

REFERENCE: R-4060

PROJECT: 34605

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.	R-4060	1	29

**CONTENTS**

LINE	STATION	PLAN	PROFILE
L	10+00 - 44+30	4 - 7	8 - 10
Y	10+00 - 15+15	4	N/A
Y2	13+00 - 22+00	7	N/A

**CROSS SECTIONS**

LINE	STATION	SHEETS
L	13+00 - 43+00	11 - 19
Y	14+00	20
Y2	13+00 - 21+00	21 - 25

# ROADWAY SUBSURFACE INVESTIGATION

COUNTY Alleghany  
PROJECT DESCRIPTION US 21 Western Loop from SR 1172  
(Grandview Drive) to US 21

## 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:
- 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.
  - 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

Robbie DeLost

Mike Morgan

Herold Morris

INVESTIGATED BY Michael Gragg

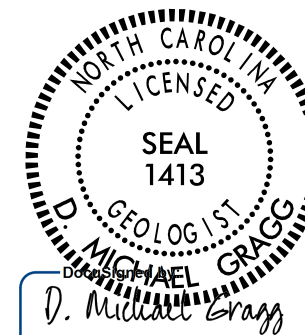
DRAWN BY Wesley Shuecraft

CHECKED BY Kenneth Bussey

SUBMITTED BY ICA Engineering

DATE APRIL 2015

DS  
CBL



D. Michael Gragg

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5/19/2015

SIGNATURE

DATE



Kenneth R. Bussey, Jr.

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5/26/2015

SIGNATURE

DATE



See Sheet 1-A For Index of Sheets

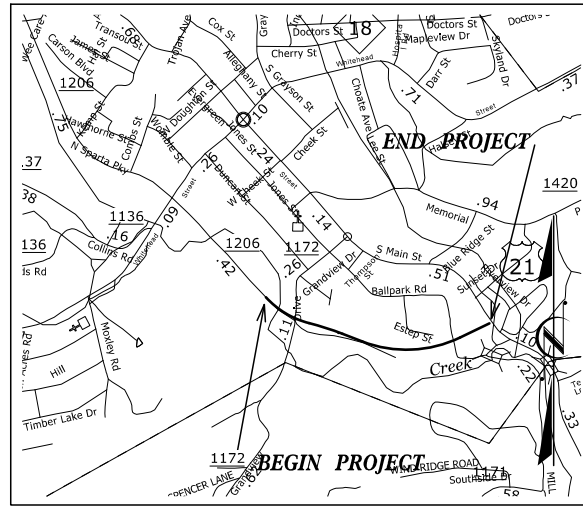
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**ALLEGHANY COUNTY**

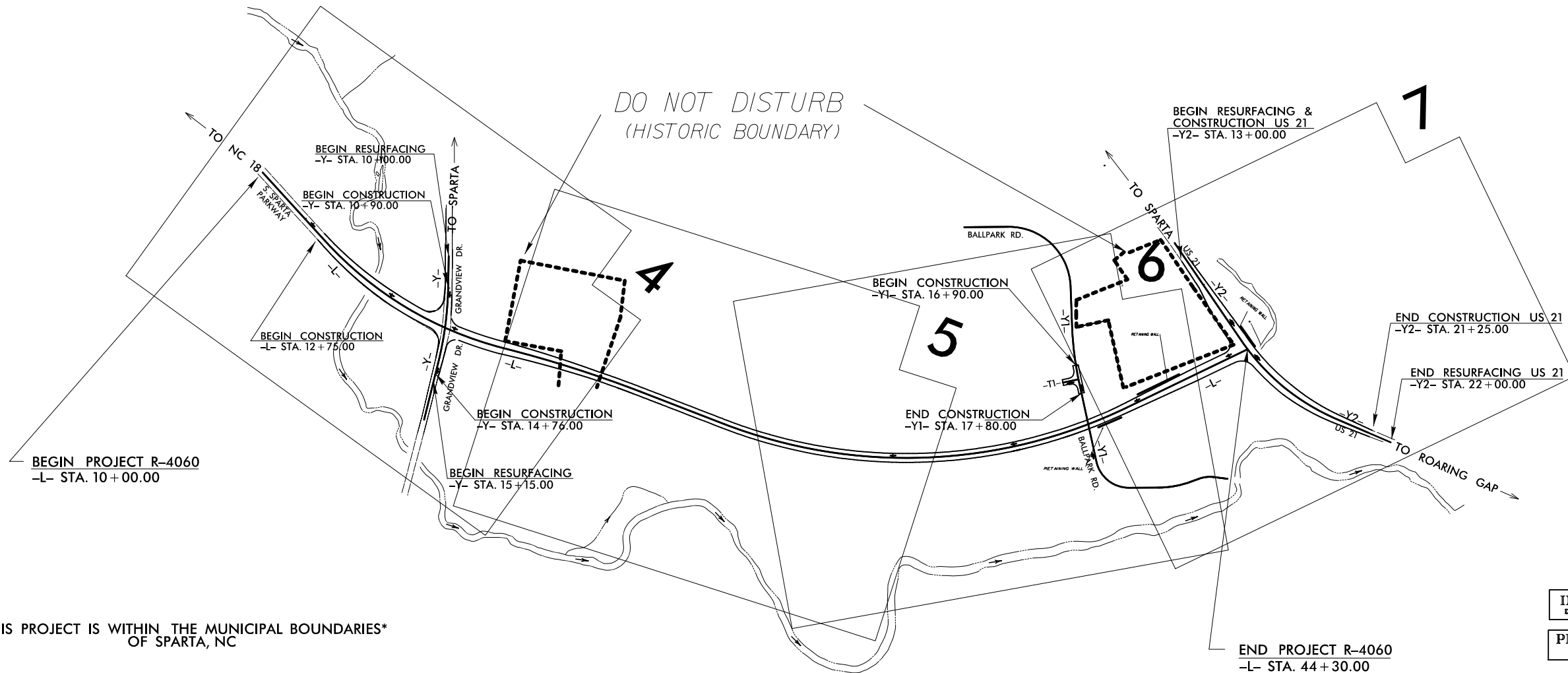
**LOCATION: SPARTA BYPASS FROM SR 1172 (GRANDVIEW DR.)  
TO US 21 - NEW LOCATION**

**TYPE OF WORK: GRADING, DRAINAGE, WIDENING, PAVING, AND SIGNALS  
INVENTORY**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-4060	3	29
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34605.1.2		PE	
34605.2.1		RW	



VICINITY MAP



\*THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES\*  
OF SPARTA, NC



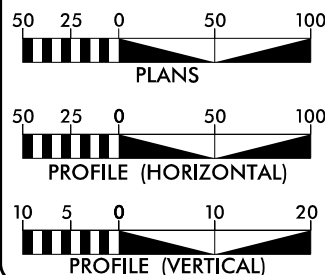
INCOMPLETE PLANS  
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

PROJECT: R-4060

CONTRACT:

GRAPHIC SCALES



DESIGN DATA

ADT 2007 = 2300  
ADT 2030 = 4400  
DHV = %  
D = %  
T = 5 % \*  
V = 50 MPH  
\* TTST 1 DUAL 4

PROJECT LENGTH

PROJECT R-4060 LENGTH = 0.891 MI

Prepared in the Office of:  
**DIVISION OF HIGHWAYS**  
801 STATESVILLE ROAD, NORTH WILKESBORO, N.C. 28659

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:  
August 15, 2014

LETTING DATE:  
July 21, 2015

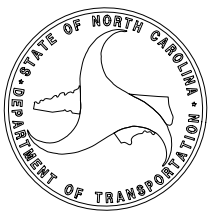
DIVISION ENGINEER  
M.A. PETTYJOHN, PE

SIGNATURE \_\_\_\_\_ P.E.  
DATE \_\_\_\_\_

HYDRAULICS ENGINEER  
PE

SIGNATURE \_\_\_\_\_ P.E.  
DIVISION PROJECT MANAGER  
JOSEPH L. LAWS, PE

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



09/08/15 09:08:39 SYSTEM TIME\$\$\$\$\$DDON\$\$\$\$\$USER NAME\$\$\$\$\$



April 13, 2015

WBS NUMBER: 34605.1.2  
 TIP NUMBER: R-4060  
 F.A. NUMBER: STP-21 (10)  
 COUNTY: Alleghany  
 DESCRIPTION: US 21 Western Loop from SR 1172 (Grandview Drive) to US 21

**SUBJECT: Geotechnical Report – Inventory**

**PROJECT DESCRIPTION**

The project is located in central Alleghany County, North Carolina. This project consists of the reconstruction/widening of 0.09 miles of existing South Sparta Parkway (-L-), reconstruction/widening of 0.07 miles of existing Grandview Drive (-Y-), new alignment construction of 0.50 miles of US 21 Western Loop (-L-) and reconstruction/widening of 0.16 miles of existing US 21 (-Y2-), which is a two-lane roadway passing thru Sparta, NC.

A CME 45 drill rig with an automatic hammer was used for the geotechnical investigation during late October and November 2014. At selected locations standard penetration tests (SPT) were performed, Shelby tube samples extracted and representative bulk soil samples collected for laboratory analysis by ICA Engineering, Inc.

The following alignments, totaling 0.83 miles of roadway, were investigated. Profiles and cross sections of this alignment are included within this report.

<u>LINE</u>	<u>STATIONS</u>
-L-	12+75.00 to 44+30.00
-Y-	10+90.00 to 14+76.00
-Y2-	13+00.00 to 21+25.00

**AREAS OF SPECIAL GEOTECHNICAL INTEREST**

**High Plasticity Soils:** No soils encountered during the subsurface investigation possessed plasticity indices in excess of 25.

**Wet or Saturated Soils:** Soils with natural moisture contents in excess of the liquid limit or excessively high moisture contents were encountered at the following locations:

<u>LINE</u>	<u>STATIONS</u>	<u>OFFSETS</u>
-L-	12+50.00 to 13+50.00	LT to RT
-L-	16+50.00 to 17+50.00	LT to RT

**Alluvial Soils:** The following location was found to have very soft to soft alluvial soils.

<u>LINE</u>	<u>STATIONS</u>	<u>OFFSETS</u>
-L-	13+00.00 to 16+00.00	RT

**PHYSIOGRAPHY AND GEOLOGY**

The project is located in the Blue Ridge Physiographic Province. The project corridor is comprised of small town subdivisions, industrial tracts and rural mountainsides. The general topography of the site consists of moderately sloping hillsides, a relatively narrow floodplain and a steep sided secondary drainage course along or dissecting the proposed -L-, -Y- and -Y2- alignments.

Geologically, the project is located within the Fries Block of the Blue Ridge Thrust Sheets Tectonic Unit (*Rankin, et.al., 1972*), specifically the Ashe Metamorphic Suite and Tallulah Falls Formation (*Geologic Map of North Carolina, 1985*). These stratigraphic units are considered Late Proterozoic Era. The overlying residual soils are the product of the physical and chemical weathering of this underlying crystalline rock.

**SOIL PROPERTIES**

Soils encountered during this investigation are separated into six (6) categories based on origin. The origins consist of roadway embankment, artificial fill, alluvial soils, residual soils, weathered rock, and crystalline rock.

Roadway embankment was encountered along the -L- alignment at the beginning of the project west of Grandview Drive and along the roadway passing thru the NCDOT district office complex. Materials encountered consist of moist, medium stiff to stiff, tan, red, brown, white, gray, micaceous, finely to coarsely sandy silts and moist, loose, fine to coarse grain, silty sand. Plasticity indices ranged from 3 to 7. Penetrated thickness ranged from 3.7 feet to 12.0 feet.

Artificial Fill was encountered south of the roadway passing thru the NCDOT district office. Materials encountered consist of moist, stiff, tan-orange, black, white, black-green, micaceous, finely to coarsely sandy silt. A plasticity index of 7 was reported. Penetrated thickness was 12.8 feet.

Alluvial soils are present along the existing -L- alignment (South Sparta Parkway) west of Grandview Drive underlying roadway embankment, within the footprint of the proposed widening, to a depth of 8.3 feet. The alluvial soils thickness is interpreted to be 4.6 feet and they consist of moist, soft, dark gray, gray, micaceous, finely sandy clay (A-7-5). A plasticity index of 15 was reported for the alluvial soils.

Residual soils are present along and throughout the proposed -L-, -Y- and -Y2- alignments and are derived from the weathering of the underlying metamorphic rock. Typically residual soils were recognized at the surface and penetrated to total boring depth however they may also underlie roadway embankment, artificial fill or alluvium. The majority of the residual soils consist of dry to saturated, loose to medium dense (rare very loose, dense and very dense occur), tan-orange-red, black, green-black, gray, white, brown, dark gray-gray, micaceous to highly micaceous, occasionally saprolitic, silty sands (A-2-4). Limited strata consisting of saturated, dense, brown and gray, coarse rock fragments and sand (A-1-a) and dry to moist, stiff to very stiff, red, tan, green-black, micaceous, saprolitic, sandy silt (A-4, A-5) were reported. The plasticity indices for residual soils ranged from non-plastic to 9 (A-2-4, A-1-a) and 3 to 10 (A-4, A-5).

**ROCK PROPERTIES**

Weathered rock, determined by SPT, was encountered along the proposed -L- and -Y2- alignments, generally east of the NCDOT district office at elevations ranging from 2,854.2 feet to 2,773.3 feet (MSL). The weathered rock consists of gneiss or interlayered gneiss and schist. One instance of intercepted weathered rock within and surrounded by residual soils was reported between elevations 2,828.0 feet and 2,826.5 feet (MSL) at the east end of the NCDOT district office yard.

Crystalline rock was intercepted along the proposed -L- and -Y2- alignments at elevations ranging from 2,854.2 feet to 2,775.0 feet (MSL) and consists of fresh to moderately severe weathered gneiss containing thin seams of severely weathered gneiss. Apparent foliation angles were widely variable and crenulated in some intervals. Discontinuity measurements of 0°-20°, 40°-60° and 70°-90° and very close to wide spacing were reported.

