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STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PURDUE  
GOVERNOR

EUGENE A. CONTI, JR.  
SECRETARY

November 27, 2012

MEMORANDUM TO: Jay Bennett, P.E.  
State Roadway Design Engineer

ATTENTION: Burke Evans, P. E.  
Project Engineer

FROM: Njoroge Wainaina, P.E.  
State Geotechnical Engineer

STATE PROJECT: 36001.1.2 (R-2603)  
FEDERAL PROJECT: STP-268(15)  
COUNTY: Wilkes  
DESCRIPTION: NC 268 from East of NC 18 to SR 1966 (Airport Road)

SUBJECT: Geotechnical Report - Design and Construction  
Recommendations

The Geotechnical Engineering Unit has completed the investigation for this project and presents the following recommendations.

**I. Slope/Embankment Stability**

**A. Slope Design**

We recommend all roadway slopes not listed below to be constructed no steeper than 2:1(H:V).

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

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

[www.ncdot.gov/doh/preconstruct/highway/geotech](http://www.ncdot.gov/doh/preconstruct/highway/geotech)

**LOCATION:**  
CENTURY CENTER COMPLEX  
ENTRANCE B-2  
1020 BIRCH RIDGE DRIVE  
RALEIGH NC 27610

**B. Undercut**

We recommend including a contingency quantity of 500 cubic yards of undercut in the contract to be used discretion of the Engineer.

**C. Geotextile for Soil Stabilization**

We recommend a quantity of 500 square yards of Geotextile for Soil Stabilization to be used at the discretion of the Engineer.

**II. Subgrade Stability****A. Aggregate Subgrade**

We recommend the following quantities as contingency items to be used at the discretion of the Engineer.

Shallow Undercut	500 cubic yards
Geotextile for Soil Stabilization	1500 square yards
Class IV Subgrade Stabilization	1,000 tons

**B. Subsurface Drainage - Underdrain**

We recommend a contingency quantity of 500 linear feet of 6" perforated subdrain pipe to be used at the discretion of the Engineer. At the request of the Engineer, the Geotechnical Engineering Unit will assist with the design of underdrain systems. Rough grading for the project needs to be completed before evaluation of underdrain requirements.

**III. Borrow Specifications****A. Shrinkage/Swell Factor**

We recommend using a shrinkage factor of 15%.

**B. Common Borrow**

The project is in the piedmont region of North Carolina. Any borrow source will adhere to the Statewide Criteria for Acceptance of Borrow Material (Section 1018 of the 2012 Standard Specifications). No exceptions to this Criterion are anticipated.

**C. Select Granular Material**

We recommend a quantity of 500 cubic yards of Select Granular Material to be used with the items discussed in Section I.B and I.C. The backfill material should be placed to a height of three (3) feet above geotextile for soil stabilization or water level. All select granular material shall meet the criteria outlined in the 2012 Standard Specifications, Article 1016-3.

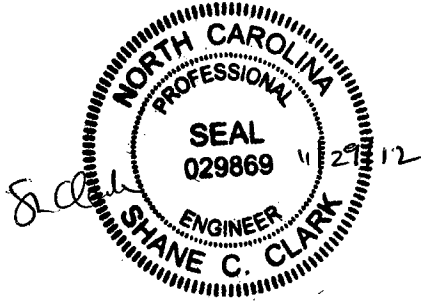
**IV. Miscellaneous****A. Reduction of Unclassified Excavation**

We estimate a total Reduction of Unclassified Excavation due to clearing and grubbing at 6,500 cubic yards.

B. Crystalline Rock

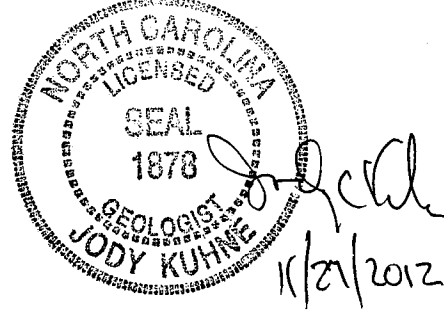
Crystalline rock was not encountered within 10' of grade.

Respectfully submitted,



Shane Clark, P.E.  
Regional Design Engineer

Respectfully submitted,



Jody Kuhne, LG, PE  
Project Geological Engineer

JCK



**NORTH CAROLINA DEPARTMENT OF TRANSPORTATION  
 GEOTECHNICAL ENGINEERING UNIT  
 Summary of Quantities**

WBS No.: 36001.1.2

County: WILKES

Project Engineer: \_\_\_\_\_

TIP No.: R-2603

Field Office: ASHEVILLE

Project Geologist: JC KUHNE

Description: NC 268 (ELKIN HWY) FROM EAST OF NC 18 TO SR 1966 (AIRPORT ROAD)

Pay Item No.	Pay Item/ Quantity Adjustment	Spec Book Section No. or Special Provision (SP) Reference	Report Section	Alignment	Begin Station	End Station	Quantity	Units
0036000000-E	Undercut Excavation	225 - Roadway Excavation	I. B	Contingency	N/A	N/A	500	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	II. A	Contingency	N/A	N/A	500	CY
<b>Total Quantity of Undercut Excavation =</b>							<b>1,000</b>	<b>CY</b>
0195000000-E	Select Granular Material	265 - Select Granular Material	III. C	Contingency	N/A	N/A	500	CY
<b>Total Quantity of Select Granular Material =</b>							<b>500</b>	<b>CY</b>
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	I. C	Contingency	N/A	N/A	500	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. A	Contingency	N/A	N/A	1,500	SY
<b>Total Quantity of Geotextile for Soil Stabilization =</b>							<b>2,000</b>	<b>SY</b>
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. A	Contingency	N/A	N/A	500	CY
<b>Total Quantity of Shallow Undercut =</b>							<b>500</b>	<b>CY</b>
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	II. A	Contingency	N/A	N/A	1,000	TON
<b>Total Quantity of Class IV Subgrade Stabilization =</b>							<b>1,000</b>	<b>TON</b>
1115000000-E	Geotextile for Pavement Stabilization	SP - Geotextile for Pavement Stabilization	II. A	Contingency	N/A	N/A	1,500	SY
<b>Total Quantity of Geotextile for Pavement Stabilization =</b>							<b>1,500</b>	<b>SY</b>
<b>These Items Only Impact Earthwork Totals</b>								
N/A	Loss Due to Clearing & Grubbing	200 - Clearing and Grubbing	IV. A	N/A	N/A	N/A	6,500	CY
N/A	Shrinkage Factor	235 - Embankments	III. A	N/A	N/A	N/A	15	%

CONTRACT: 36001.1.2 ID: R-2603

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

CONTENTS

TITLE	1
LEGEND	2
REPORT & EARTHWORK	3
PLANSHEETS	4 - 11
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STATE OF NORTH CAROLINA  
 DEPARTMENT OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 GEOTECHNICAL ENGINEERING UNIT

**ROADWAY  
 SUBSURFACE INVESTIGATION**

PROJ. REFERENCE NO. 36001.1.2 F.A. PROJ. STP-0268(15)  
 COUNTY WILKES  
 PROJECT DESCRIPTION NC 268 FROM MULTI-LANES EAST  
OF NC 18 TO SR 1966 (AIRPORT ROAD)

**INVENTORY**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2603 36001.1.2	1	39
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
		P.E.	
		RW & UTIL.	

**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. NEITHER THE SUBSURFACE PLANS AND REPORTS, NOR THE FIELD BORING LOGS, ROCK CORES, OR SOIL TEST DATA ARE PART OF THE CONTRACT.

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

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

PERSONNEL

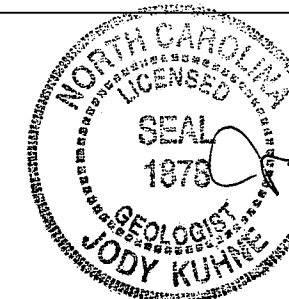
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INVESTIGATED BY JC KUHNE

CHECKED BY WD FRYE

SUBMITTED BY JC KUHNE

DATE 11/27/2012



DRAWN BY: JT WILLIAMS JC KUHNE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IT IS CONSIDERED TO BE PART OF THE PLANS, SPECIFICATIONS, OR CONTRACT FOR THE PROJECT.

NOTE - BY HAVING REQUESTED THIS INFORMATION THE CONTRACTOR SPECIFICALLY WAIVES ANY CLAIMS FOR INCREASED COMPENSATION OR EXTENSION OF TIME BASED ON DIFFERENCES BETWEEN THE CONDITIONS INDICATED HEREIN AND THE ACTUAL CONDITIONS AT THE PROJECT SITE.



