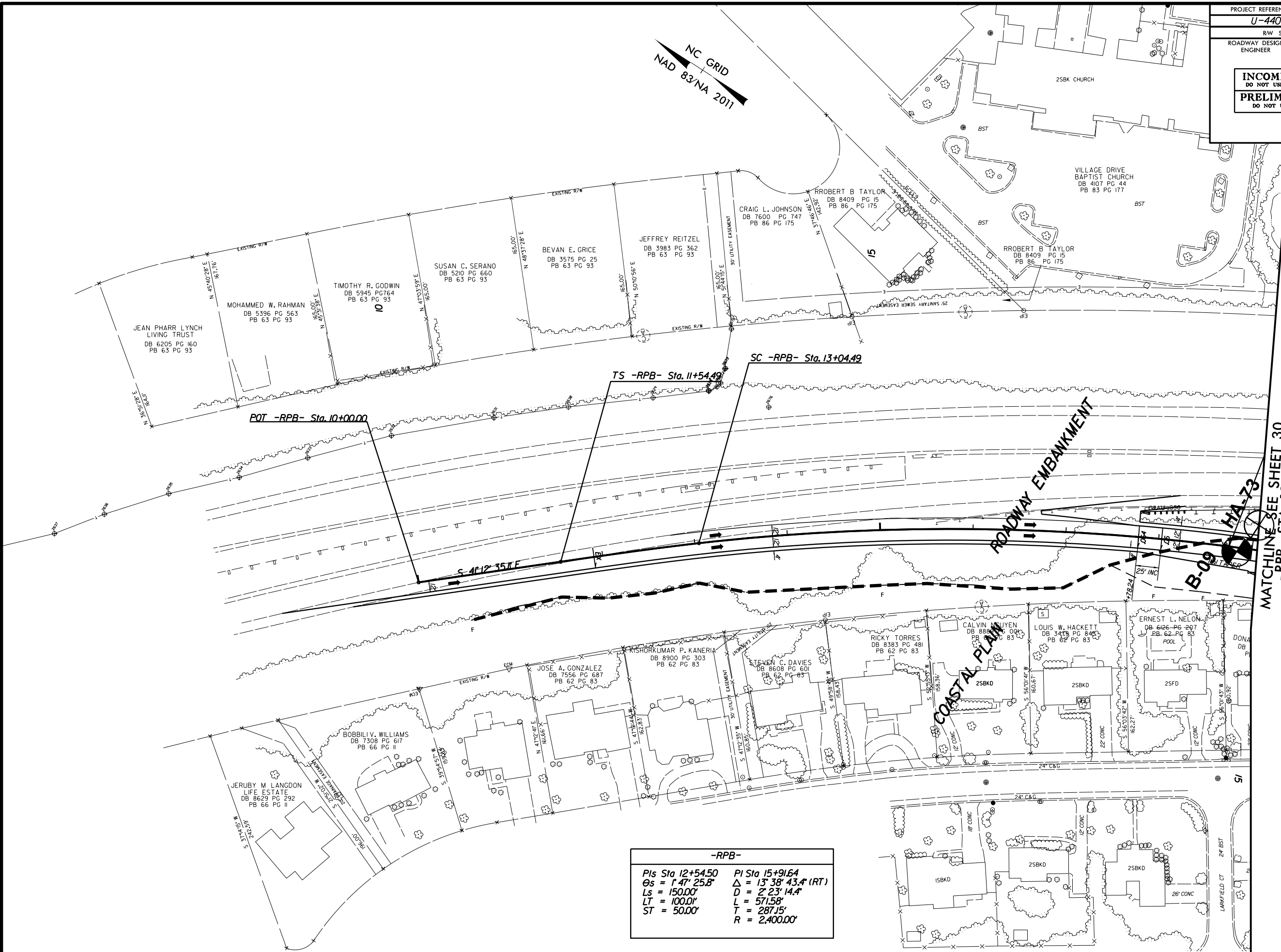
REVISIONS  
 20-JAN-2016 15:00  
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 8/17/99

PROJECT REFERENCE NO. <b>U-4405</b>		SHEET NO. <b>29</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	

8/17/99

NC GRID  
NAD 83/NA 2011

REVISIONS



POT -RPB- Sta. 10+00.00

TS -RPB- Sta. 11+54.49

SC -RPB- Sta. 13+04.49

S-41P-35.1E

ROADWAY EMBANKMENT

COASTAL PLAIN

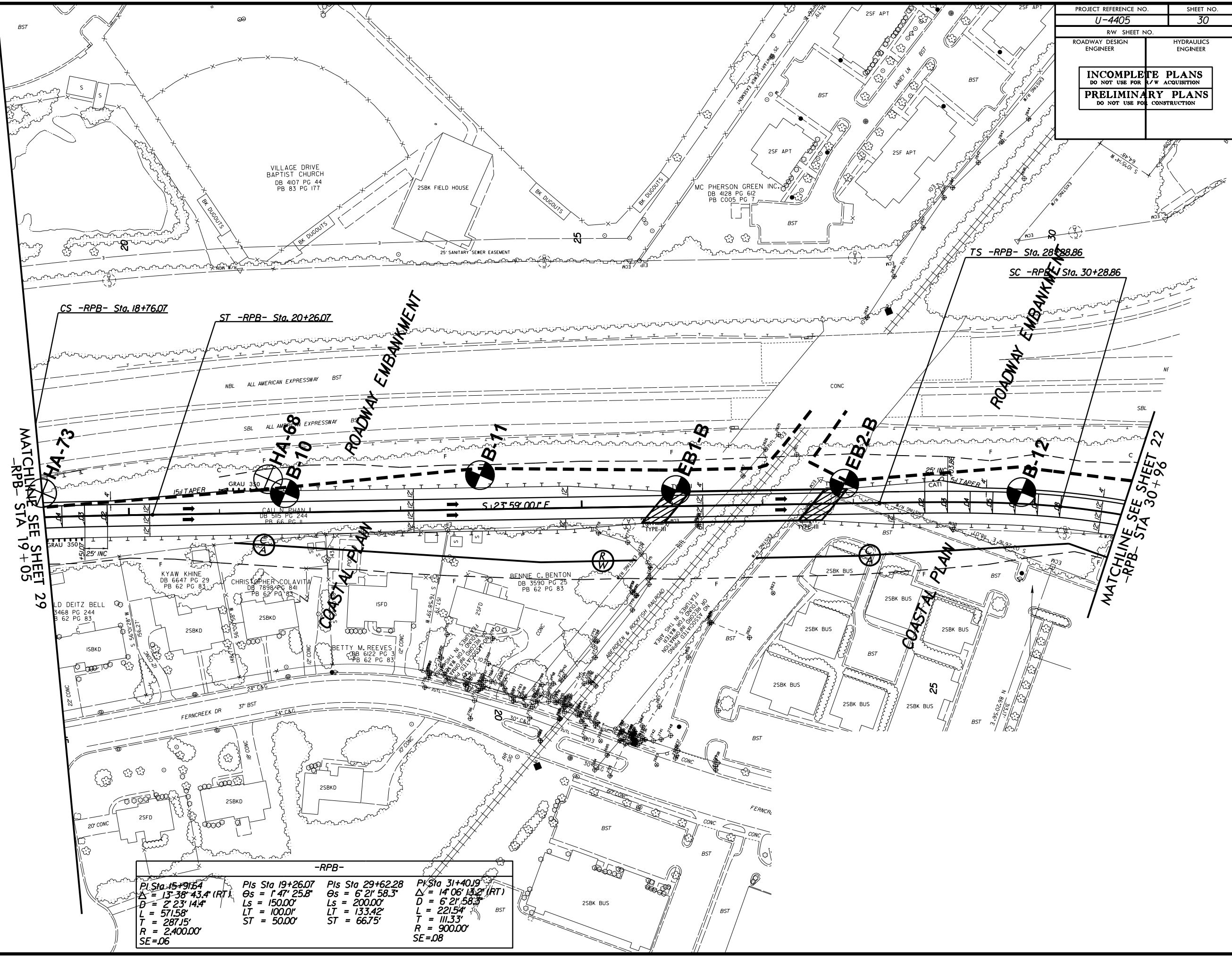
MATCHLINE SEE SHEET 30  
-RPB- STA 19+05

B-09 HA-73

-RPB-	
PIs Sta 12+54.50	PI Sta 15+91.64
$\Theta_s = 1^\circ 47' 25.8''$	$\Delta = 13^\circ 38' 43.4''$ (RT)
$L_s = 150.00'$	$D = 2^\circ 23' 14.4''$
$LT = 100.01'$	$L = 571.58'$
$ST = 50.00'$	$T = 287.15'$
	$R = 2,400.00'$

20-JAN-2016 15:00  
D:\PROJECTS\2015\1305-15-050 U4405\CADD\_GEO\ECH\PlanProf\U4405-rdy\_psh\_29.dgn  
8/17/99

PROJECT REFERENCE NO. <b>U-4405</b>	SHEET NO. <b>30</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	



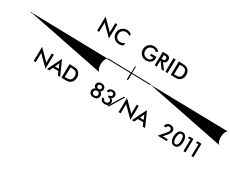
-RPB-			
PI Sta 15+91.64	PIs Sta 19+26.07	PIs Sta 29+62.28	PI Sta 31+40.19
$\Delta = 13^{\circ} 38' 43.4''$ (RT)	$\Theta_s = 1^{\circ} 47' 25.8''$	$\Theta_s = 6^{\circ} 21' 58.3''$	$\Delta = 14^{\circ} 06' 15.2''$ (RT)
$D = 2^{\circ} 23' 14.4''$	$L_s = 150.00'$	$L_s = 200.00'$	$D = 6^{\circ} 21' 58.3''$
$L = 571.58'$	$LT = 100.01'$	$LT = 133.42'$	$L = 221.54'$
$T = 287.15'$	$ST = 50.00'$	$ST = 66.75'$	$T = 111.33'$
$R = 2,400.00'$			$R = 900.00'$
$SE = 06$			$SE = 08$

REVISIONS

20-MAN-2016 (5/20) 15-01-1305-15-050 U4405\CADD\_GEO\_ECHY\Plan\Prof\_U4405\_rdy\_psh\_30.dgn  
 PROJECTS 2015\1305-15-050 U4405\CADD\_GEO\_ECHY\Plan\Prof\_U4405\_rdy\_psh\_30.dgn  
 8/17/99

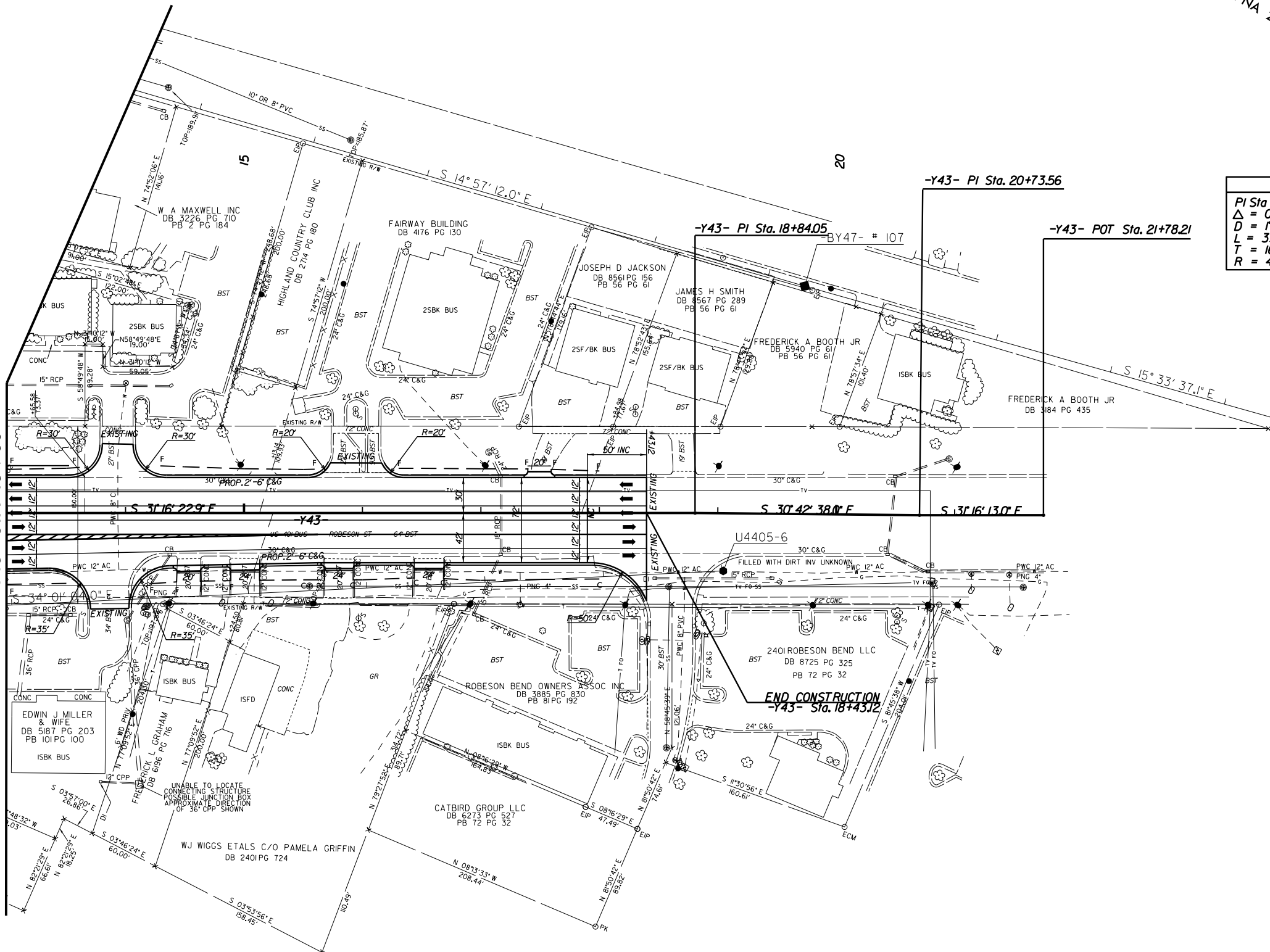


PROJECT REFERENCE NO.	SHEET NO.
U-4405	31
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



-Y43-	
PI Sta 18+97.74	PI Sta 21+17.77
$\Delta = 0^\circ 29' 06.2''$ (RT)	$\Delta = 0^\circ 28' 56.2''$ (LT)
D = 1'25' 56.6"	D = 1'25' 56.6"
L = 33.86'	L = 33.67'
T = 16.93'	T = 16.83'
R = 4,000.00'	R = 4,000.00'

MATCHLINE SEE SHEET 27  
-Y43- STA 13+00



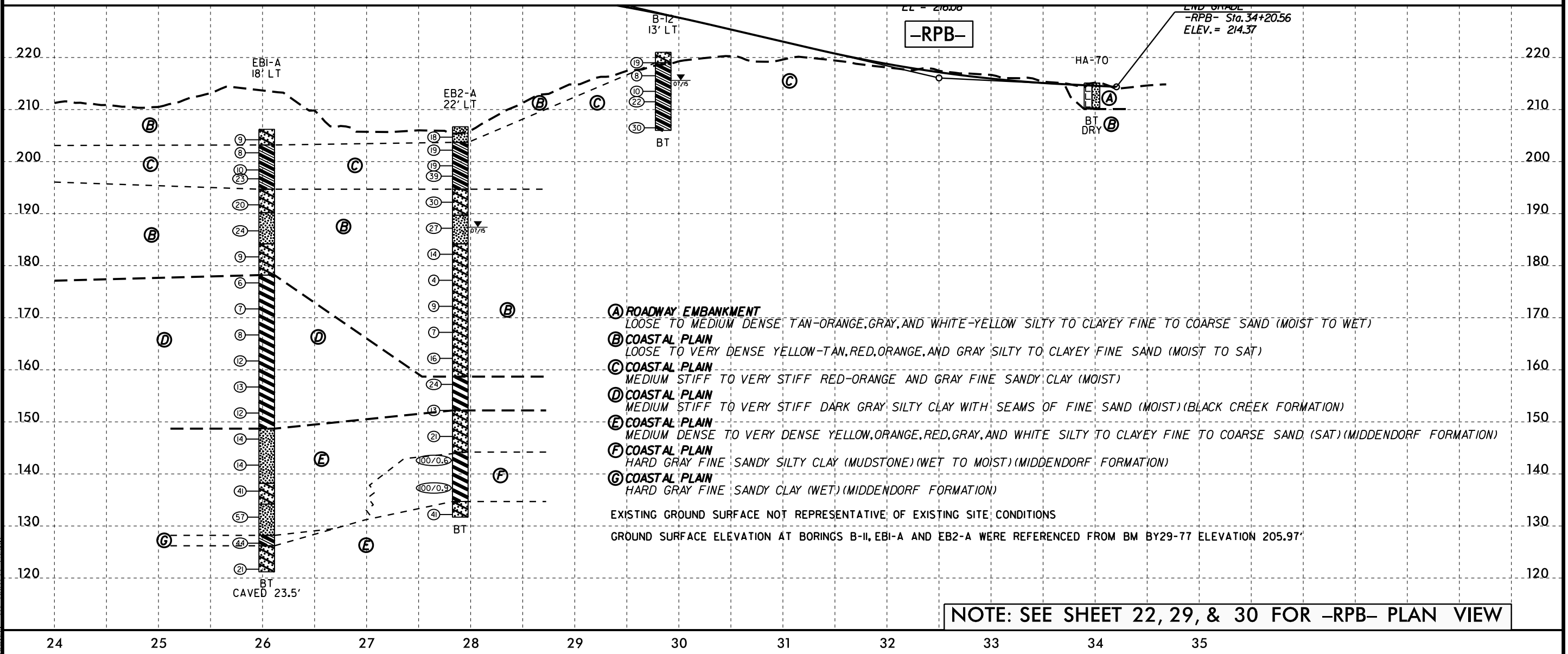
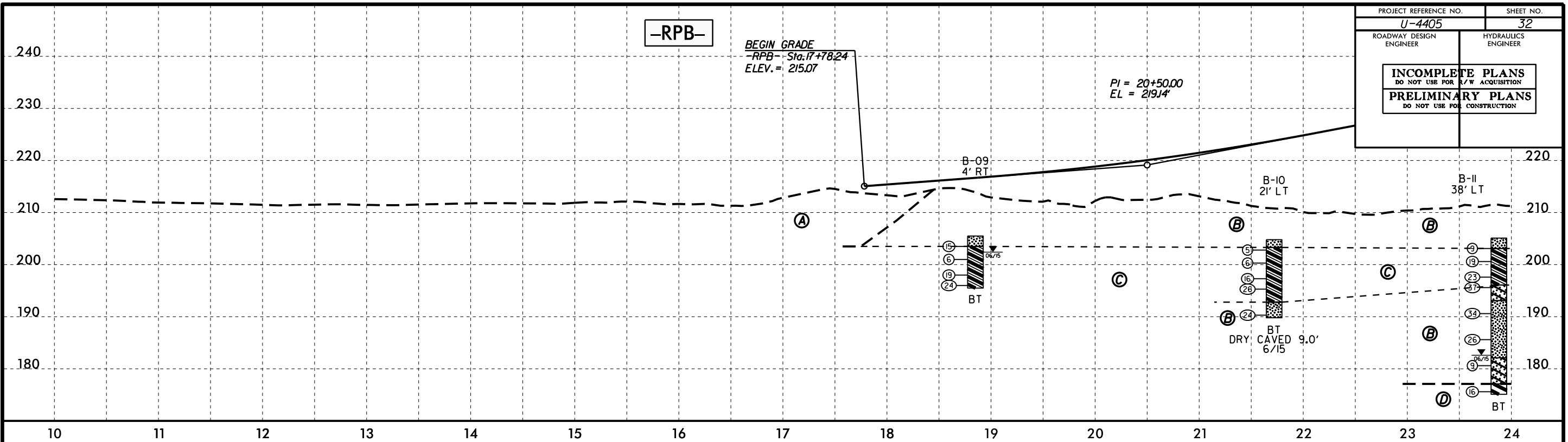
**END CONSTRUCTION**  
-Y43- Sta. 18+43.12

REVISIONS

20-JAN-2016 15:01  
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 8/17/99

5/28/99

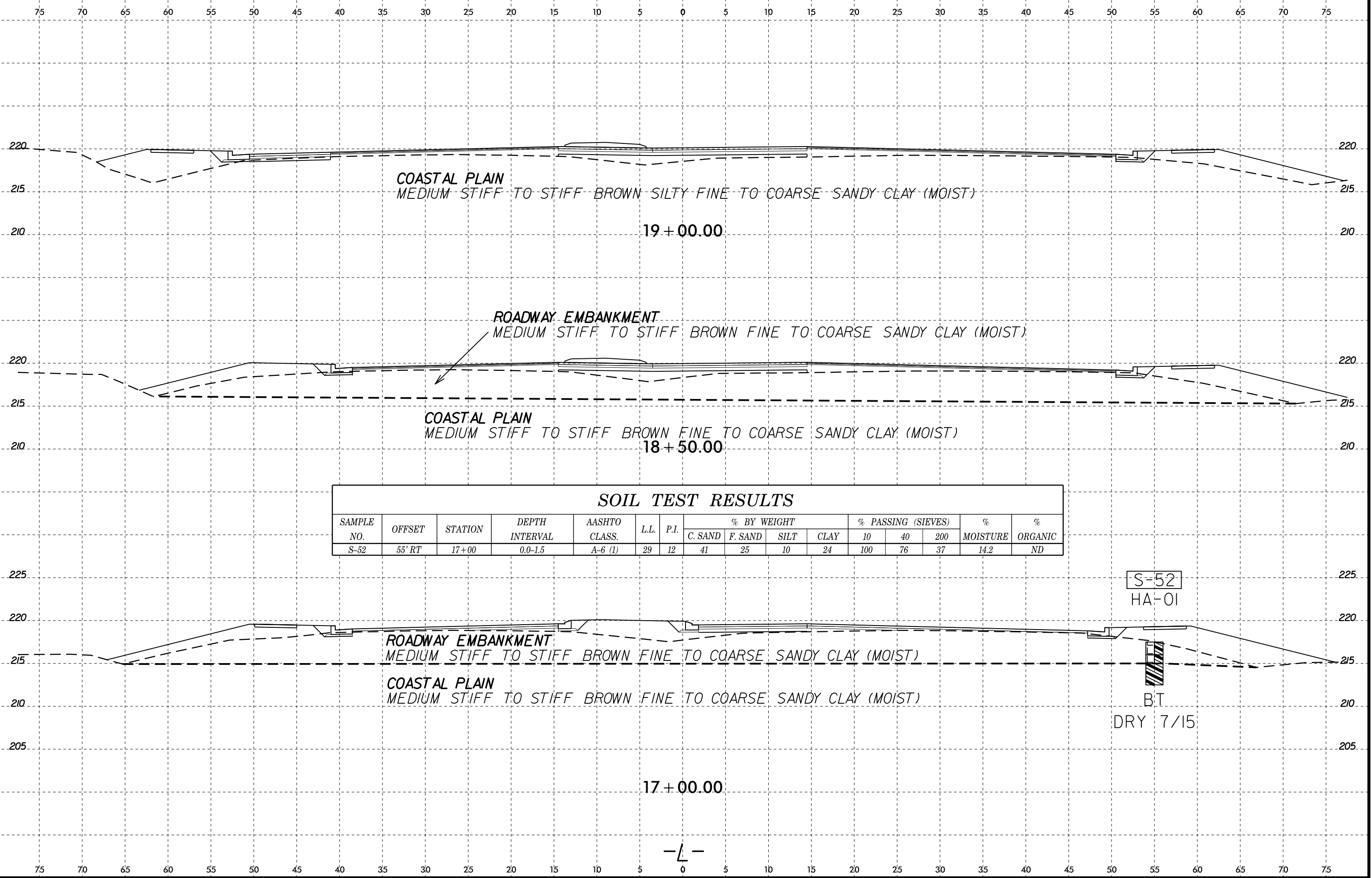
PROJECT REFERENCE NO. U-4405	SHEET NO. 32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR A/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



NOTE: SEE SHEET 22, 29, & 30 FOR -RPB- PLAN VIEW

20-JAN-2016 15:38  
G:\PROJECTS\2015\1305-15-050\U4405\CADD\_GEDTECH\Plan\Prof\U4405\_rdy.pfl\_psh.dgn  
PROJECT AT 15:00

8/23/99  
 25-JAN-2016 13:55  
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 BRATTI-13500



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-52	55' RT	17+00	0.0-1.5	A-6 (1)	29	12	41	25	10	24	100	76	37	14.2	ND