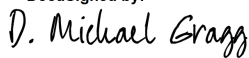
### **GROUNDWATER**

Groundwater was encountered during drilling operations (immediate) at several locations along the proposed -L- alignment at elevations ranging from 2,790.4 feet to 2,780.1 feet (MSL). A 24 hour measurement of 2,793.6 feet (MSL) was also recorded. Numerous attempts to acquire 24 hour measurements recorded dry conditions however collapse of the boreholes did not allow passage to the final boring depths. Groundwater may fluctuate with seasonal precipitation.

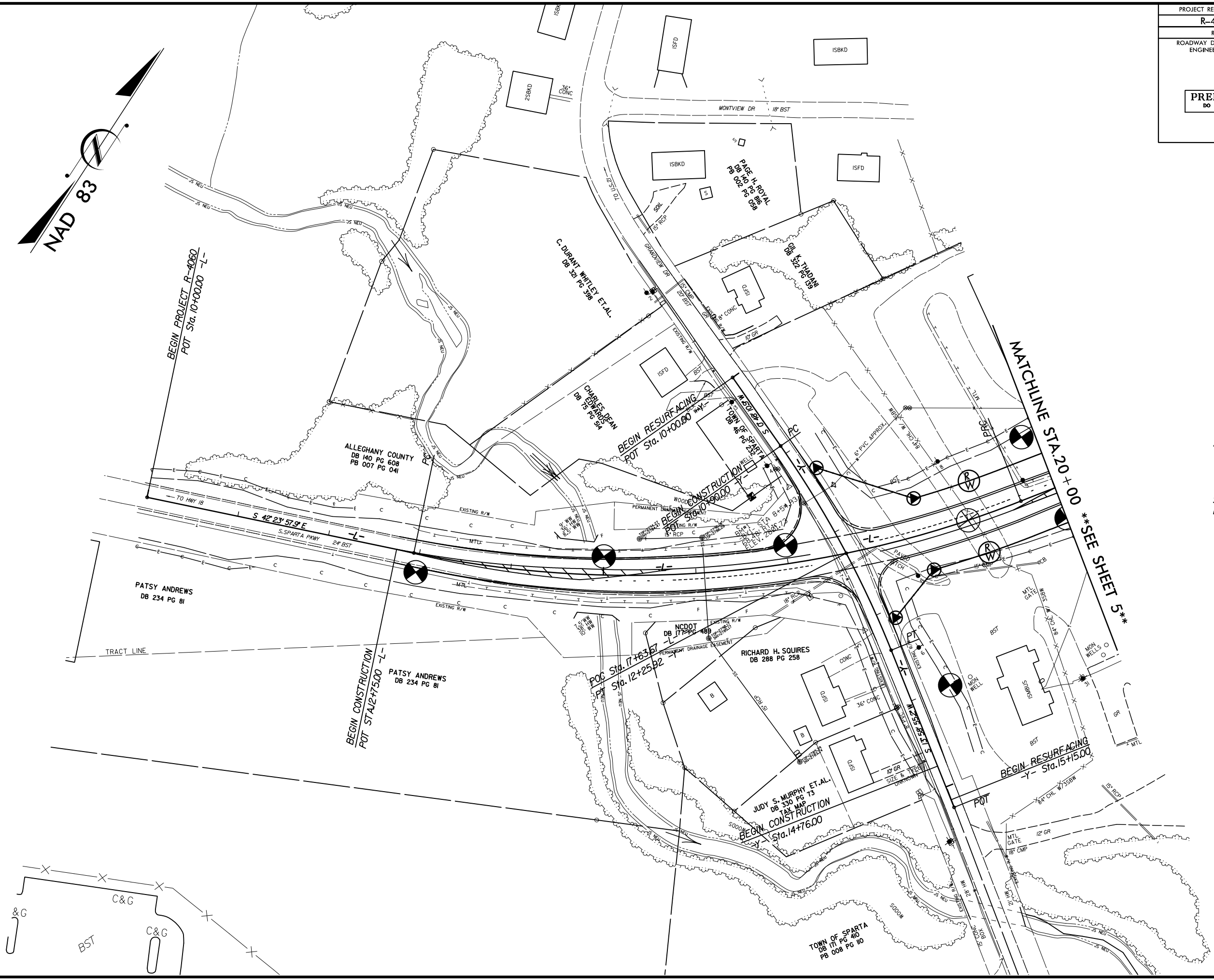
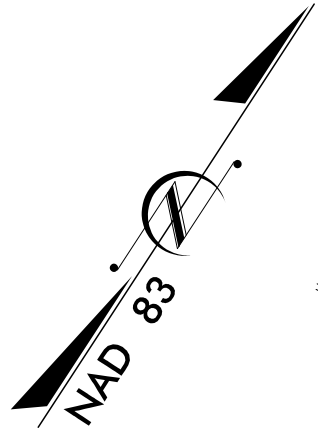
Prepared by,

DocuSigned by:  
  
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Kenneth R. Bussey, Jr., PE  
Project Engineer

DocuSigned by:  
  
AF1EAFEB00144D7...  
D. Michael Gragg, LG  
Senior Project Geologist

PROJECT REFERENCE NO. <b>R-4060</b>		SHEET NO. <b>4</b>	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION			



-L-

PC Sta 12+93.95  
 PI Sta 16+36.99  
 $\Delta = 33^\circ 19' 51"$  (LT)  
 D = 5' 00" 00.0"  
 L = 666.62'  
 T = 343.04'  
 R = 1145.92'  
 PRC Sta 19+60.57  
 PI Sta 21+88.37  
 $\Delta = 6^\circ 49' 33.6"$  (RT)  
 D = 1' 30" 00.0"  
 L = 455.07'  
 T = 227.80'  
 R = 3,819.72'  
 PT Sta 24+15.64  
 S 68° 54' 15.3" E

-Y-

POT Sta 10+00.00  
 S 0° 48' 10.9" W  
 PC Sta 10+90.21  
 PI Sta 12+16.28  
 $\Delta = 13^\circ 10' 44.3"$  (RT)  
 D = 5' 15" 00.0"  
 L = 251.03'  
 T = 126.07'  
 R = 1,091.35'  
 PT Sta 13+41.24  
 S 13° 58' 55.2" W  
 POT Sta 15+23.78

\*\*\*\*\*SYTIME\*\*\*\*\*  
 \*\*\*\*\*DESIGN\*\*\*\*\*  
 \*\*\*\*\*\*\*\*\*\*

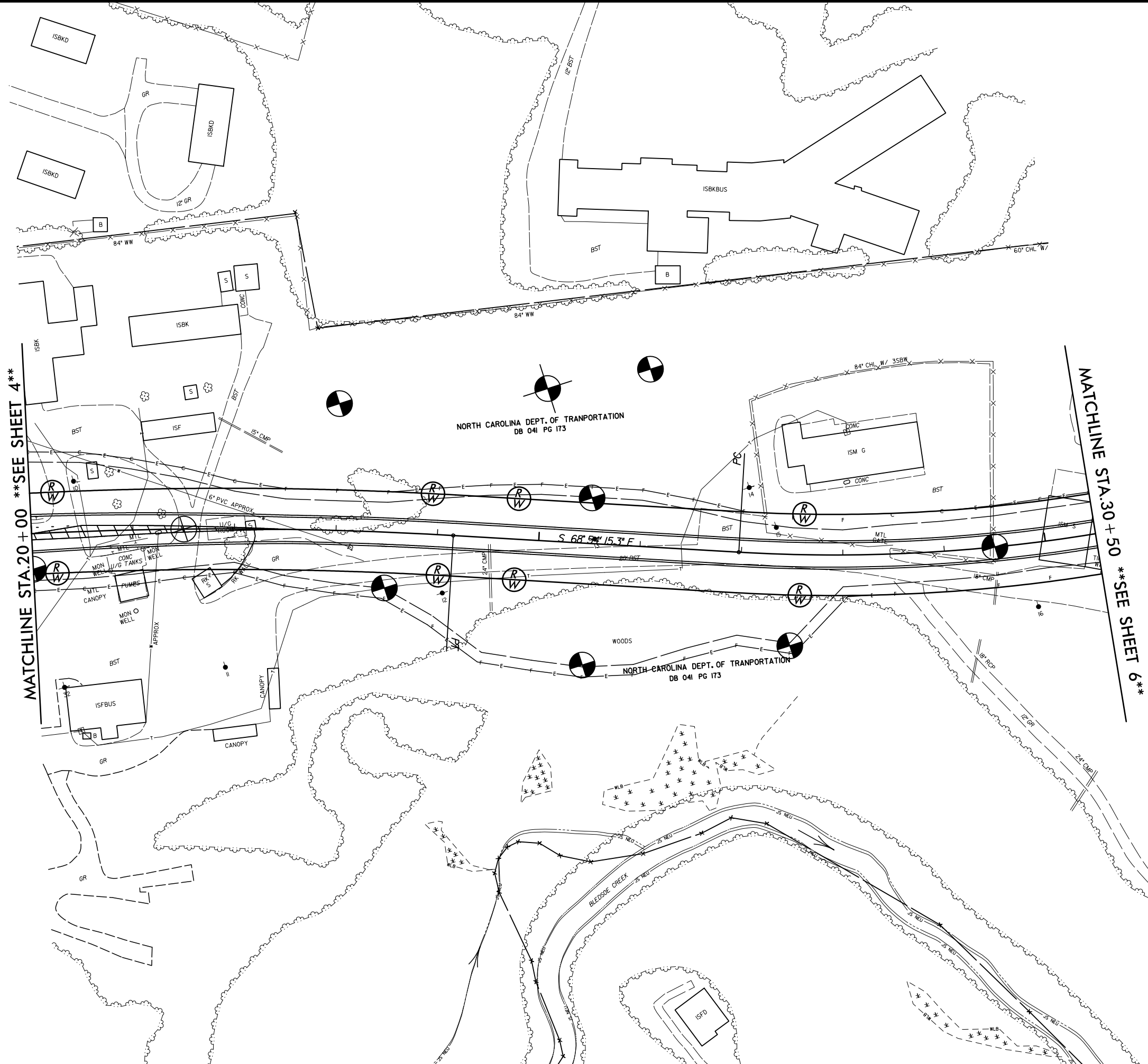
PROJECT REFERENCE NO.	SHEET NO.
R-4060	5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

REVISIONS

8/17/99

MATCHLINE STA.20+00 \*\*SEE SHEET 4\*\*

MATCHLINE STA.30+50 \*\*SEE SHEET 6\*\*



NORTH CAROLINA DEPT. OF TRANSPORTATION  
DB 041 PG 173

NORTH CAROLINA DEPT. OF TRANSPORTATION  
DB 041 PG 173



-L-

PRC Sta 19+60.57  
 PI Sta 21+88.37  
 $\Delta = 6^\circ 49' 33.6''$  (RT)  
 $D = 1^\circ 30' 00.0''$   
 $L = 455.07'$   
 $T = 227.80'$   
 $R = 3,819.72'$   
 PT Sta 24+15.64  
 $S 68^\circ 54' 15.3'' E$   
 PC Sta 26+97.40  
 PI Sta 33+90.26  
 $\Delta = 46^\circ 49' 43.7''$  (LT)  
 $D = 3^\circ 34' 51.6''$   
 $L = 1,307.71'$   
 $T = 692.86'$   
 $R = 1,600.00'$   
 PT Sta.40+05.11  
 $N 64^\circ 16' 01.0'' E$

\$\$\$\$\$SYTIME\$\$\$\$\$  
 \$\$\$DESIGN\$\$\$\$\$  
 \$\$\$DATE\$\$\$\$\$

PROJECT REFERENCE NO.	SHEET NO.
R-4060	6
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b>	
DO NOT USE FOR CONSTRUCTION	

-YI-  
 PT Sta 14+38.89  
 S 2° 18' 42.4" E  
 PC Sta 15+72.95  
 PI Sta 16+60.81  
 $\Delta = 10° 02' 34.3"$  (LT)  
 D = 5' 43' 46.5"  
 L = 175.28'  
 T = 87.87'  
 R = 1,000.00'  
 PT Sta 17+48.23  
 S 12° 21' 16.6" E  
 PC Sta 20+01.21  
 PI Sta 20+86.13  
 $\Delta = 77° 55' 39.9"$  (LT)  
 D = 54' 34' 02.7"  
 L = 142.81'  
 T = 84.92'  
 R = 105.00'  
 PT Sta 21+44.02  
 N 89° 43' 03.5" E  
 PC Sta 22+36.40  
 PI Sta 22+90.78  
 $\Delta = 20° 33' 03.6"$  (LT)  
 D = 19' 05' 54.9"  
 L = 107.60'  
 T = 54.39'  
 R = 300.00'  
 PT Sta 23+44.00  
 N 69° 09' 59.9" E  
 PC Sta 23+66.88  
 PI Sta 23+91.59  
 $\Delta = 27° 45' 24.5"$  (RT)  
 D = 57' 17' 44.8"  
 L = 48.44'  
 T = 24.71'  
 R = 100.00'  
 PT Sta 24+15.33  
 S 83° 04' 35.6" E  
 POT Sta 24+59.90