See Sheet 1-A For Index of Sheets

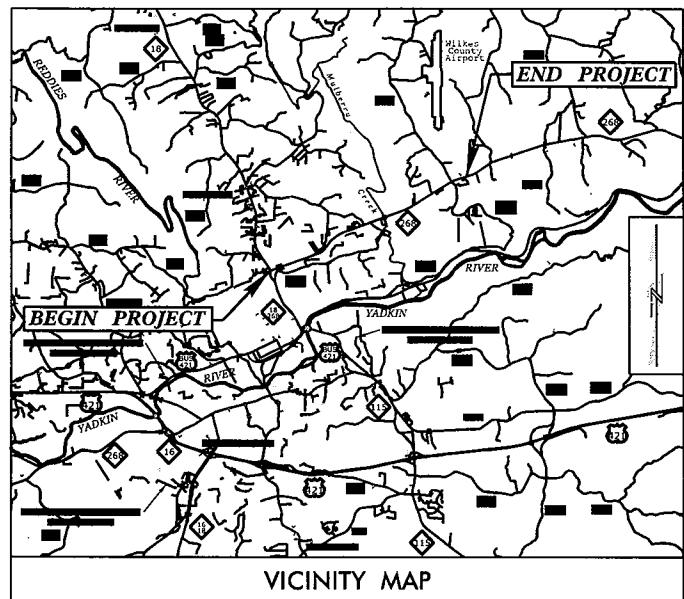
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**WILKES COUNTY**

LOCATION: NC 268 FROM MULTI-LANES EAST OF NC 18 TO SR 1966 (AIRPORT ROAD)

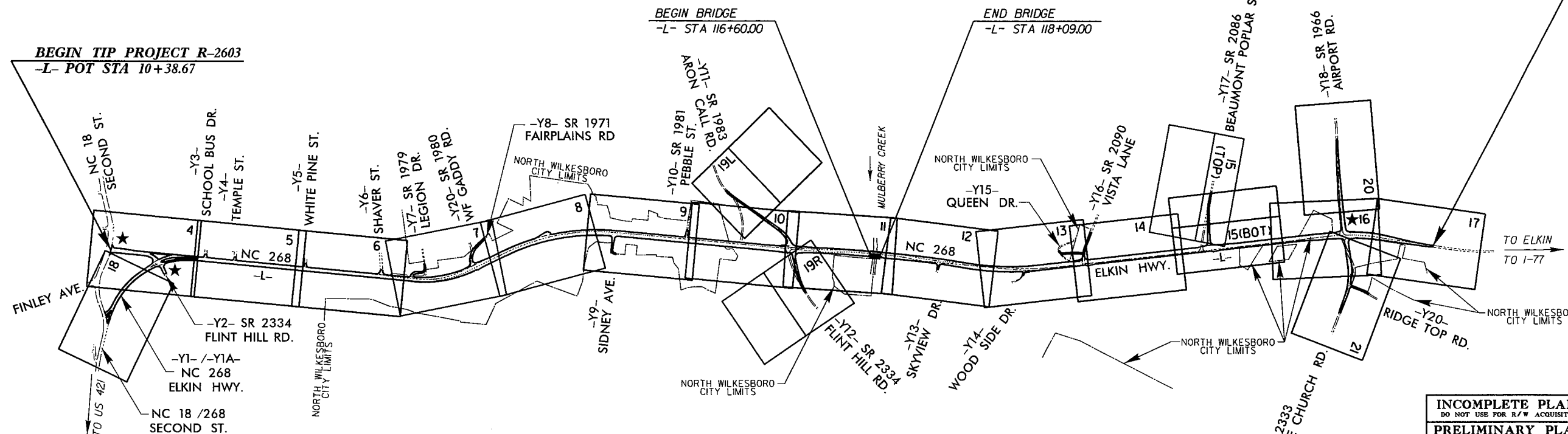
TYPE OF WORK: GRADING, DRAINAGE, PAVING, CURB & GUTTER, SIGNALS, STRUCTURES, AND SIGNING

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2603	2A	39
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
36001.1.2	STP-0268(15)	PE	



25% PLANS

TIP PROJECT: R-2603



END TIP PROJECT R-2603  
-L- POC STA 195+00.00

BEGIN TIP PROJECT R-2603  
-L- POT STA 10+38.67

BEGIN BRIDGE  
-L- STA 116+60.00

END BRIDGE  
-L- STA 118+09.00

A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF NORTH WILKESBORO. CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD \_\_\_\_\_

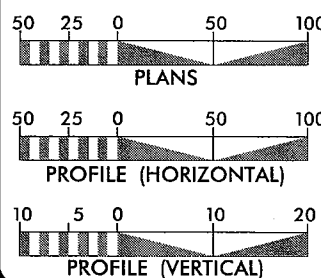
- \*\* 40 MPH FROM BEGINNING OF PROJECT TO FAIRPLAINS RD.  
50 MPH FROM FAIRPLAINS RD. TO END OF PROJECT
- \*\*\* MINOR ARTERIAL FROM BEGINNING OF PROJECT TO MULBERRY CREEK  
MAJOR COLLECTOR FROM MULBERRY CREEK TO END OF PROJECT

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

NCDOT CONTACT:  
BRENDA MOORE, PE  
PROJECT ENGINEER  
ROADWAY DESIGN UNIT

★ - NEW / UPGRADED SIGNAL

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = 20,540  
ADT 2035 = 26,400  
DHV = 10 %  
D = 65 %  
T = 6 % \*  
V = \*\*  
\* TTST = 2 DUAL 4  
FUNC CLASS = \*\*\*  
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY PROJECT R-2603 = 3.468 mi.  
LENGTH STRUCTURE PROJECT R-2603 = 0.028 mi.  
TOTAL LENGTH OF TIP PROJECT R-2603 = 3.496 mi.  
LENGTH OF PROJECT BASED ON -L-

Prepared for:  
**DIVISION OF HIGHWAYS**  
1000 Birch Ridge Dr., NC, 27610

Prepared by:  
**MA ENGINEERING CONSULTANTS, INC.**  
598 E. CHATHAM STREET, SUITE 137  
CARY, NORTH CAROLINA 27511  
(919) 297-0220

2012 STANDARD SPECIFICATIONS  
RIGHT OF WAY DATE:  
APRIL 16, 2013  
LETTING DATE:  
MAY 19, 2015

BURKE EVANS, PE  
PROJECT ENGINEER  
K. S. HUTCHENS, PE  
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

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

ROADWAY DESIGN ENGINEER

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

DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA



STATE HIGHWAY DESIGN ENGINEER

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CONTRACT:





STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PURDUE  
GOVERNOR

Eugene A. Conti, Jr.  
SECRETARY

November 27, 2012

STATE PROJECT: 36001.1.2 (R-2603)  
FEDERAL PROJECT: STP-268(15)  
COUNTY: Wilkes  
DESCRIPTION: NC 268 from East of NC 18 to SR 1966 (Airport Road)  
SUBJECT: Geotechnical Report – Inventory

**PROJECT DESCRIPTION**

This project is located in east-central Wiles County to the east of North Wilkesboro. The proposed project is upgrade of existing 4 lane within the town limits and upgrade of existing 2 lane continuing to SR 1966 (Airport Road). The highway traverses rolling terrain and crosses the wide floodplain of Mulberry Creek. The following alignment was investigated:

-L- Station 10+38.67 to 195+00 (3.47 miles)

The total length of lines investigated is 3.47 miles. The field investigation was conducted in October and November 2012. All borings were conducted with a Dietrich-D50-T drill machine with an automatic hammer. Standard Penetration Tests were performed utilizing Hollow Stem Augers with carbide insert teeth in the head stem.

**AREAS OF SPECIAL GEOTECHNICAL INTEREST**

Alluvial Soils: Mulberry Creek cuts perpendicular to the alignment at Sta. 117+20. This and a small related tributary have generated floodplain alluvial deposits up to 15' in depth with weak soils showing SPT blow counts of zero to low double digits. Groundwater is within 4' of the surface. No long term problems or settlement are occurring in the existing 8' deep embankment. These soils were encountered at the following location: Sta. 115+00 to 124+00.

**SOIL PROPERTIES**

*Residual Soils*

All residual soils on the project are derived from metamorphosed granite gneiss and schist (CZma<sub>1</sub>) rocks encountered within the project corridor. They consist of micaceous sandy silt saprolite with a <6' top layer of residual sandy and clayey silt.

No weathered or crystalline rock was encountered within 10' of grade.