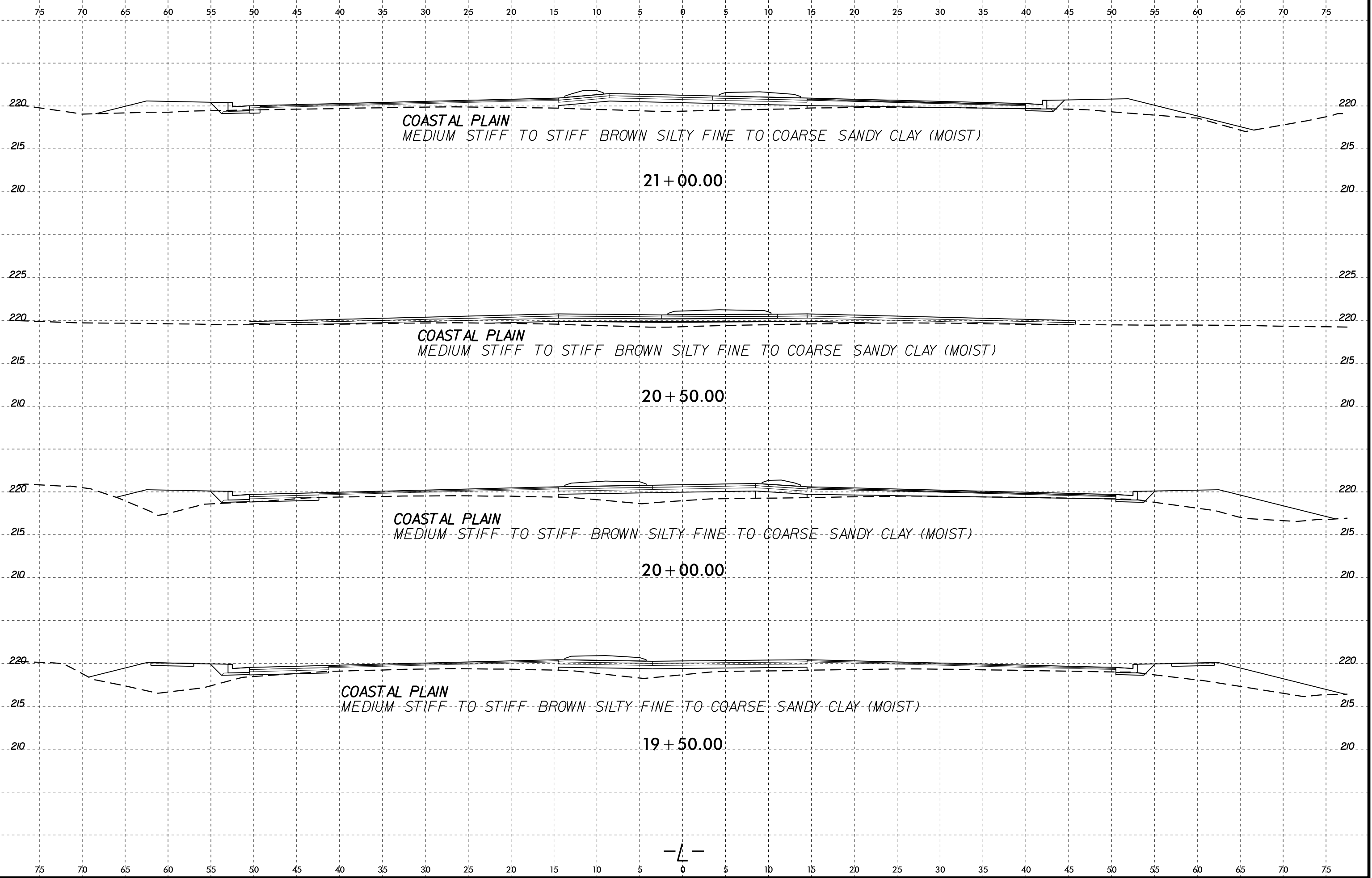
S-52

  
 HA-01


BT  
 DRY 7/15

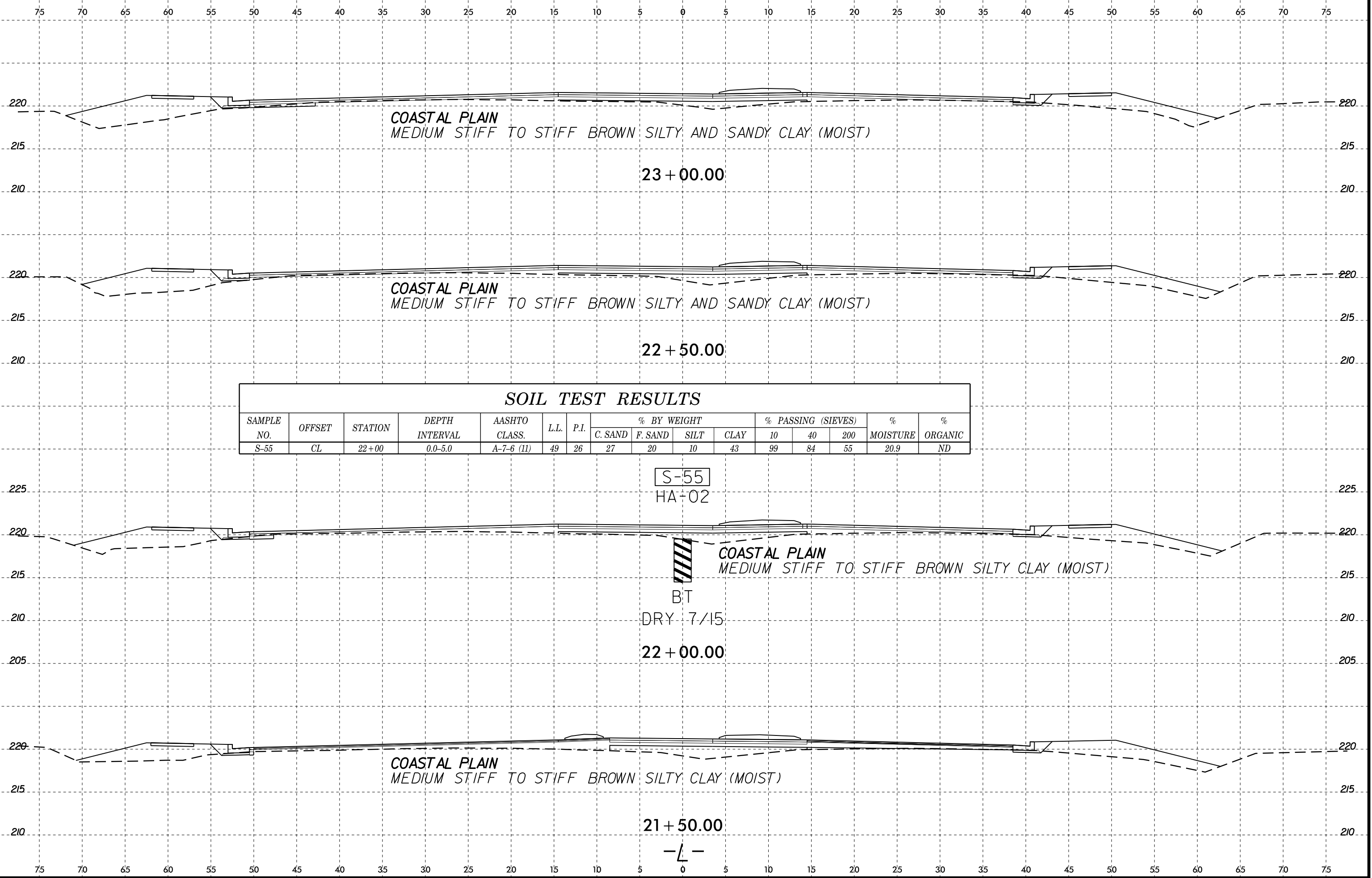
-L-

8/23/99



25-JAN-2016 13:55  
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BRett

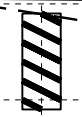
8/23/99



**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-55	CL	22+00	0.0-5.0	A-7-6 (11)	49	26	27	20	10	43	99	84	55	20.9	ND

S-55

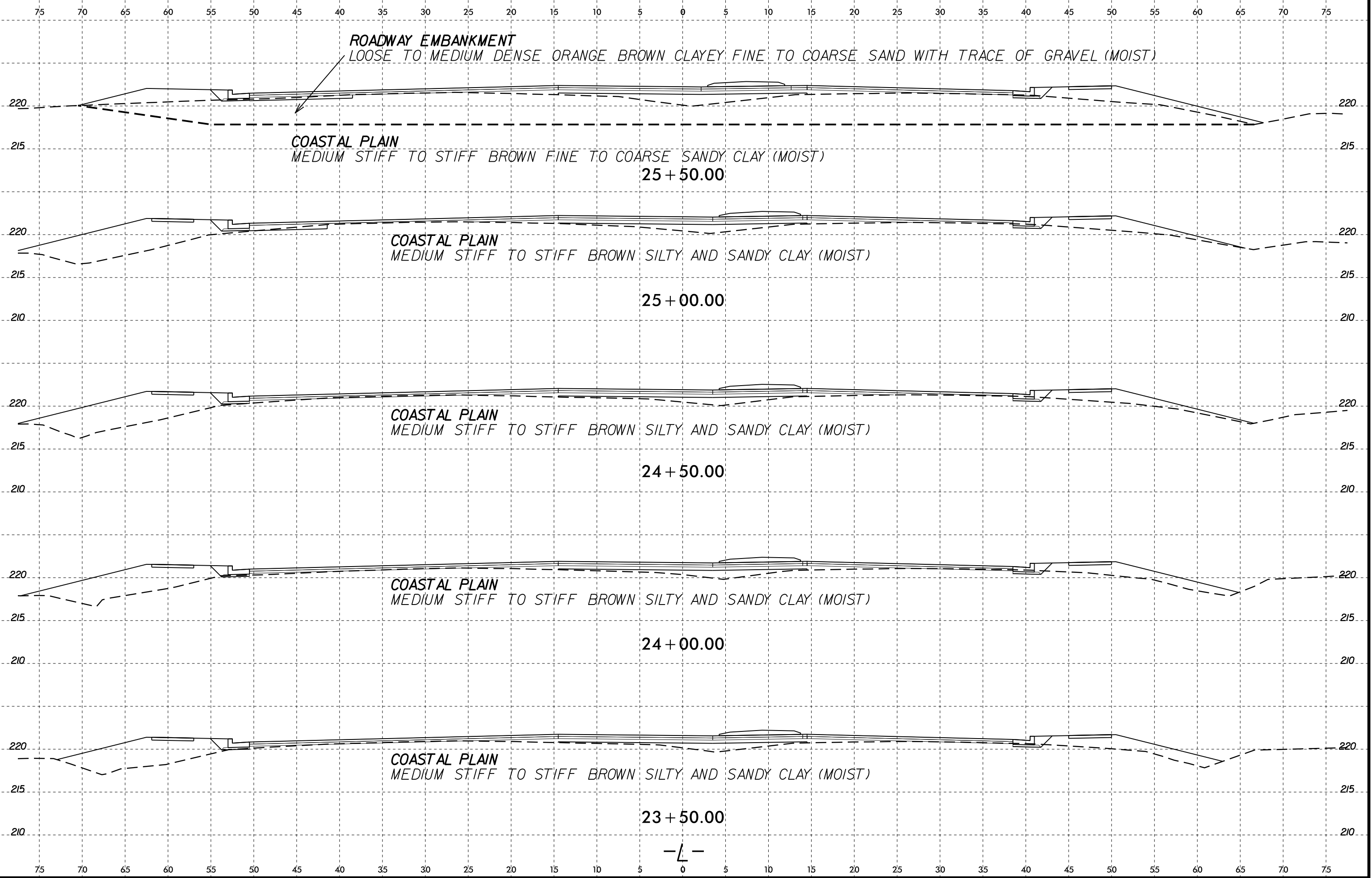
  
 HA-02


BT  
 DRY 7/15

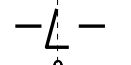
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 BRett AT BRA11-13508

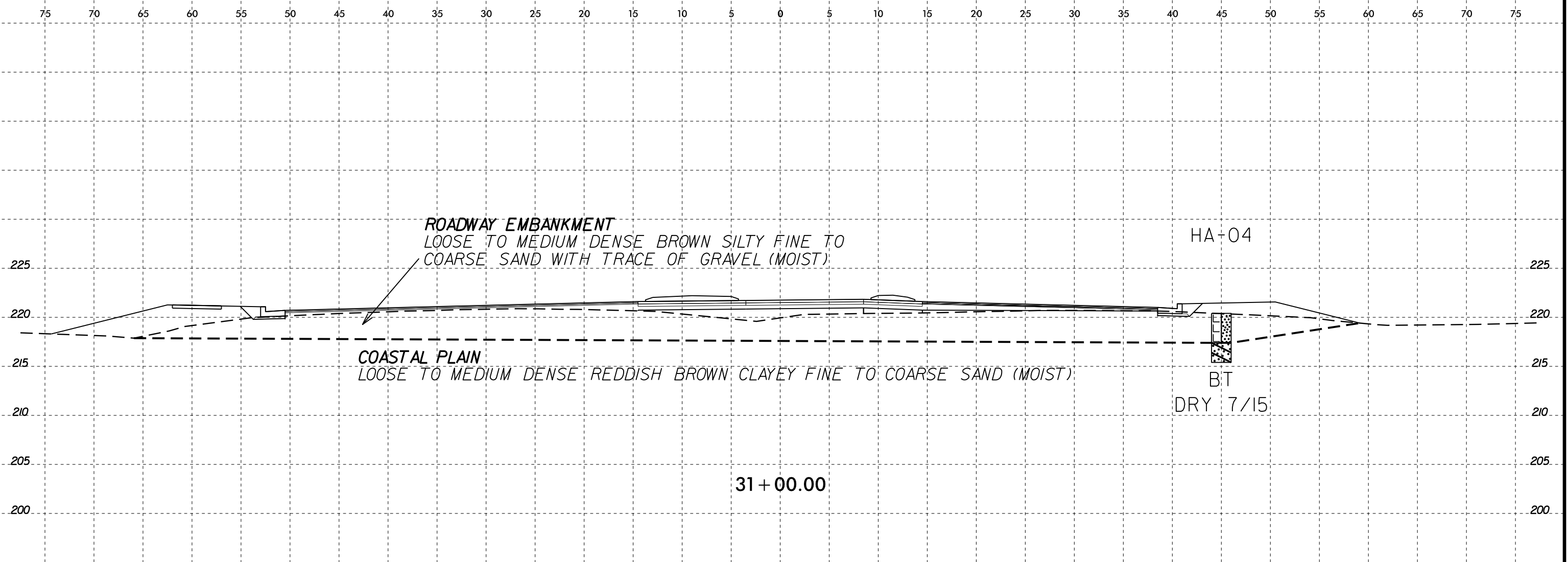


8/23/99

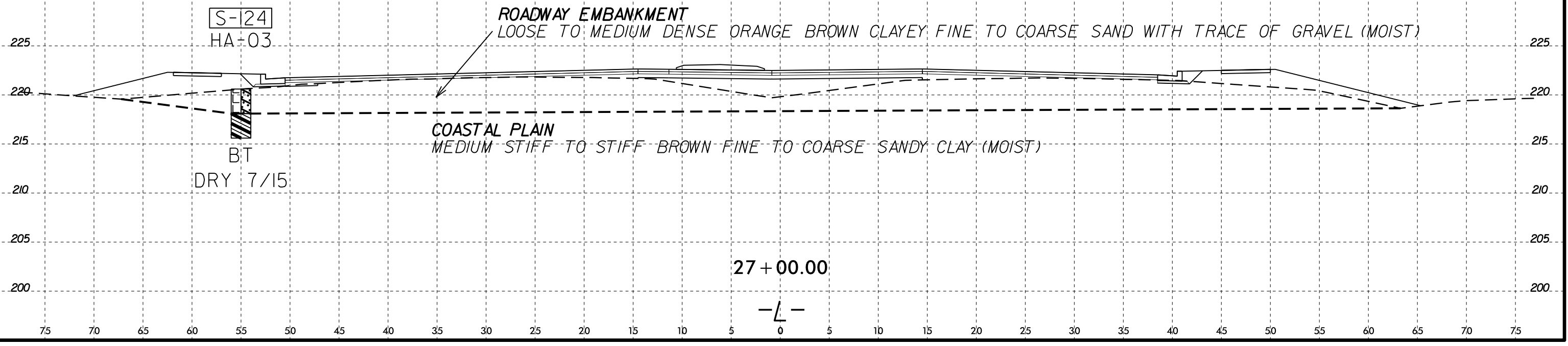


25-JAN-2016 13:55  
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 BRett

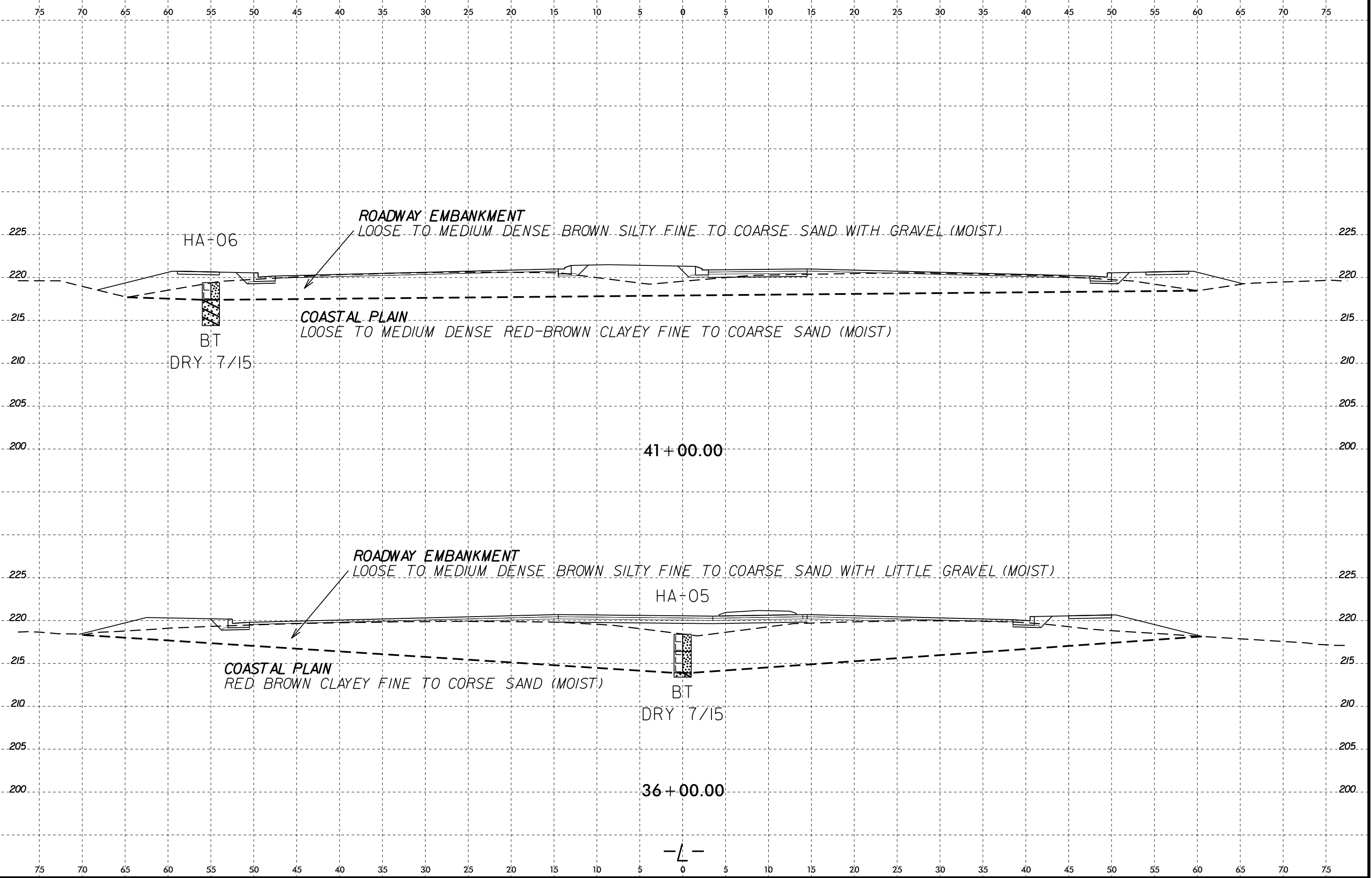




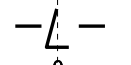
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-124	55' LT	27+00	0.0-2.5	A-2-6 (0)	33	16	46	29	3	22	100	74	28	10.5	ND



8/23/99

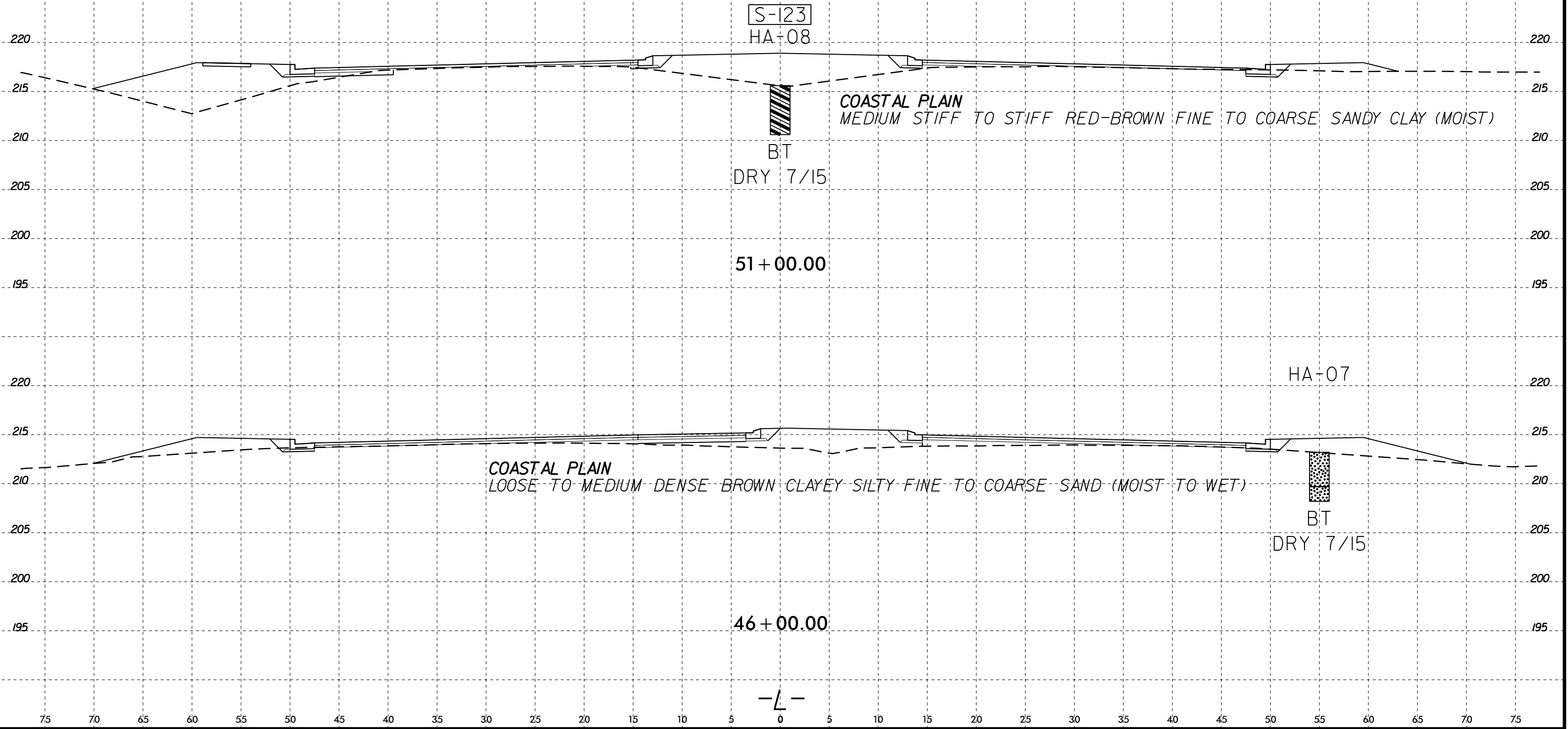


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BRettu AT BRA11-13500



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

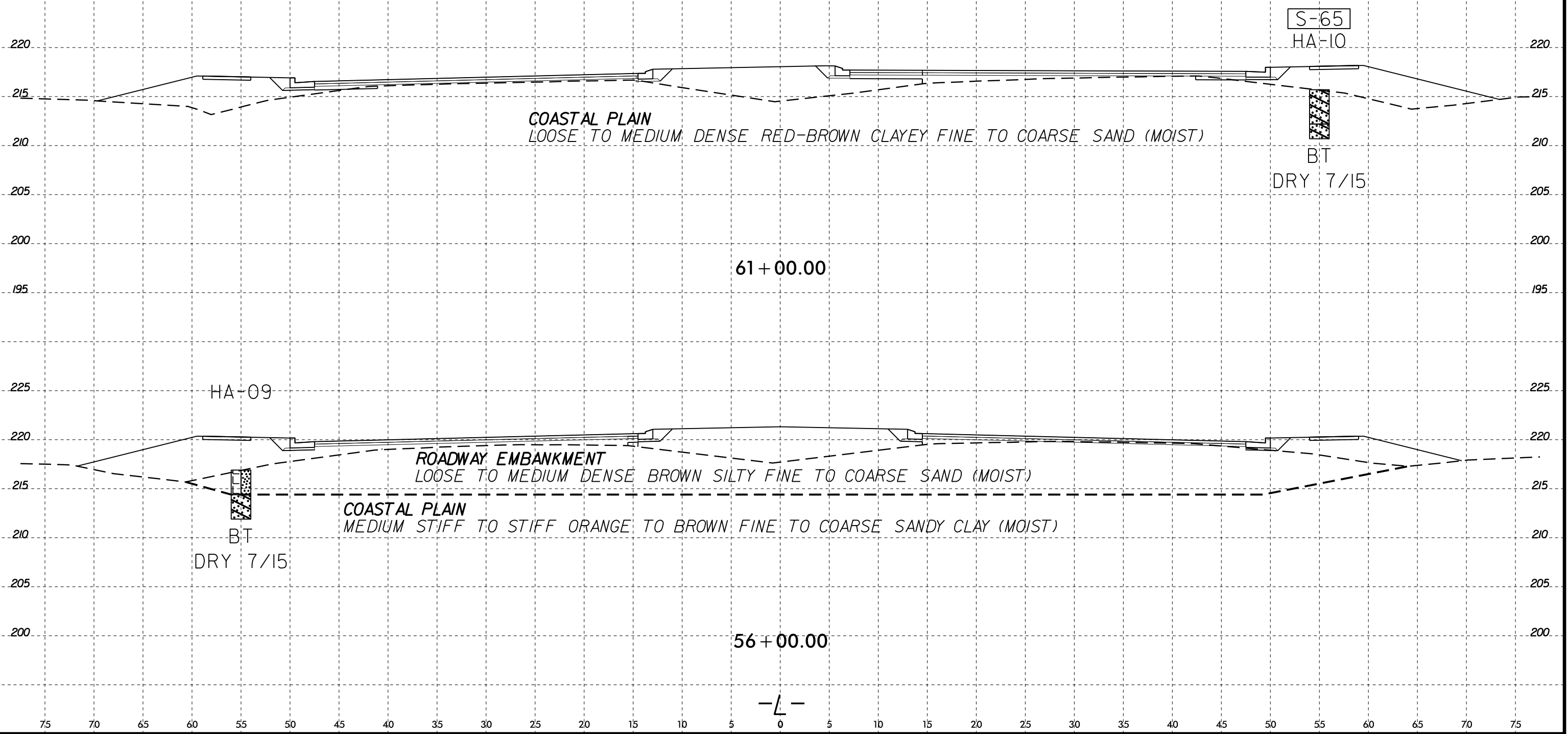
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-123	CL	51+00	0.0-5.0	A-6 (2)	34	19	40	27	6	27	99	75	36	12.9	ND



8/23/99

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-65	55' RT	61+00	0.0-3.5	A-2-6 (1)	34	15	46	24	5	25	100	73	33	11.8	ND

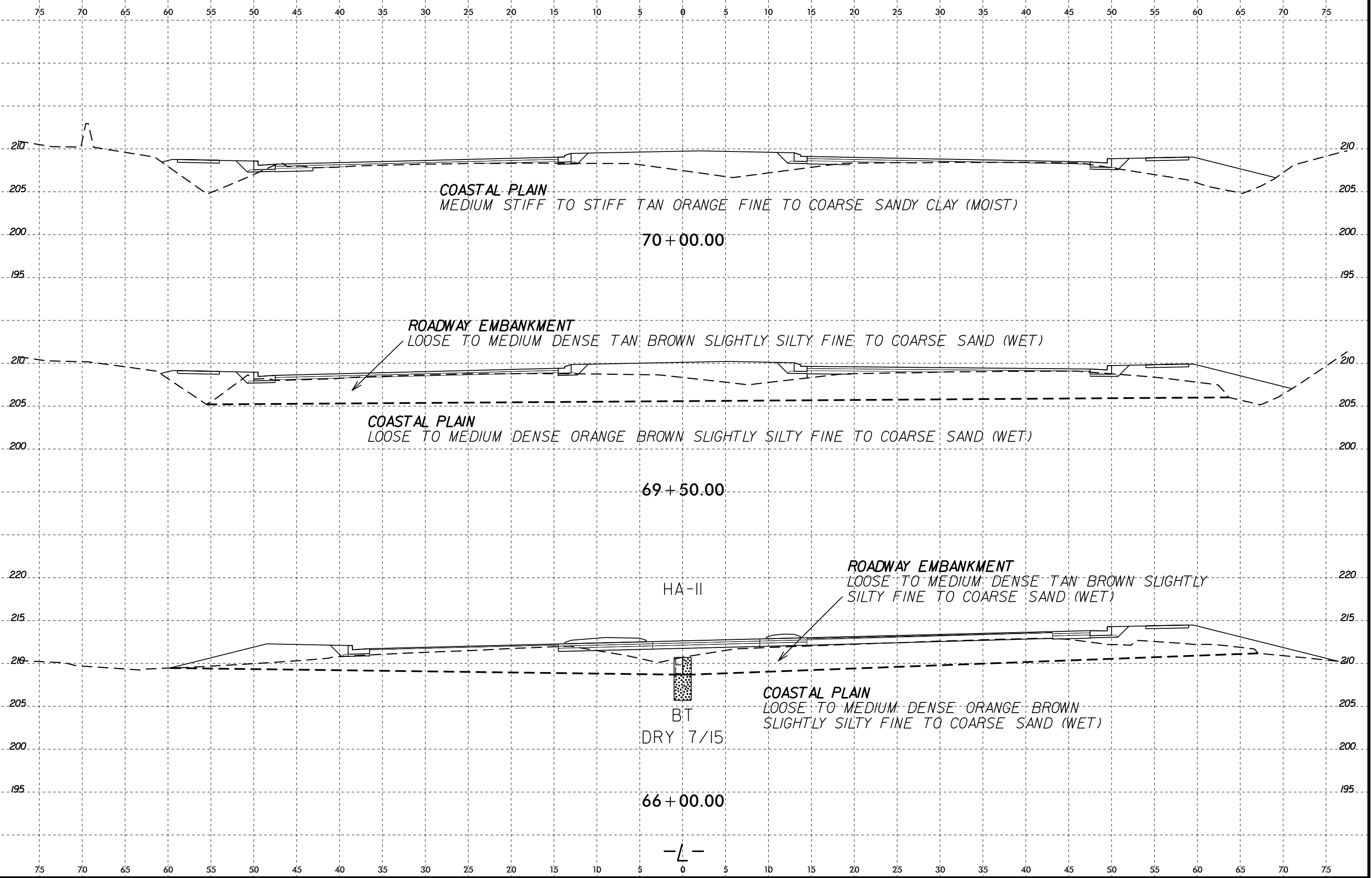


25-JAN-2016 13:55  
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 BRATTI - AT 13500