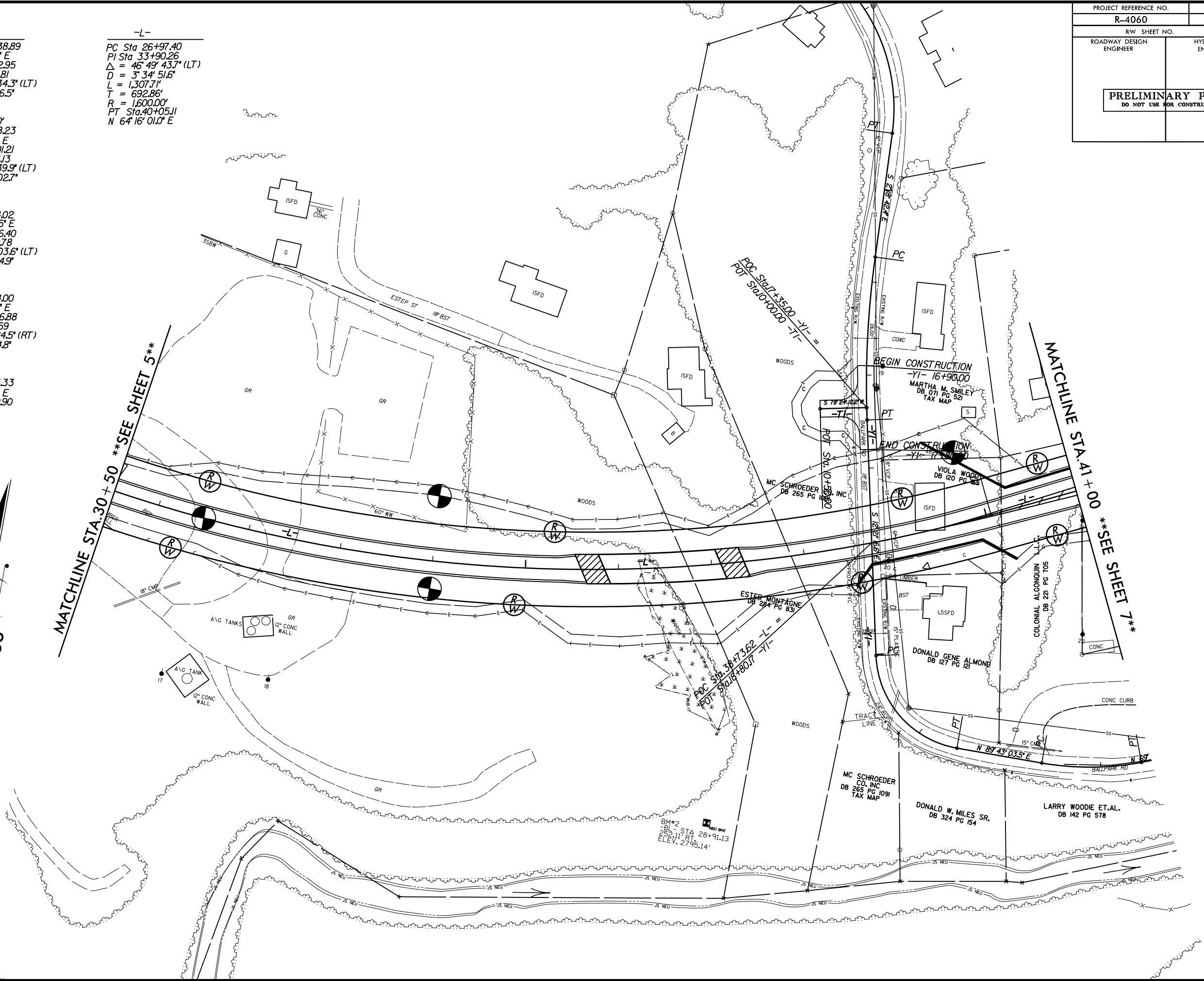
-L-  
 PC Sta 26+97.40  
 PI Sta 33+90.26  
 $\Delta = 46° 49' 43.7"$  (LT)  
 D = 3' 34' 51.6"  
 L = 1,307.71'  
 T = 692.86'  
 R = 1,600.00'  
 PT Sta 40+05.11  
 N 64° 16' 01.0" E

REVISIONS



MATCHLINE STA. 30 + 50 \*\*SEE SHEET 5\*\*

MATCHLINE STA. 41 + 00 \*\*SEE SHEET 7\*\*



SYTIME  
 DGN  
 \$\$\$\$\$\$

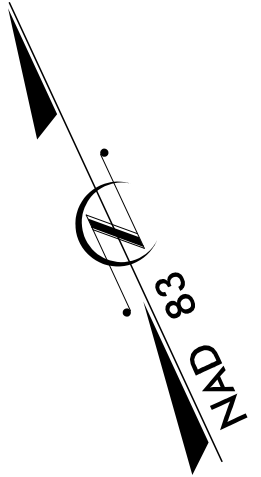
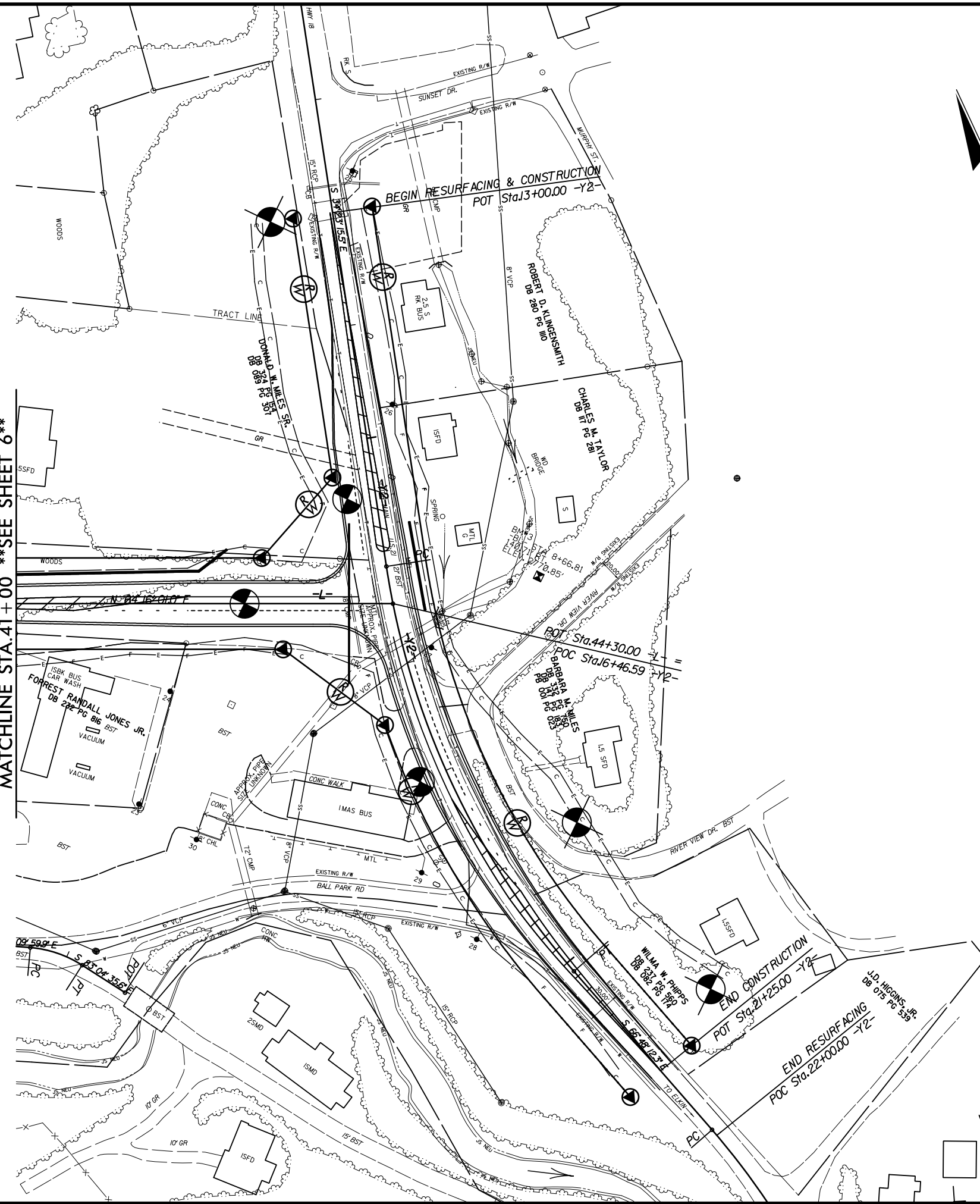


PROJECT REFERENCE NO.	SHEET NO.
R-4060	7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b>	
DO NOT USE FOR CONSTRUCTION	

8/17/99

REVISIONS

MATCHLINE STA. 41+00 \*\*SEE SHEET 6\*\*

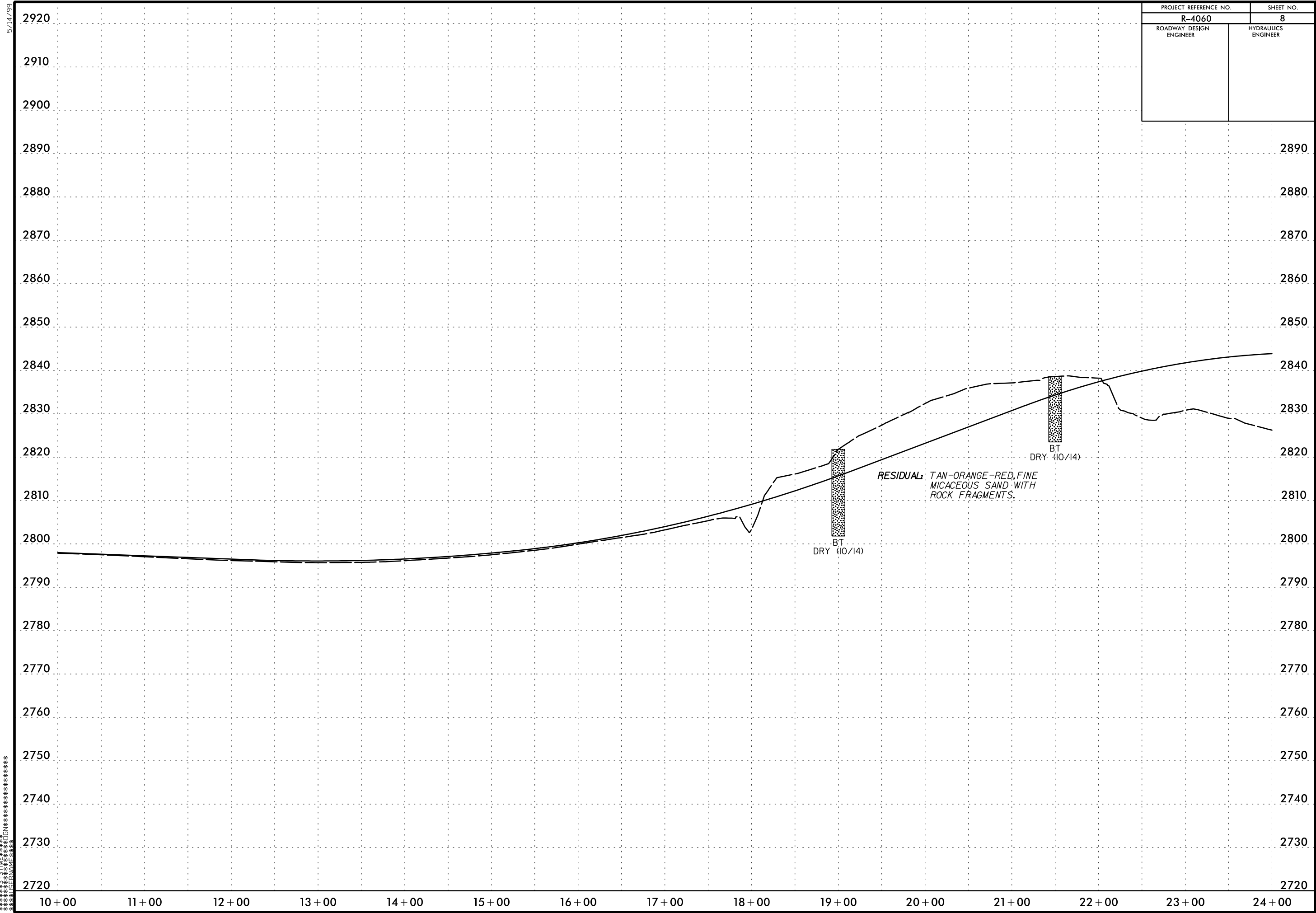


\*\*\*\*\*SYTIME\*\*\*\*\*  
\*\*\*\*\*CDGN\*\*\*\*\*  
\*\*\*\*\*\*\*\*\*\*

-Y2-  
 POT Sta.10+00.00  
 S 34° 23' 15.5" E  
 PC Sta.16+13.41  
 PI Sta. 18+16.89  
 $\Delta = 32° 24' 56.9"$  (LT)  
 D = 8' 11" 06.4"  
 L = 396.03'  
 T = 203.47'  
 R = 700.00'  
 PT Sta.20+09.45  
 S 66° 48' 12.3" E  
 PC Sta.21+93.61