Respectfully submitted,

Jody C. Kuhne  
Project Geological Engineer


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

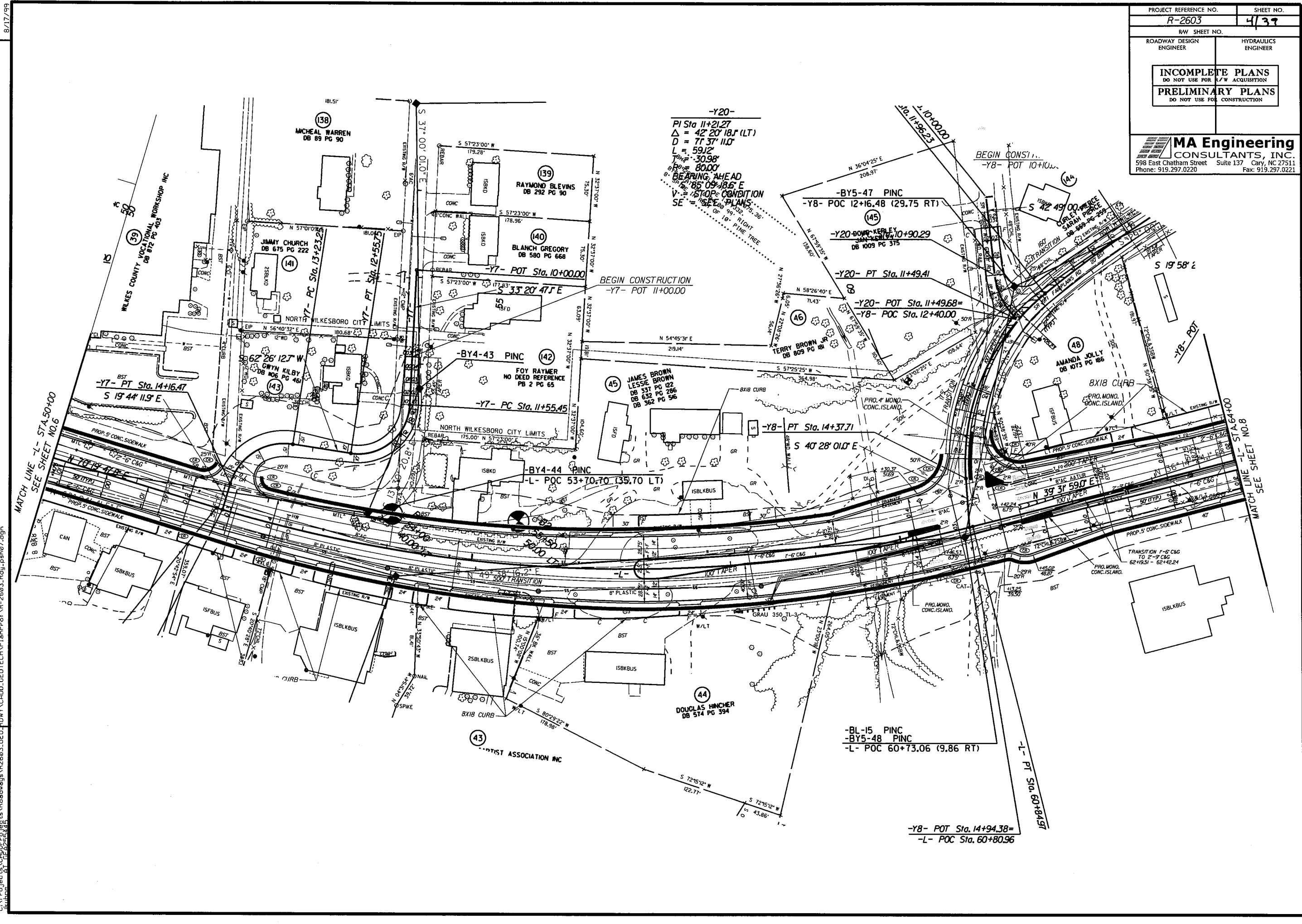
TELEPHONE: 919-707-6850  
FAX: 919-250-4237  
WEBSITE:  
[www.ncdot.gov/doh/preconstruct/highway/geotech](http://www.ncdot.gov/doh/preconstruct/highway/geotech)

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

***EARTHWORK BALANCE SHEET***

***EARTHWORK BALANCE SHEET***

PROJECT REFERENCE NO.	SHEET NO.
R-2603	4/37
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
 <b>MA Engineering</b> CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	



-Y20-  
 PI Sta 11+21.27  
 $\Delta = 42^{\circ} 20' 18.1''$  (LT)  
 $D = 71' 37.110''$   
 $L = 59.12'$   
 $TAN \theta = 30.98'$   
 $80.00'$   
 BEARING AHEAD  
 $85^{\circ} 09' 18.6''$  E  
 STOP CONDITION  
 SEE PLAN  
 SE 1/4 OF 10' PINE TREE

BEGIN CONSTRUCTION  
 -Y7- POT 11+00.00

-BY5-47 PINC  
 -Y8- POC 12+16.48 (29.75 RT)

-Y20- POT 10+90.29  
 DB 1009 PG 375

-Y20- PT Sta. 11+49.41

-Y20- POT Sta. 11+49.68=  
 -Y8- POC Sta. 12+40.00

TERRY BROWN JR  
 DB 809 PG 181

-Y8- PT Sta. 14+37.71  
 $S 40^{\circ} 28' 01.0''$  E

-BY4-44 PINC  
 -L- POC 53+70.70 (35.70 LT)

44  
 DOUGLAS HATCHER  
 DB 574 PG 394

-BL-15 PINC  
 -BY5-48 PINC  
 -L- POC 60+73.06 (9.86 RT)

-Y8- POT Sta. 14+94.38=  
 -L- POC Sta. 60+80.96

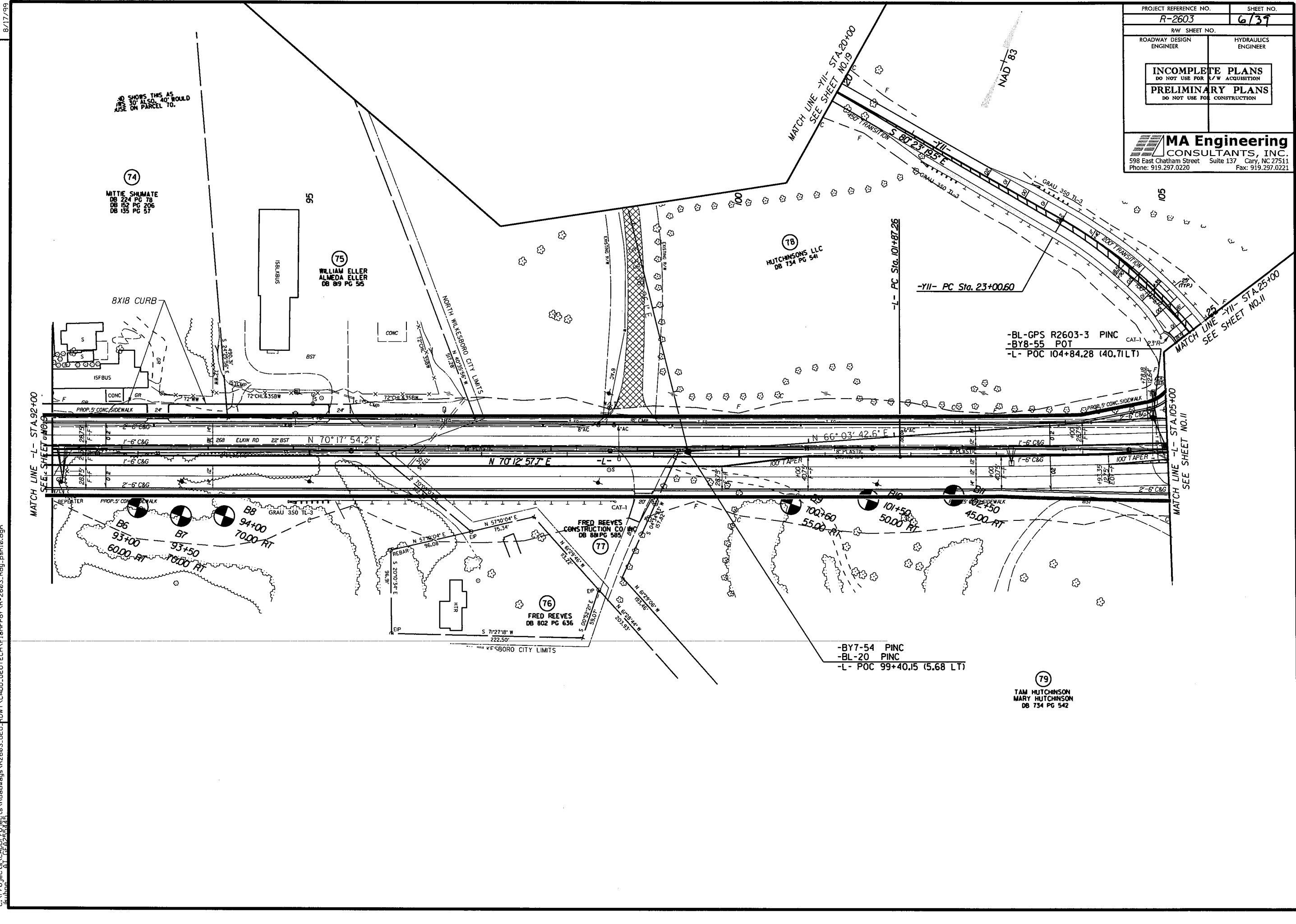
MATCH LINE -L- STA. 50+00  
 SEE SHEET NO. 6