-L-



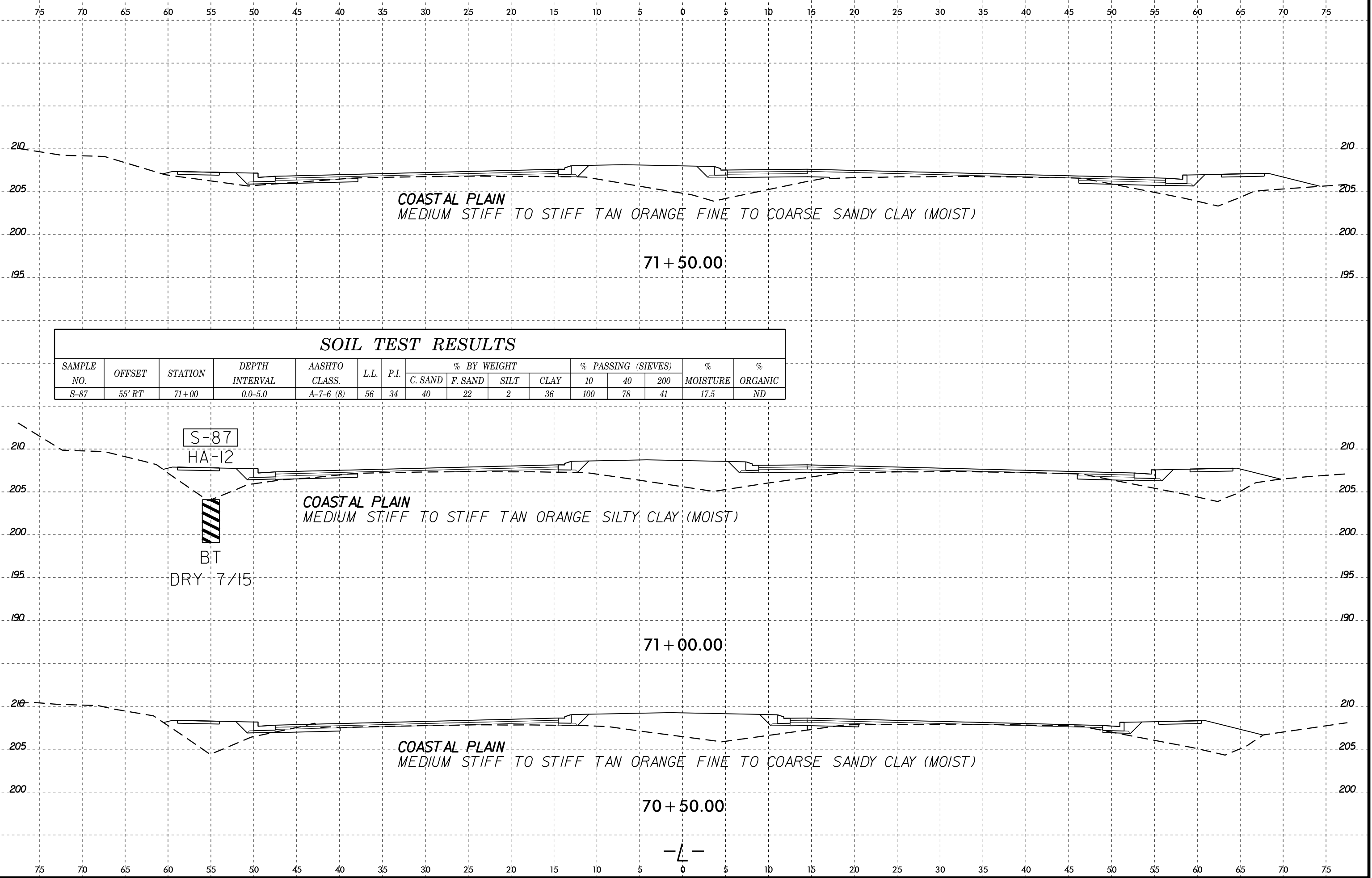
8/23/99



25-JAN-2016 13:56  
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BRettu AT BRA11-13508

-L-

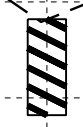
8/23/99



### 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-87	55' RT	71+00	0.0-5.0	A-7-6 (8)	56	34	40	22	2	36	100	78	41	17.5	ND

S-87  
HA-12

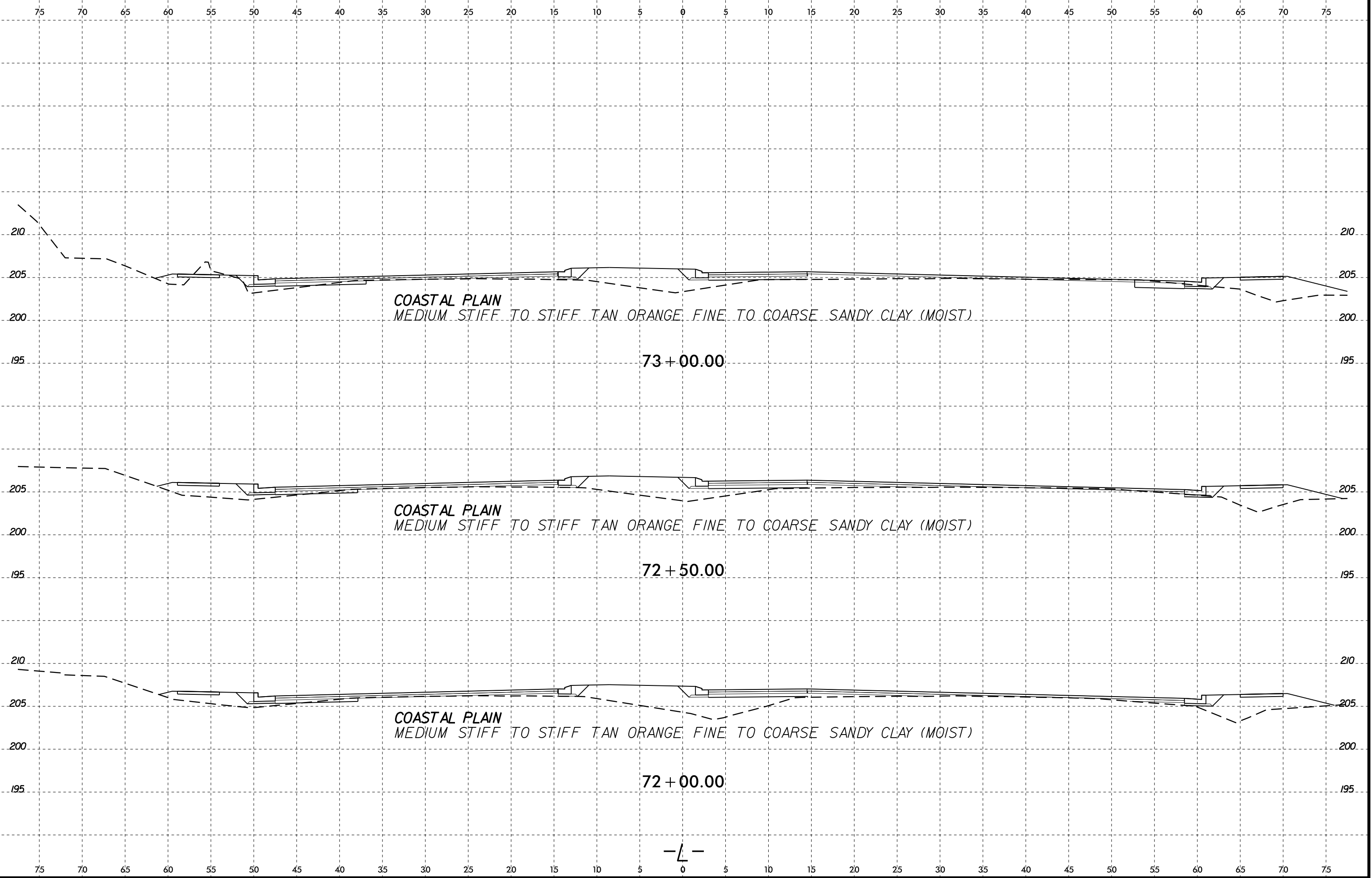


BT  
DRY 7/15

25-JAN-2016 13:56  
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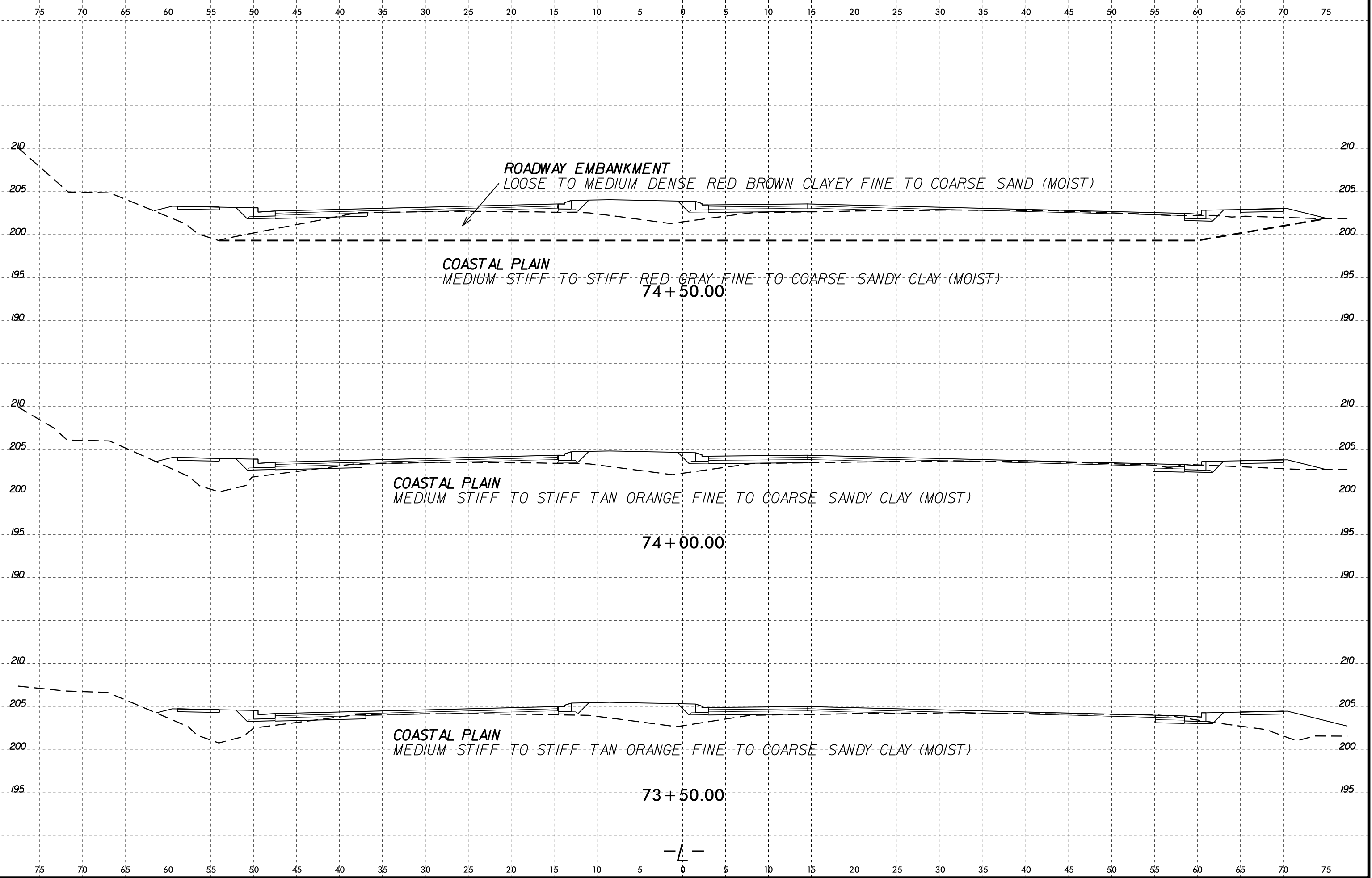
-L-

8/23/99

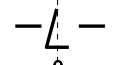


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BRettu AT BRA11-13500

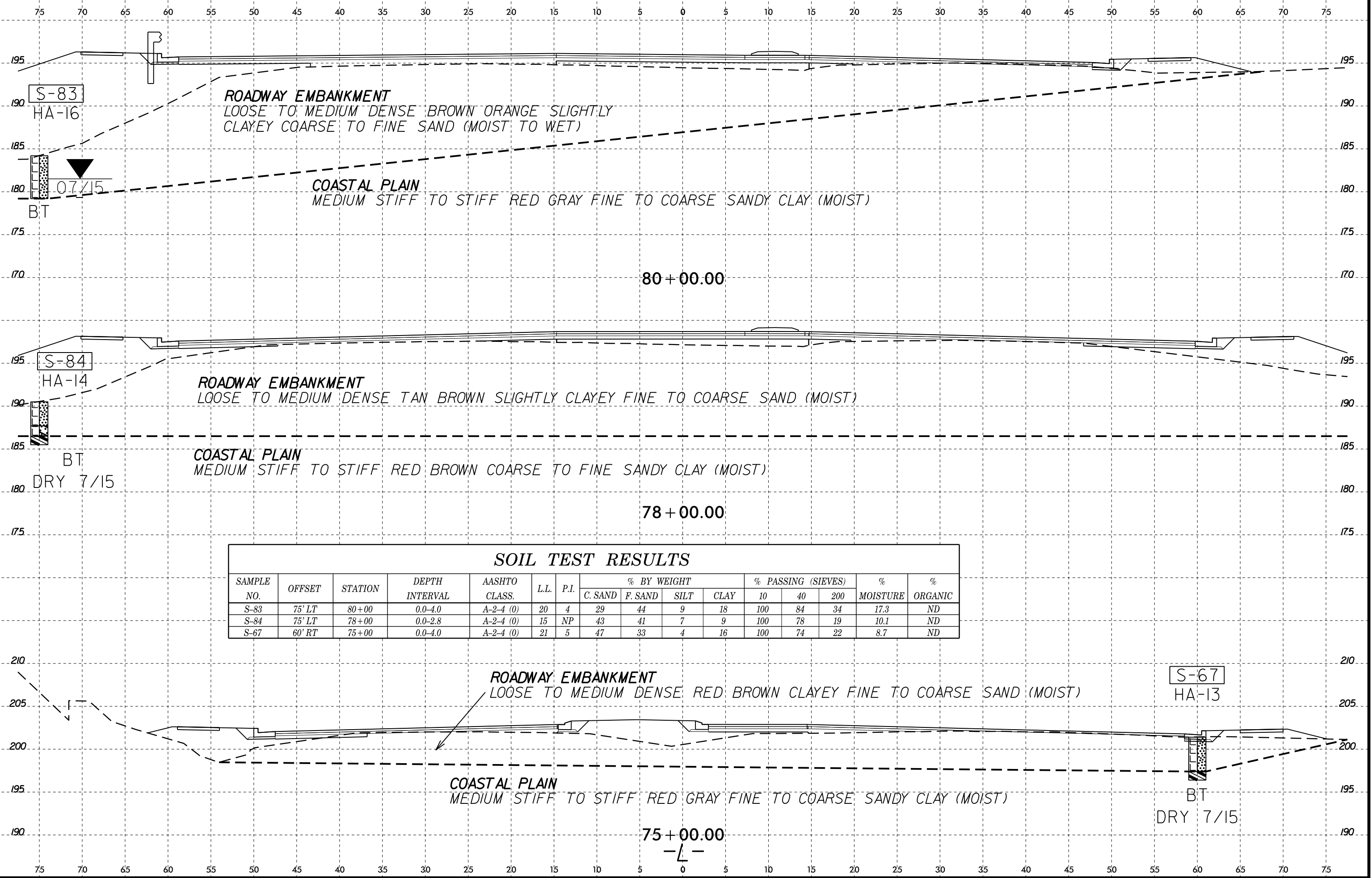
8/23/99



25-JAN-2016 14:00  
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BRett



8/23/99



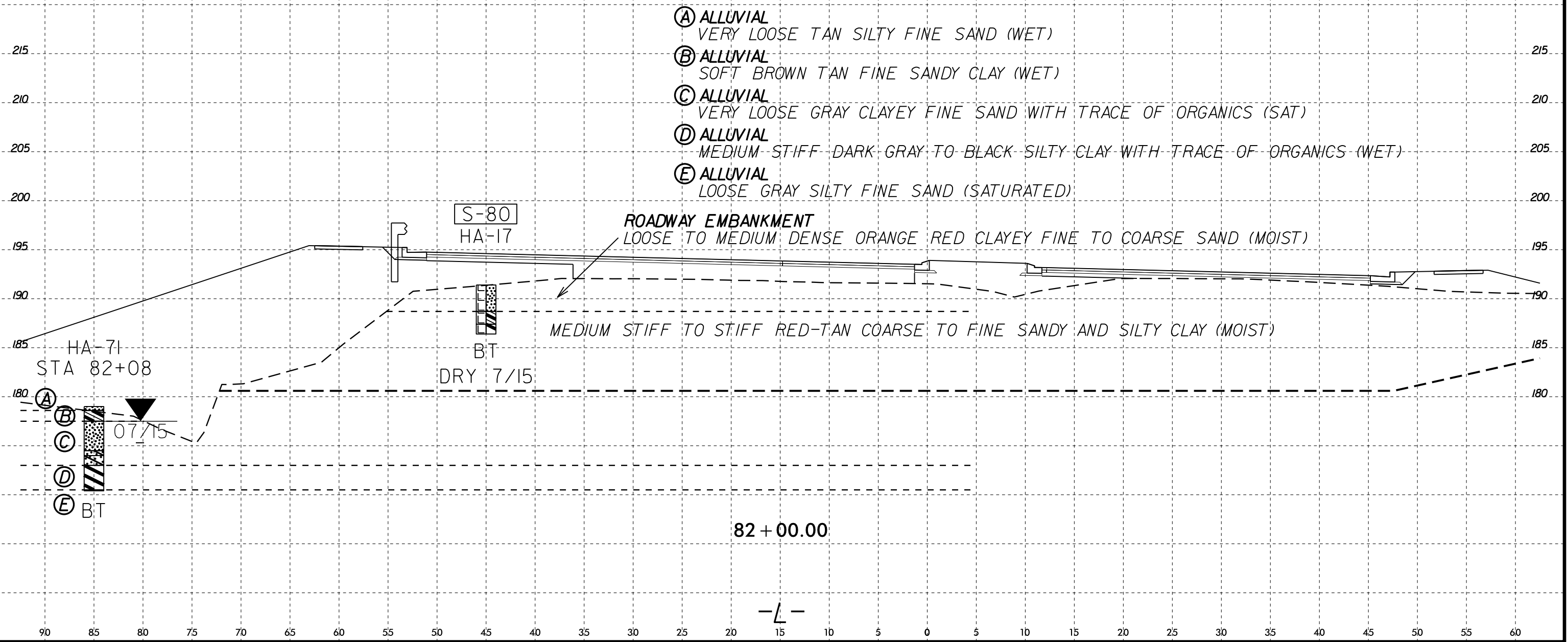
**SOIL TEST RESULTS**

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-83	75' LT	80+00	0.0-4.0	A-2-4 (0)	20	4	29	44	9	18	100	84	34	17.3	ND
S-84	75' LT	78+00	0.0-2.8	A-2-4 (0)	15	NP	43	41	7	9	100	78	19	10.1	ND
S-67	60' RT	75+00	0.0-4.0	A-2-4 (0)	21	5	47	33	4	16	100	74	22	8.7	ND

25-JAN-2016 14:00  
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 BRett AT BRA11-13508

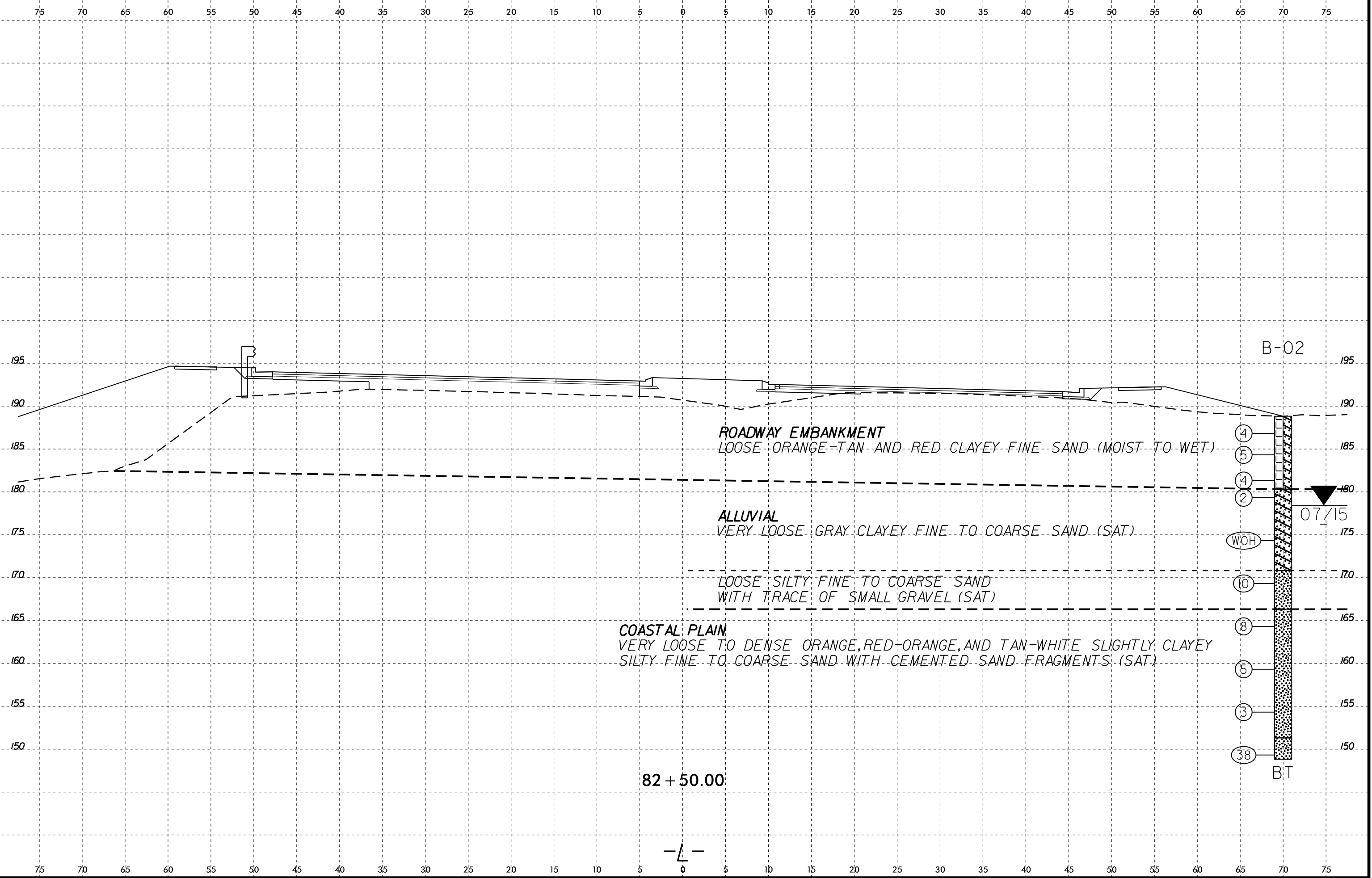
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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-80	45' LT	82+00	0.0-2.7	A-2-4 (0)	24	8	46	31	4	19	99	69	26	8.4	ND



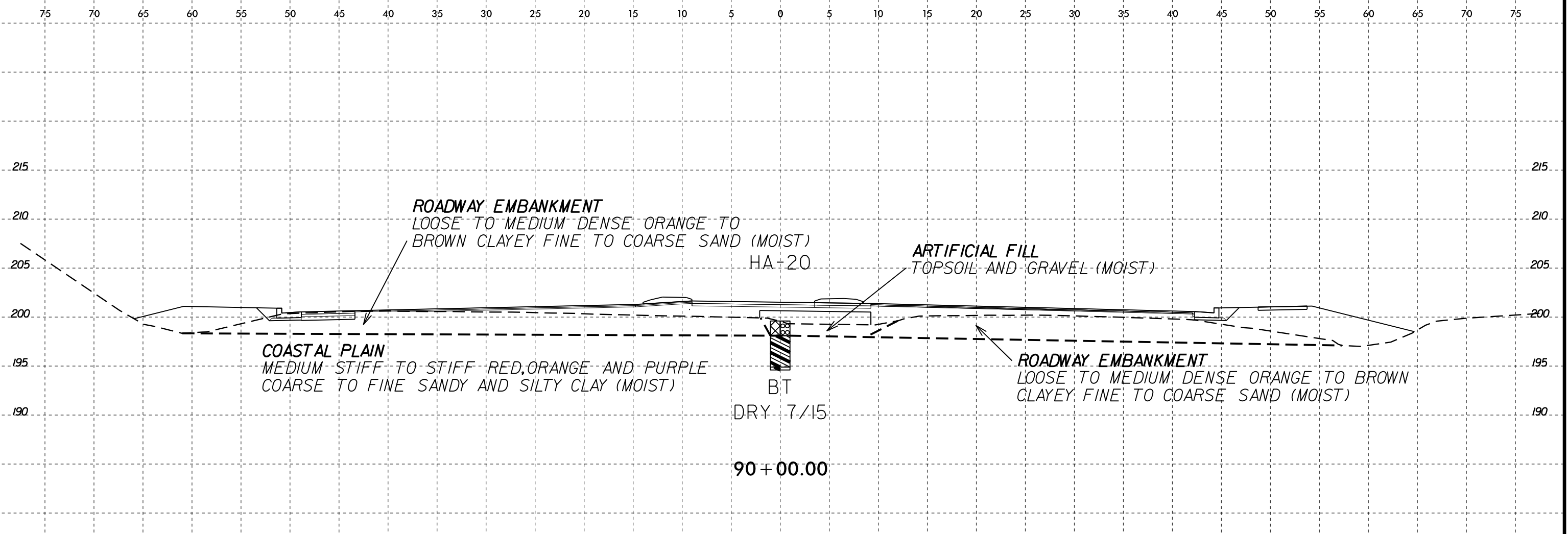


8/23/99



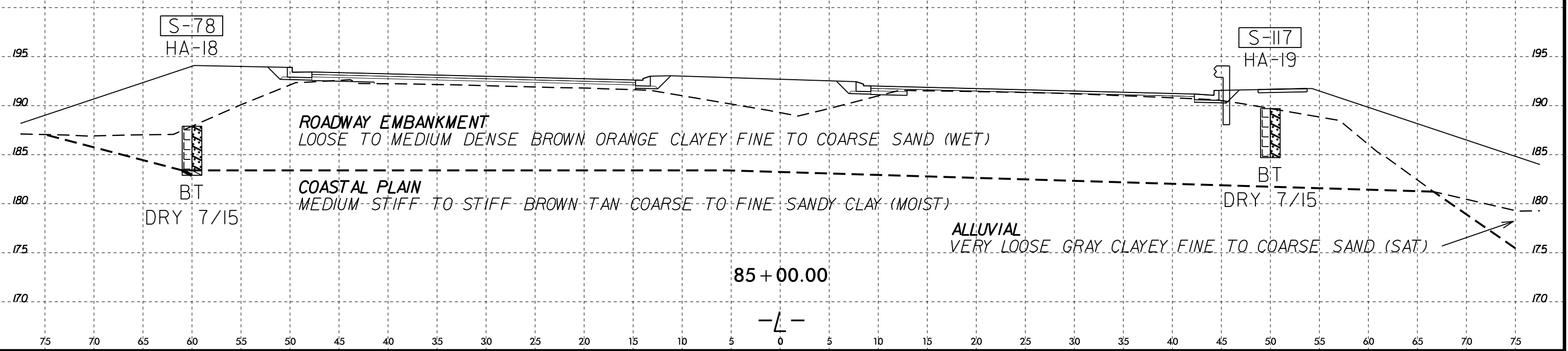
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BRettu AT BRA11-13508