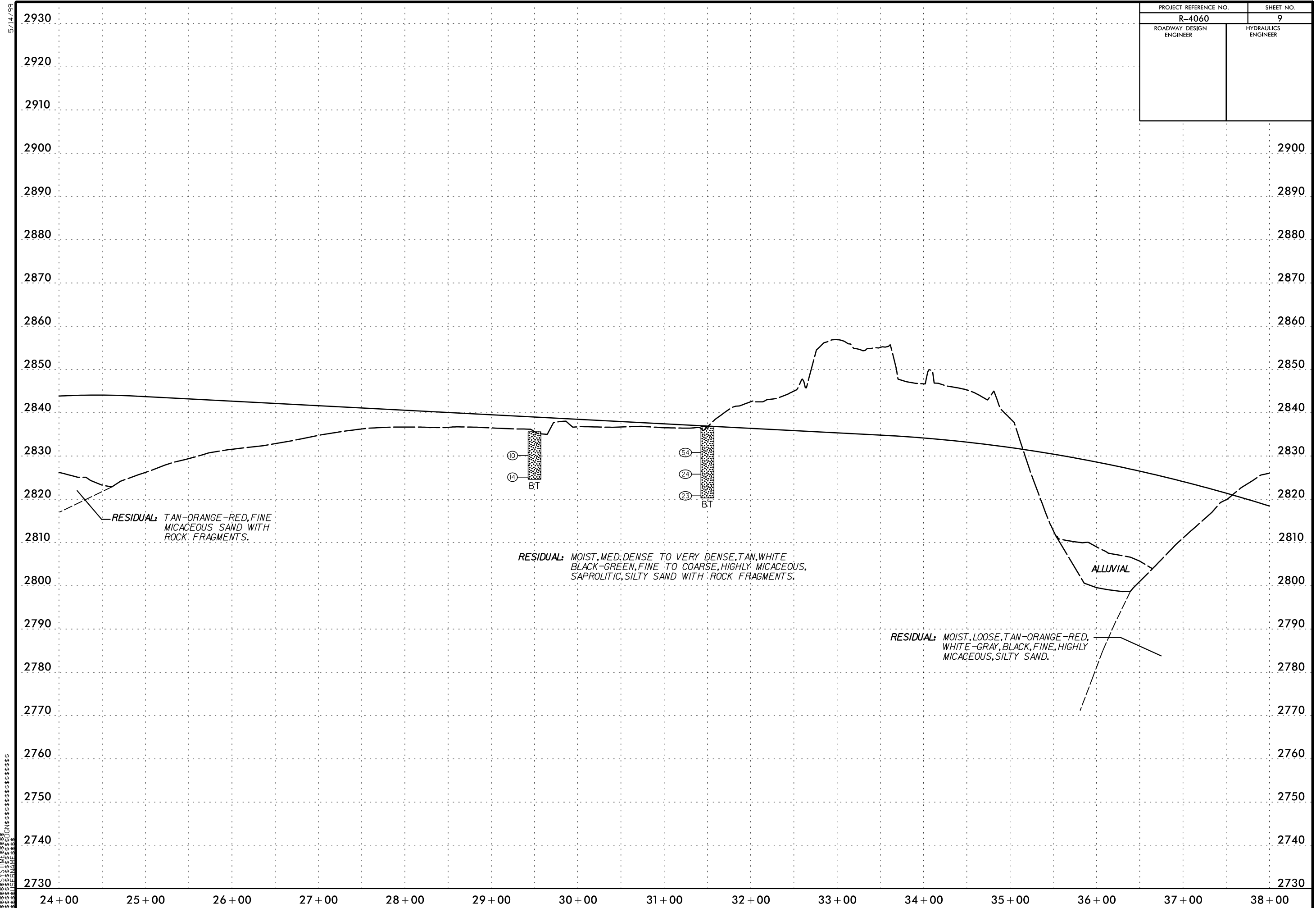
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PROJECT REFERENCE NO.		SHEET NO.	
R-4060		8	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	



SYSTEMS DESIGN GROUP

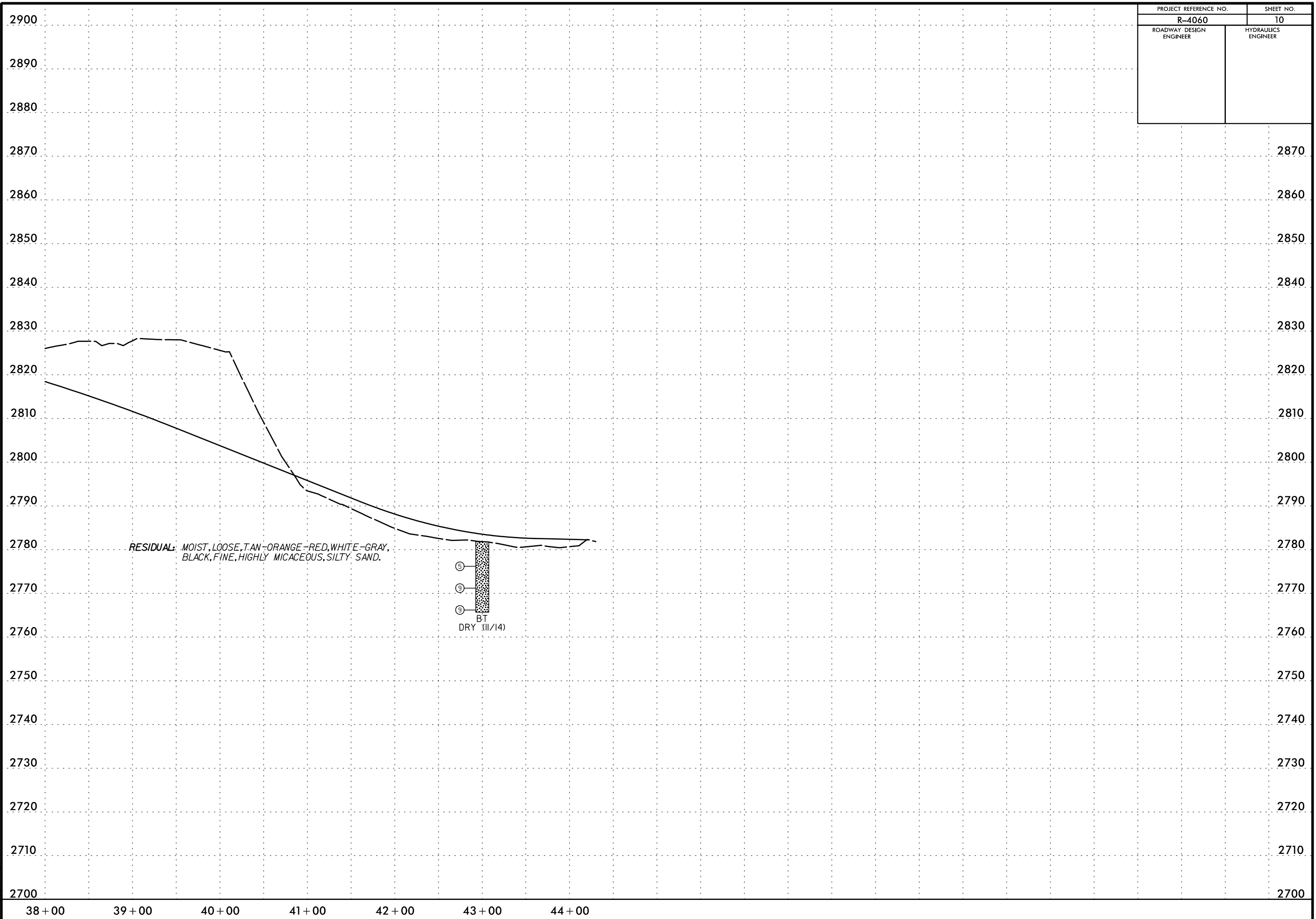
PROJECT REFERENCE NO.		SHEET NO.	
R-4060		9	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	



SYSTEMS DESIGN GROUP

5/14/99  
SYSTEMS DESIGN GROUP

PROJECT REFERENCE NO.	SHEET NO.
R-4060	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER



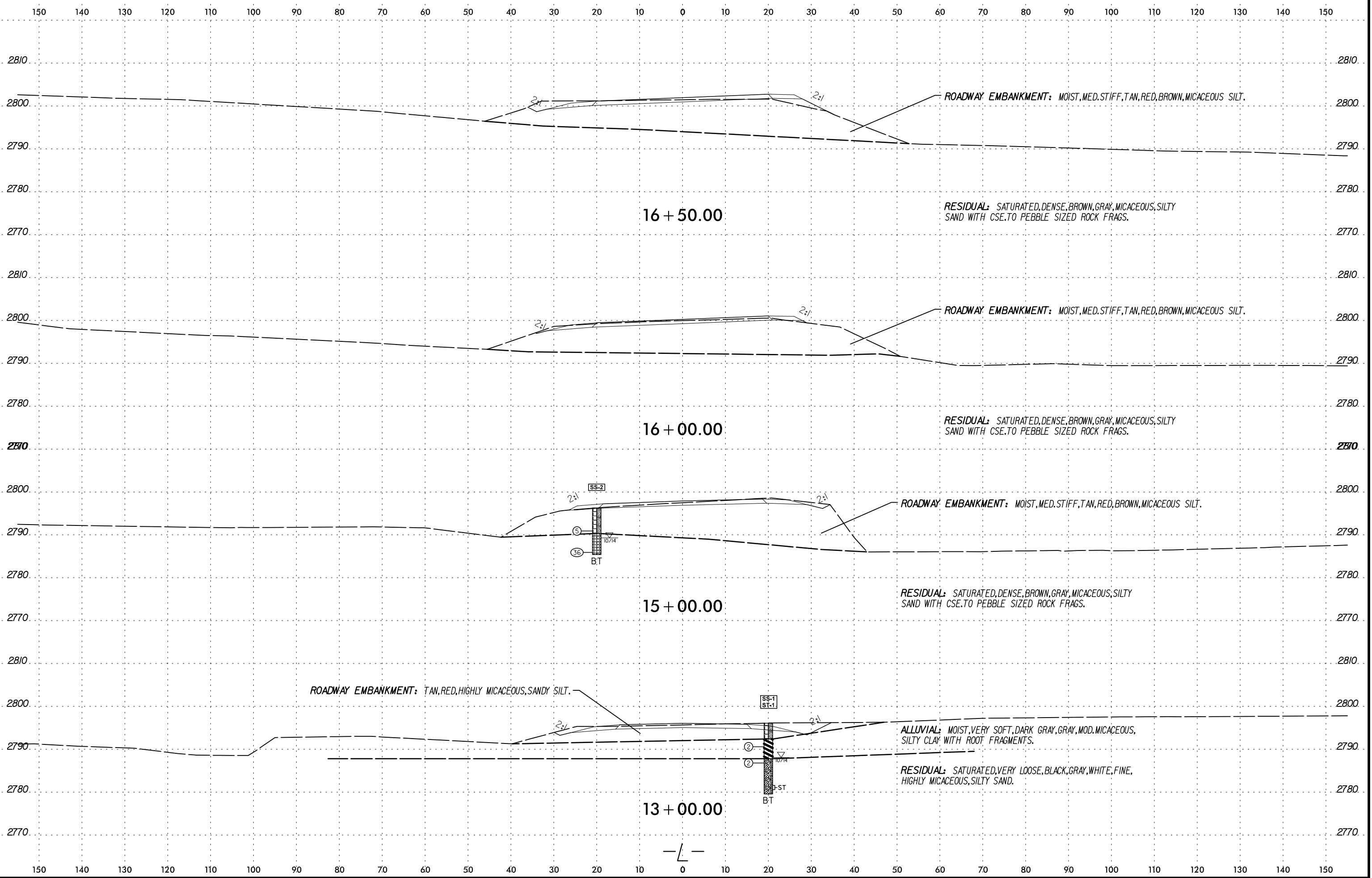
RESIDUAL: MOIST, LOOSE, TAN-ORANGE-RED, WHITE-GRAY, BLACK, FINE, HIGHLY MICACEOUS, SILTY SAND.

BT  
DRY (11/14)

2870  
2860  
2850  
2840  
2830  
2820  
2810  
2800  
2790  
2780  
2770  
2760  
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2700

38+00 39+00 40+00 41+00 42+00 43+00 44+00

8/23/99



DATE: 8/23/99  
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SCALE: [illegible]

16 + 50.00

16 + 00.00

15 + 00.00

13 + 00.00

ROADWAY EMBANKMENT: MOIST, MED. STIFF, TAN, RED, BROWN, MICACEOUS SILT.

RESIDUAL: SATURATED, DENSE, BROWN, GRAY, MICACEOUS, SILTY SAND WITH CSE. TO PEBBLE SIZED ROCK FRAGS.

ROADWAY EMBANKMENT: MOIST, MED. STIFF, TAN, RED, BROWN, MICACEOUS SILT.

RESIDUAL: SATURATED, DENSE, BROWN, GRAY, MICACEOUS, SILTY SAND WITH CSE. TO PEBBLE SIZED ROCK FRAGS.

ROADWAY EMBANKMENT: MOIST, MED. STIFF, TAN, RED, BROWN, MICACEOUS SILT.

RESIDUAL: SATURATED, DENSE, BROWN, GRAY, MICACEOUS, SILTY SAND WITH CSE. TO PEBBLE SIZED ROCK FRAGS.

ROADWAY EMBANKMENT: TAN, RED, HIGHLY MICACEOUS, SANDY SILT.

ALLUVIAL: MOIST, VERY SOFT, DARK GRAY, GRAY, MOD. MICACEOUS, SILTY CLAY WITH ROOT FRAGMENTS.

RESIDUAL: SATURATED, VERY LOOSE, BLACK, GRAY, WHITE, FINE, HIGHLY MICACEOUS, SILTY SAND.