MATCH LINE -L- STA. 64+00  
 SEE SHEET NO. 8

8/17/99  
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 REVISIONS

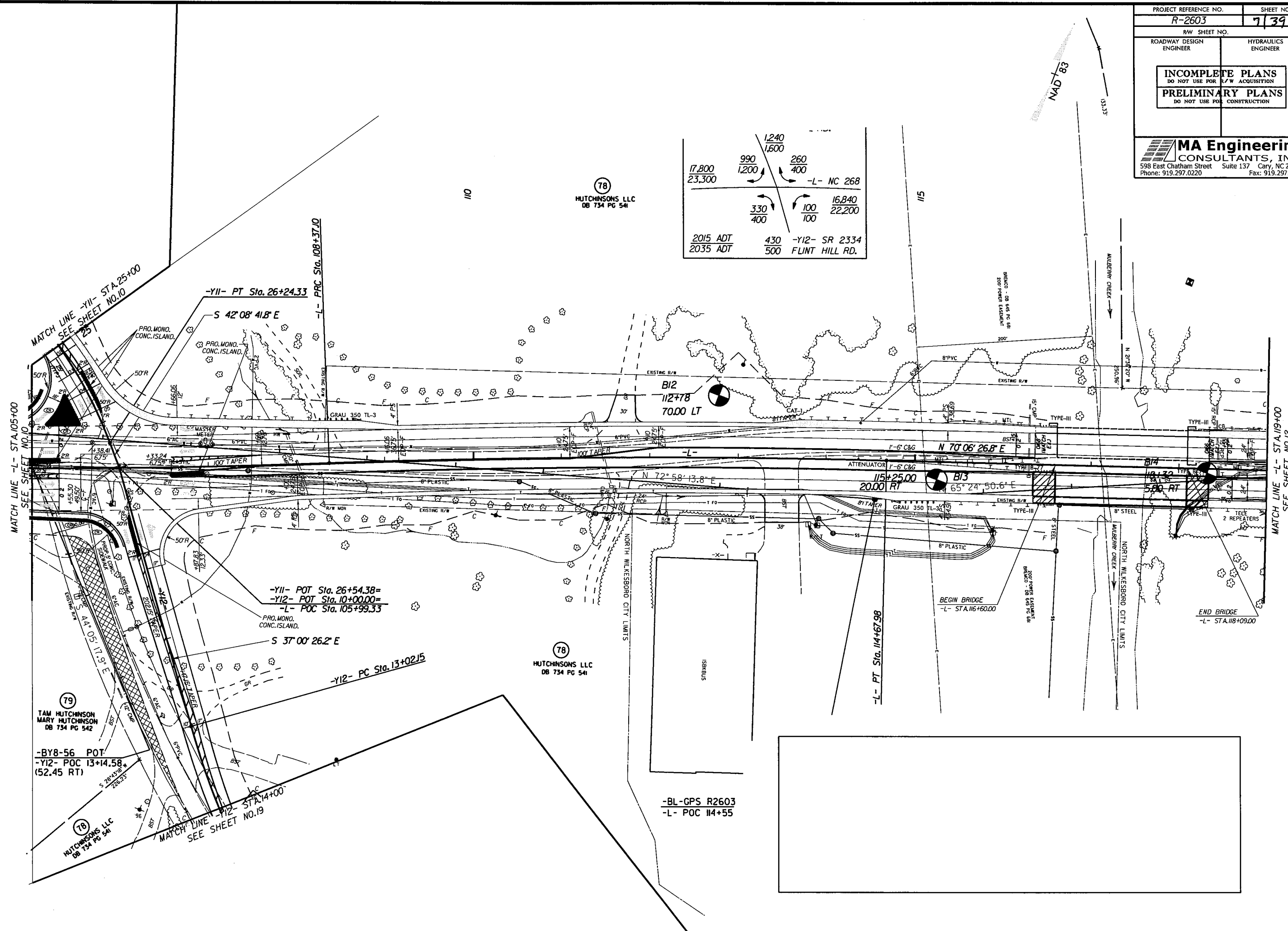


PROJECT REFERENCE NO.	SHEET NO.
R-2603	6139
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
<b>MA Engineering</b> CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	



REVISIONS

17,800 23,300	990 1,200	1,240 1,600	260 400	-L- NC 268
2015 ADT	430	-Y12- SR 2334	16,840 22,200	
2035 ADT	500	FLINT HILL RD.		



(78)  
HUTCHINSONS LLC  
DB 734 PG 541

(78)  
HUTCHINSONS LLC  
DB 734 PG 541

(79)  
TAM HUTCHINSON  
MARY HUTCHINSON  
DB 734 PG 542

(78)  
HUTCHINSONS LLC  
DB 734 PG 541

REVISIONS

28-NOV-2012 11:31  
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 Author: R. J. ...

MATCH LINE -L- STA. 105+00  
SEE SHEET NO. 10

MATCH LINE -Y11- STA. 25+00  
SEE SHEET NO. 10

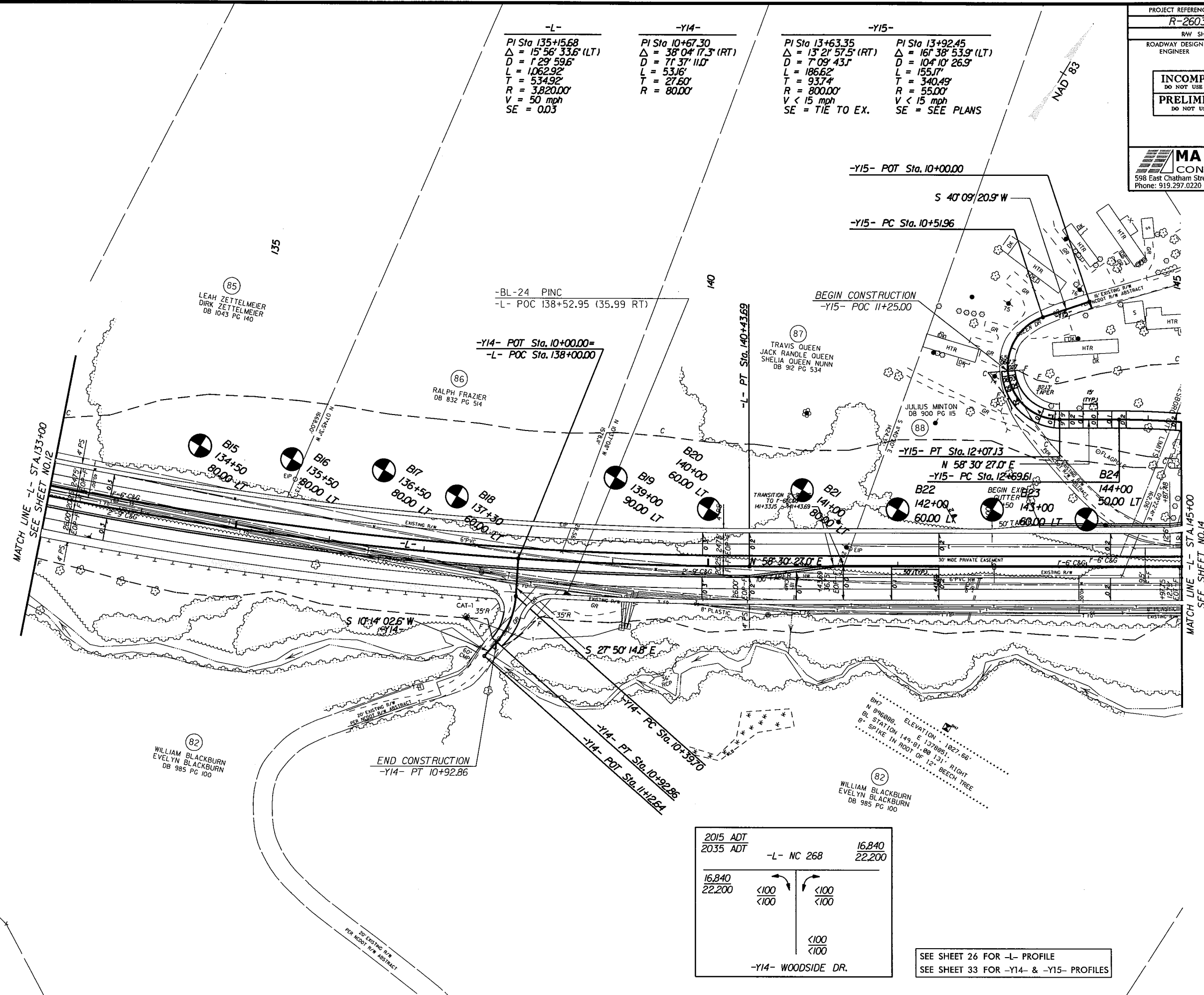
MATCH LINE -Y12- STA. 14+00  
SEE SHEET NO. 19

MATCH LINE -L- STA. 119+00  
SEE SHEET NO. 12

8/17/99

PROJECT REFERENCE NO. <b>R-2603</b>	SHEET NO. <b>8/39</b>
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
<b>MA Engineering CONSULTANTS, INC.</b> 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

<p><b>-L-</b></p> <p>PI Sta 135+15.68  <math>\Delta = 15^\circ 56' 33.6"</math> (LT)  <math>D = 1' 29' 59.6"</math>  <math>L = 1062.92'</math>  <math>T = 534.92'</math>  <math>R = 3,820.00'</math>  <math>V &lt; 15</math> mph  <math>SE = 0.03</math></p>	<p><b>-Y14-</b></p> <p>PI Sta 10+67.30  <math>\Delta = 38^\circ 04' 17.3"</math> (RT)  <math>D = 71' 37' 11.0"</math>  <math>L = 53.16'</math>  <math>T = 27.60'</math>  <math>R = 80.00'</math></p>	<p><b>-Y15-</b></p> <p>PI Sta 13+63.35      PI Sta 13+92.45  <math>\Delta = 13^\circ 21' 57.5"</math> (RT)    <math>\Delta = 161^\circ 38' 53.9"</math> (LT)  <math>D = 7' 09' 43.1"</math>            <math>D = 104' 10' 26.9"</math>  <math>L = 186.62'</math>                <math>L = 155.17'</math>  <math>T = 93.74'</math>                 <math>T = 340.49'</math>  <math>R = 800.00'</math>                <math>R = 55.00'</math>  <math>V &lt; 15</math> mph                <math>V &lt; 15</math> mph  <math>SE = TIE TO EX.</math>         <math>SE = SEE PLANS</math></p>
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REVISIONS