8/23/99

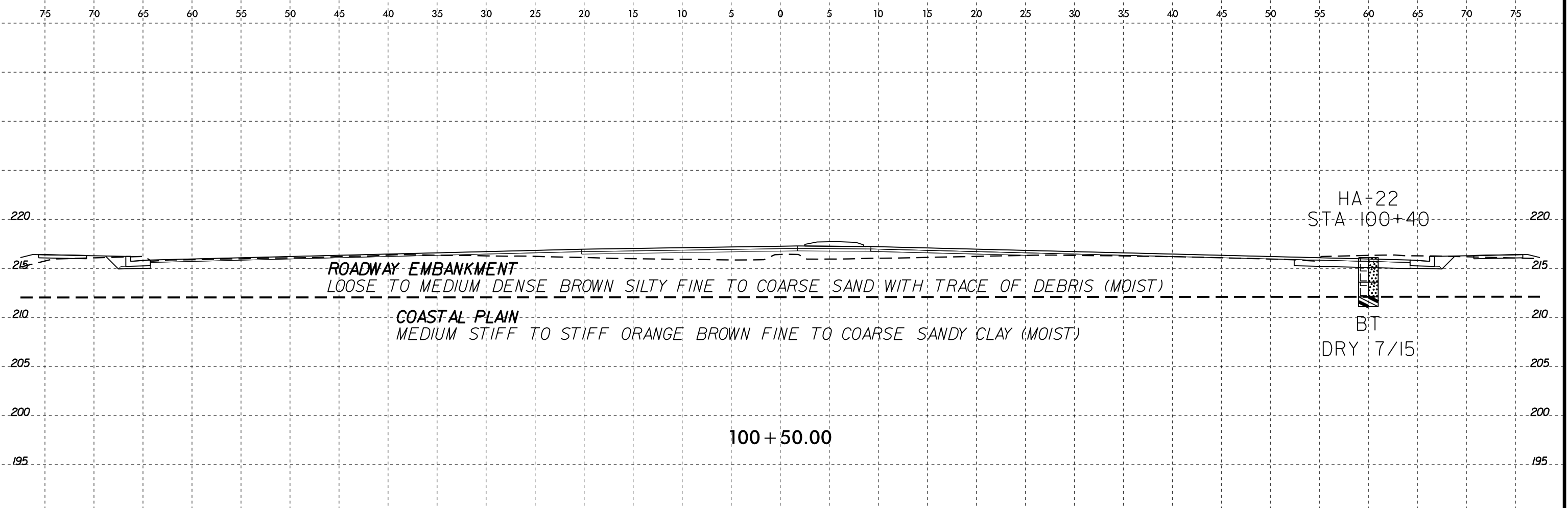


**SOIL TEST RESULTS**

SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-78	60' LT	85+00	0.0-4.5	A-2-6 (0)	27	11	44	31	2	23	100	74	28	14.4	ND
S-117	50' RT	85+00	0.0-5.0	A-2-6 (1)	35	19	48	21	4	27	99	70	32	14.6	ND



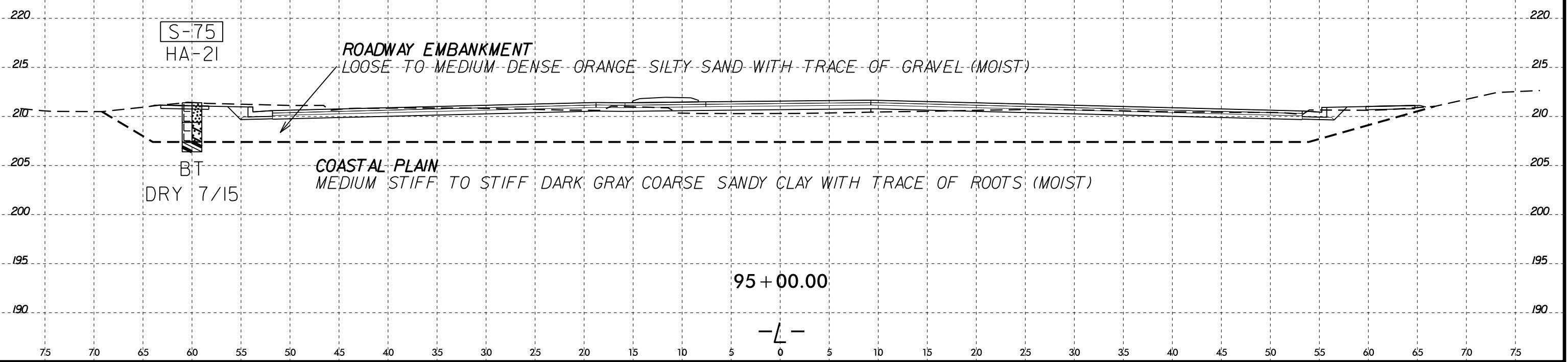
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 BRett AT BRA11-13500



100 + 50.00

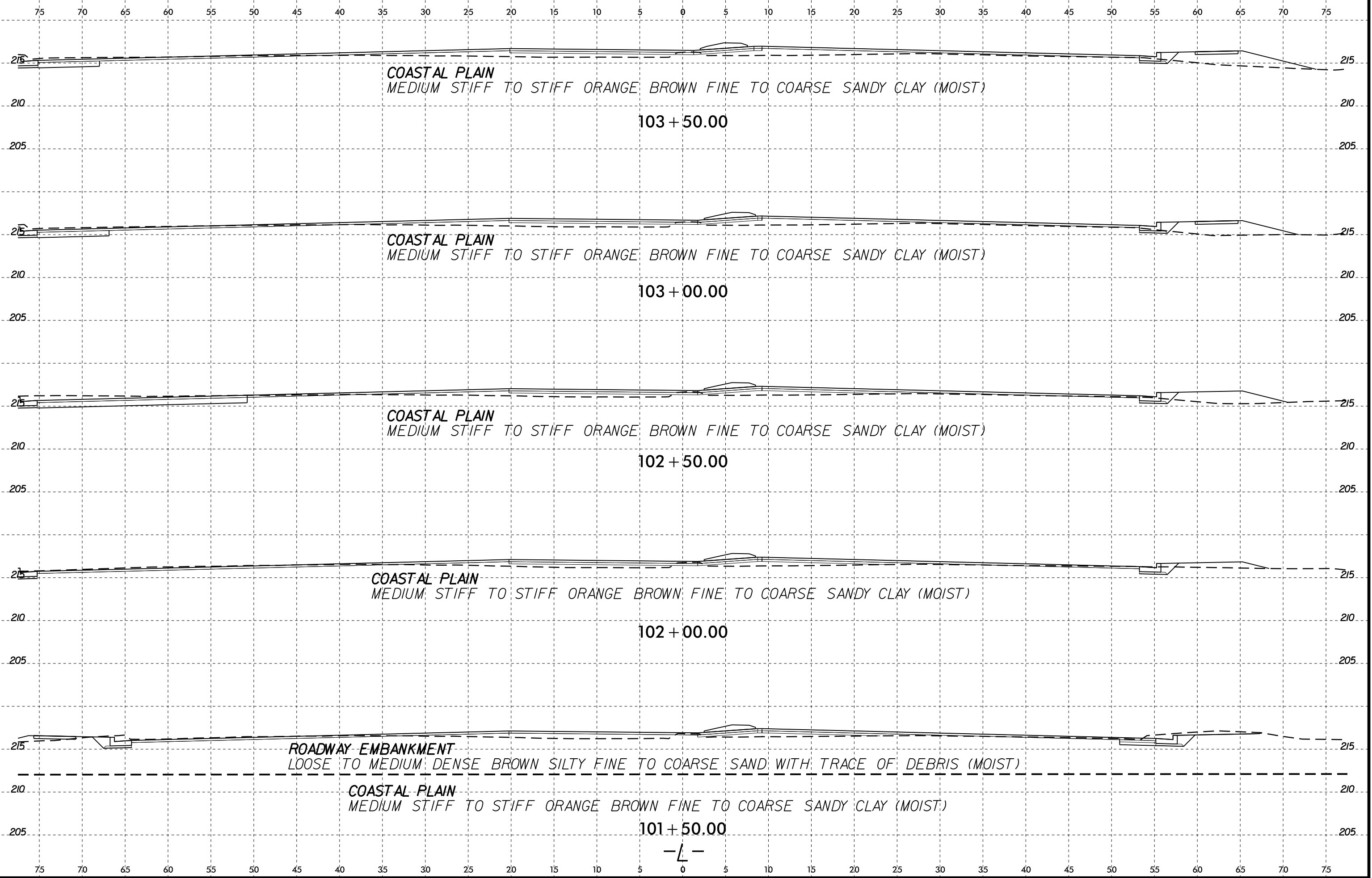
### SOIL TEST RESULTS

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							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-75	60' LT	95+00	0.0-2.0	A-2-4 (0)	25	7	35	44	3	18	99	77	23	7.3	ND



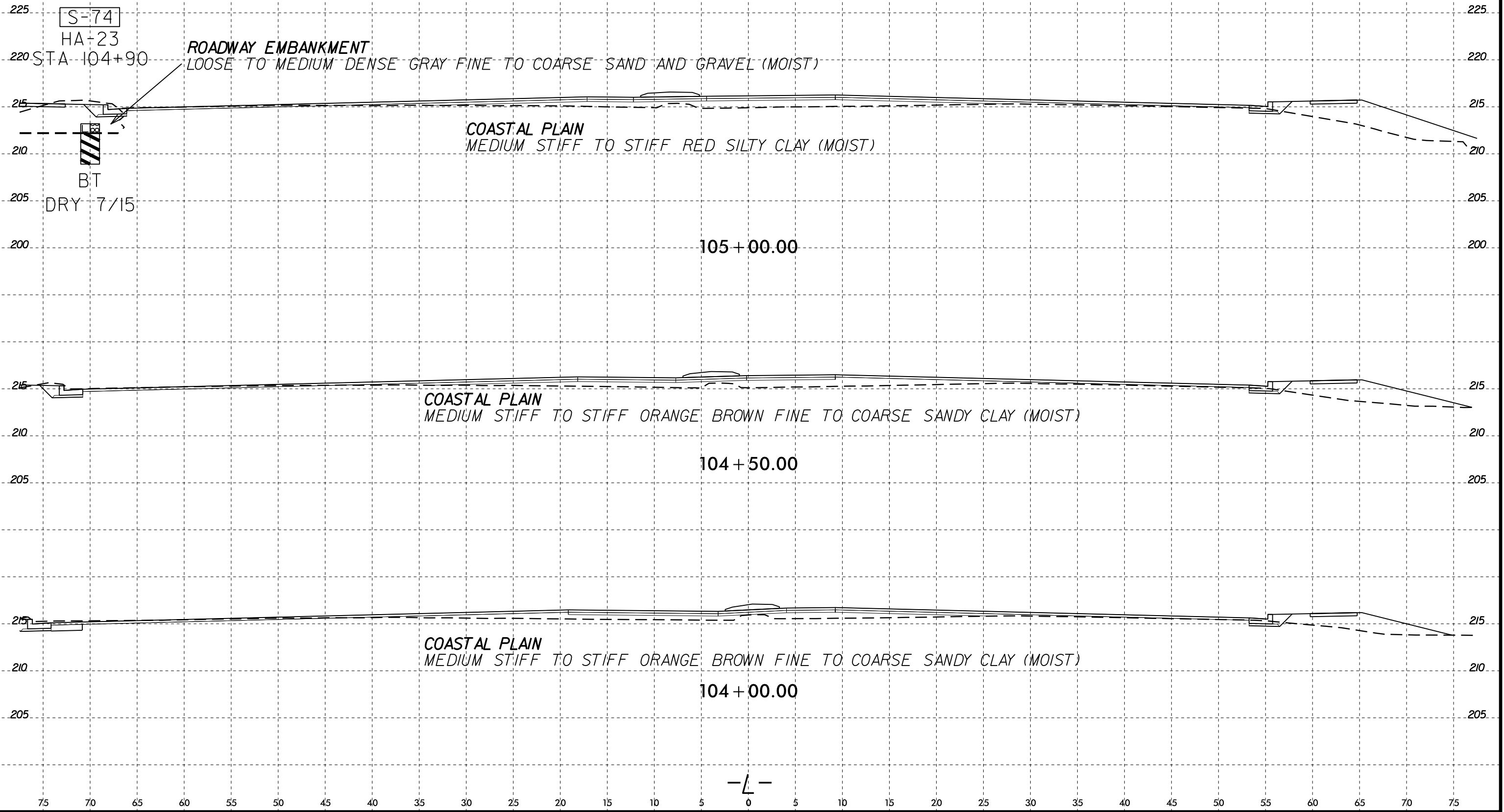
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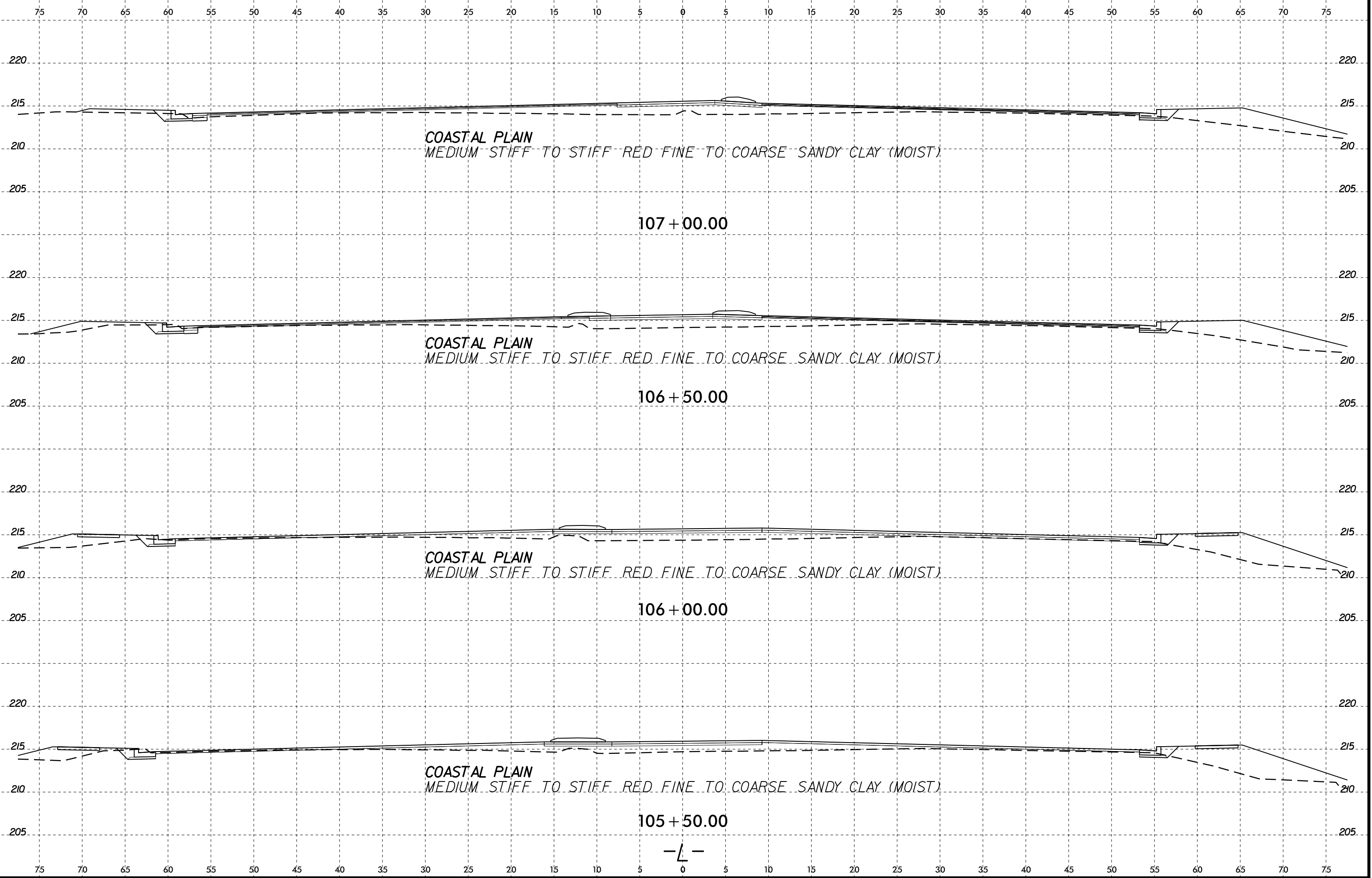
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BRettu - AT BRA111-13508

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-74	70' LT	104+90	1.0-4.3	A-7-6 (14)	52	26	28	14	7	51	100	82	60	22.2	ND



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8/23/99



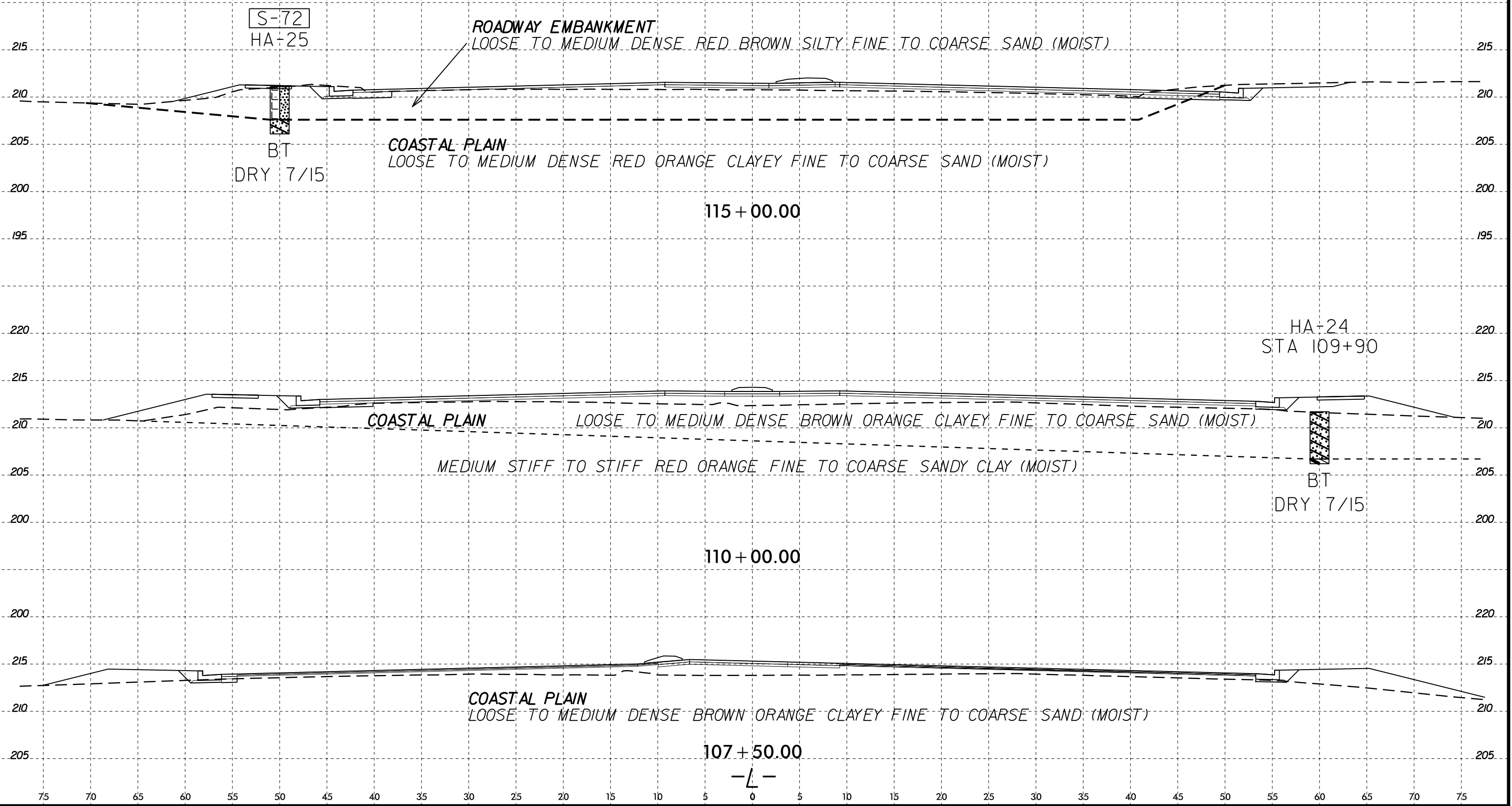
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BRettu AT BRA11-13508



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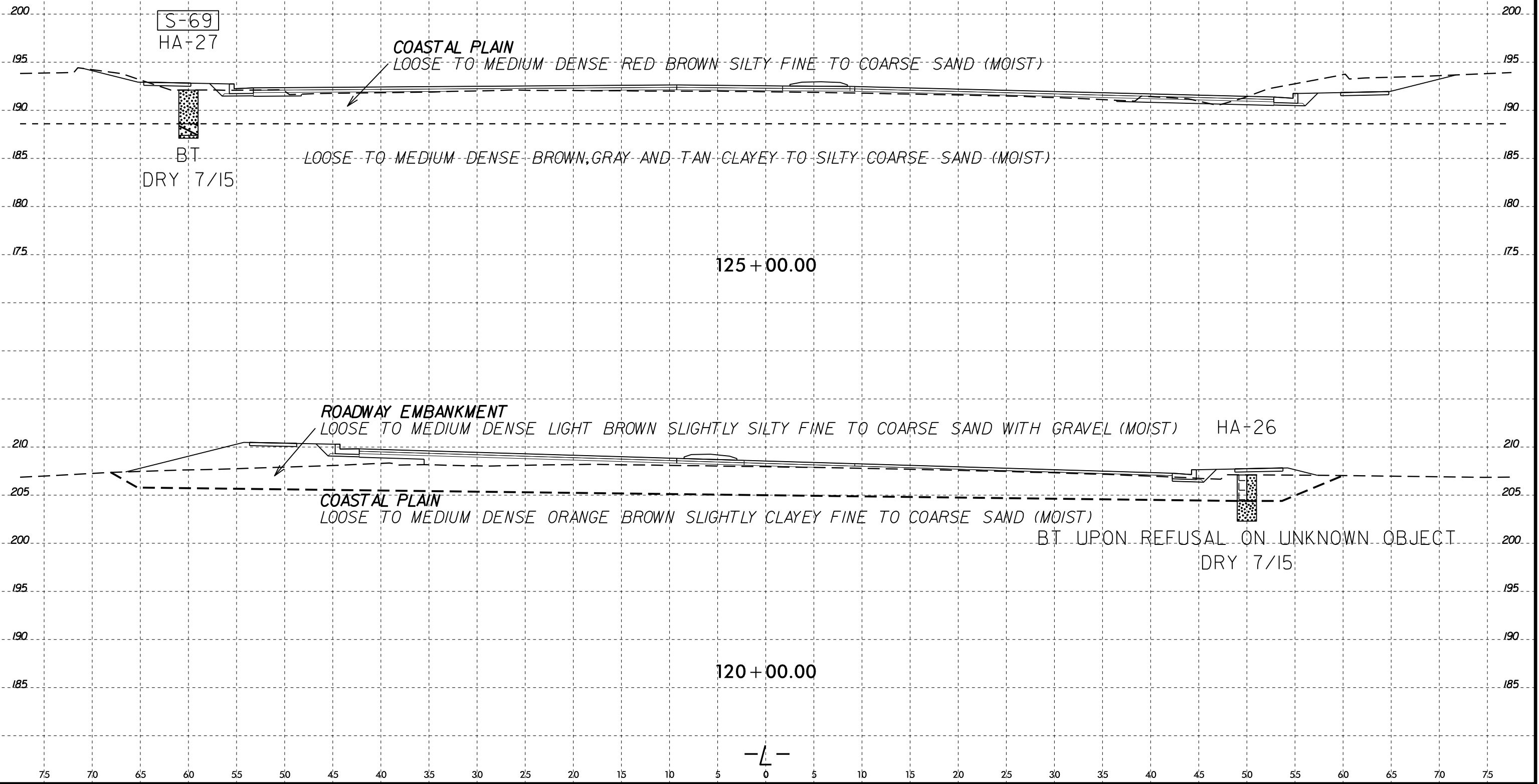
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-72	50' LT	115+00	0.0-3.5	A-2-4 (0)	18	3	55	27	5	13	100	64	21	6.7	ND



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BRettu AT BRA11-13508

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-69	60' LT	125+00	0.0-3.5	A-2-4 (0)	17	4	49	37	3	11	98	68	17	9.3	ND



S-69  
HA+27

BT  
DRY 7/15

**COASTAL PLAIN**  
LOOSE TO MEDIUM DENSE RED BROWN SILTY FINE TO COARSE SAND (MOIST)

LOOSE TO MEDIUM DENSE BROWN, GRAY AND TAN CLAYEY TO SILTY COARSE SAND (MOIST)

**ROADWAY EMBANKMENT**  
LOOSE TO MEDIUM DENSE LIGHT BROWN SLIGHTLY SILTY FINE TO COARSE SAND WITH GRAVEL (MOIST)

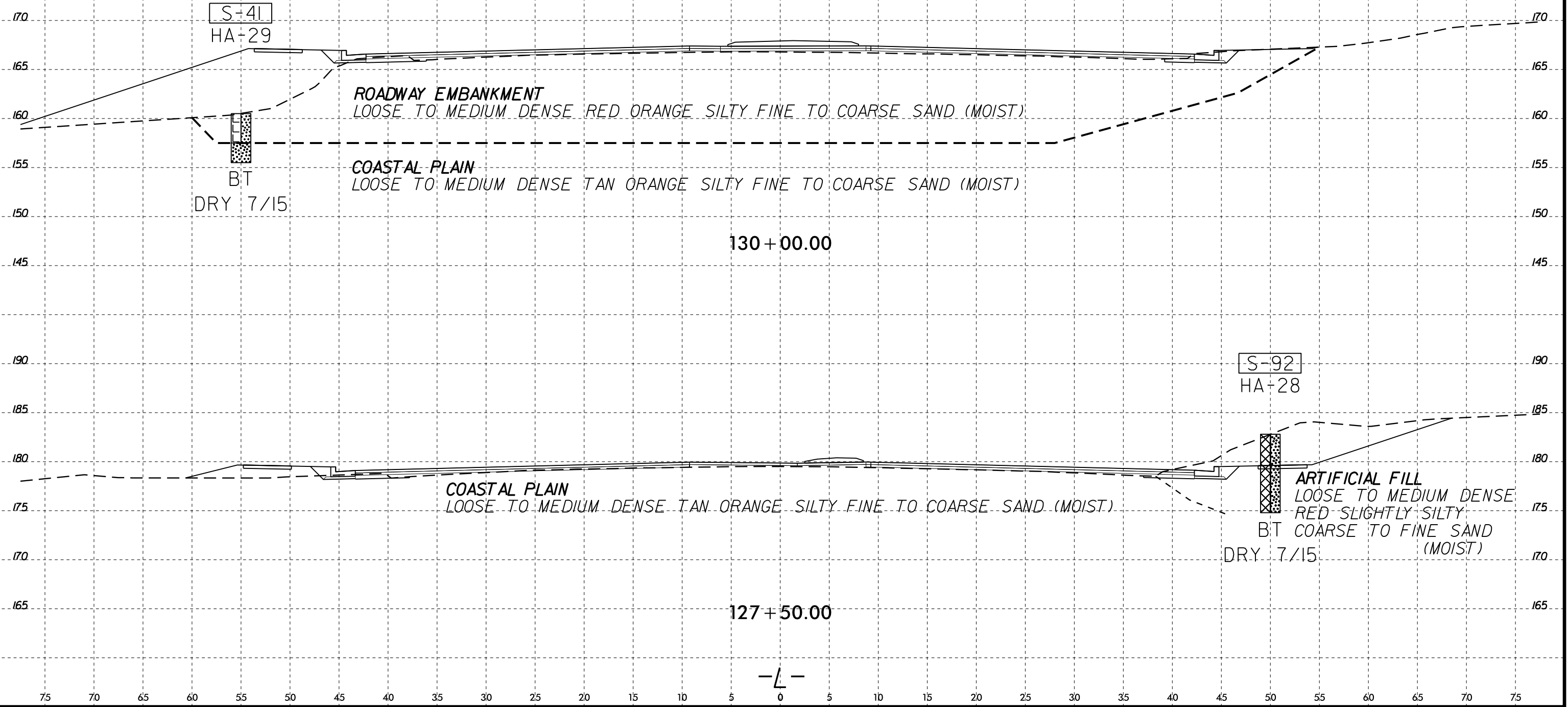
**COASTAL PLAIN**  
LOOSE TO MEDIUM DENSE ORANGE BROWN SLIGHTLY CLAYEY FINE TO COARSE SAND (MOIST)