SS-2

2:1

36

BT

10/14

SS-1

2:1

2

BT

10/14

SS-1

2:1

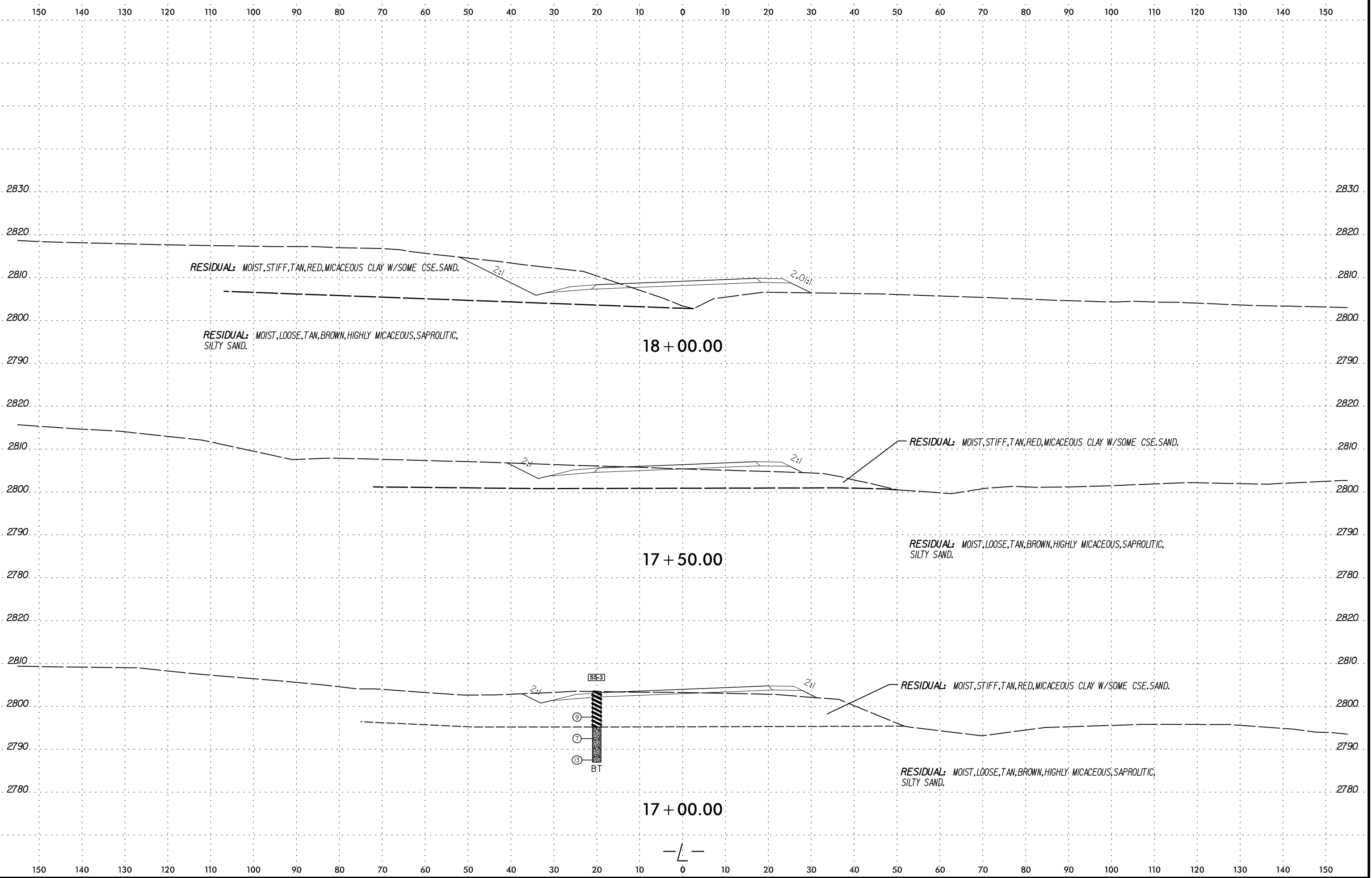
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BT

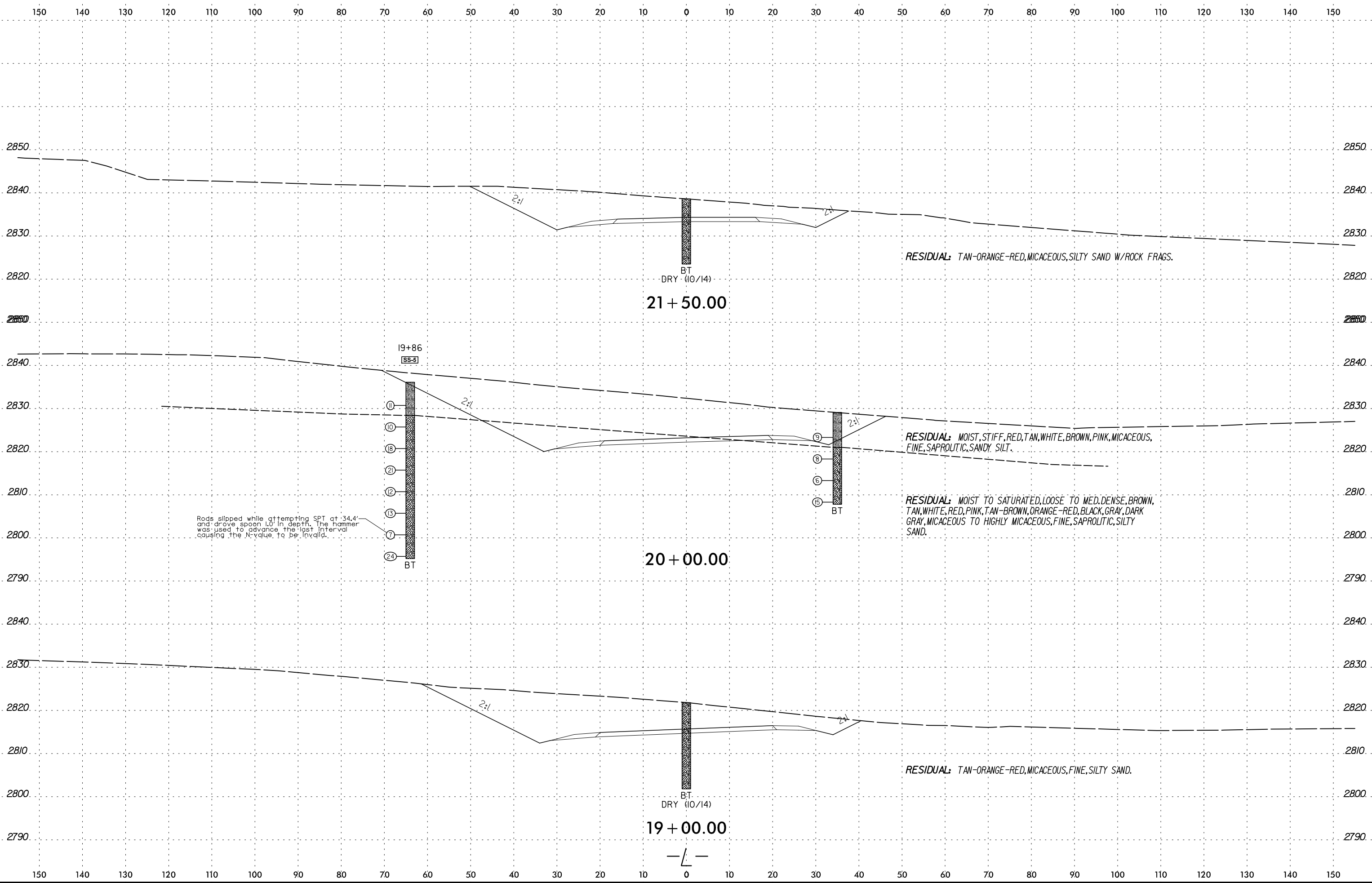
10/14

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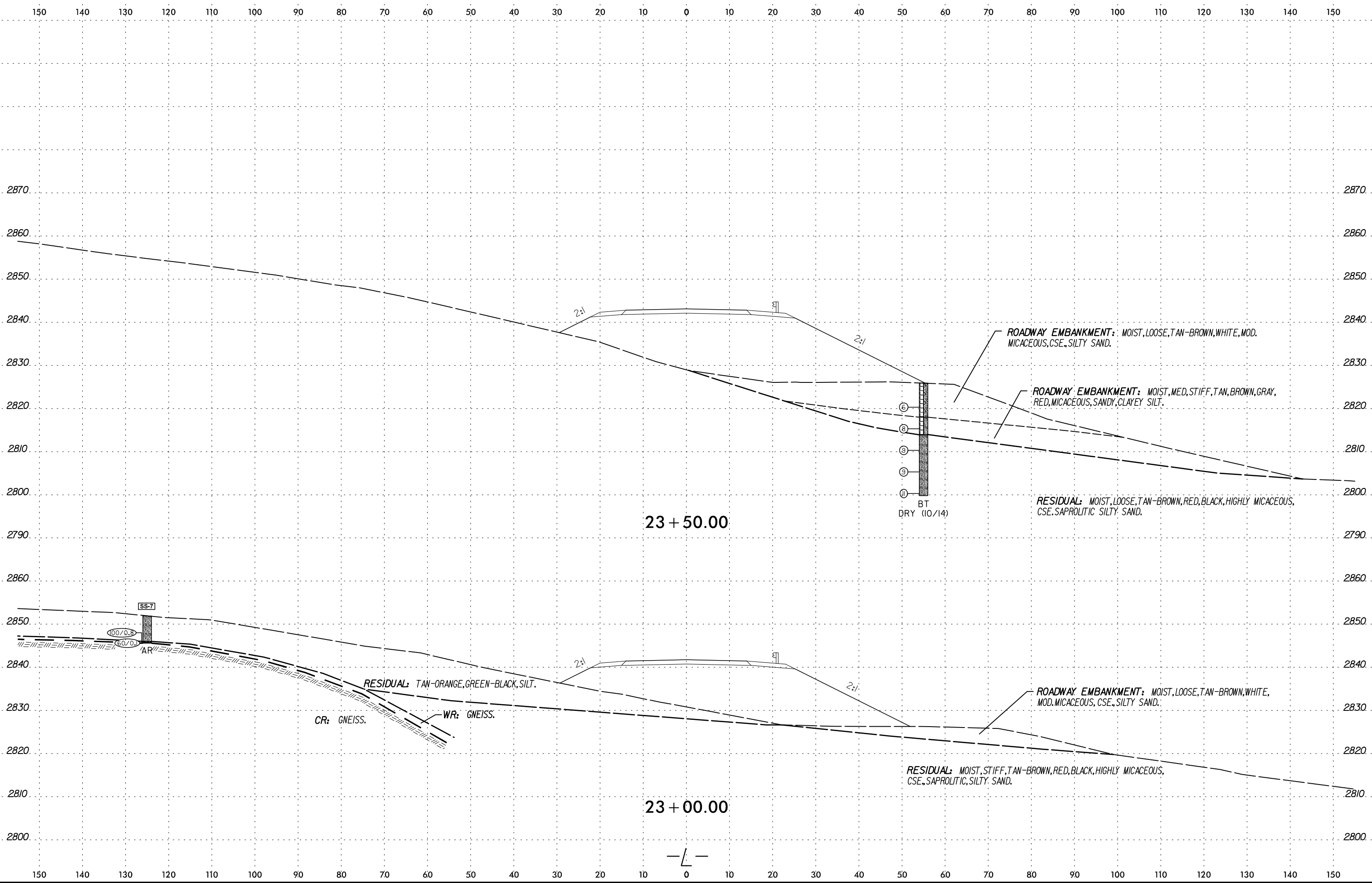
8/23/99



DATE: 8/23/99  
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SCALE: AS SHOWN  
SHEET NO.: 12 OF 12

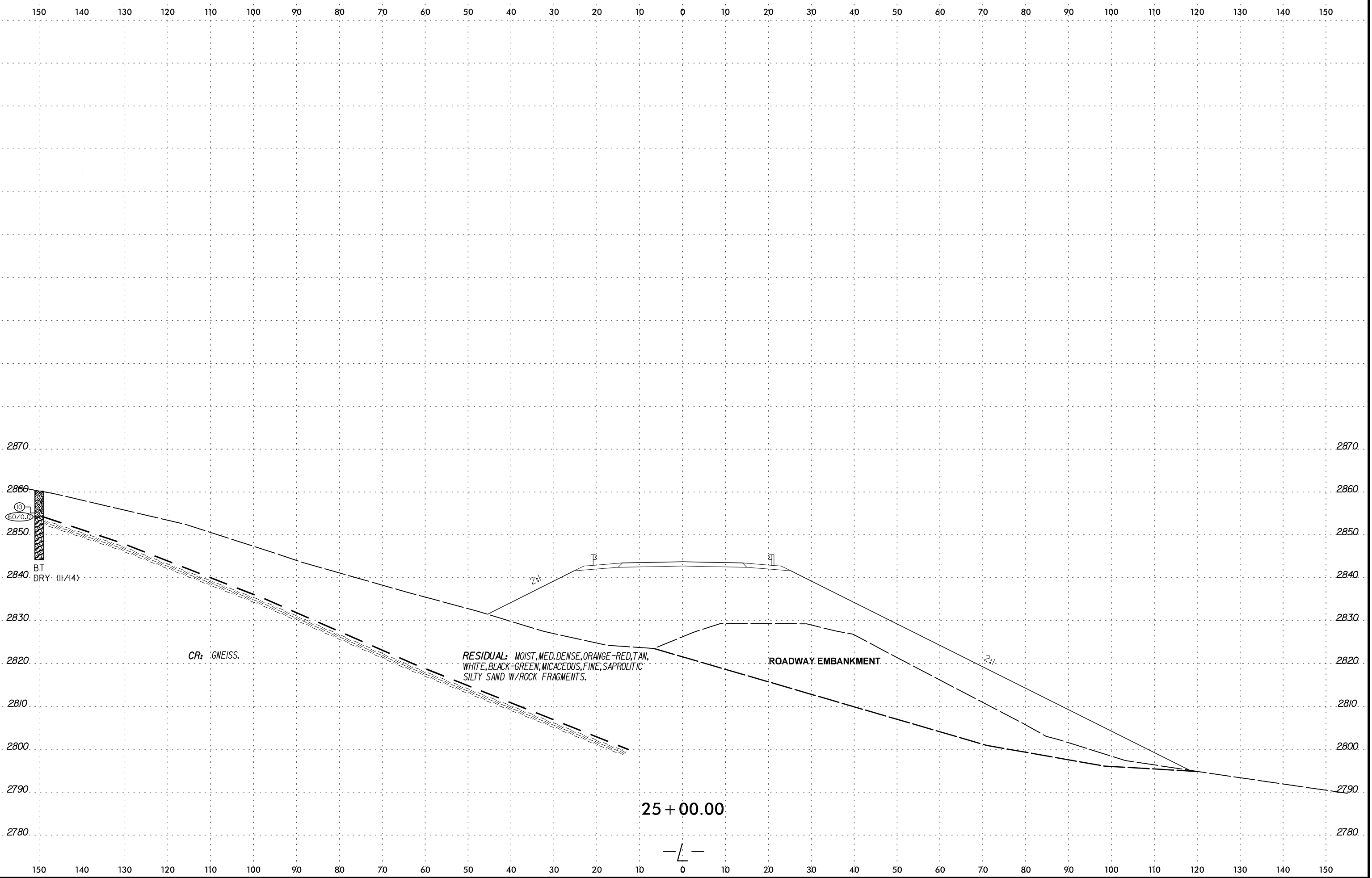
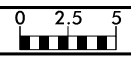