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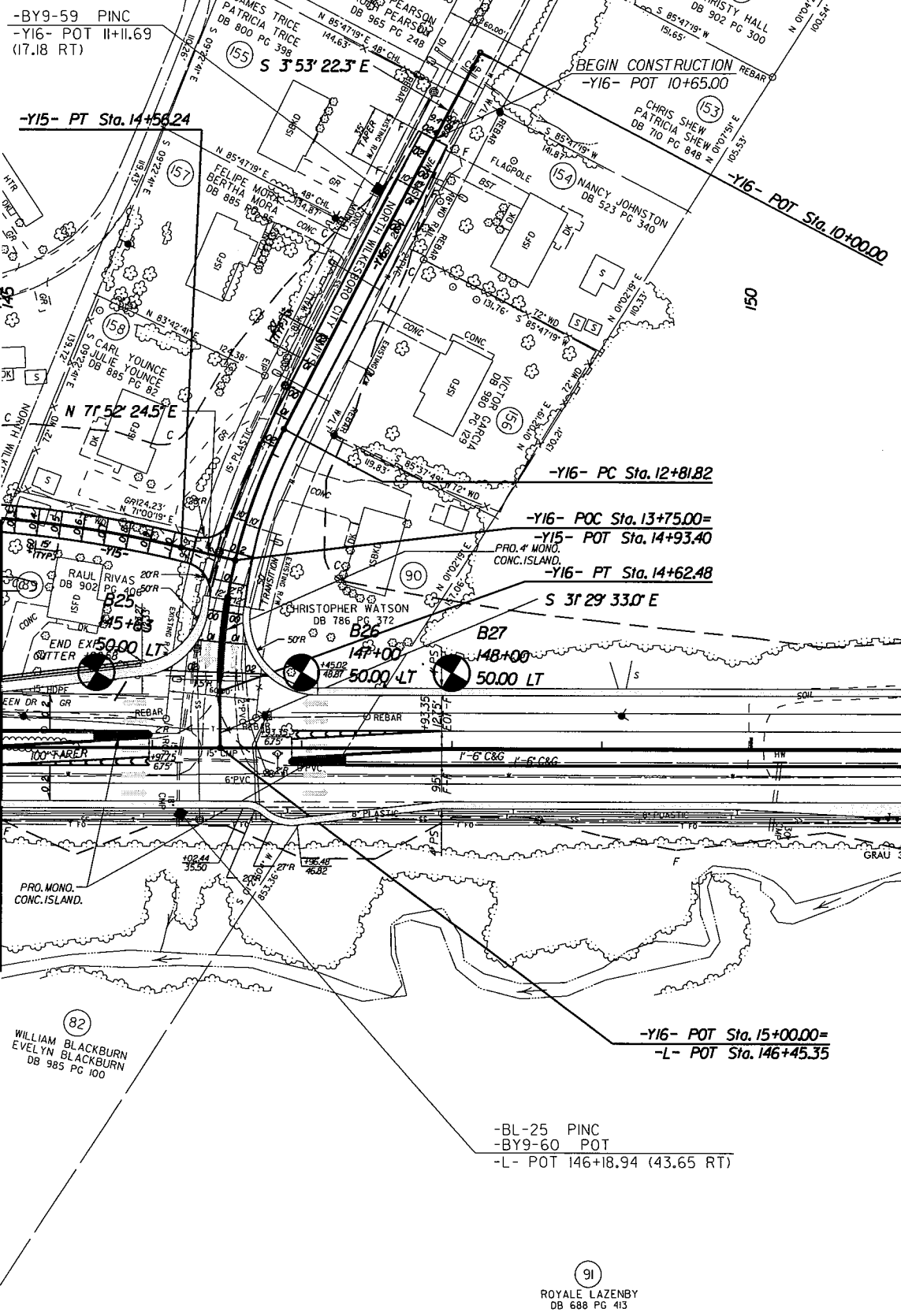
2015 ADT	16,840
2035 ADT	22,200
-L- NC 268	
16,840	22,200
<100	<100
<100	<100
-Y14- WOODSIDE DR.	

SEE SHEET 26 FOR -L- PROFILE  
 SEE SHEET 33 FOR -Y14- & -Y15- PROFILES



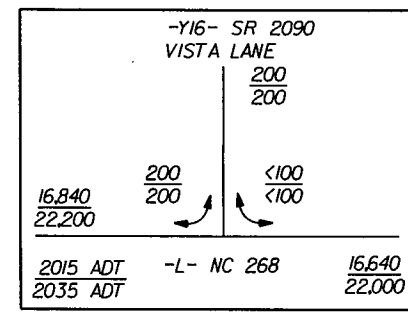
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REVISIONS



**-Y15-**  
PI Sta 13+63.35  
 $\Delta = 13^{\circ} 21' 57.5" (RT)$   
 $D = 7^{\circ} 09' 43.1"$   
 $L = 186.62'$   
 $T = 93.74'$   
 $R = 800.00'$   
 $V < 15$  mph  
SE = SEE PLANS

**-Y16-**  
PI Sta 13+73.94  
 $\Delta = 27^{\circ} 36' 10.7" (LT)$   
 $D = 15^{\circ} 16' 43.9"$   
 $L = 180.66'$   
 $T = 92.12'$   
 $R = 375.00'$   
 $V = STOP CONDITION$   
SE = 0.02



SEE SHEET 27 FOR -L- PROFILE  
SEE SHEET 33 FOR -Y15- PROFILE  
SEE SHEET 34 FOR -Y16- PROFILE

PROJECT REFERENCE NO. <b>R-2603</b>	SHEET NO. <b>9/39</b>
R/W SHEET NO. ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR R/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
<b>MA Engineering</b> CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

155  
NAD 83

92  
F C JOHNSON HEIRS  
NO DEED  
INSUFFICIENT DESCRIPTION  
MAPPED BY GIS

B28  
152+50  
60.00 LT  
B29  
153+50  
60.00 LT  
B30  
154+68  
60.00 LT  
B31  
158+50  
60.00 LT

-Y16- POT Sta. 15+00.00=  
-L- POT Sta. 146+45.35

-BL-25 PINC  
-BY9-60 POT  
-L- POT 146+18.94 (43.65 RT)

-BL-26 PINC  
-L- POT 153+97.02 (46.22 RT)