HA+26

BT UPON REFUSAL ON UNKNOWN OBJECT  
DRY 7/15

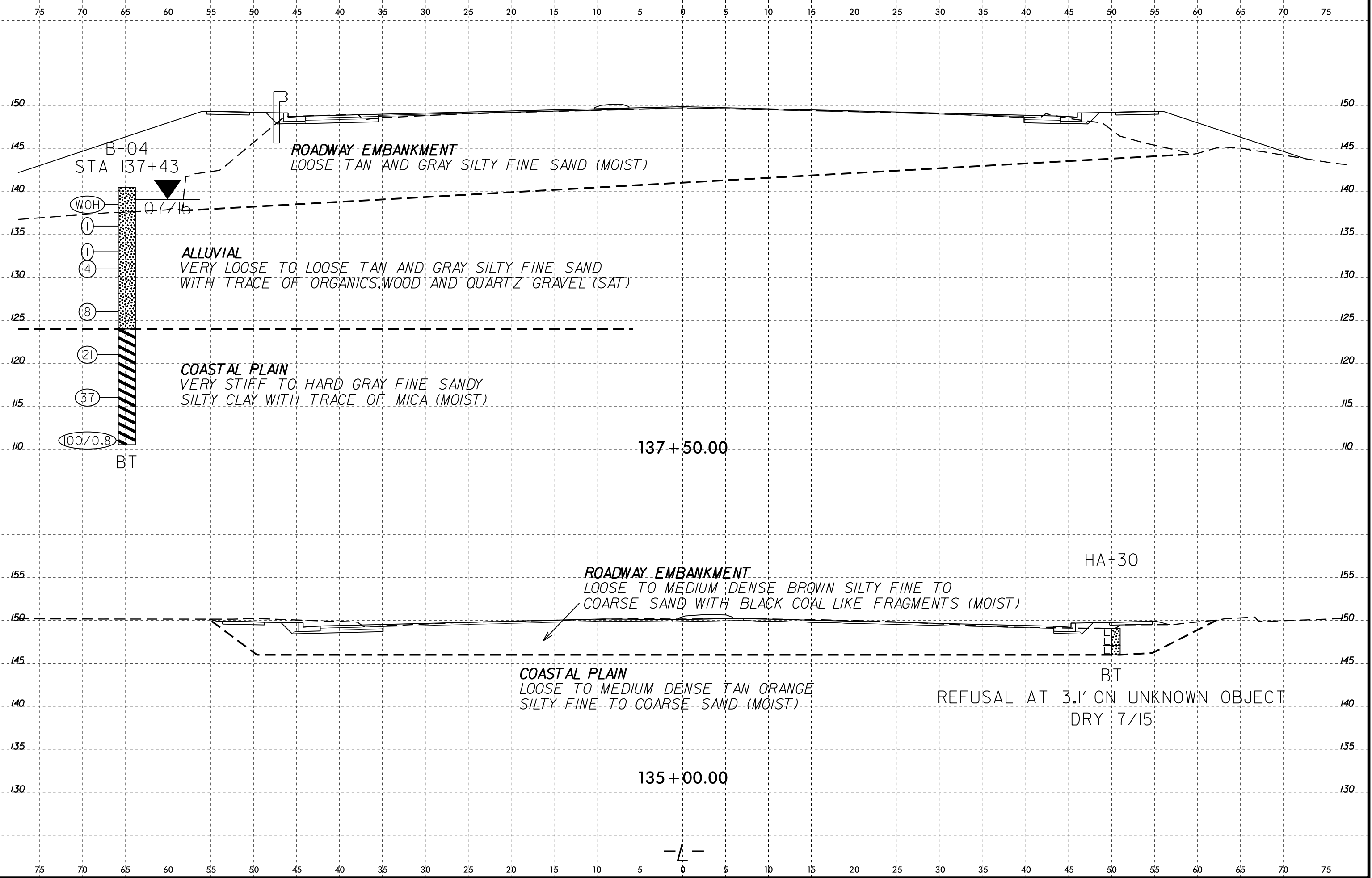
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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-41	55' LT	130+00	0.0-3.0	A-2-4 (0)	18	1	40	41	5	14	99	76	22	7.7	ND
S-92	50' RT	127+50	0.0-8.0	A-2-4 (0)	24	4	26	57	4	13	100	84	19	8	ND



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 AT BRA11-13508

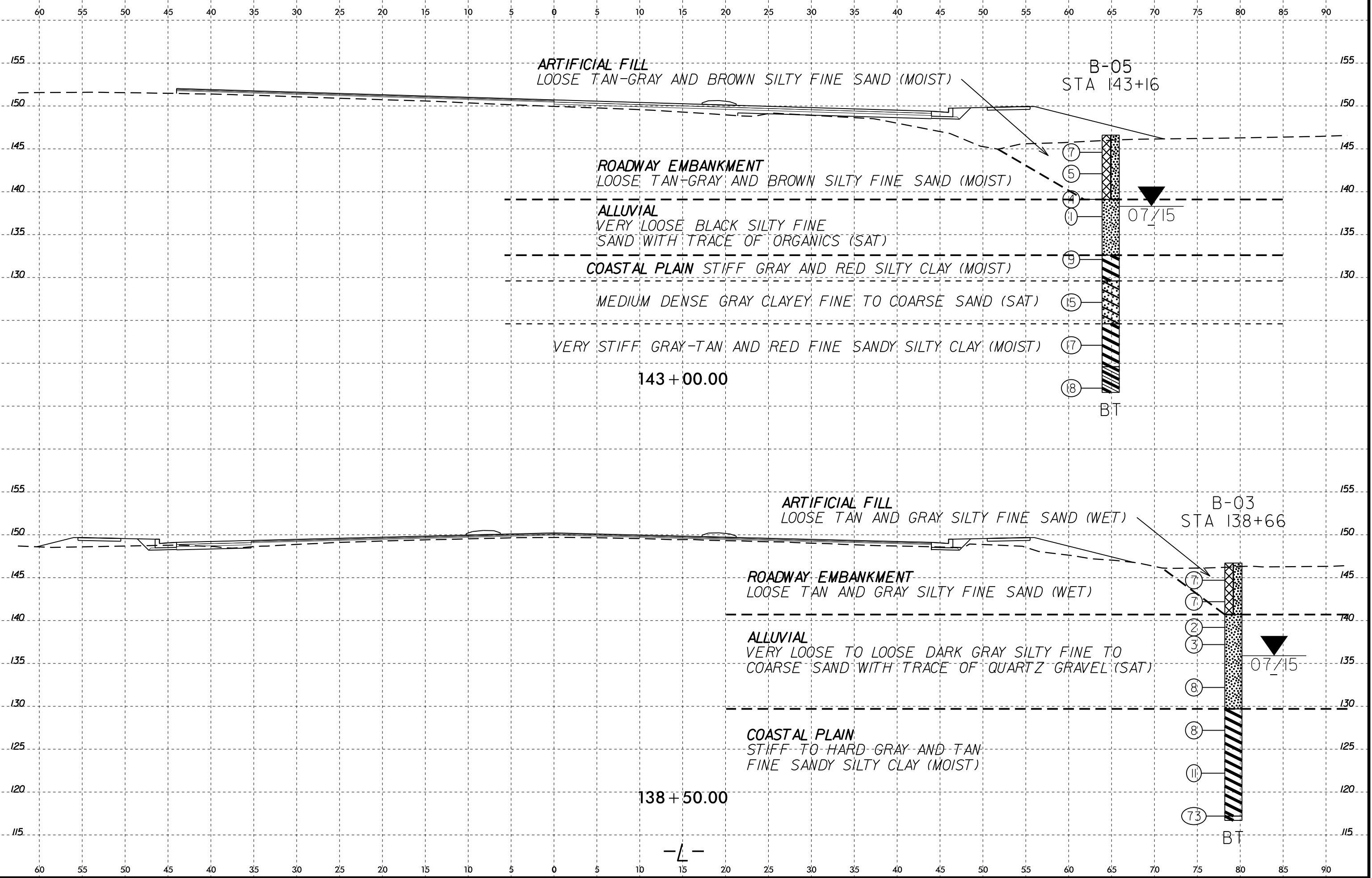
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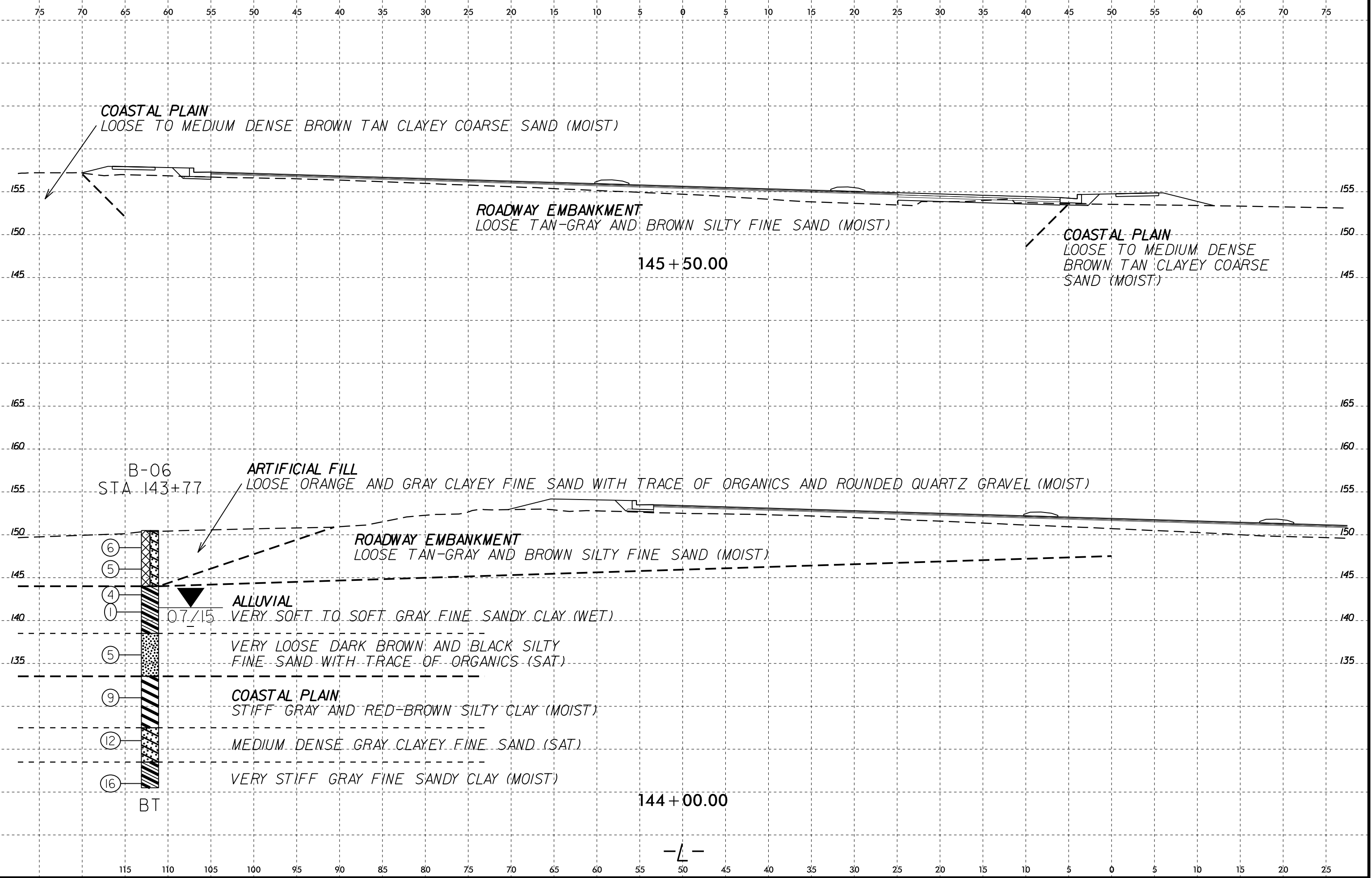
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BRettu AT BRA11-13508

8/23/99



**COASTAL PLAIN**  
 LOOSE TO MEDIUM DENSE BROWN TAN CLAYEY COARSE SAND (MOIST)

**ROADWAY EMBANKMENT**  
 LOOSE TAN-GRAY AND BROWN SILTY FINE SAND (MOIST)

**COASTAL PLAIN**  
 LOOSE TO MEDIUM DENSE  
 BROWN TAN CLAYEY COARSE  
 SAND (MOIST)

145 + 50.00

B-06  
 STA 143+77

**ARTIFICIAL FILL**  
 LOOSE ORANGE AND GRAY CLAYEY FINE SAND WITH TRACE OF ORGANICS AND ROUNDED QUARTZ GRAVEL (MOIST)

**ROADWAY EMBANKMENT**  
 LOOSE TAN-GRAY AND BROWN SILTY FINE SAND (MOIST)

- ⑥
- ⑤
- ④
- ①
- ⑤
- ⑨
- ⑫
- ⑯

0.7/15  
**ALLUVIAL**  
 VERY SOFT TO SOFT GRAY FINE SANDY CLAY (WET.)

VERY LOOSE DARK BROWN AND BLACK SILTY  
 FINE SAND WITH TRACE OF ORGANICS (SAT.)

**COASTAL PLAIN**  
 STIFF GRAY AND RED-BROWN SILTY CLAY (MOIST)

MEDIUM DENSE GRAY CLAYEY FINE SAND (SAT.)

VERY STIFF GRAY FINE SANDY CLAY (MOIST)

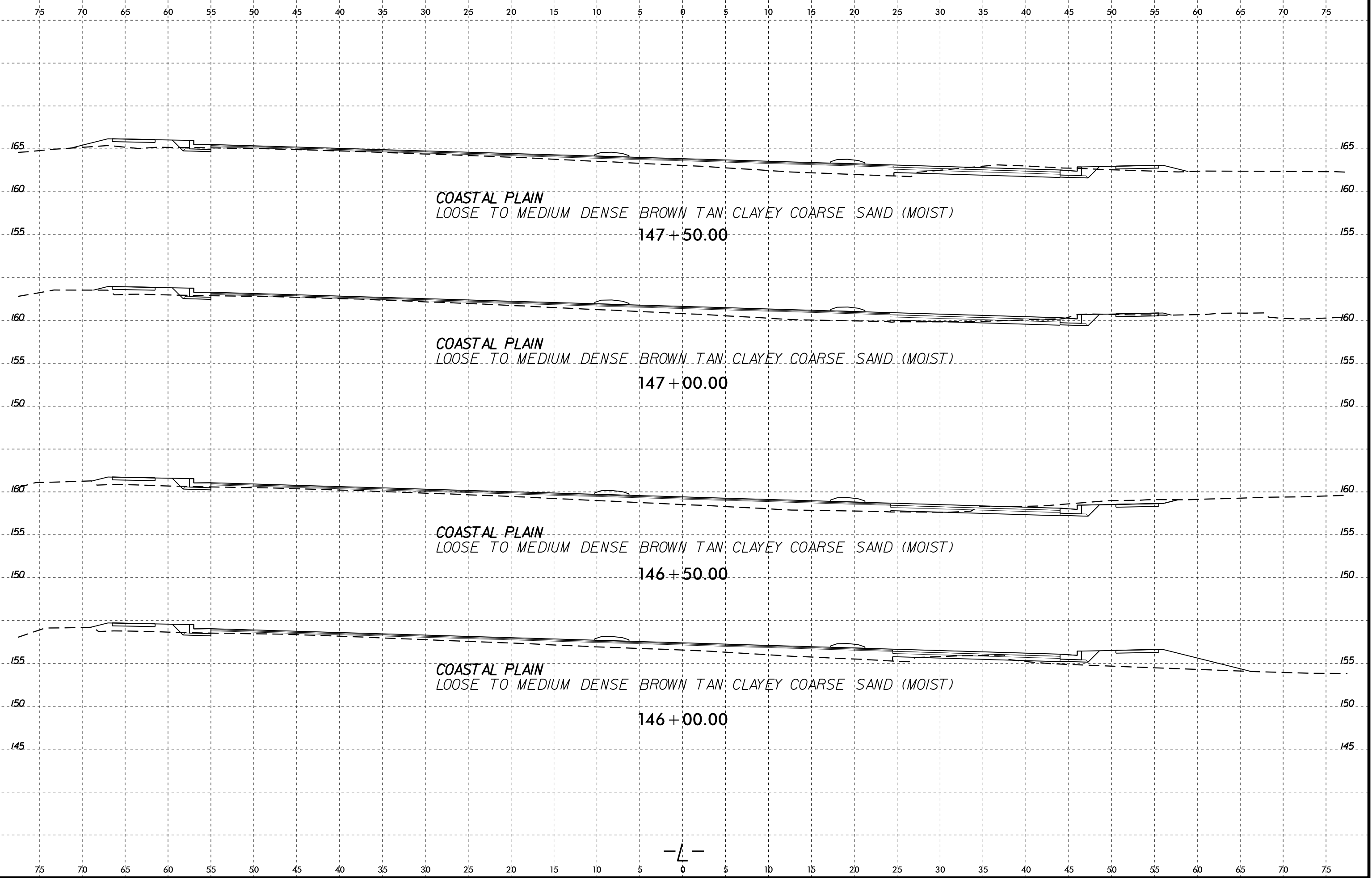
144 + 00.00

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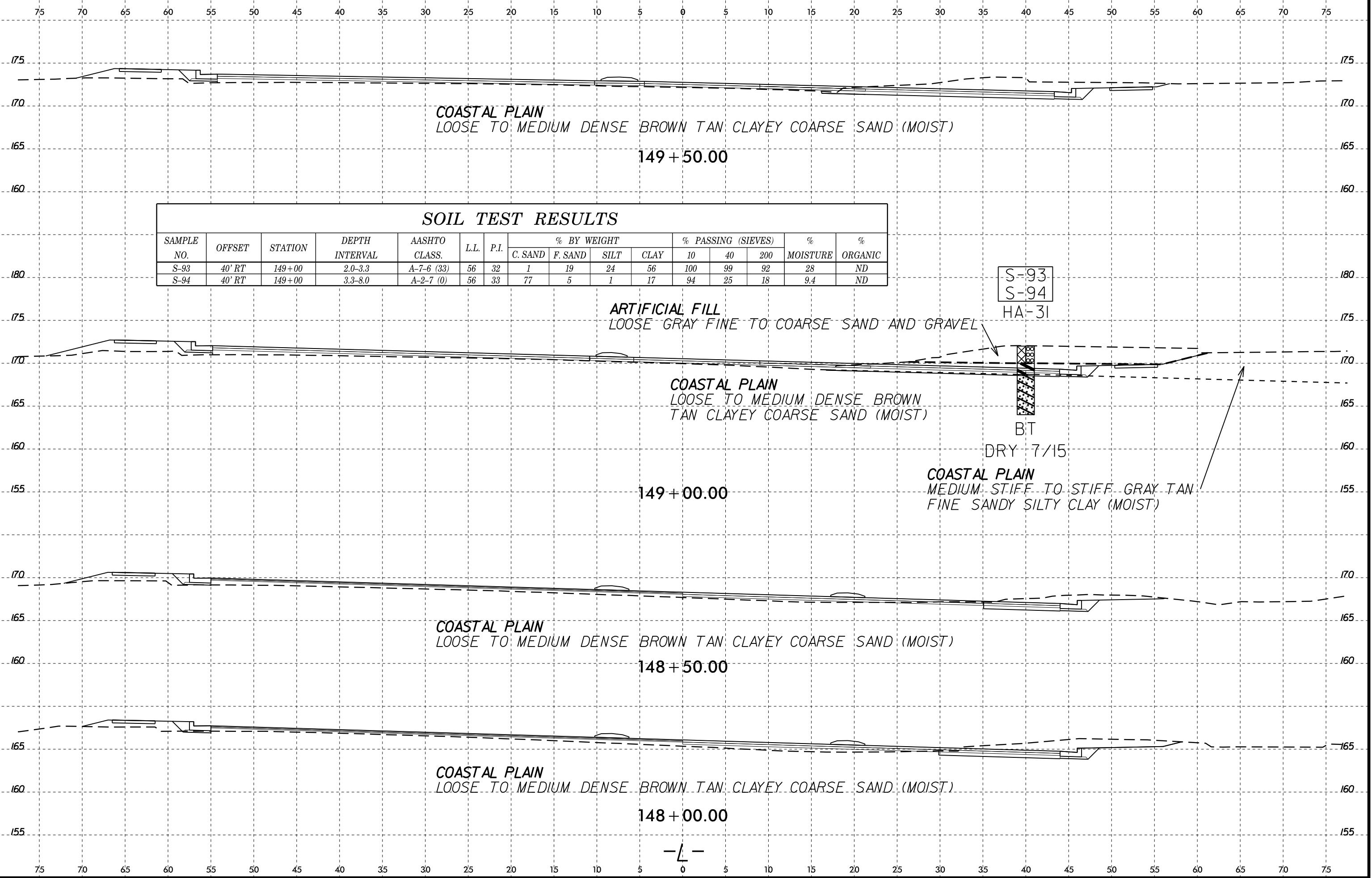


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**COASTAL PLAIN**  
 LOOSE TO MEDIUM DENSE BROWN TAN CLAYEY COARSE SAND (MOIST)  
 149 + 50.00

**ARTIFICIAL FILL**  
 LOOSE GRAY FINE TO COARSE SAND AND GRAVEL

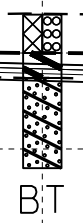
**COASTAL PLAIN**  
 LOOSE TO MEDIUM DENSE BROWN TAN CLAYEY COARSE SAND (MOIST)

**COASTAL PLAIN**  
 MEDIUM STIFF TO STIFF GRAY TAN FINE SANDY SILTY CLAY (MOIST)

**COASTAL PLAIN**  
 LOOSE TO MEDIUM DENSE BROWN TAN CLAYEY COARSE SAND (MOIST)  
 148 + 50.00

**COASTAL PLAIN**  
 LOOSE TO MEDIUM DENSE BROWN TAN CLAYEY COARSE SAND (MOIST)  
 148 + 00.00

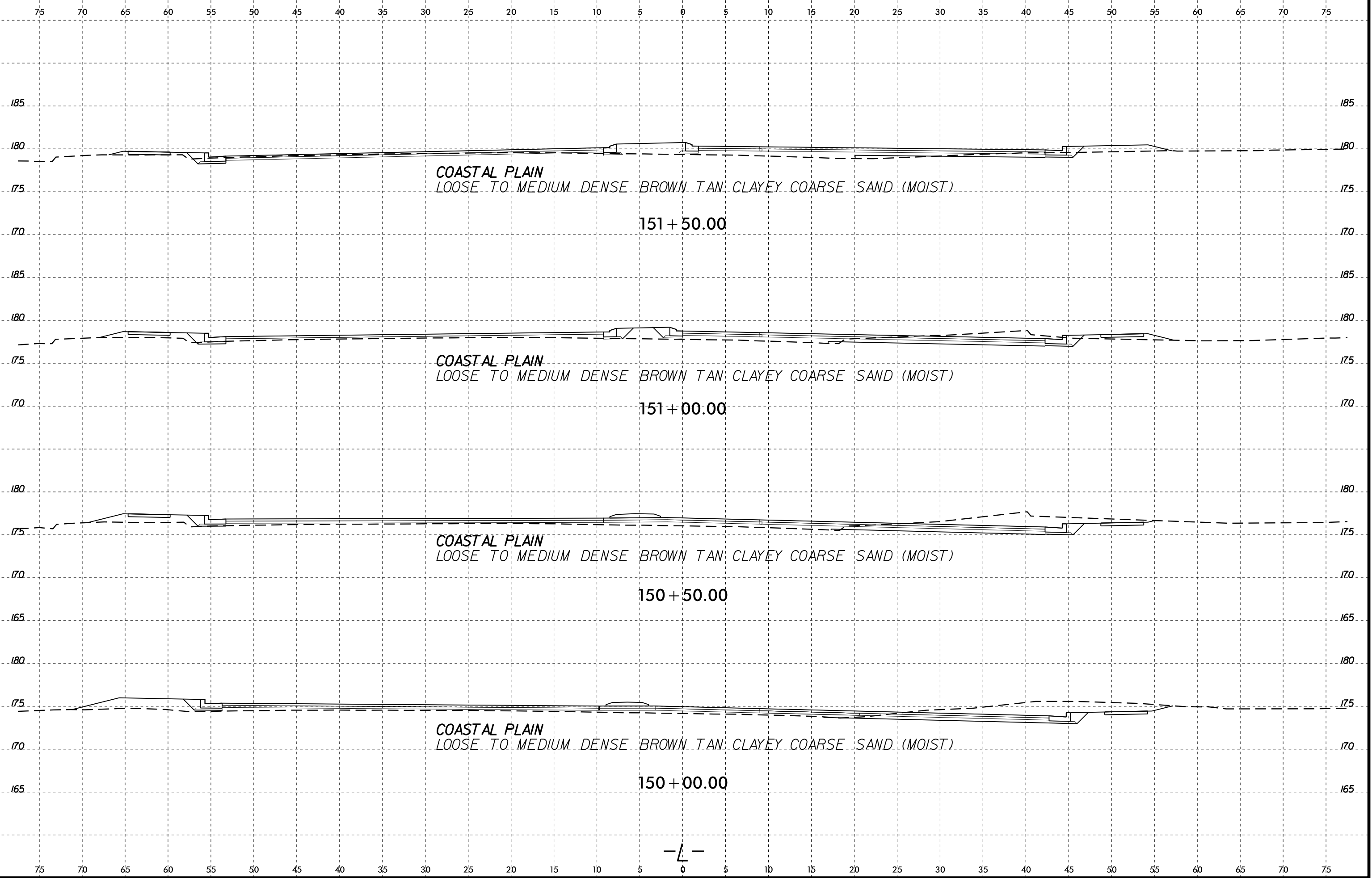
S-93  
 S-94  
 HA-31



BT  
DRY 7/15

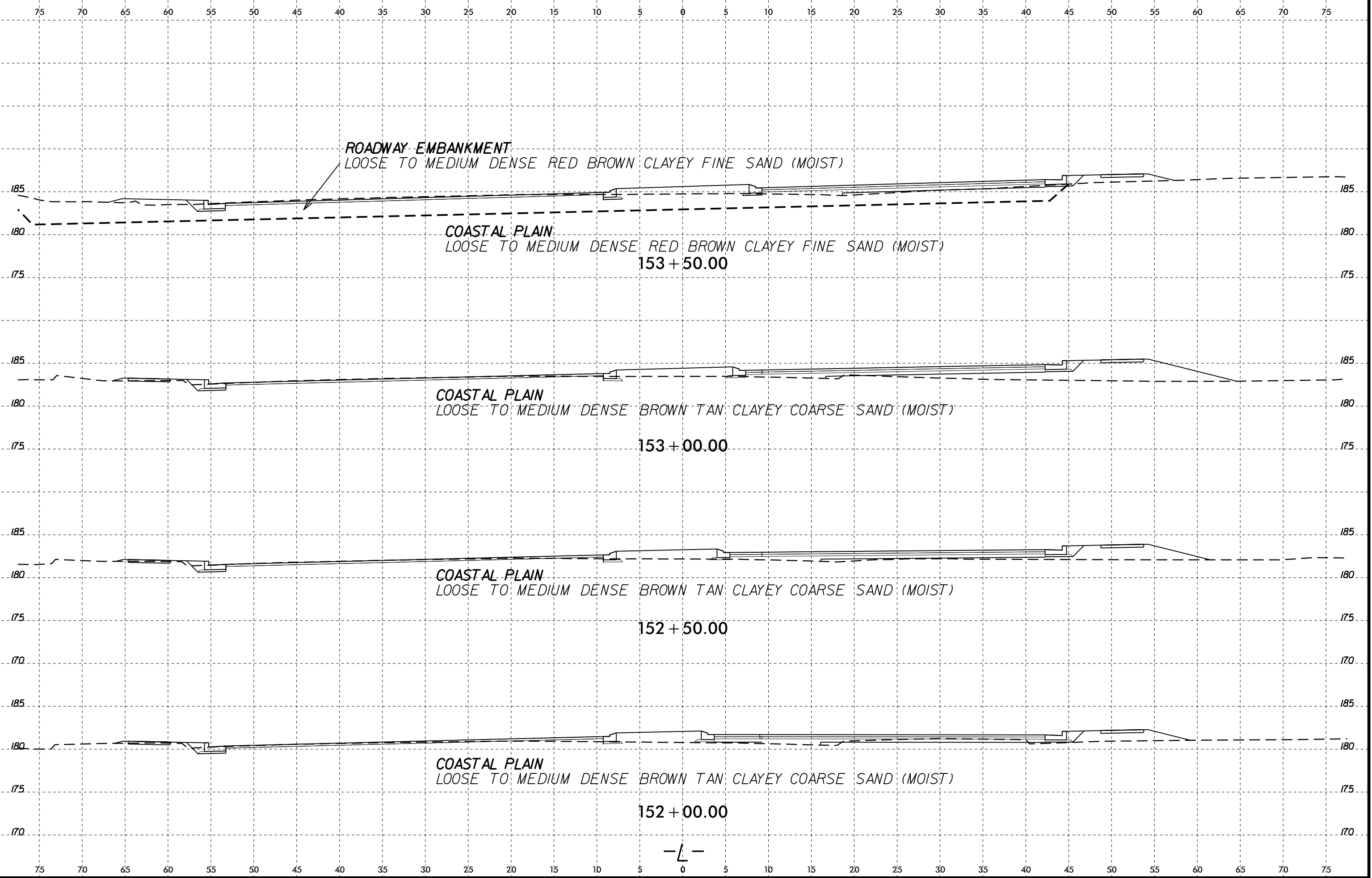
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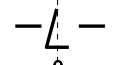