8/23/99

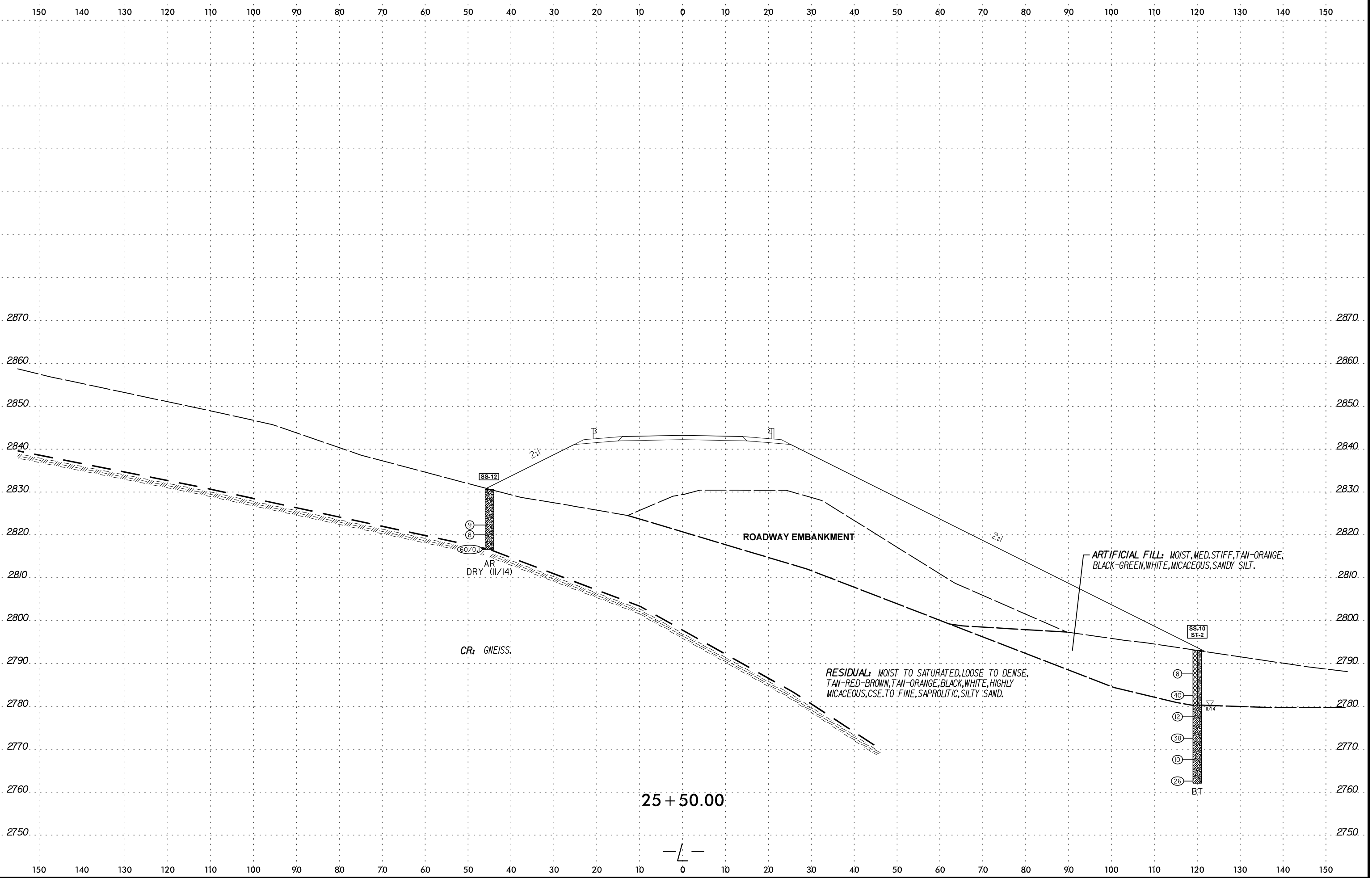


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SCALE: AS SHOWN  
PROJECT: R-4060  
SHEET: 14



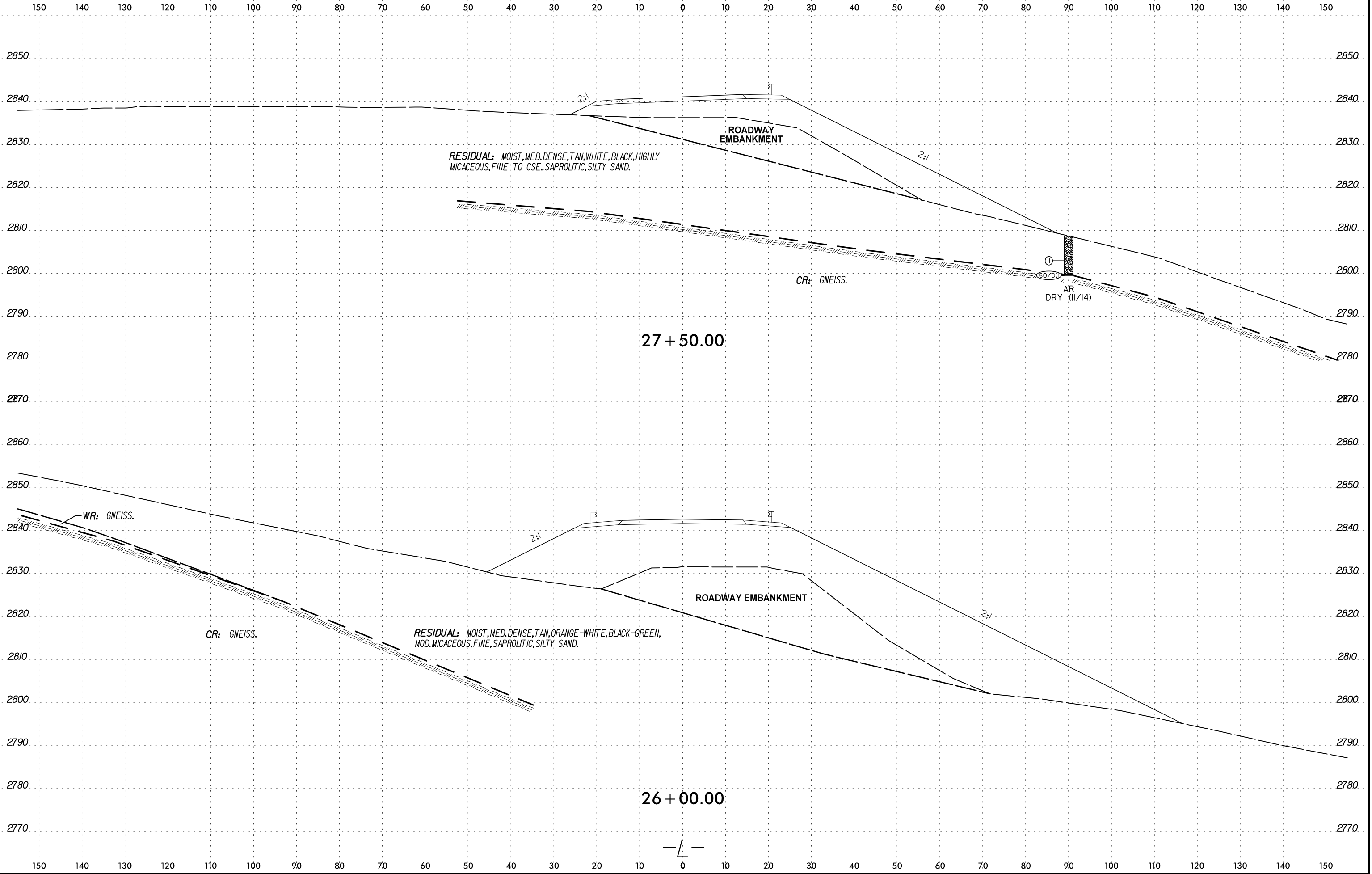


8/23/99



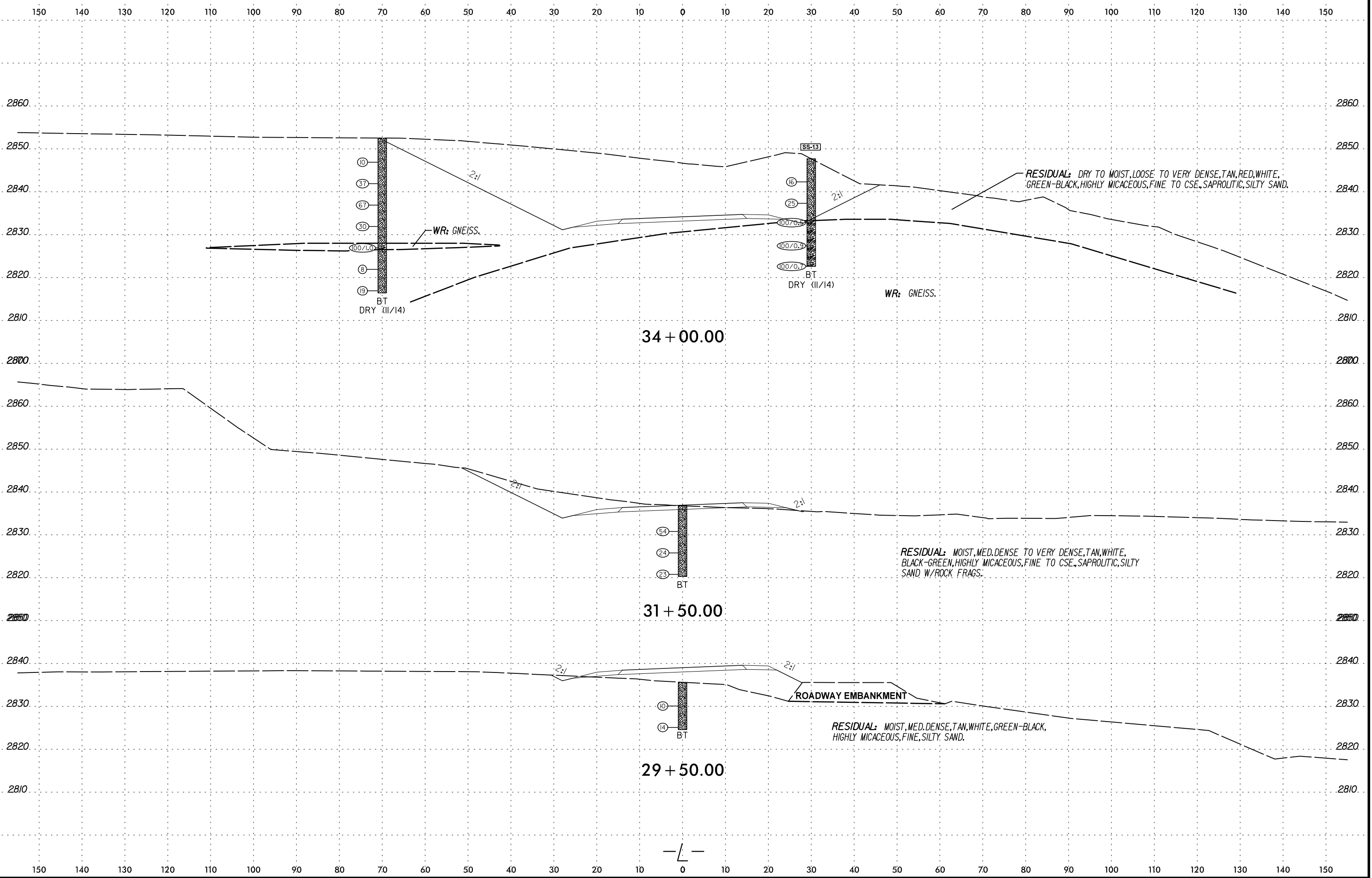
UNIVERSITY OF CALIFORNIA

8/23/99



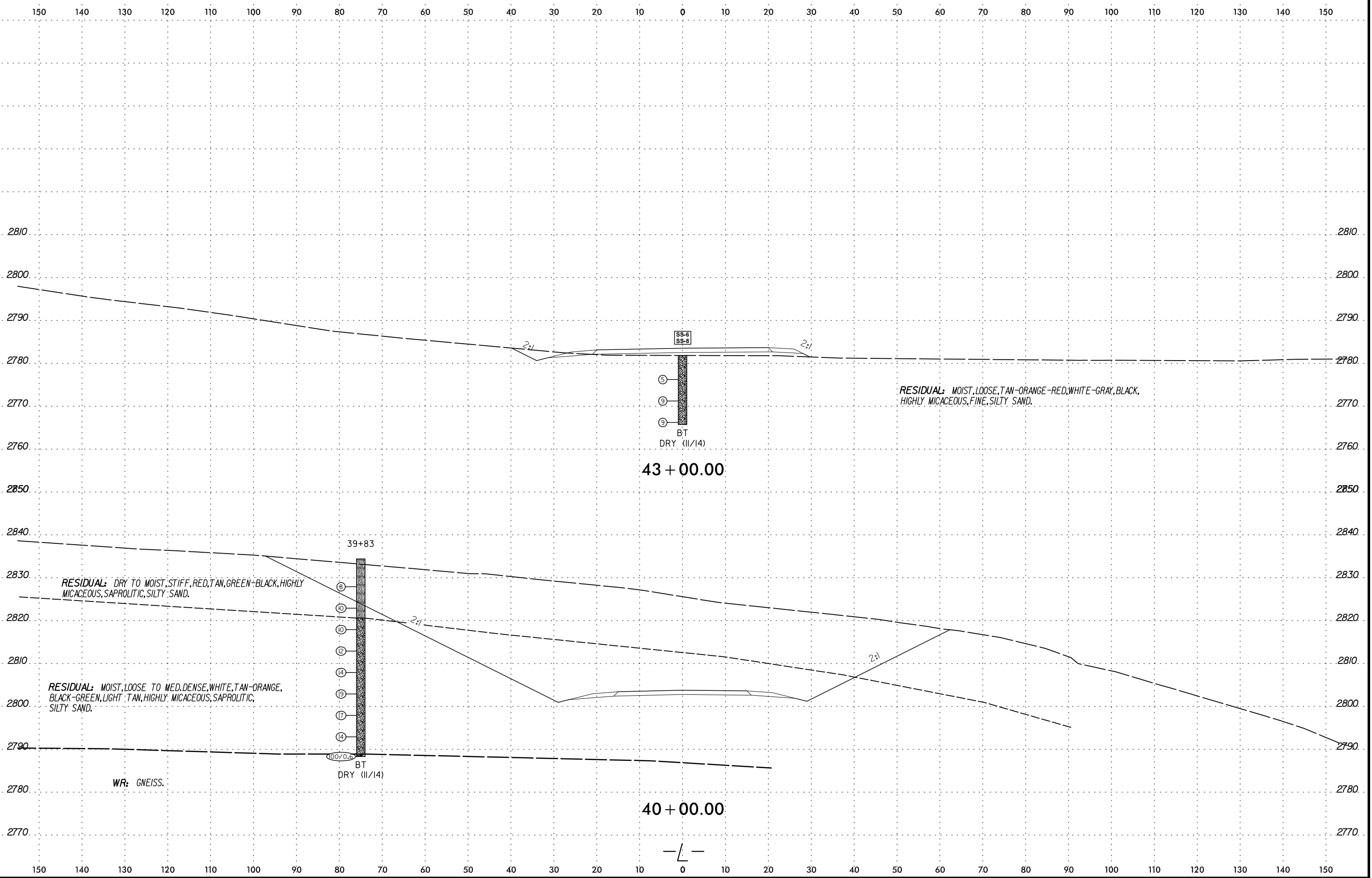
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PROJECT: R-4060  
SHEET: 17