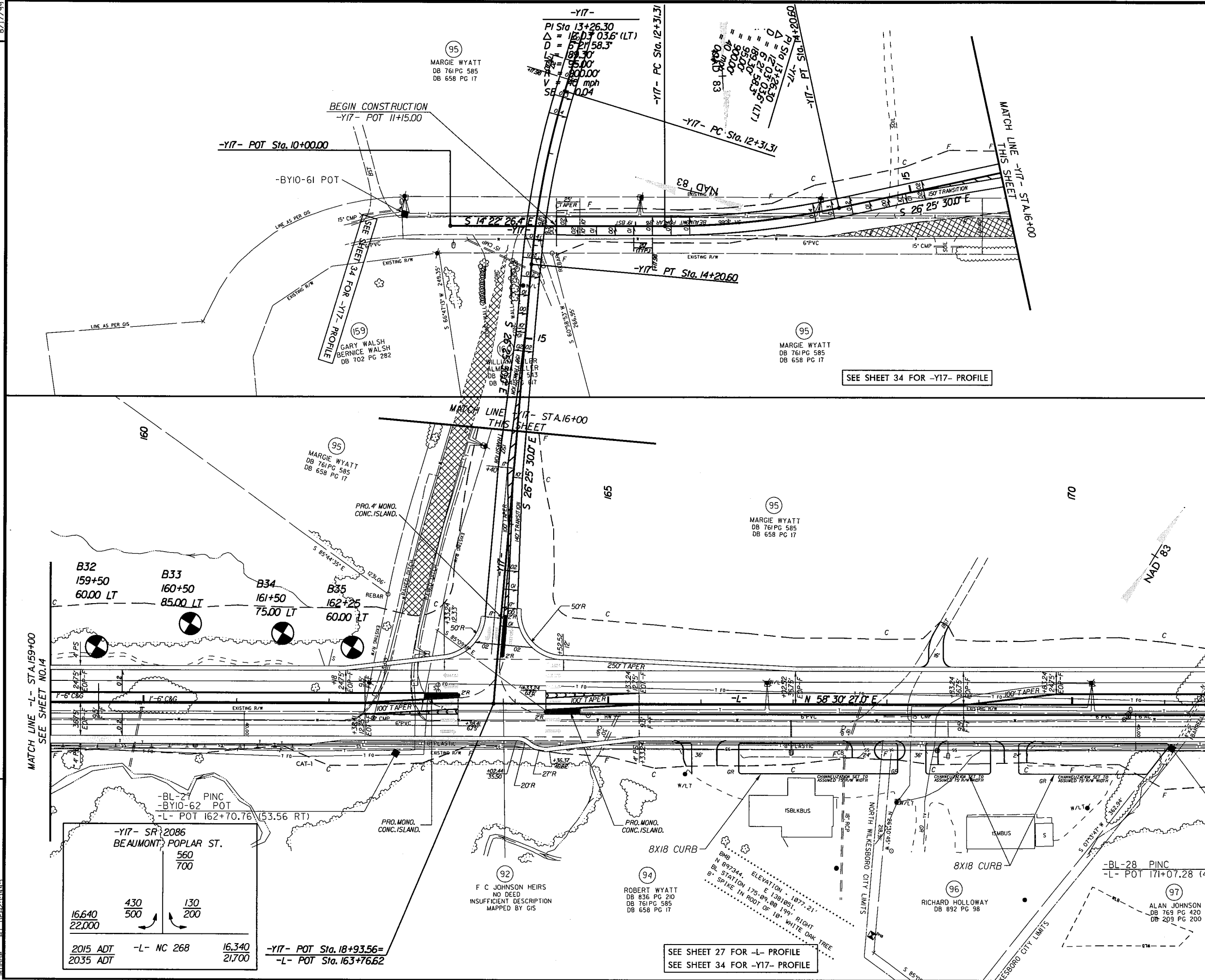
91  
ROYALE LAZENBY  
DB 688 PG 413

93  
ALICE PREVETTE  
DB 1097 PG 163

MATCH LINE -L- STA 145+00  
SEE SHEET NO. 13

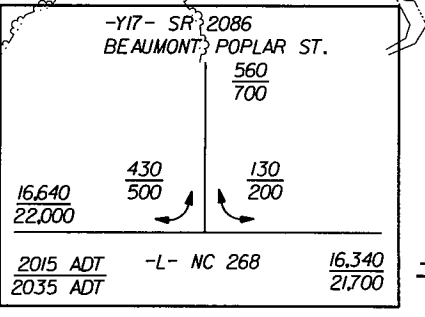
MATCH LINE -L- STA 159+00  
SEE SHEET NO. 15

8/17/99  
 REVISIONS  
 28-NOV-2012 IL34  
 C:\Projects\Roadways\Roadways\VR2603.GED\RDWY\CADD\GEOTECH\Plan\VR-2603\_Rdy\_psh15.dgn  
 11/15/07 11/15/07



PROJECT REFERENCE NO. R-2603	SHEET NO. 10/39
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> DO NOT USE FOR P/W ACQUISITION <b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	
<b>MA Engineering</b> CONSULTANTS, INC. 598 East Chatham Street Suite 137 Cary, NC 27511 Phone: 919.297.0220 Fax: 919.297.0221	

SEE SHEET 27 FOR -L- PROFILE  
 SEE SHEET 34 FOR -Y17- PROFILE



8/17/99

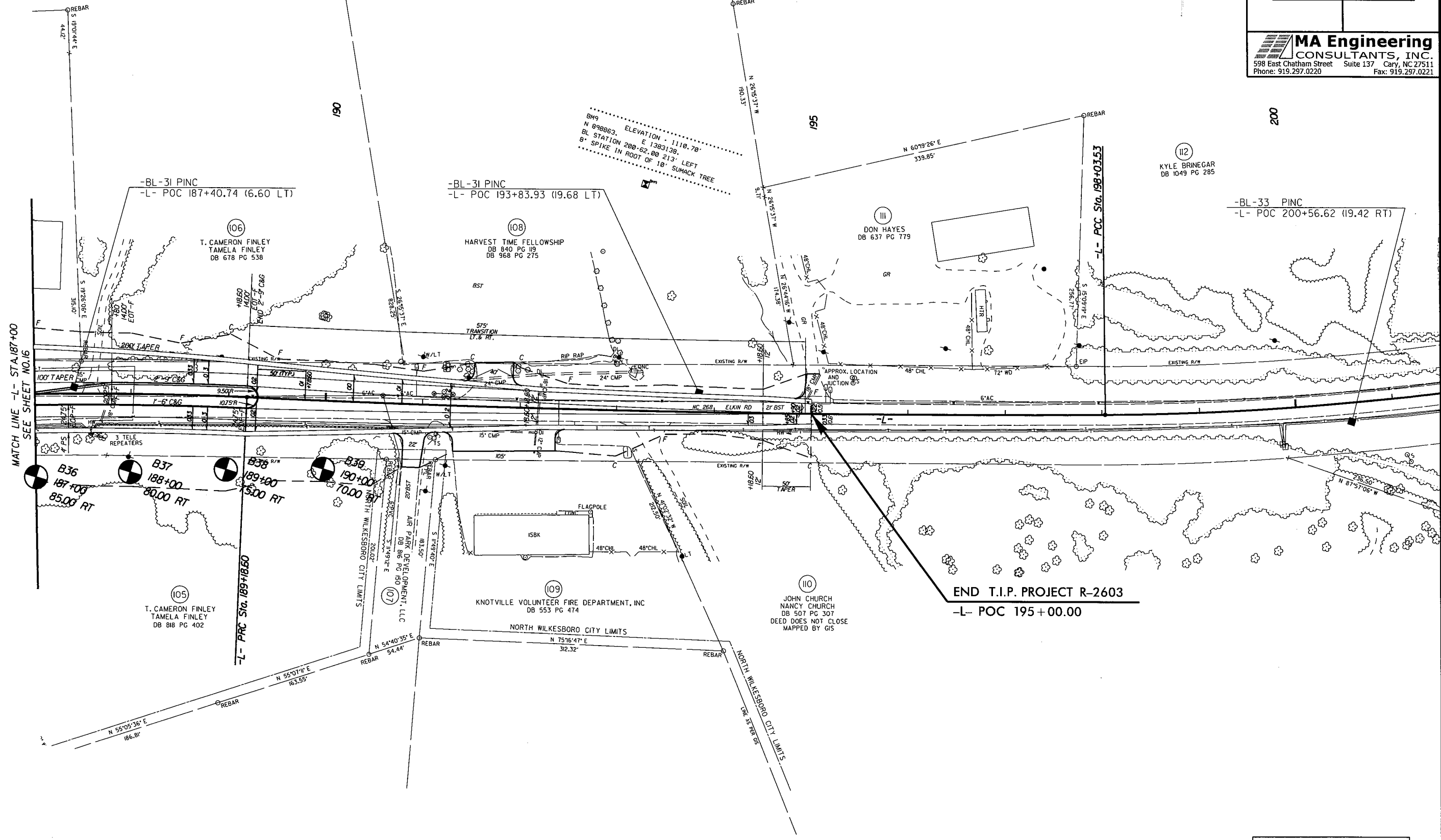
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REVISIONS

-L-		
PI Sta 184+05.55 $\Delta = 16^{\circ}55'17.5" (RT)$ $D = 138^{\circ}13.3'$ $L = 1,033.68'$ $T = 520.63'$ $R = 3,500.00'$ $V = 50 \text{ mph}$ $SE = 0.04$	PI Sta 193+61.16 $\Delta = 2^{\circ}52'21.6" (LT)$ $D = 0^{\circ}19'28.6'$ $L = 884.92'$ $T = 442.55'$ $R = 17,650.00'$	PI Sta 200+48.93 $\Delta = 9^{\circ}17'56.0" (LT)$ $D = 153^{\circ}55.5'$ $L = 489.74'$ $T = 245.41'$ $R = 3,017.55'$

NAD 83

PROJECT REFERENCE NO. <b>R-2603</b>	SHEET NO. <b>11/39</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>INCOMPLETE PLANS</b> <small>DO NOT USE FOR R/W ACQUISITION</small>	
<b>PRELIMINARY PLANS</b> <small>DO NOT USE FOR CONSTRUCTION</small>	
<b>MA Engineering</b> CONSULTANTS, INC. <small>598 East Chatham Street Suite 137 Cary, NC 27511        Phone: 919.297.0220 Fax: 919.297.0221</small>	