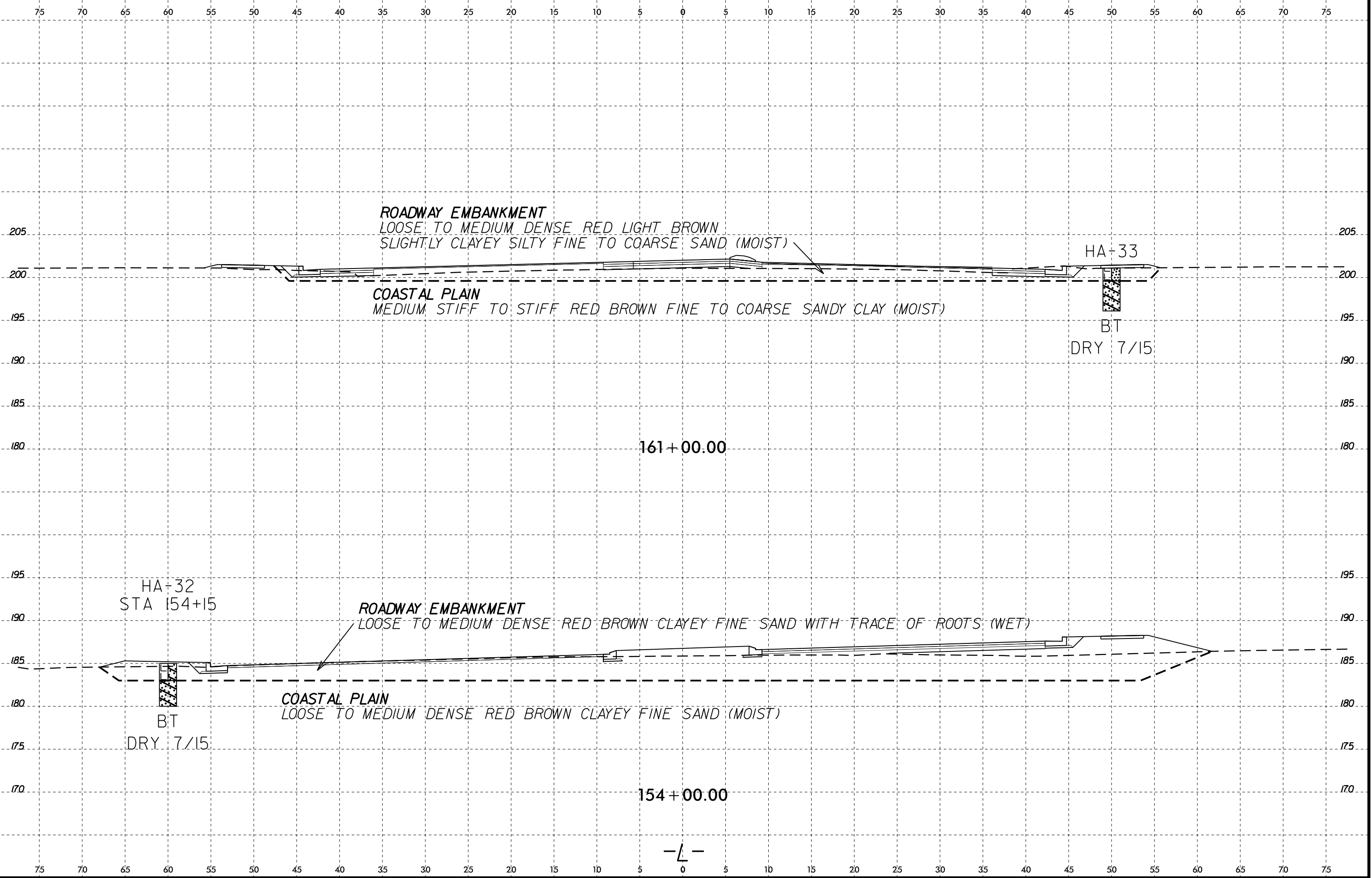
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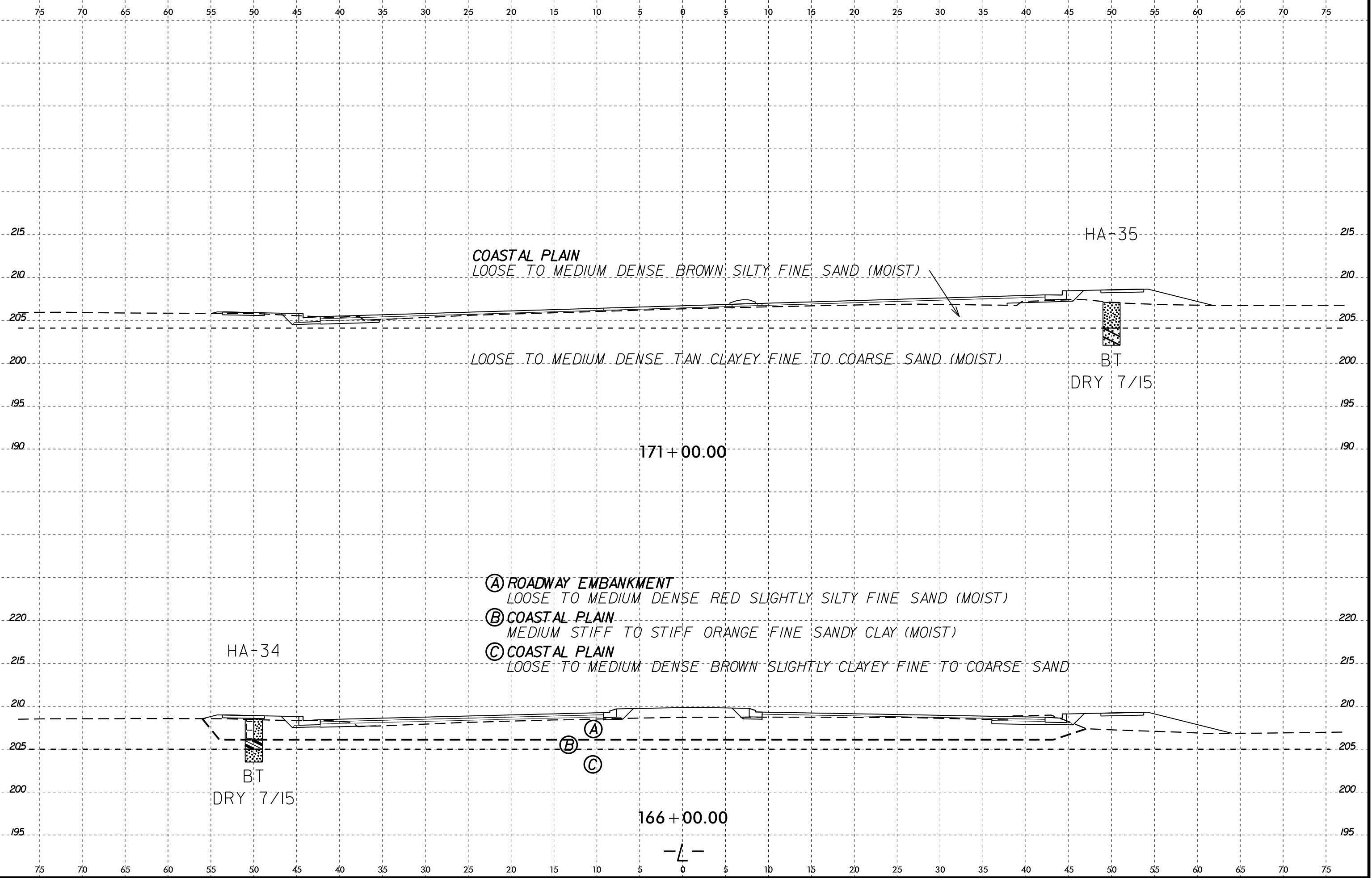


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BRett





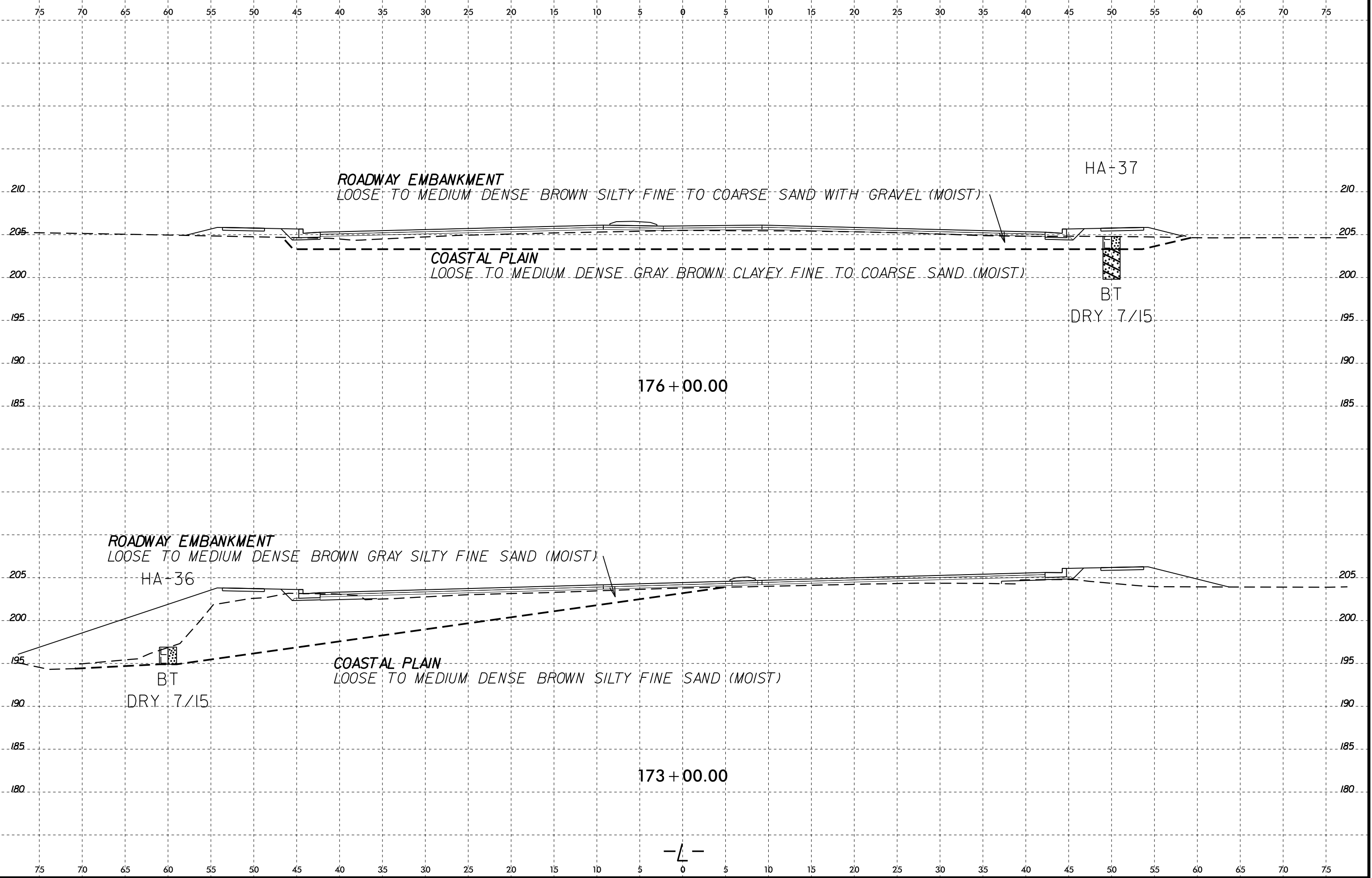
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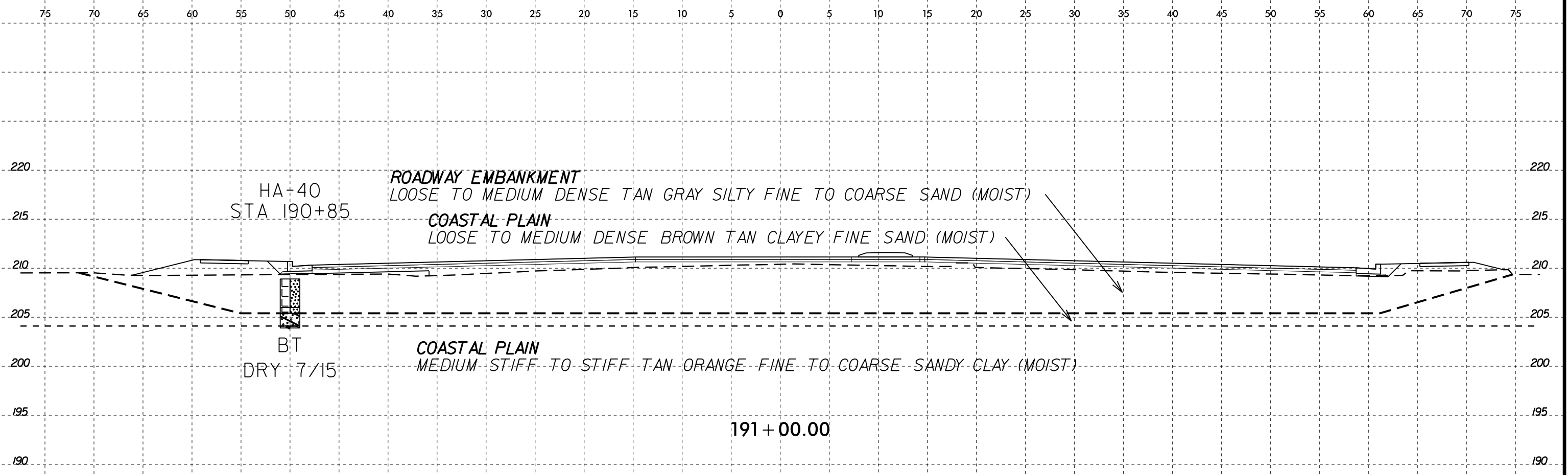


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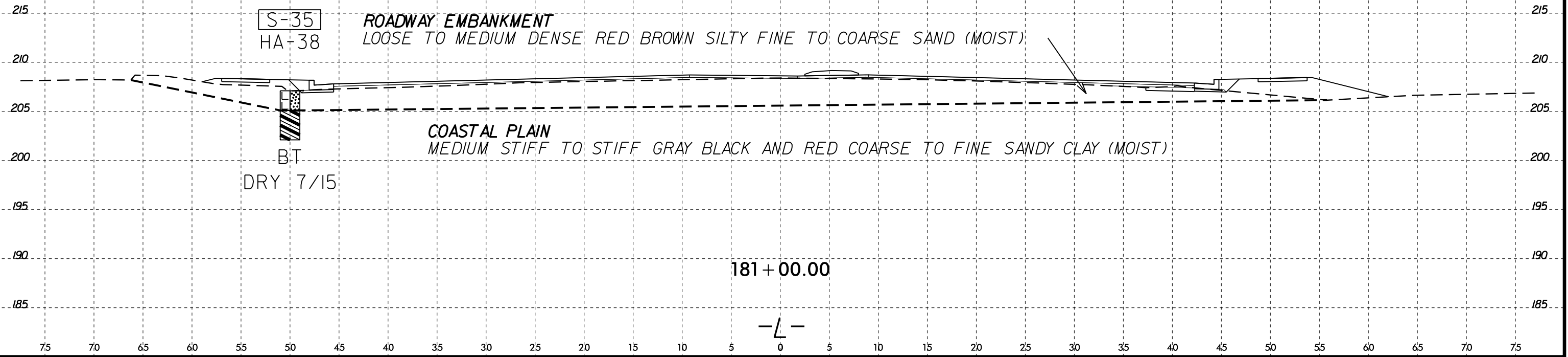


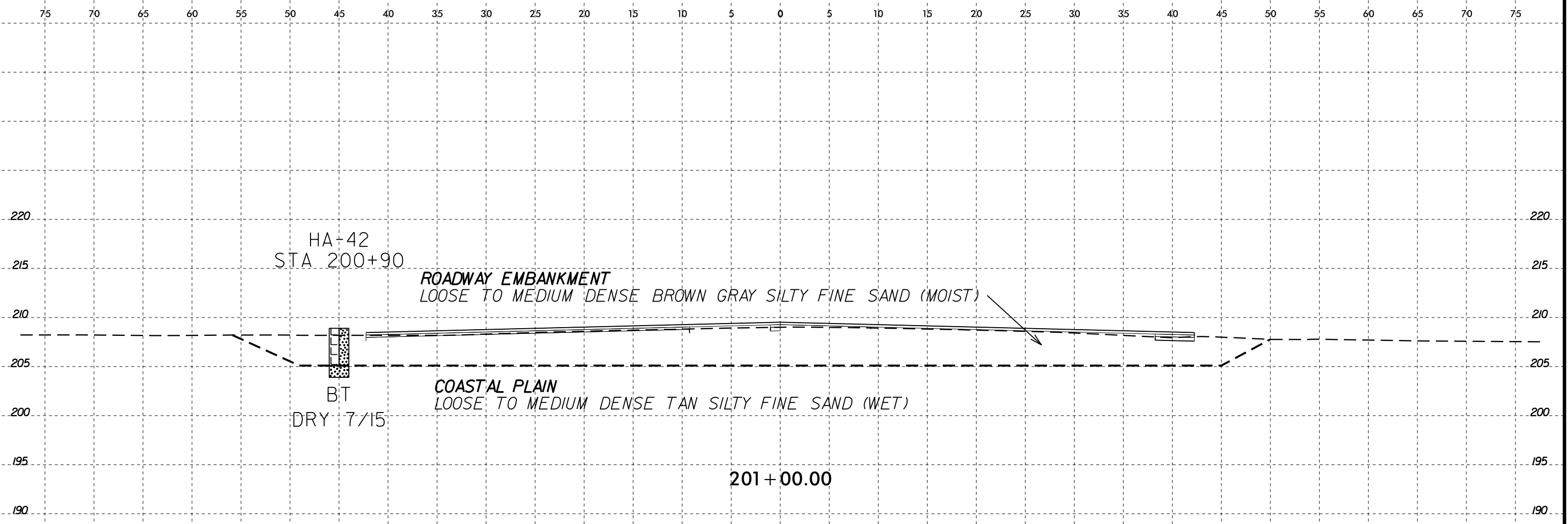
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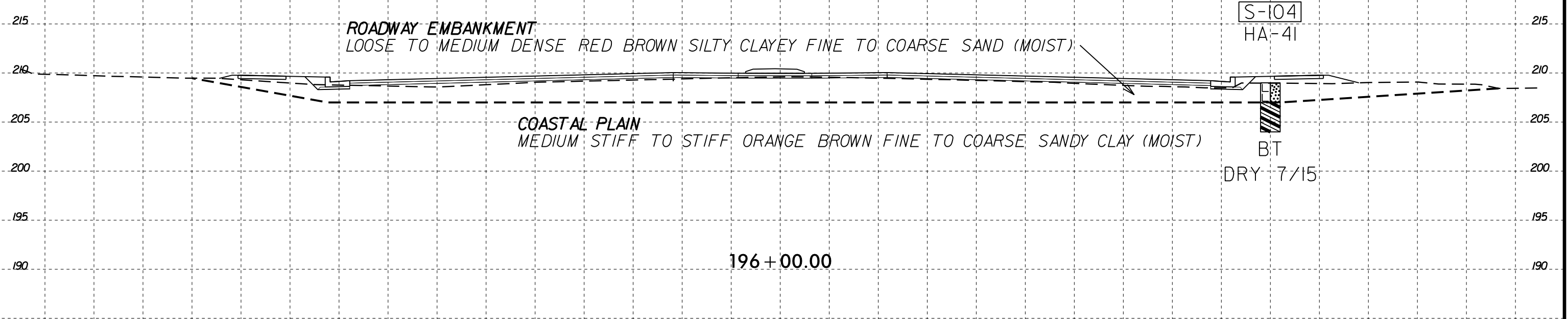


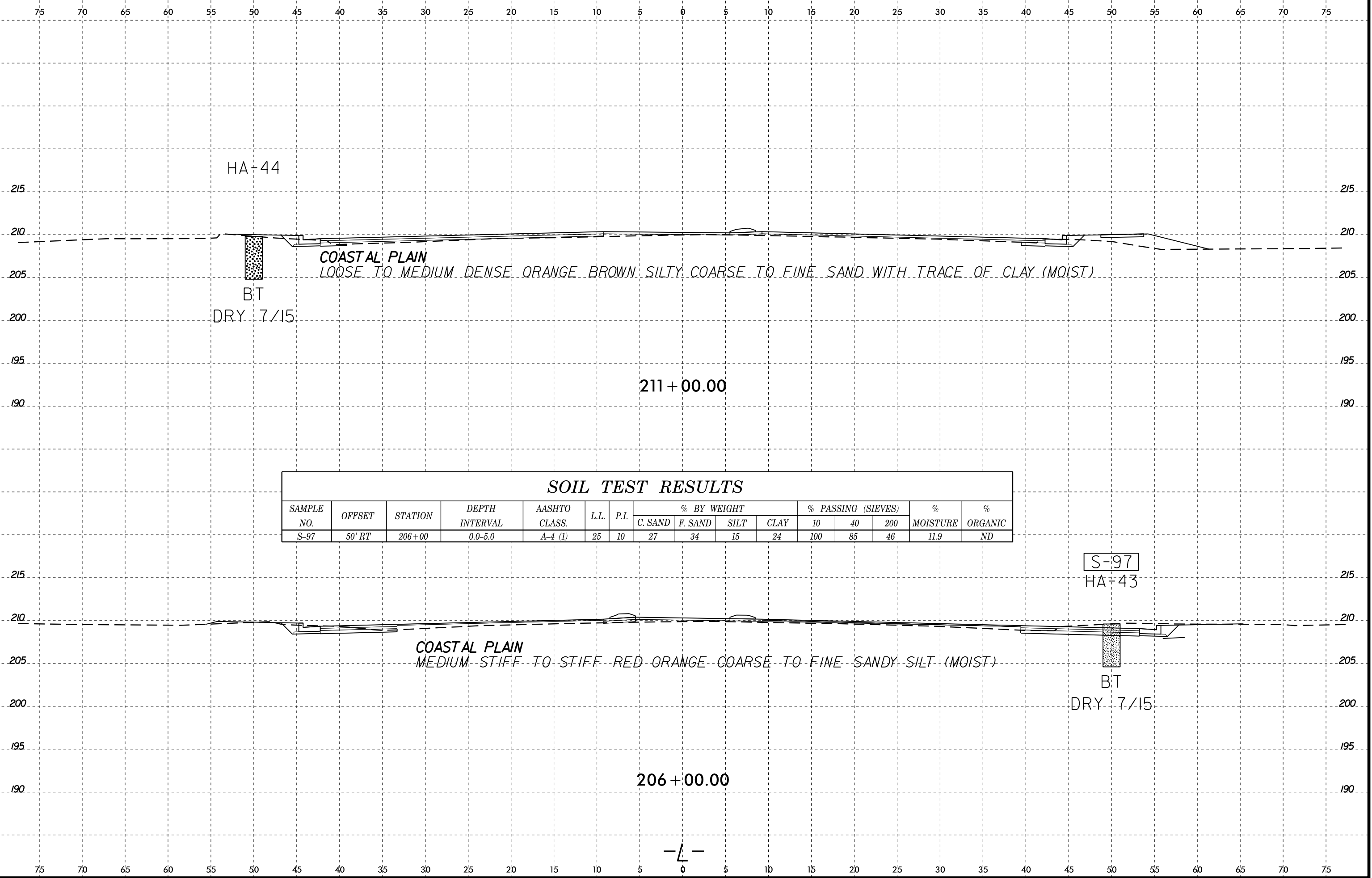
SOIL TEST RESULTS															
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							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-35	50' LT	181+00	0.0-2.0	A-2-4 (0)	23	6	51	30	2	17	96	66	20	13.5	ND





SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-104	50' RT	196+00	0.0-2.0	A-2-4 (0)	25	7	45	34	3	18	98	71	23	10.9	ND

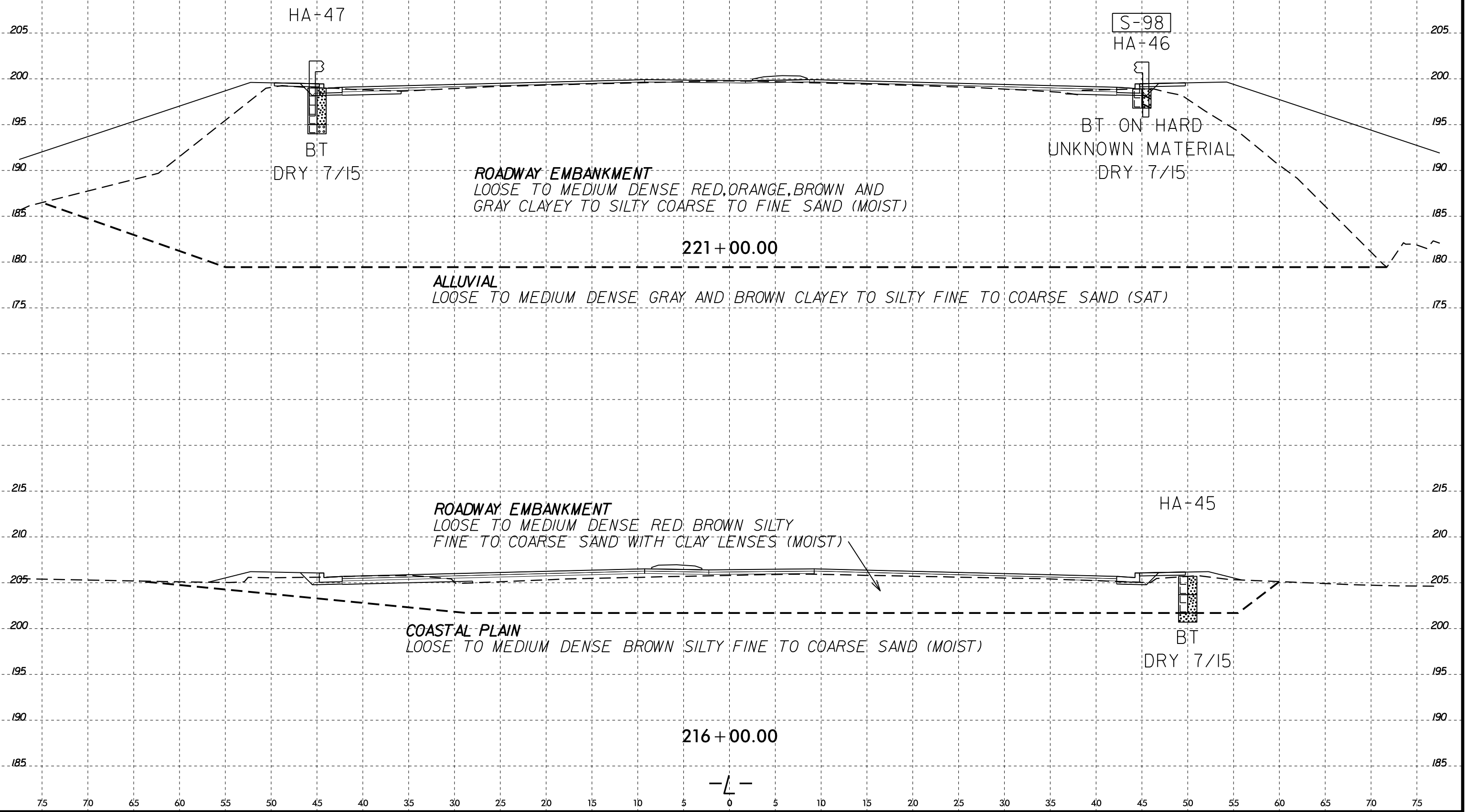




SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-97	50' RT	206+00	0.0-5.0	A-4 (1)	25	10	27	34	15	24	100	85	46	11.9	ND