8/23/99



DATE: 8/23/99  
BY: [illegible]  
CHECKED: [illegible]  
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8/23/99



8/23/99

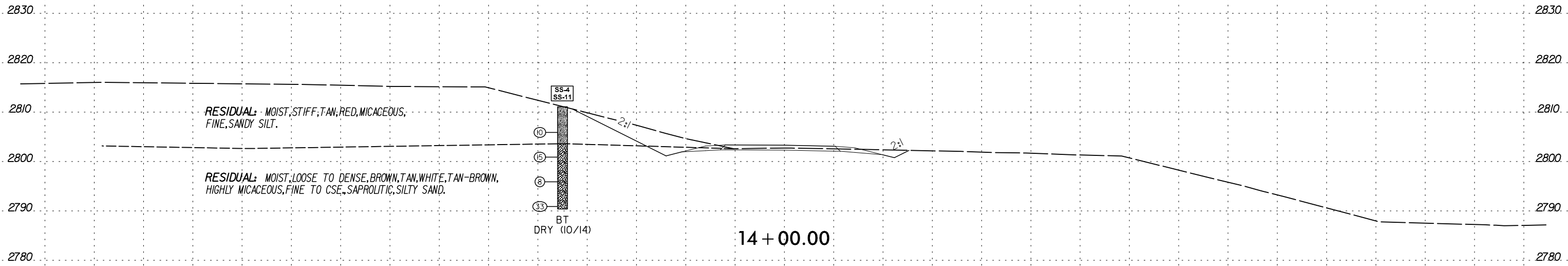
8/23/99



PROJ. REFERENCE NO.  
R-4060

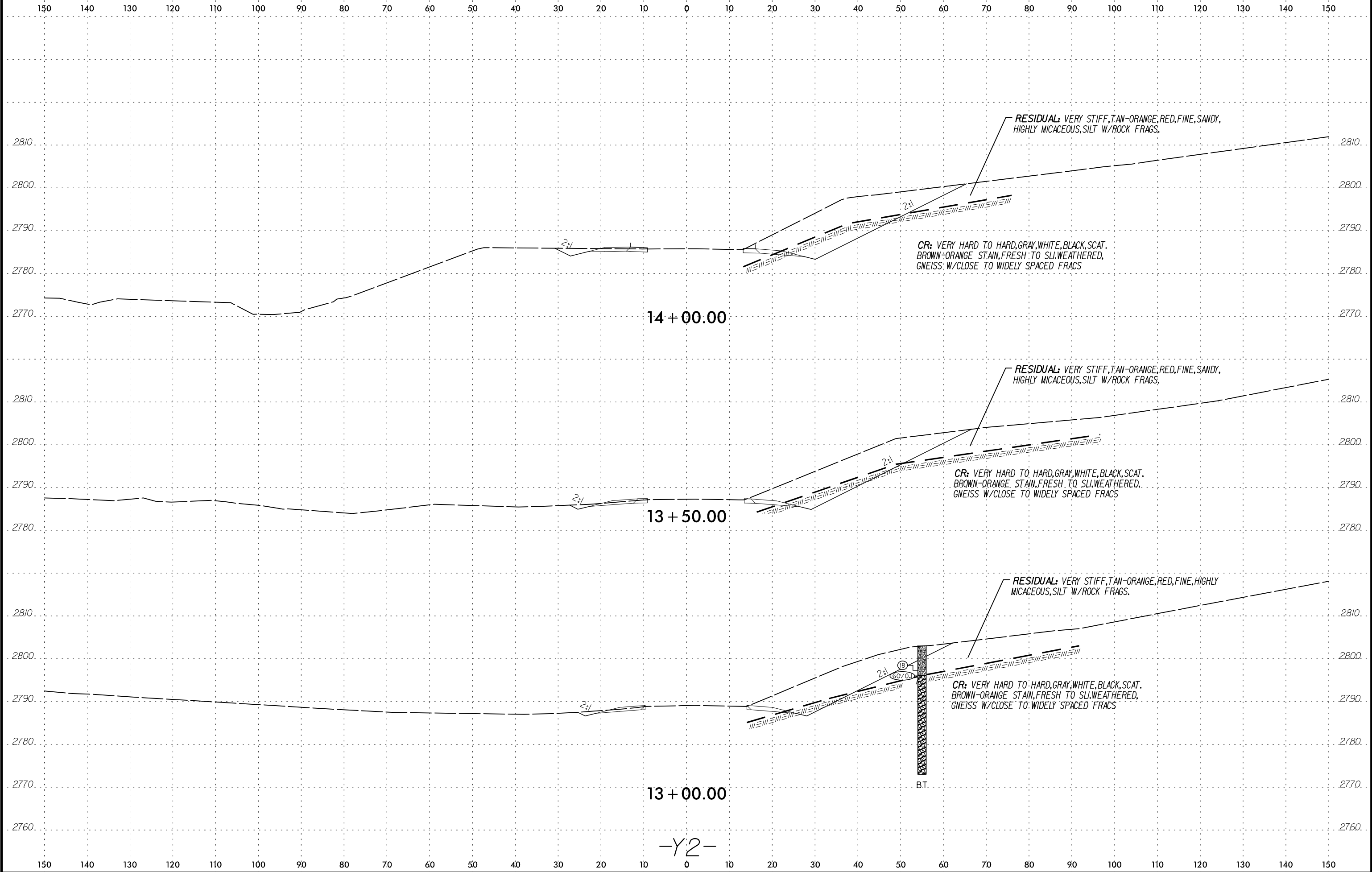
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20

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8/23/99

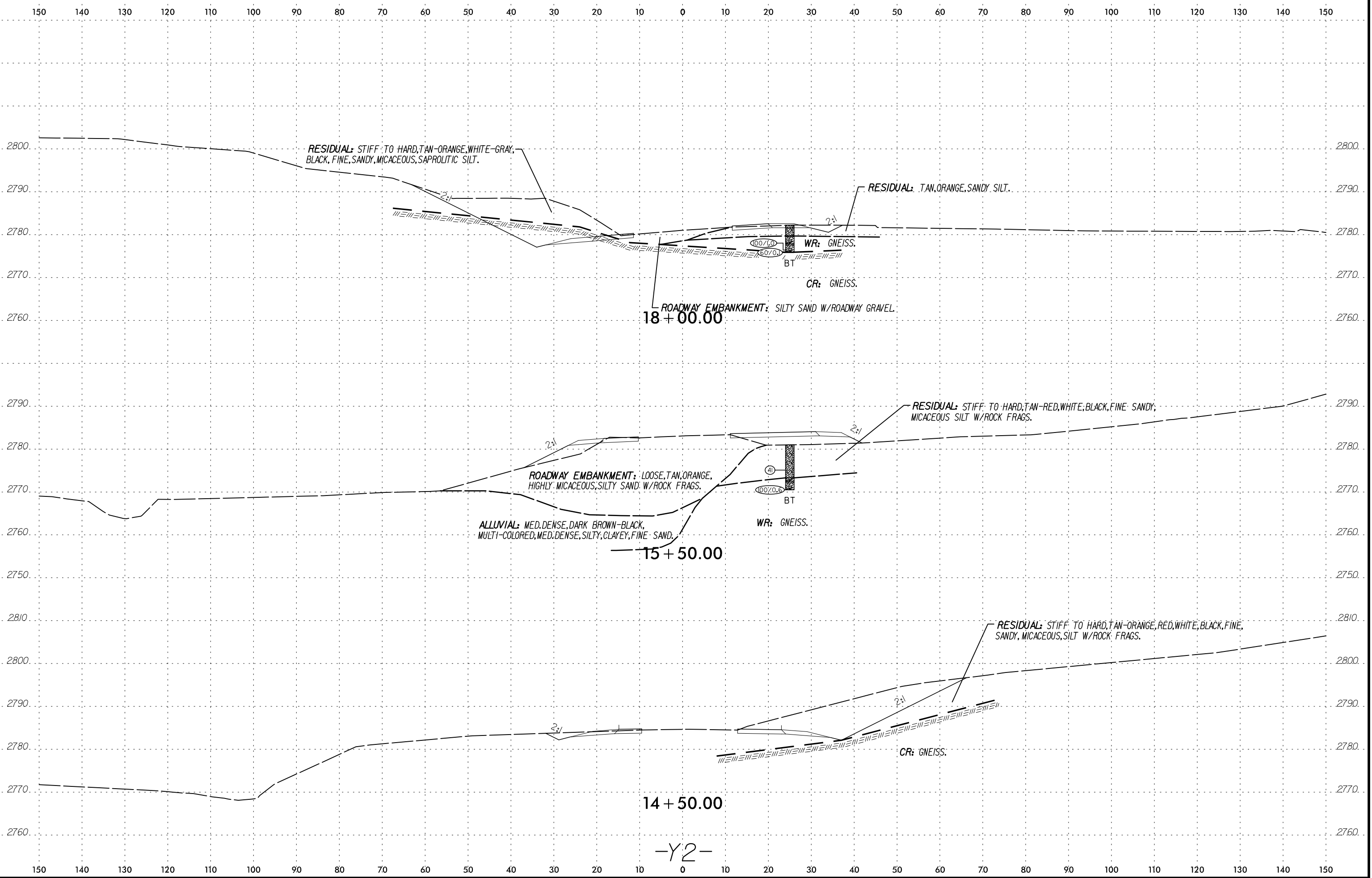
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-Y2-

DATE: 8/23/99  
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SCALE: AS SHOWN  
SHEET NO.: 21  
PROJECT: R-4060

8/23/99

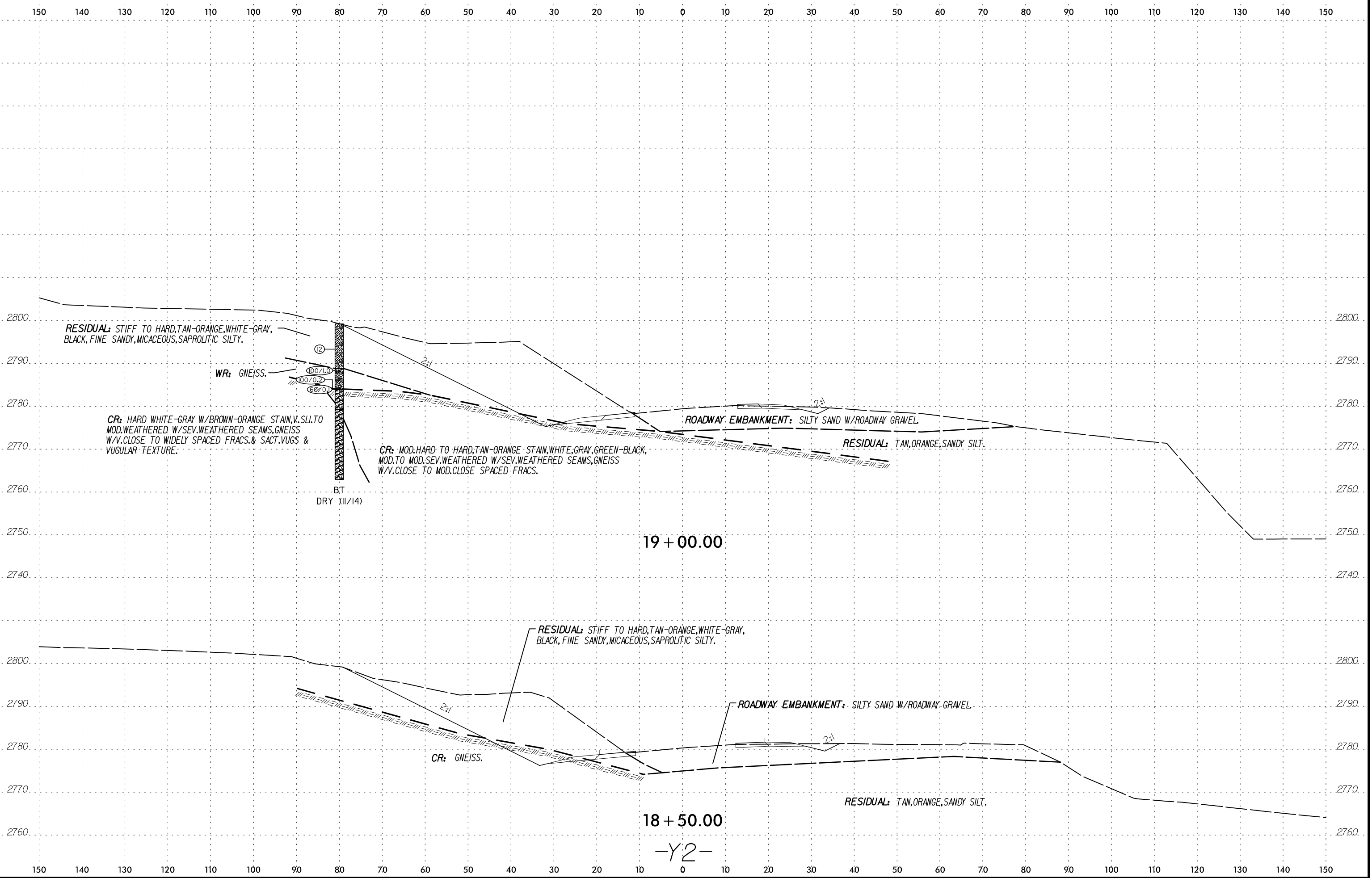


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DATE: 8/23/99  
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 PROJECT: R-4060  
 SHEET: 22