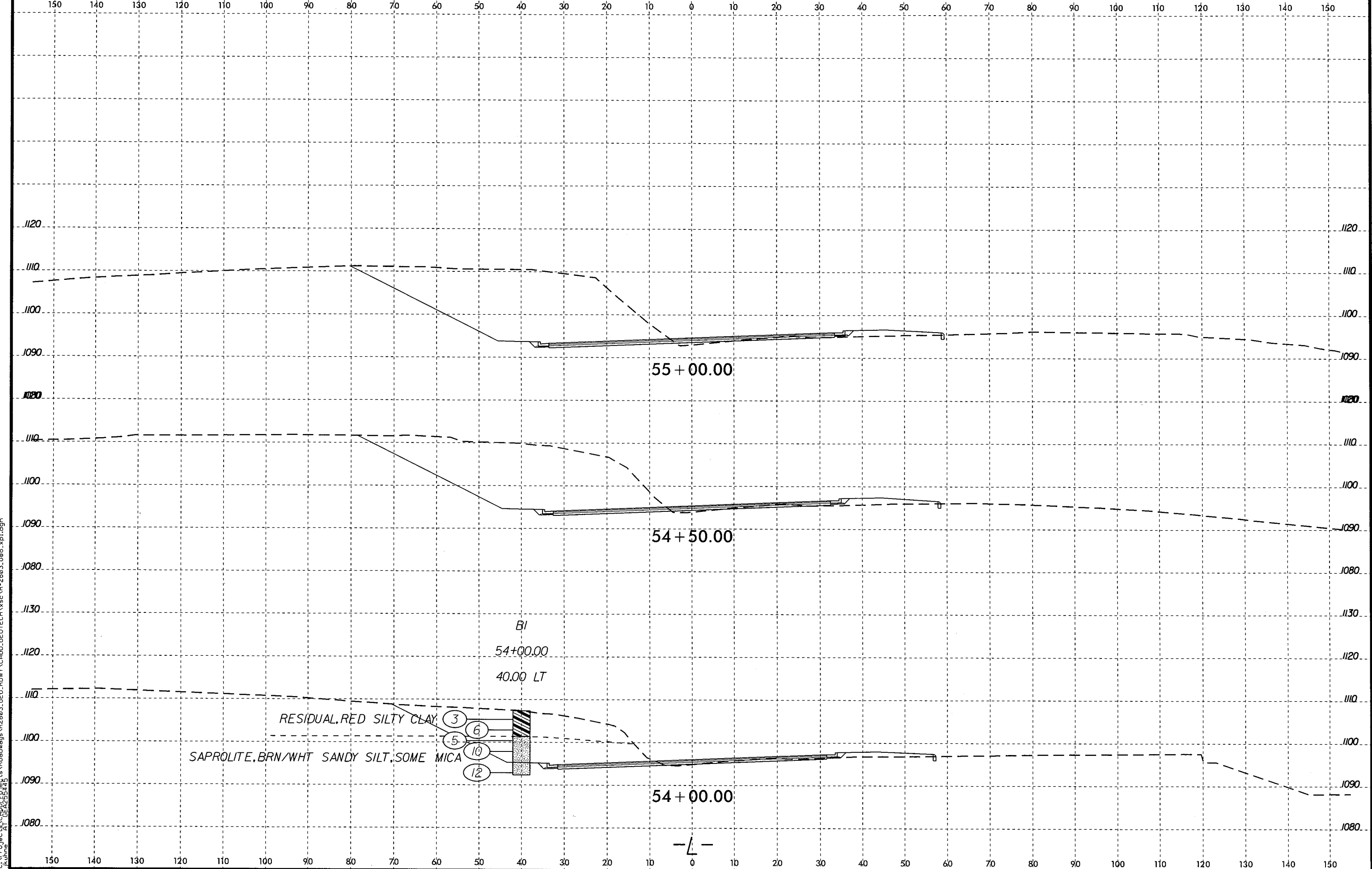


MATCH LINE -L- STA. 187+00  
SEE SHEET NO. 16

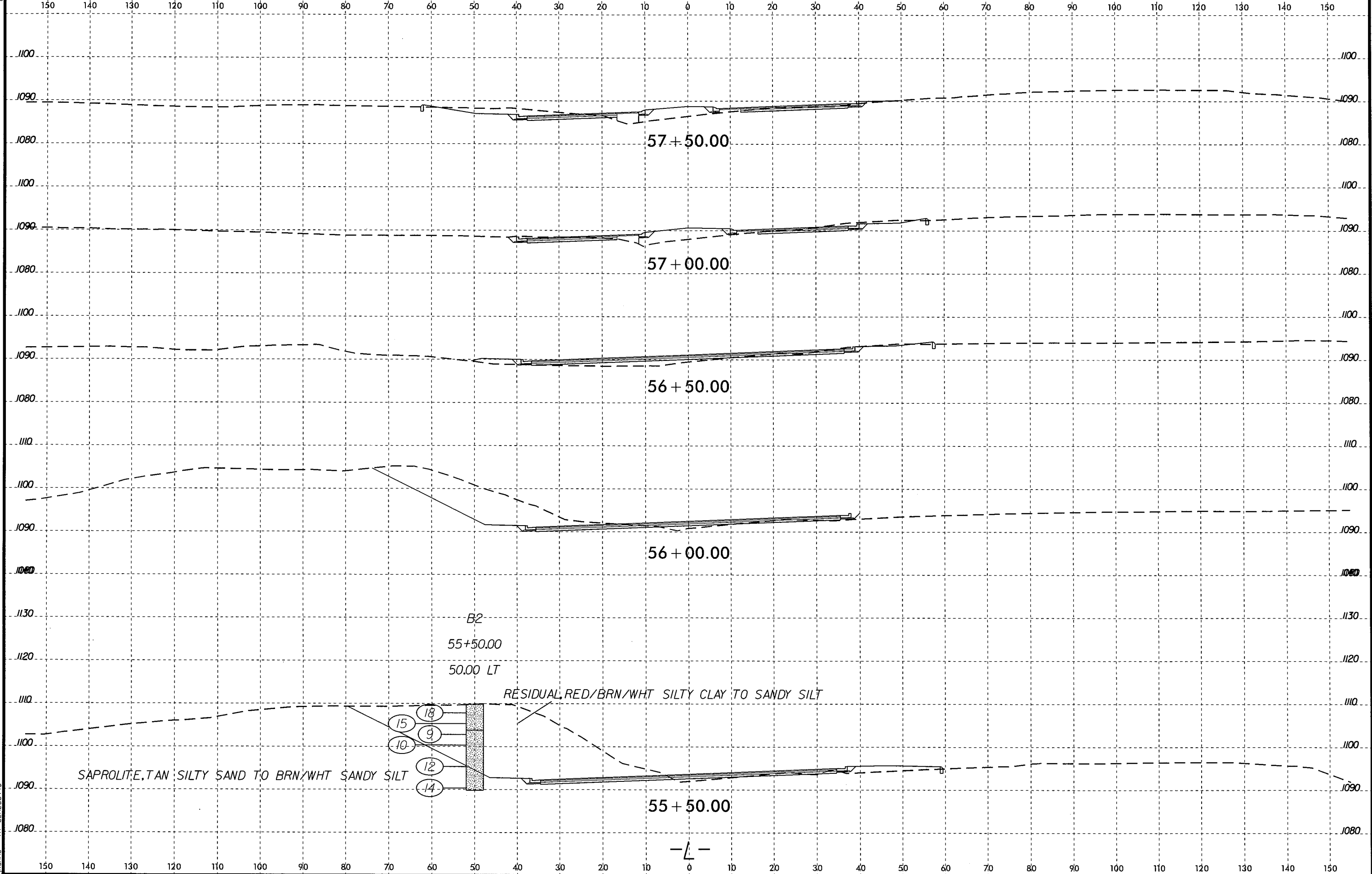
-L- POC Sta. 198+03.53

END T.I.P. PROJECT R-2603  
-L- POC 195+00.00

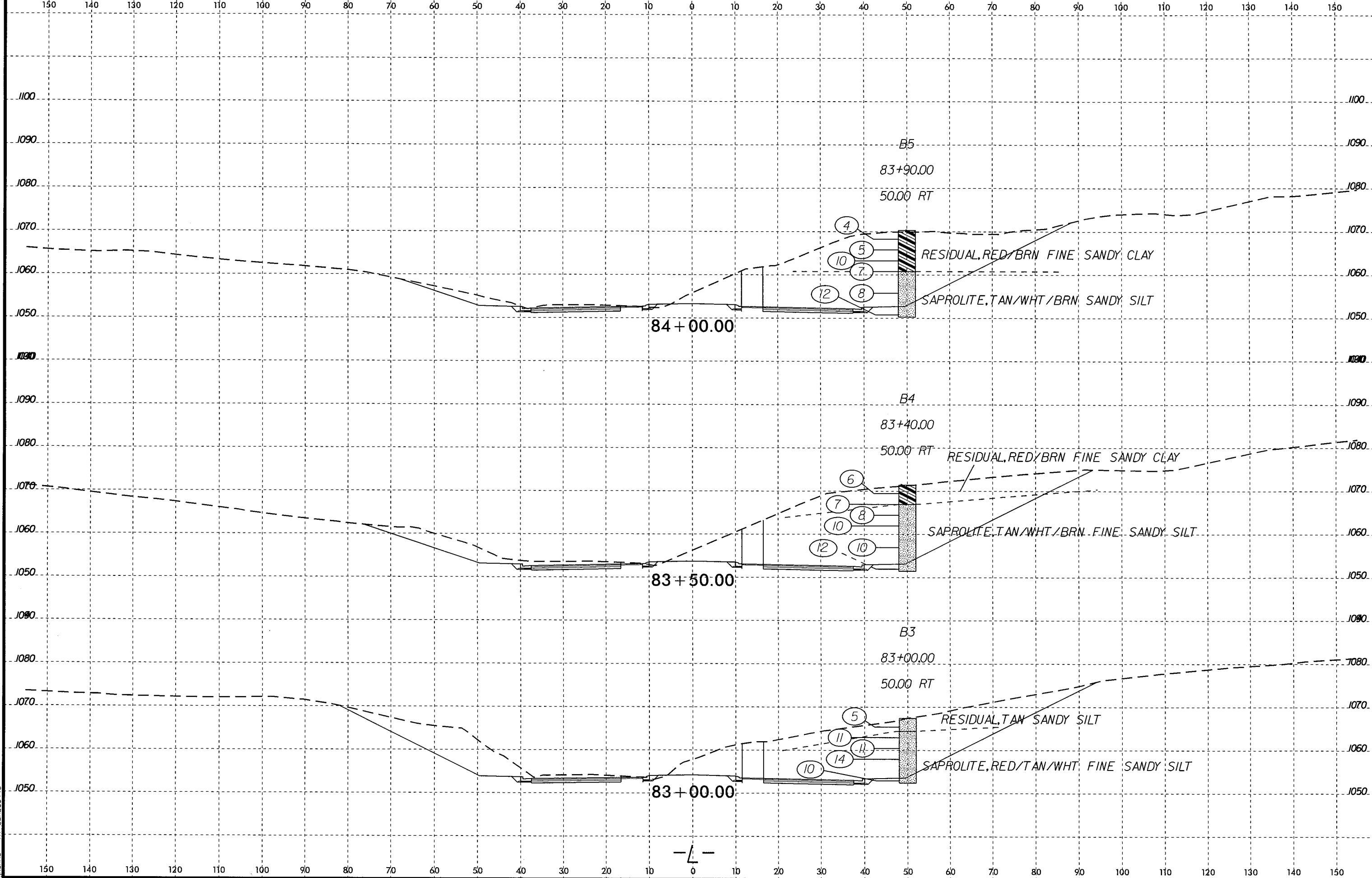
SEE SHEET 28 FOR -L- PROFILE



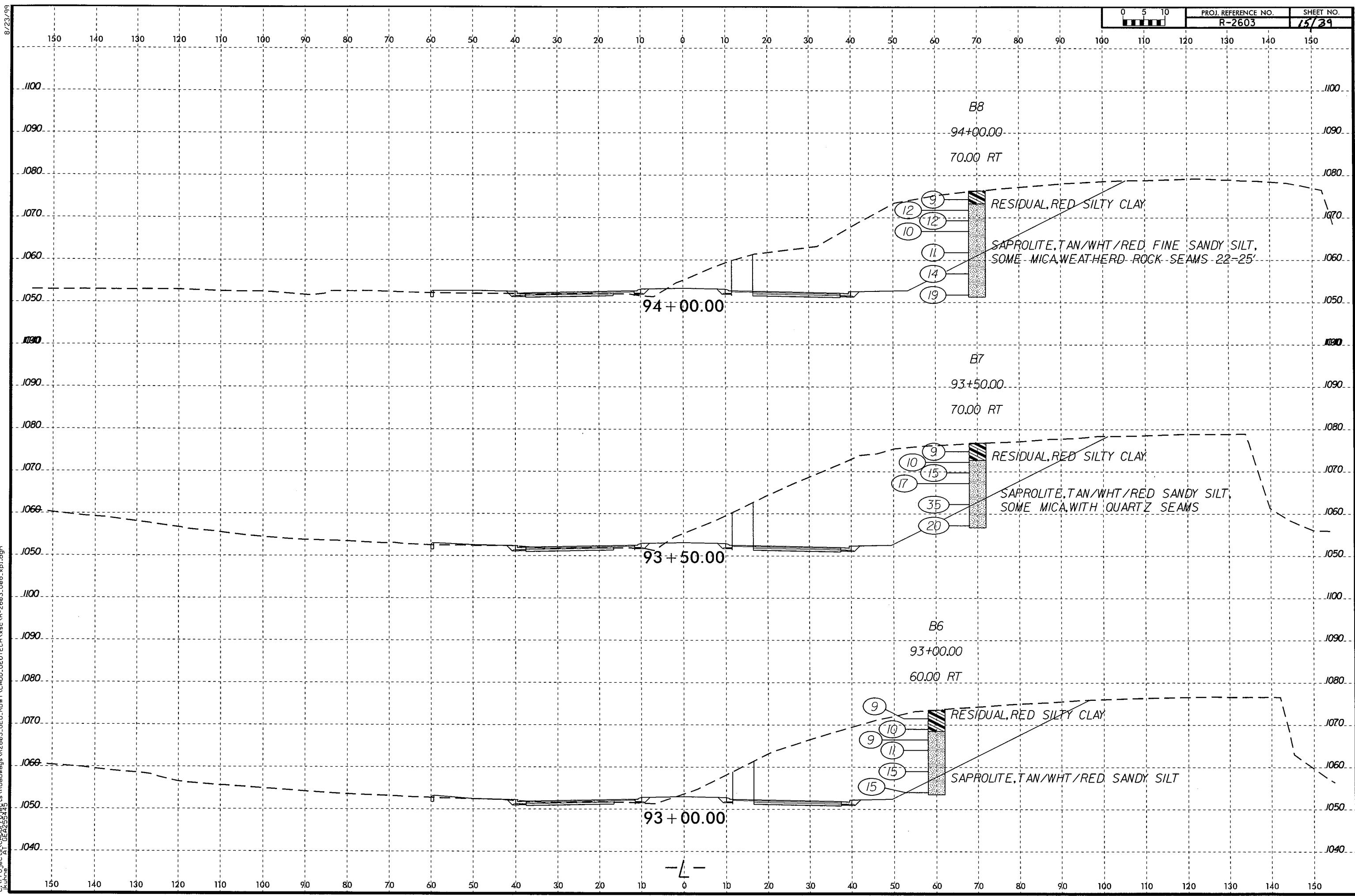
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Kuhnle AT GEAR25545



8/23/99



27-NOV-2012 15:31  
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 Kuhn