8/23/99

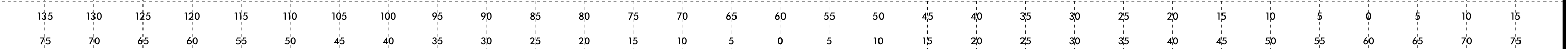
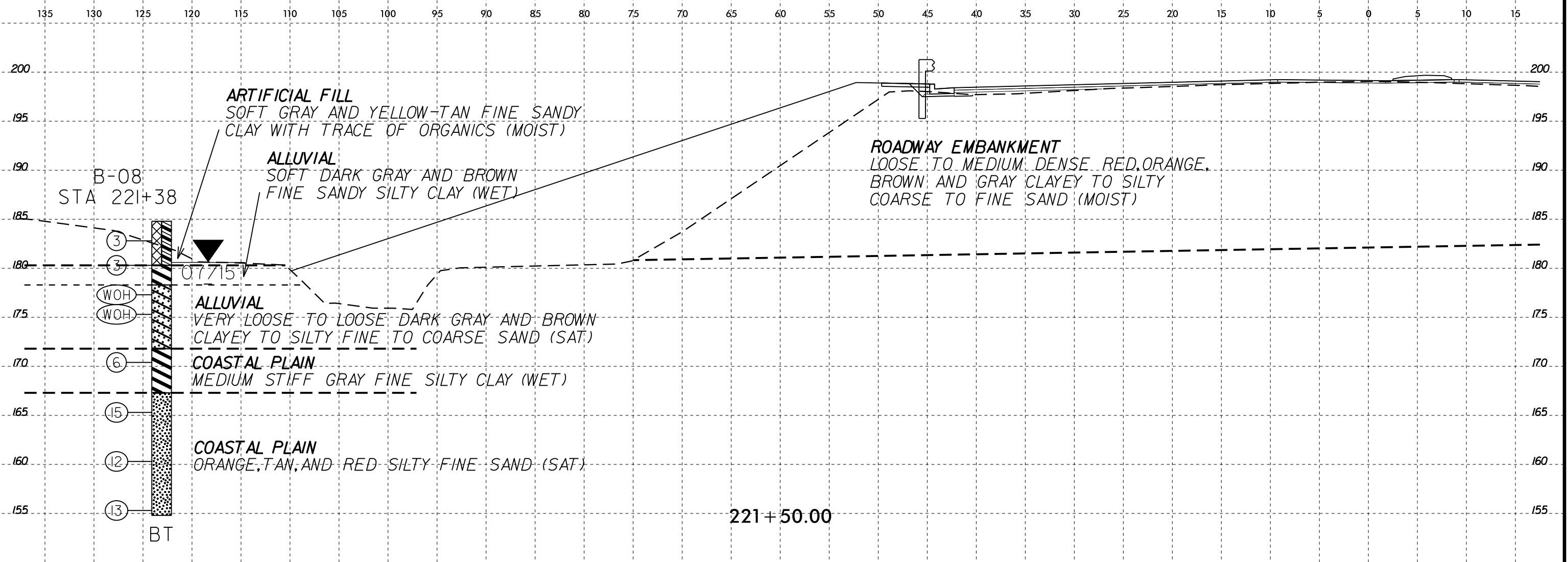
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SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-98	45' RT	221+00	0.0-2.1	A-2-6 (0)	27	12	38	31	6	25	86	66	30	9.6	ND



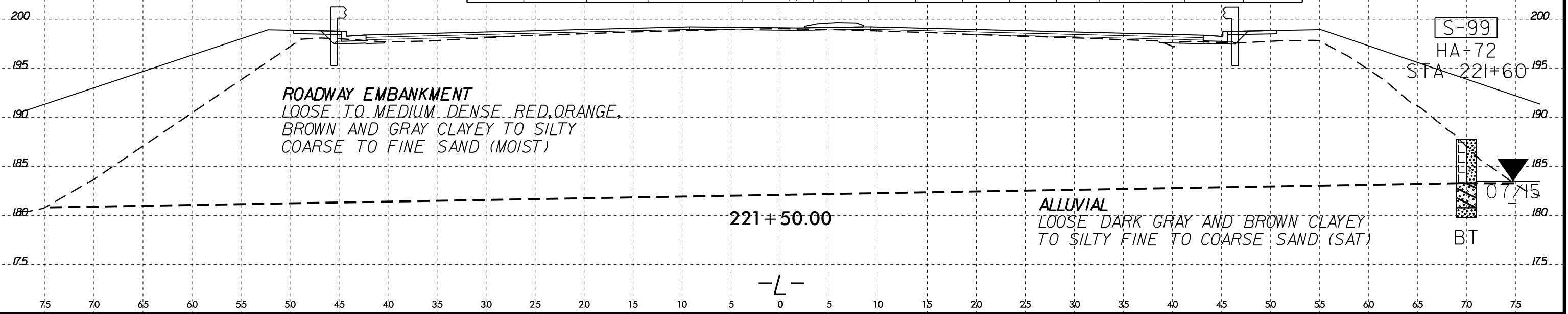
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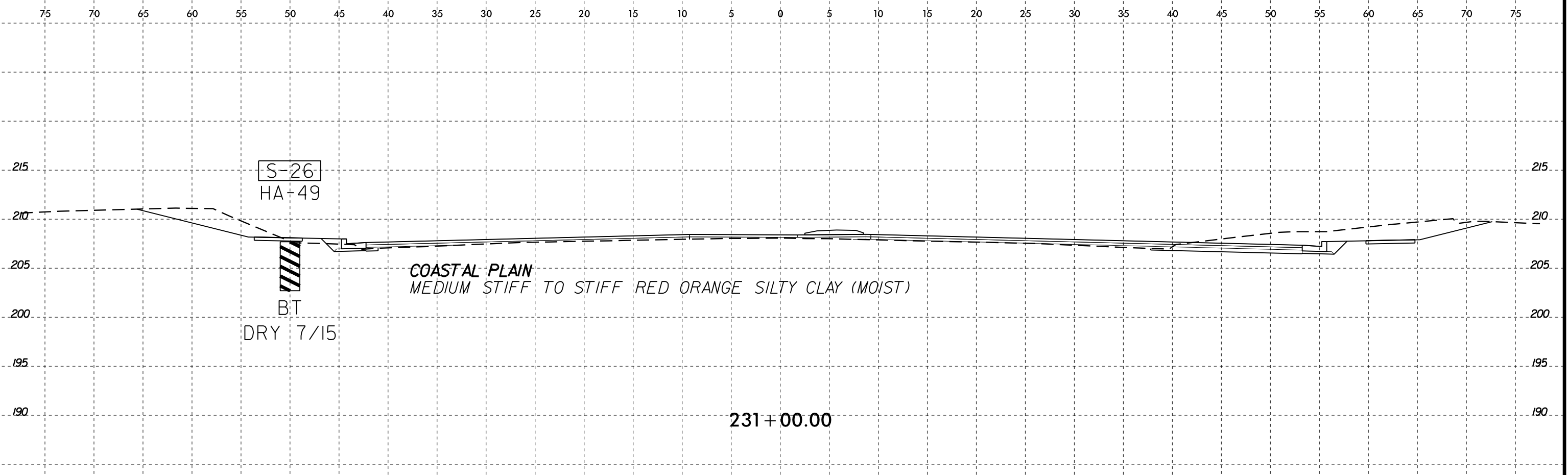
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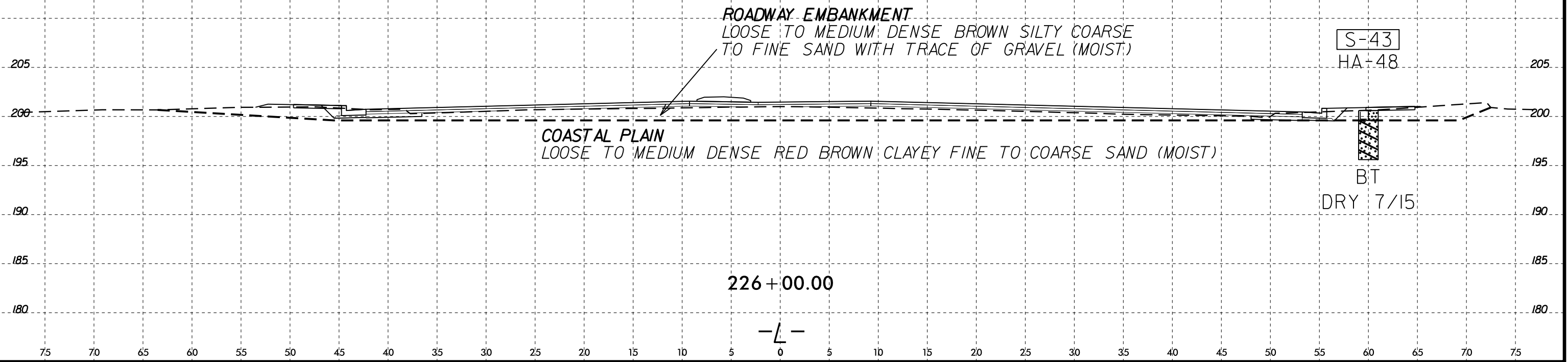
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SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-99	70' RT	221+60	0.0-4.5	A-2-4 (0)	21	2	43	38	5	14	95	70	21	14.8	ND



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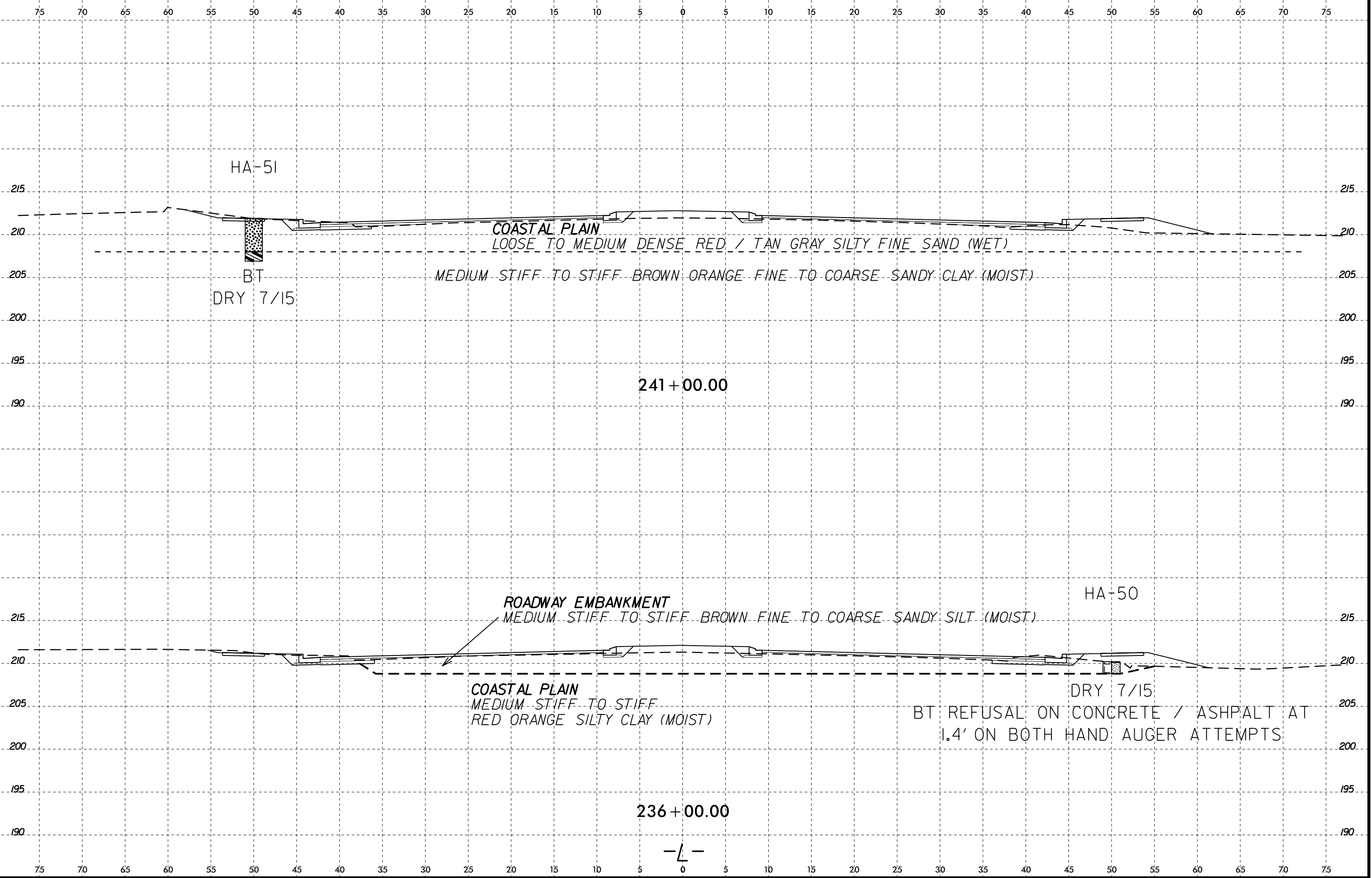


SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-26	50' LT	231+00	0.0-5.0	A-7-6 (12)	48	29	24	28	11	37	100	86	54	19.1	ND
S-43	60' RT	226+00	0.3-1.0	A-2-4 (0)	18	2	34	41	9	16	98	81	29	9.3	ND



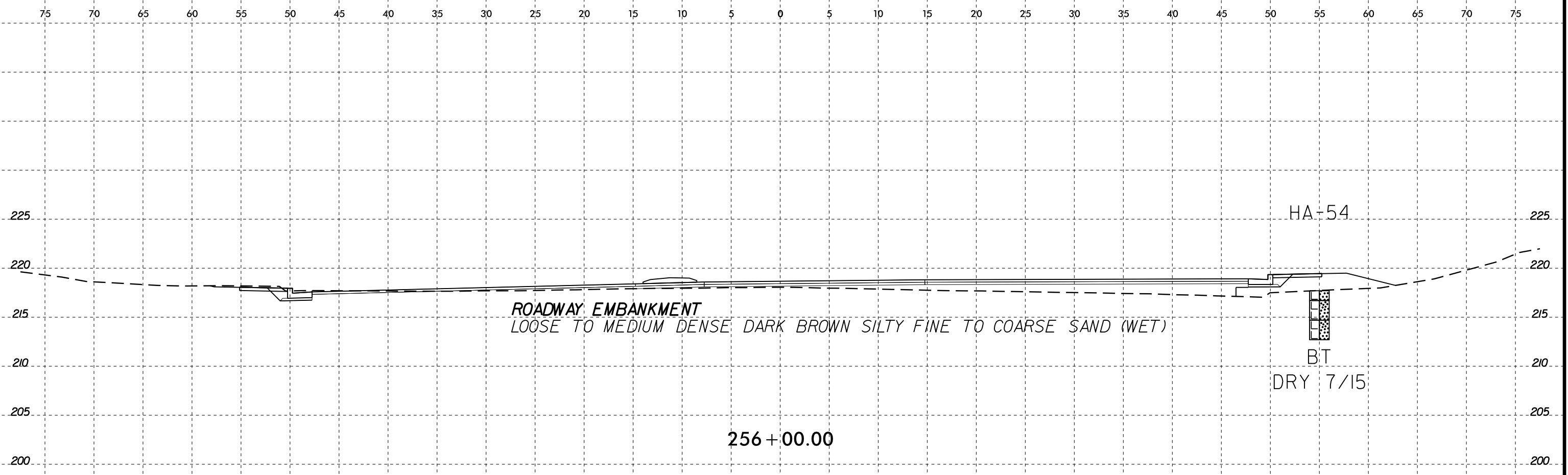


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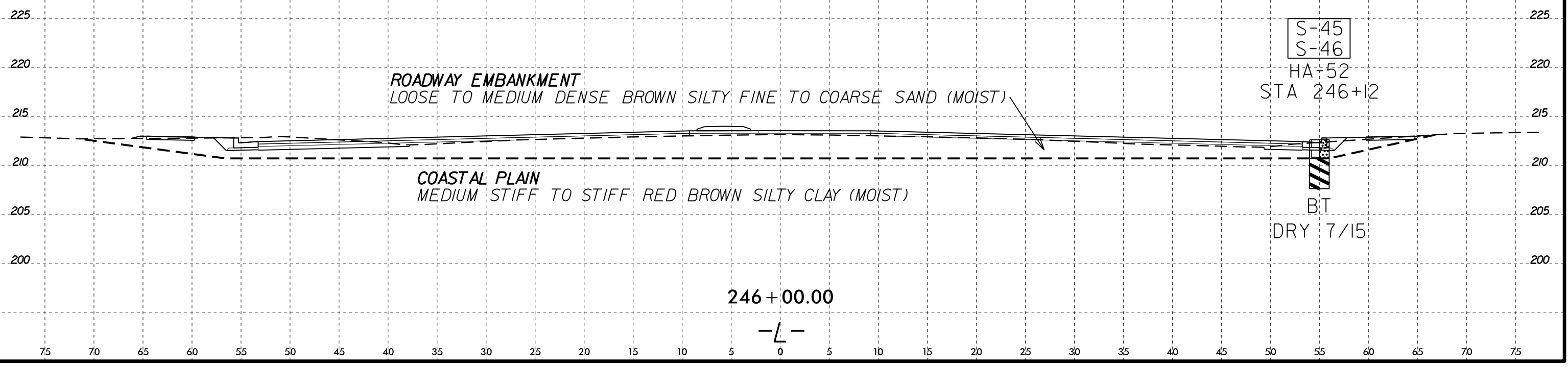


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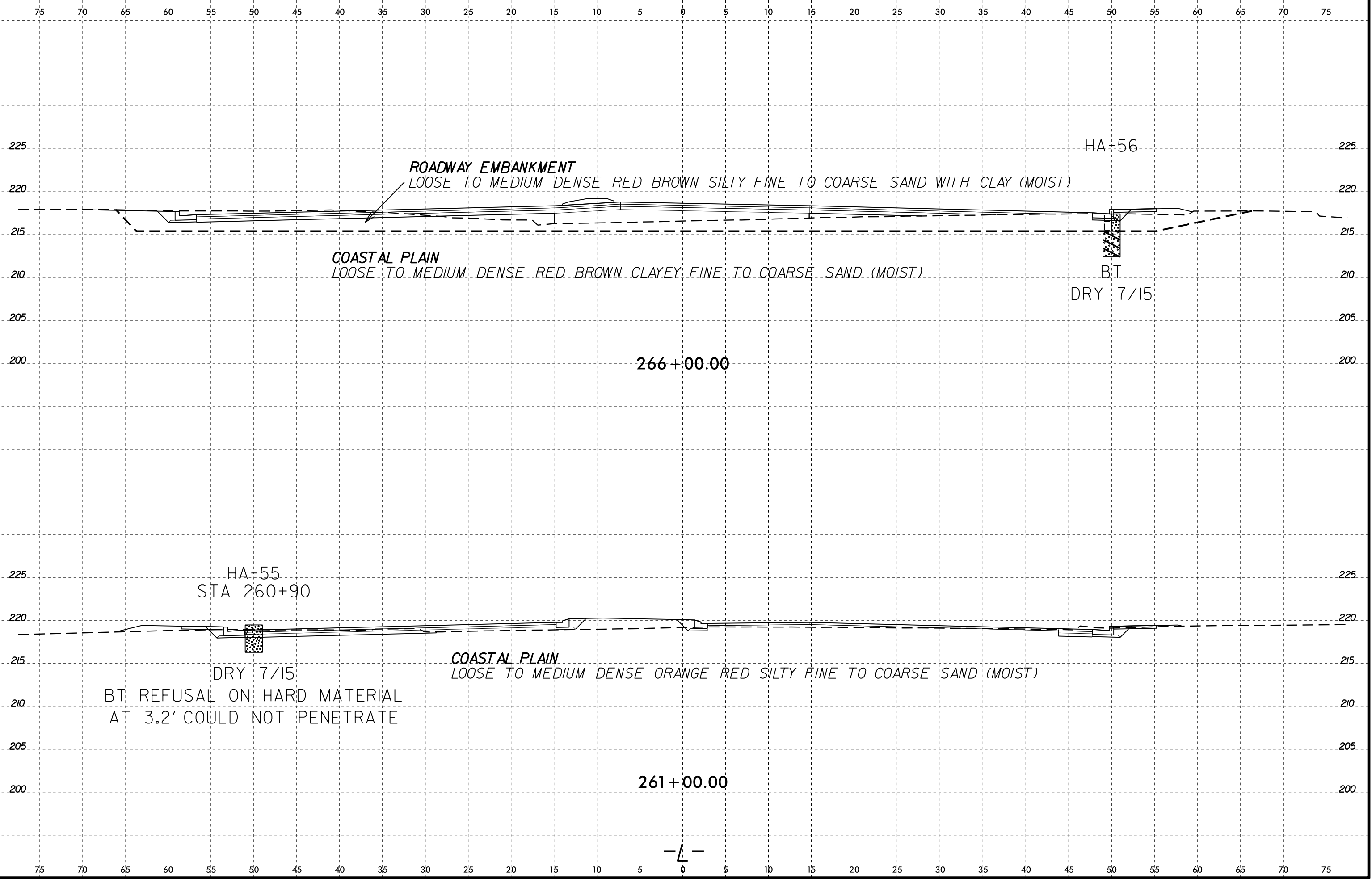


<b>SOIL TEST RESULTS</b>															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-45	55' RT	246+12	0.0-1.9	A-2-4 (0)	27	10	36	31	8	25	95	75	35	9.2	ND
S-46	55' RT	246+12	1.9-5.0	A-7-6 (10)	44	22	22	28	12	38	100	89	56	18.3	ND

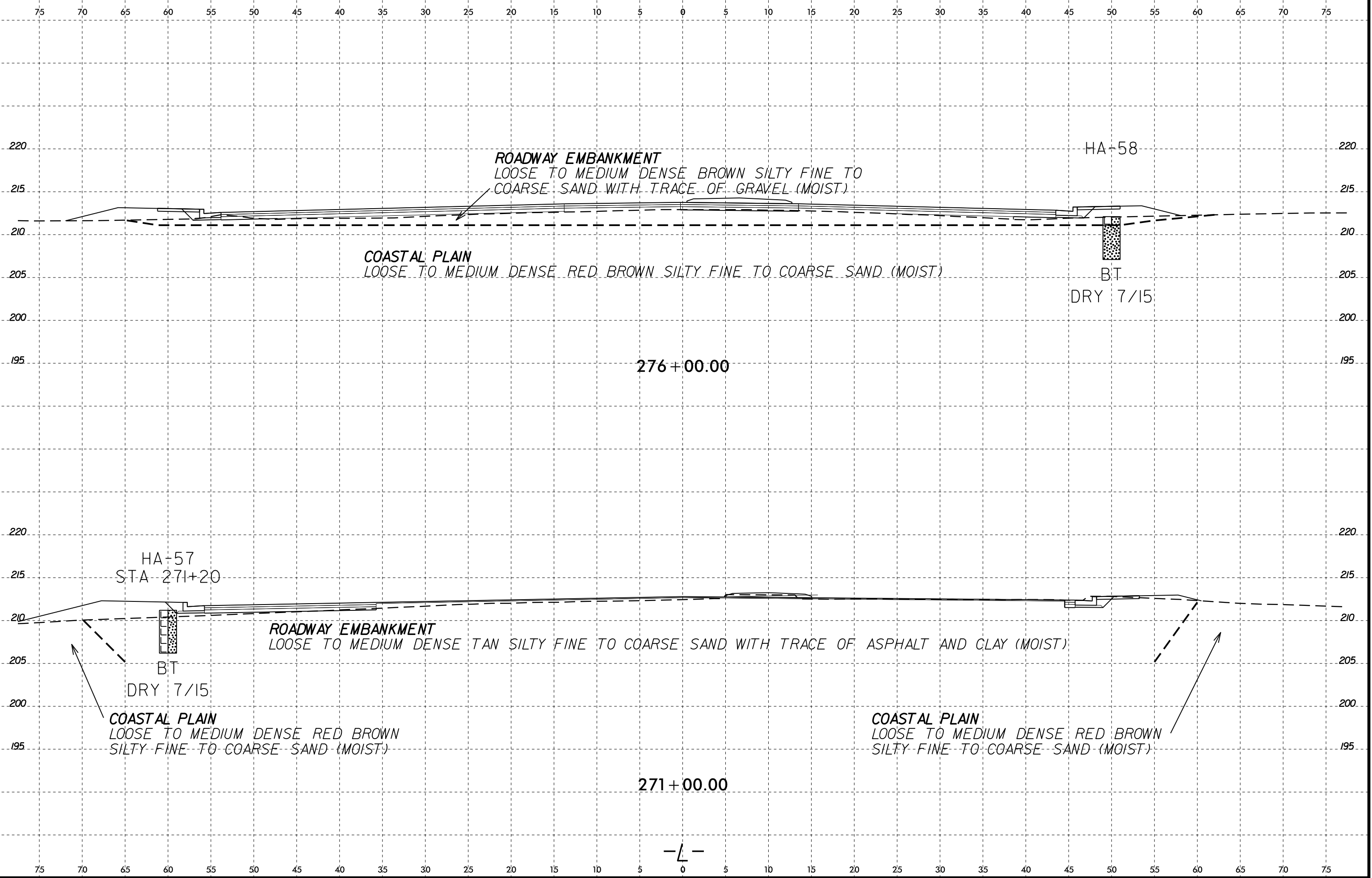


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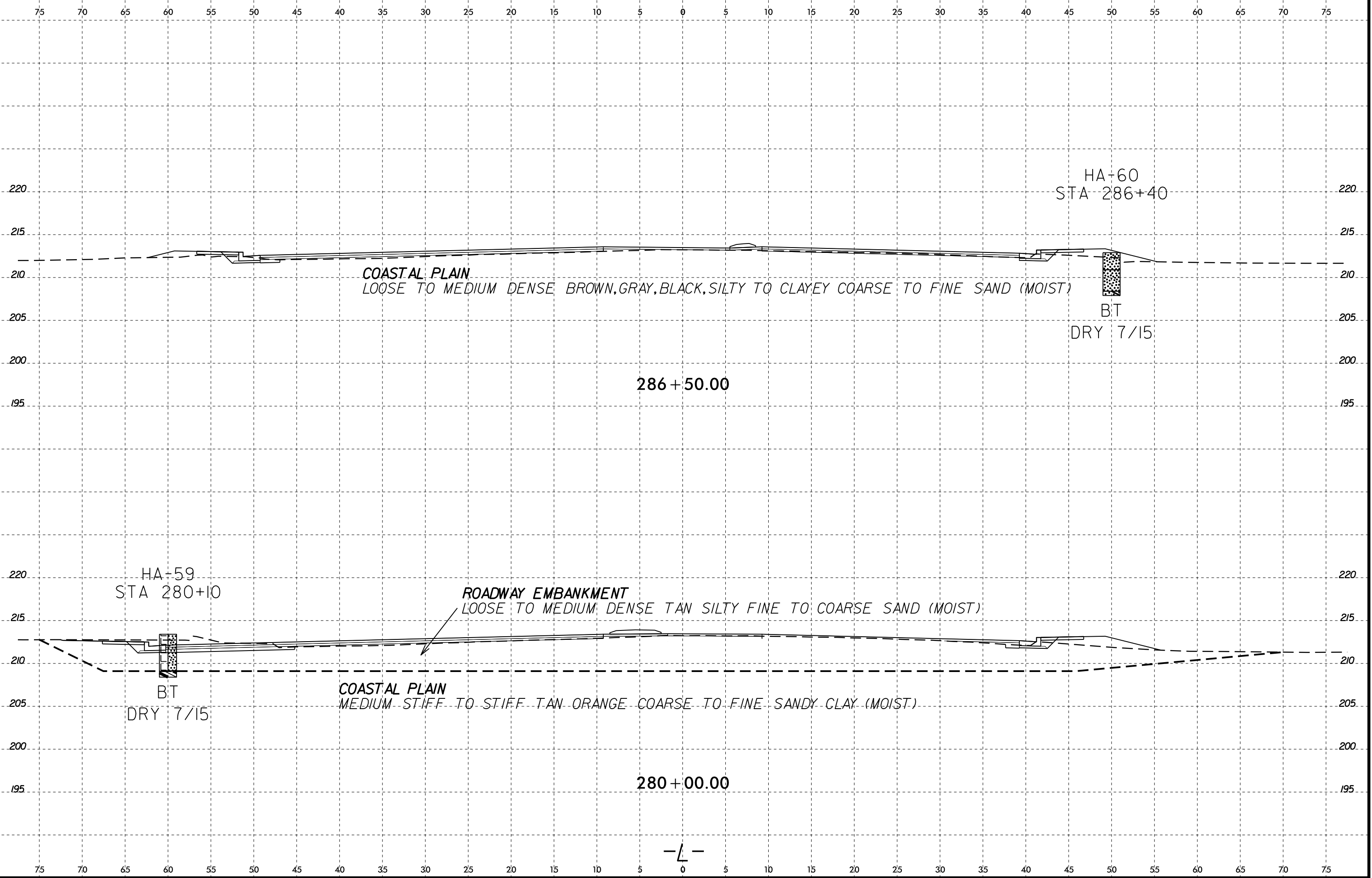