8/23/99



DATE: 8/23/99  
DRAWN BY: [illegible]  
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SHEET NO.: 23

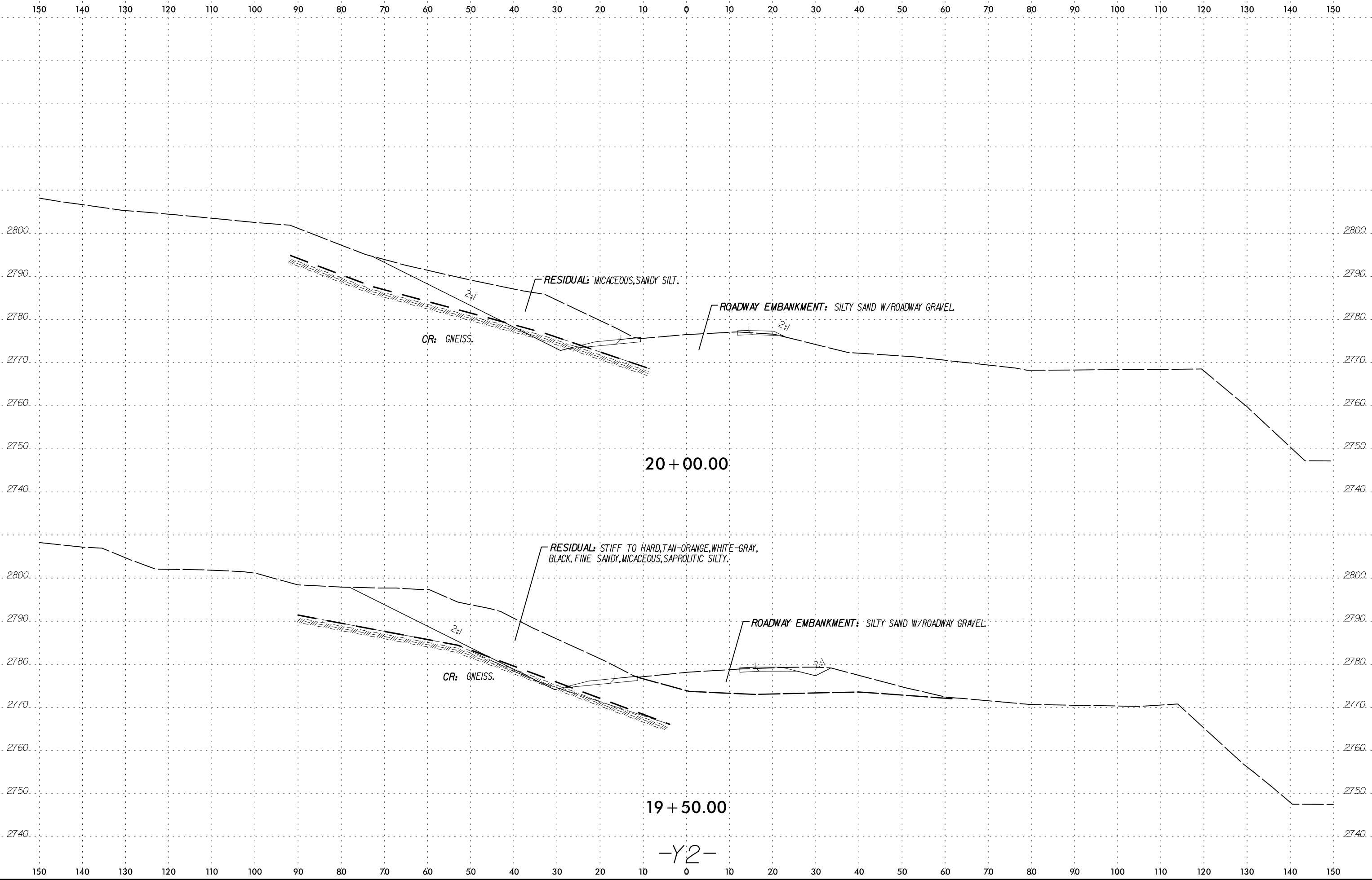
-Y2-

8/23/99

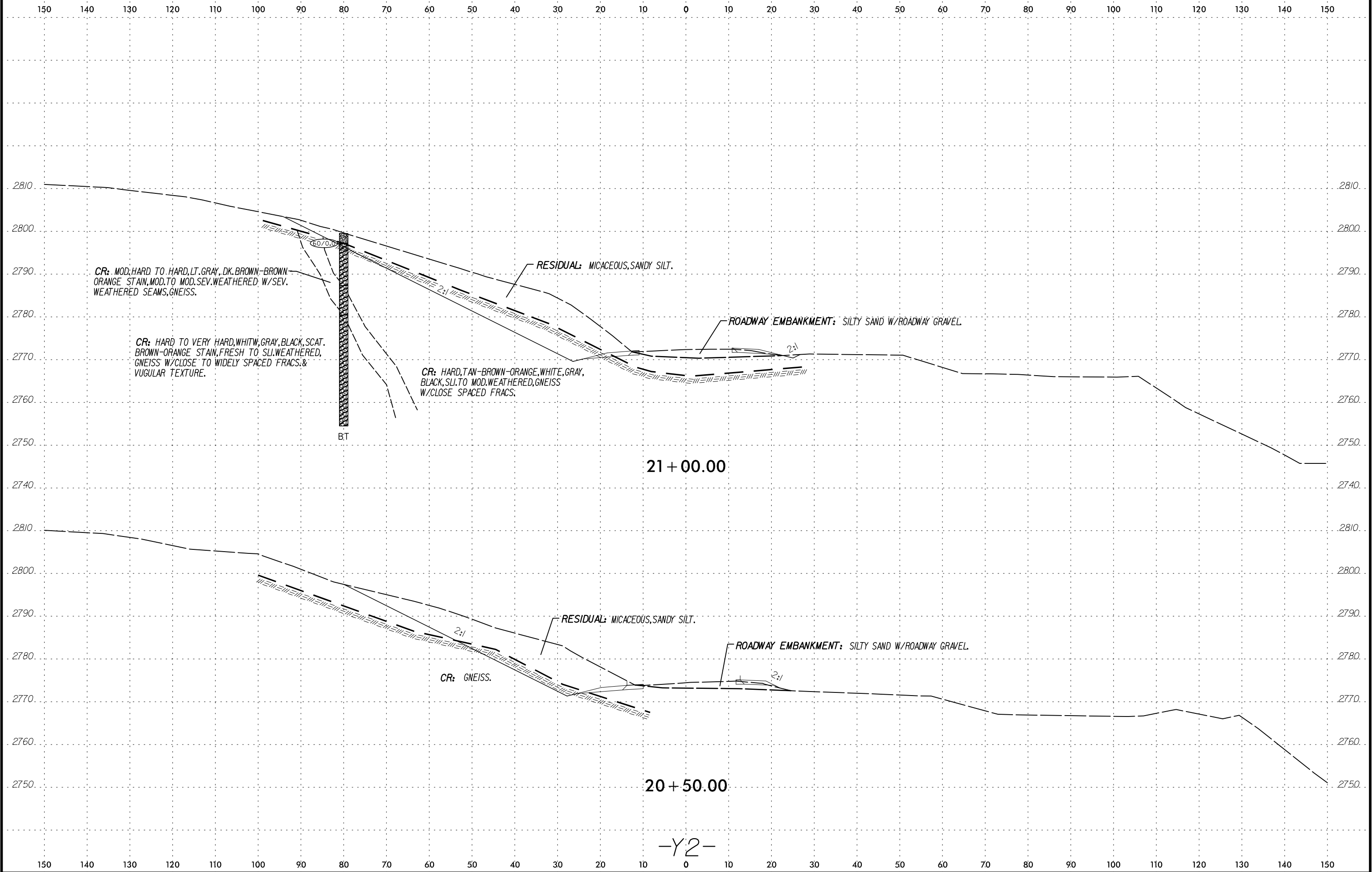


PROJ. REFERENCE NO.  
R-4060

SHEET NO.  
24



-Y2-



21+00.00

20+50.00

-Y2-

DATE: 8/23/99  
TIME: 10:00 AM  
BY: JLS  
CHECKED: JLS  
SCALE: AS SHOWN  
SHEET NO.: 25  
PROJECT: R-4060

SOIL TEST RESULTS															
SAMPLE NO.	OFFSET	STATION	DEPTH INTERVAL	AASHTO CLASS.	L.L.	P.I.	% BY WEIGHT				% PASSING (SIEVES)			% MOISTURE	% ORGANIC
							C. SAND	F. SAND	SILT	CLAY	10	40	200		
SS-1	20 RT	13+00	4.5-6.0	A-7-5 (9)	65	15	10	30.9	43.3	15.7	87.8	83.6	57.7	67.0	-
SS-2	20 LT	15+00	9.4-10.9	A-1-a (0)	NP	NP	51.6	36.7	11.7		38.9	24.1	6.5	11.7	-
SS-3	20 LT	17+00	5.0-6.5	A-7-5 (14)	60	22	15.9	25.6	15.5	43	99.0	91.5	61.7	30.6	-
SS-4	45 LT	14+00	4.2-5.7	A-4 (0)	37	3	25.5	42.5	16.1	15.9	99.1	88.0	37.5	20.6	-
SS-5	64 LT	19+86	4.4-5.9	A-5 (4)	47	10	17.1	34.7	20.7	27.5	93.2	85.8	51.1	25.5	-
SS-6	CL	43+00	14.6-16.1	A-2-4 (0)	39	5	25.0	50.4	20.5	4.1	96.5	86.2	31.9	28.7	-
SS-7	125 LT	23+00	4.9-5.9	A-4 (0)	38	7	27.9	35.9	23.1	13.1	90.6	75.4	38.5	29.5	-
SS-8	CL	43+00	9.6-11.1	A-2-4 (0)	NP	NP	31.4	44.3	22.3	2.0	86.2	71.9	27.7	16.9	-
SS-9	175 LT	26+00	4.7-6.2	A-2-4 (0)	NP	NP	29.9	44.5	16.6	8.9	97.5	82.3	31.8	17.8	-
SS-10	120 RT	25+50	19.5-21.0	A-2-4 (0)	40	4	30.0	40.4	17.7	11.9	84.4	69.8	31.0	36.9	-
SS-11	45 LT	14+00	9.2-10.7	A-2-4 (0)	NP	NP	30.8	51.4	11.9	5.9	97.4	84.5	24.3	11.4	-
SS-12	45 LT	25+50	7.3-8.8	A-2-4 (0)	38	9	34.4	41.7	15.0	8.9	97.5	83.5	28.7	16.5	-
SS-13	30 RT	34+00	9.4-10.9	A-2-4 (0)	NP	NP	40.2	40.2	13.6	6.0	82.7	62.4	21.2	11.1	-
ST-1	20 RT	13+00	14.5-15.5	A-2-4 (0)	NP	NP	29.3	55.4	11.3	4.0	100.0	90.1	22.4	40.3	-
ST-2	120 RT	25+50	2.0-3.5	A-4 (2)	33	7	22.1	29.8	25.1	22.9	97.0	86.7	52.2	23.4	-



# NCDOT GEOTECHNICAL ENGINEERING UNIT BORELOG REPORT

WBS 34605.1.2	TIP R-4060	COUNTY ALLEGHANY	GEOLOGIST DeLost, R.
SITE DESCRIPTION US 21 Western Loop from SR 1172 (Grandview Drive) to US 21			GROUND WTR (ft)
BORING NO. L_2600L	STATION 26+00	OFFSET 175 ft LT	0 HR. Dry
COLLAR ELEV. 2,857.2 ft	TOTAL DEPTH 8.2 ft	NORTHING 1,006,899	24 HR. FIAD
DRILL RIG/HAMMER EFF./DATE ICA0404 CME-45C 90% 08/25/2014		DRILL METHOD H.S. Augers	HAMMER TYPE Automatic
DRILLER Morgan, M.	START DATE 11/03/14	COMP. DATE 11/03/14	SURFACE WATER DEPTH N/A

ELEV (ft)	DRIVE ELEV (ft)	DEPTH (ft)	BLOW COUNT			BLOWS PER FOOT					SAMP. NO.	MOI	LOG	SOIL AND ROCK DESCRIPTION	DEPTH (ft)	
			0.5ft	0.5ft	0.5ft	0	25	50	75	100						
2860																
														2,857.2	GROUND SURFACE	0.0
2855															<b>RESIDUAL</b> Tan, orange-white, black-green, med. dense, mod. micaceous, silty, fine, saprolitic SAND (A-2-4).	
	2,852.5	4.7														
2850			4	8	18											
	2,849.9													2,849.9	7.3	
	2,849.1	8.1												2,849.1	8.1	
	2,849.0		60/0.1											2,849.0	8.2	
															<b>WEATHERED ROCK</b> Weathered rock	
															<b>CRYSTALLINE ROCK</b> Crystalline rock (Gneiss)	
Boring Terminated with Standard Penetration Test Refusal at Elevation 2,849.0 ft in Crystalline Rock (Gneiss).  Boring backfilled upon completion.																

NCDOT BORE SINGLE R4060\_GEO\_BH\_SPARTA BYPASS.GPJ NC\_DOT.GDT 4/15/15