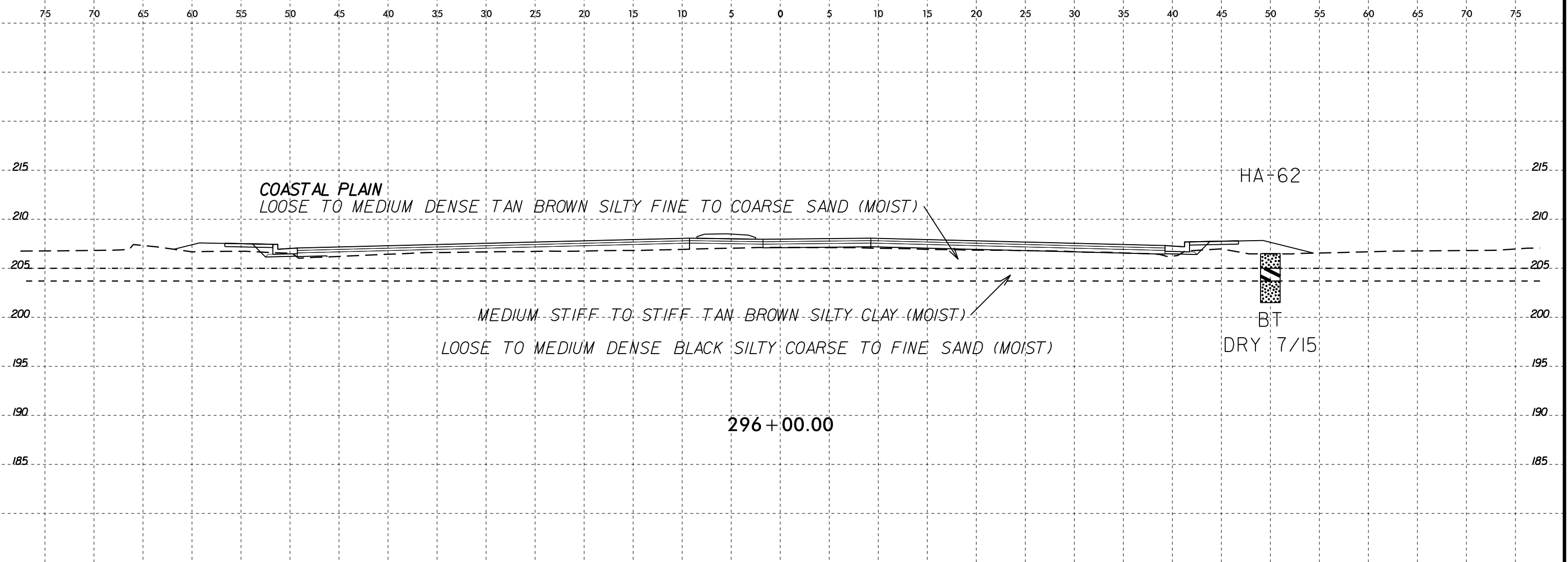
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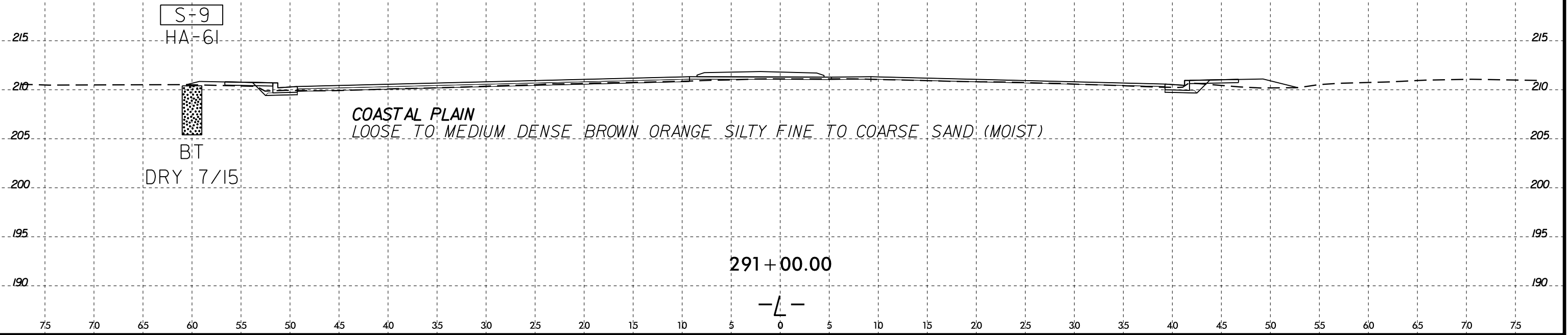
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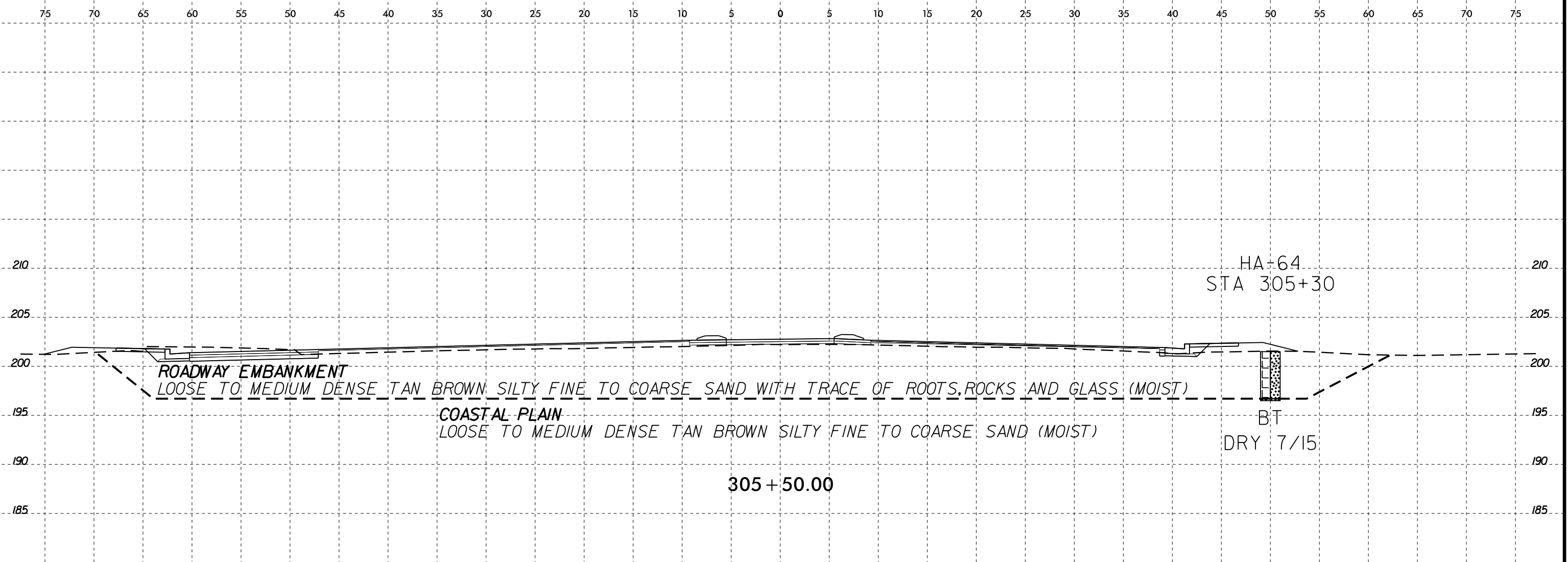
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SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-9	60' LT	291+00	0.0-5.0	A-2-4 (0)	17	3	38	35	10	17	98	76	32	12.8	ND

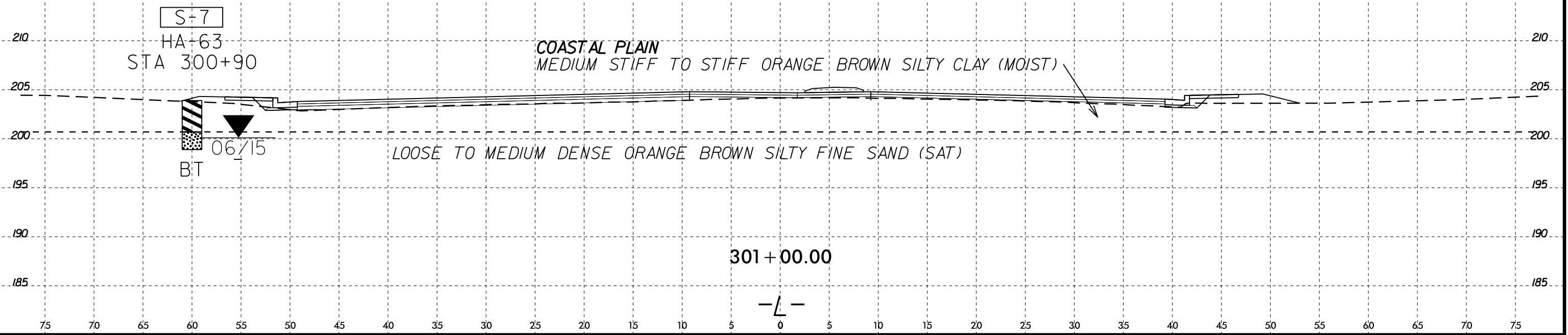


291 + 00.00

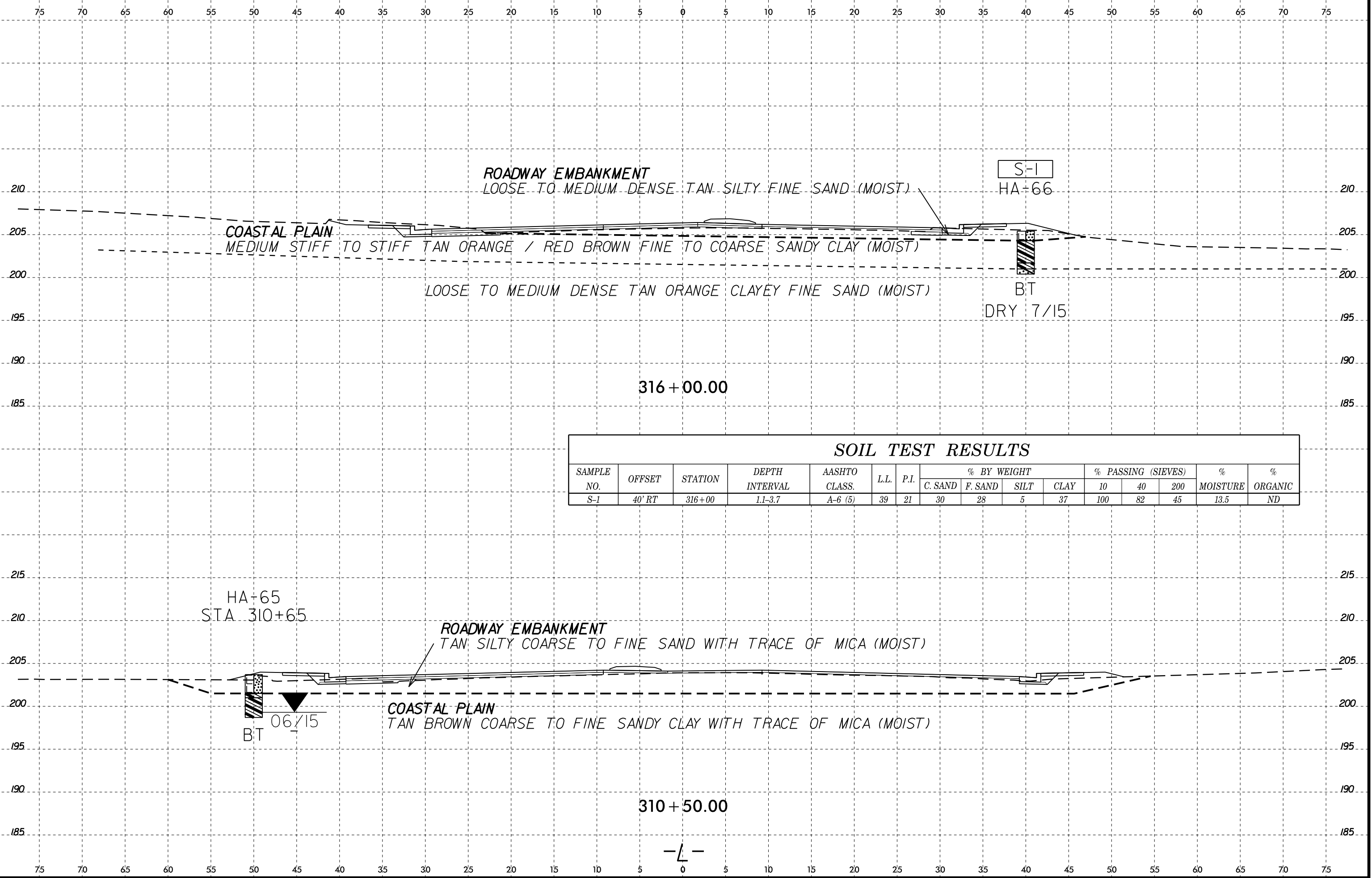
-L-



SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-7	60' LT	300+90	0.0-3.2	A-7-6 (7)	45	23	29	25	7	39	97	81	48	23.9	ND



8/23/99



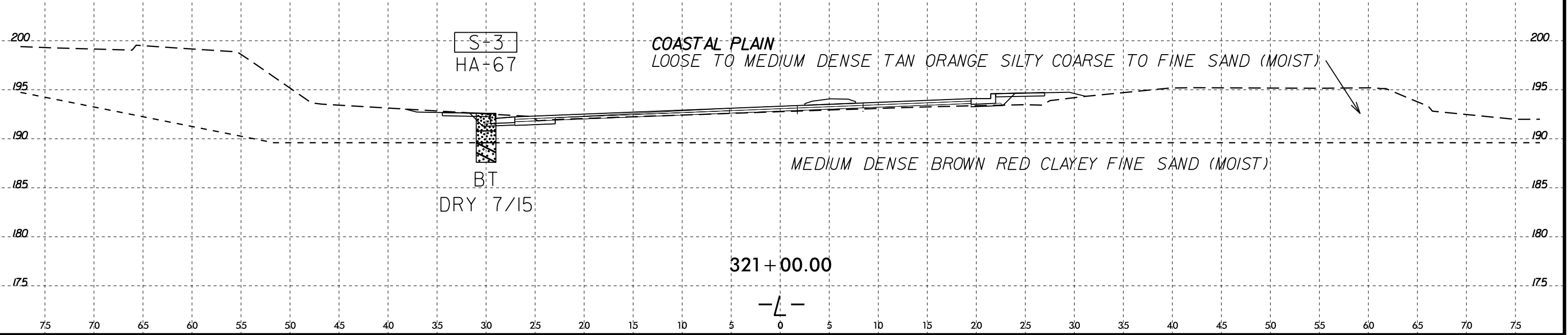
SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-1	40' RT	316+00	1.1-3.7	A-6 (5)	39	21	30	28	5	37	100	82	45	13.5	ND

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 BRettu AT BRA11-13508

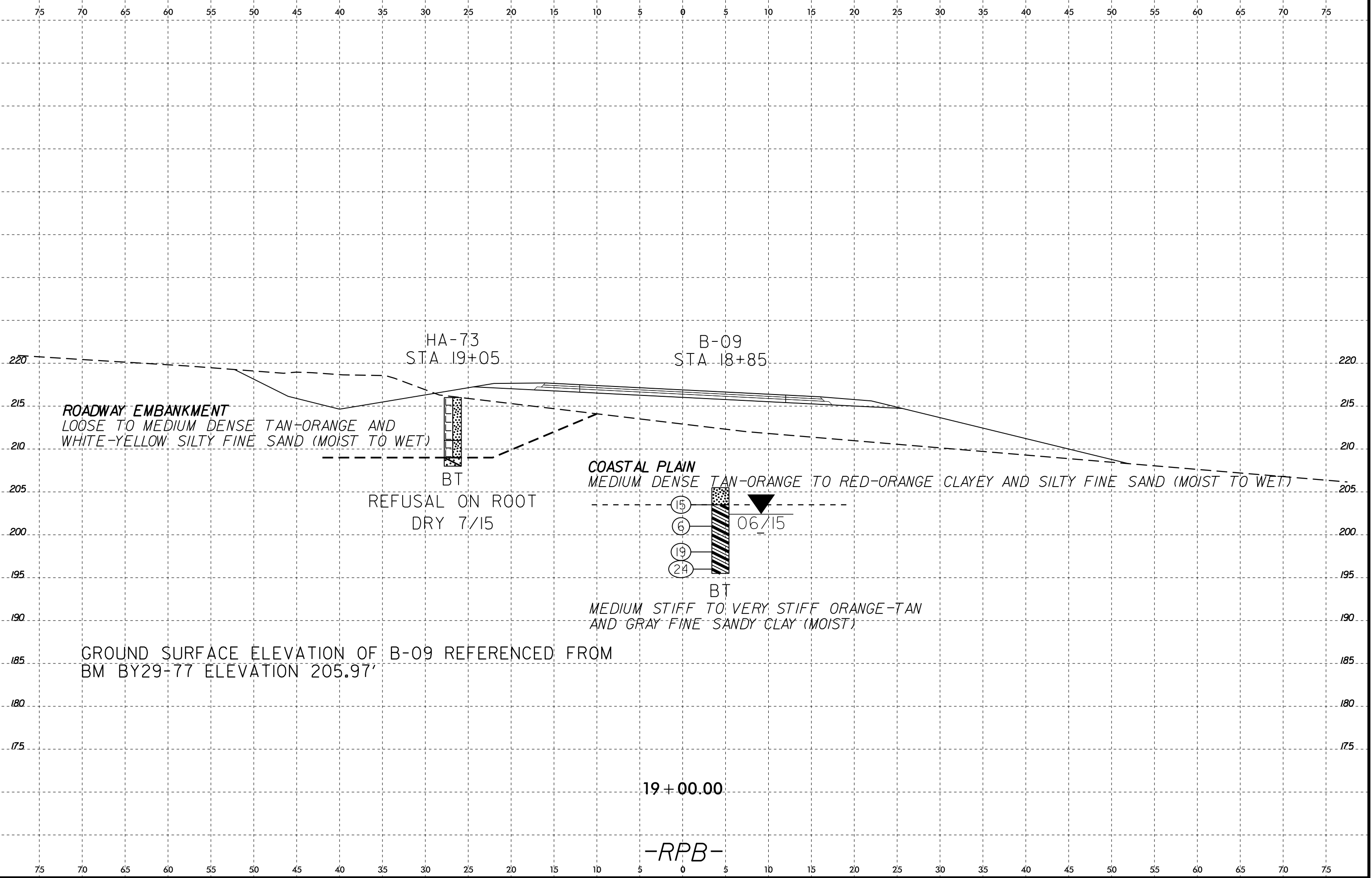


75 70 65 60 55 50 45 40 35 30 25 20 15 10 5 0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	LL.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
S-3	30' LT	321+00	0.0-1.8	A-2-4 (0)	23	7	25	50	5	20	100	87	28	10.9	ND



8/23/99



**ROADWAY EMBANKMENT**  
 LOOSE TO MEDIUM DENSE TAN-ORANGE AND  
 WHITE-YELLOW SILTY FINE SAND (MOIST TO WET)

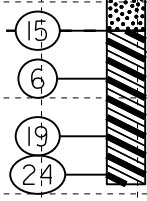
HA-73  
 STA 19+05

B-09  
 STA 18+85

BT

REFUSAL ON ROOT  
 DRY 7/15

**COASTAL PLAIN**  
 MEDIUM DENSE TAN-ORANGE TO RED-ORANGE CLAYEY AND SILTY FINE SAND (MOIST TO WET)



06/15

BT

MEDIUM STIFF TO VERY STIFF ORANGE-TAN  
 AND GRAY FINE SANDY CLAY (MOIST)

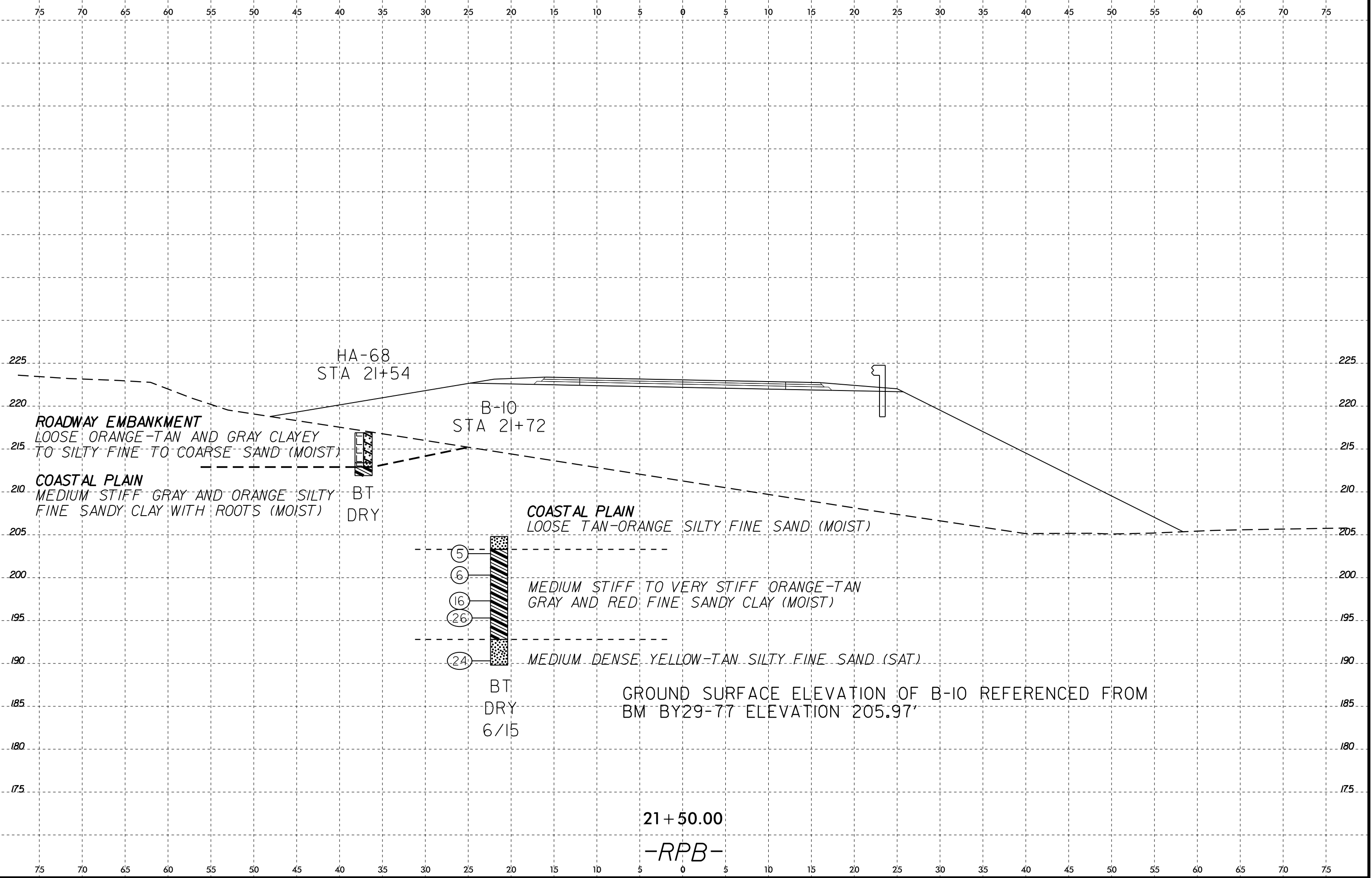
GROUND SURFACE ELEVATION OF B-09 REFERENCED FROM  
 BM BY29-77 ELEVATION 205.97'

19 + 00.00

-RPB-

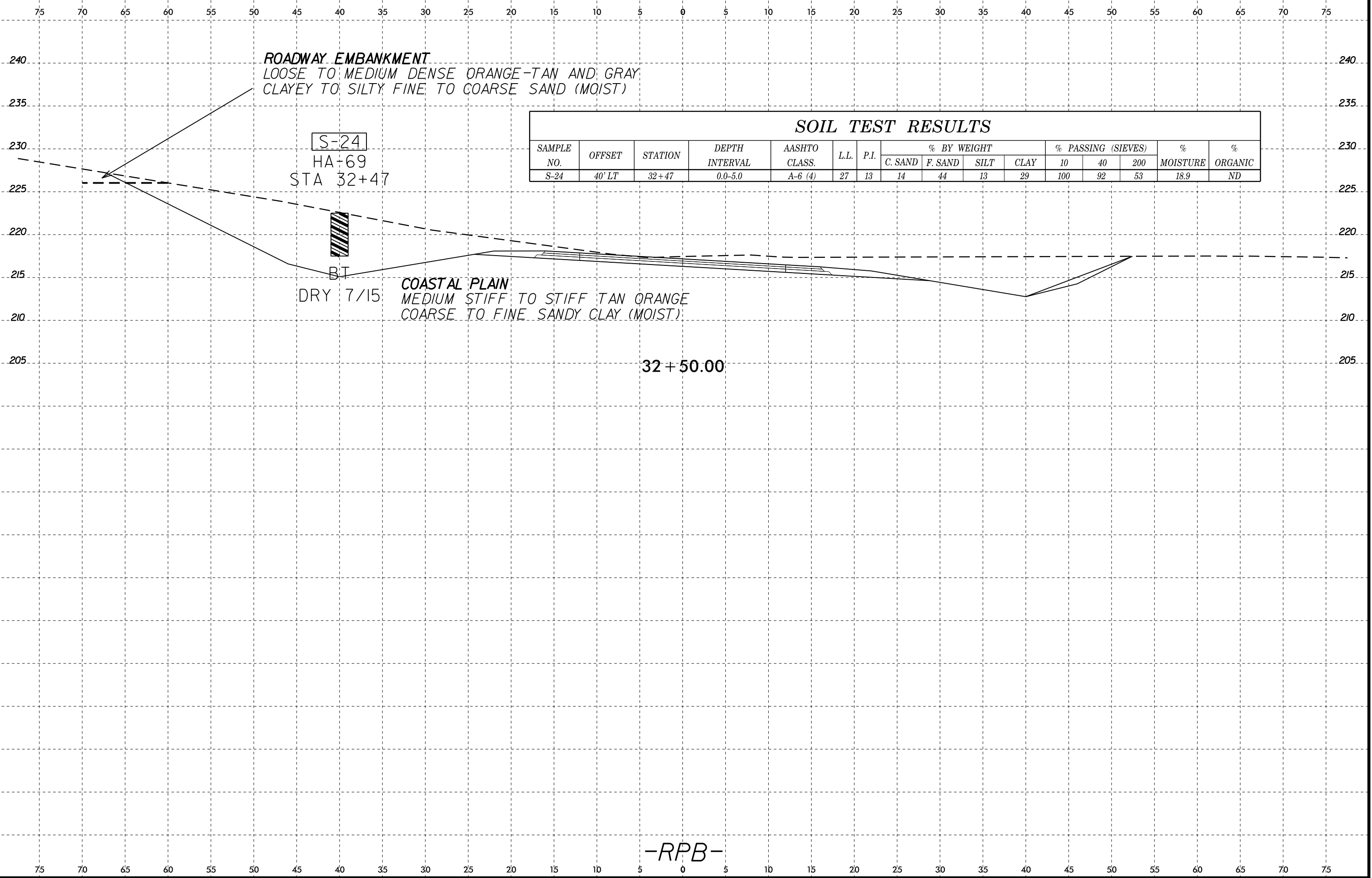
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 BRATTI - AT 13508

8/23/99



25-JAN-2016 14:12  
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BRettu AT BRA11-13508

21 + 50.00  
-RPB-



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-24	40' LT	32+47	0.0-5.0	A-6 (4)	27	13	14	44	13	29	100	92	53	18.9	ND	