B8  
94+00.00  
70.00 RT

- (9)
- (12)
- (10)
- (11)
- (14)
- (19)

RESIDUAL, RED SILTY CLAY

SAPROLITE, TAN/WHT/RED FINE SANDY SILT,  
SOME MICA, WEATHERD ROCK SEAMS 22-25'

B7  
93+50.00  
70.00 RT

- (9)
- (10)
- (17)
- (15)
- (35)
- (20)

RESIDUAL, RED SILTY CLAY

SAPROLITE, TAN/WHT/RED SANDY SILT,  
SOME MICA, WITH QUARTZ SEAMS

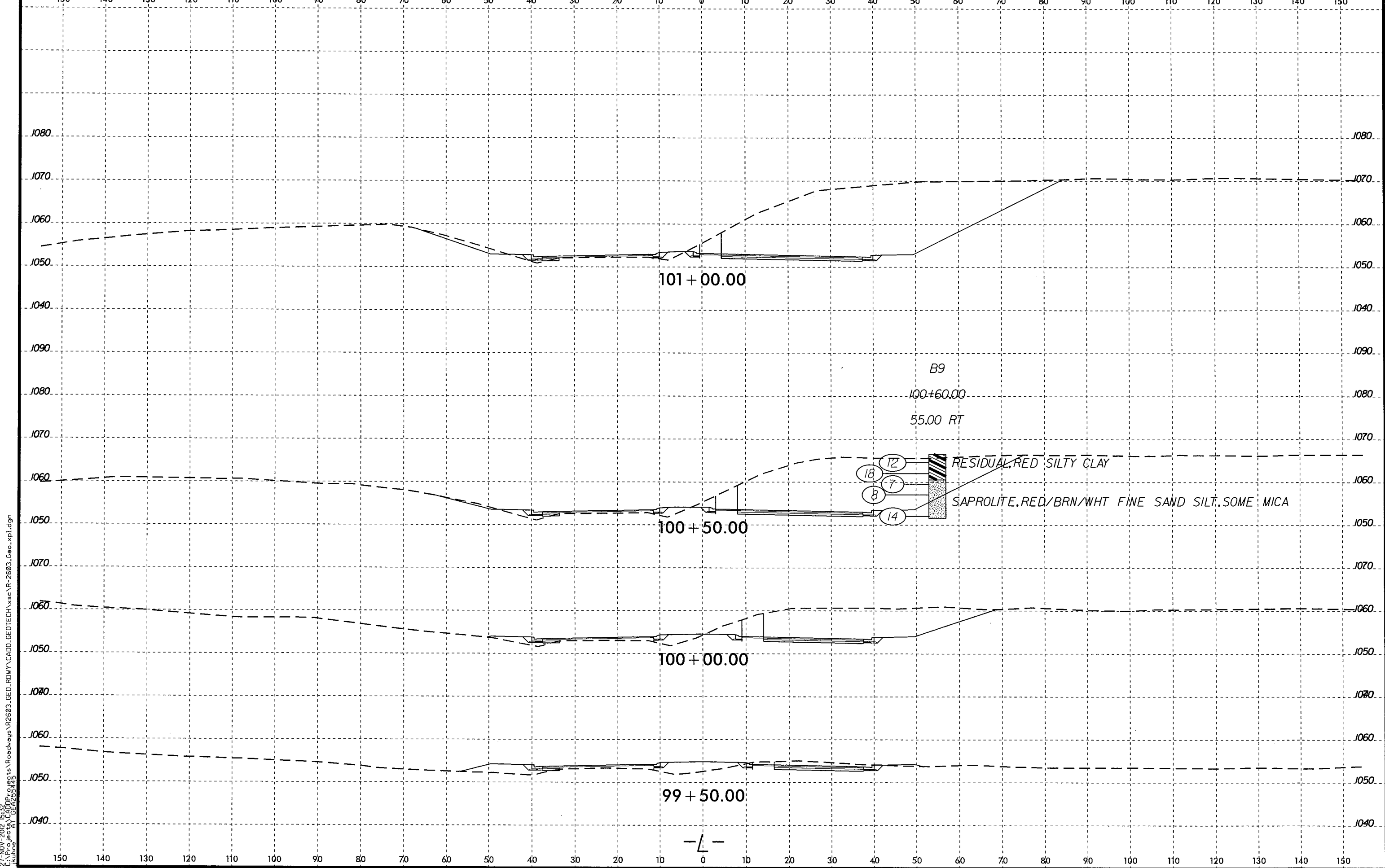
B6  
93+00.00  
60.00 RT

- (9)
- (10)
- (9)
- (11)
- (15)
- (15)

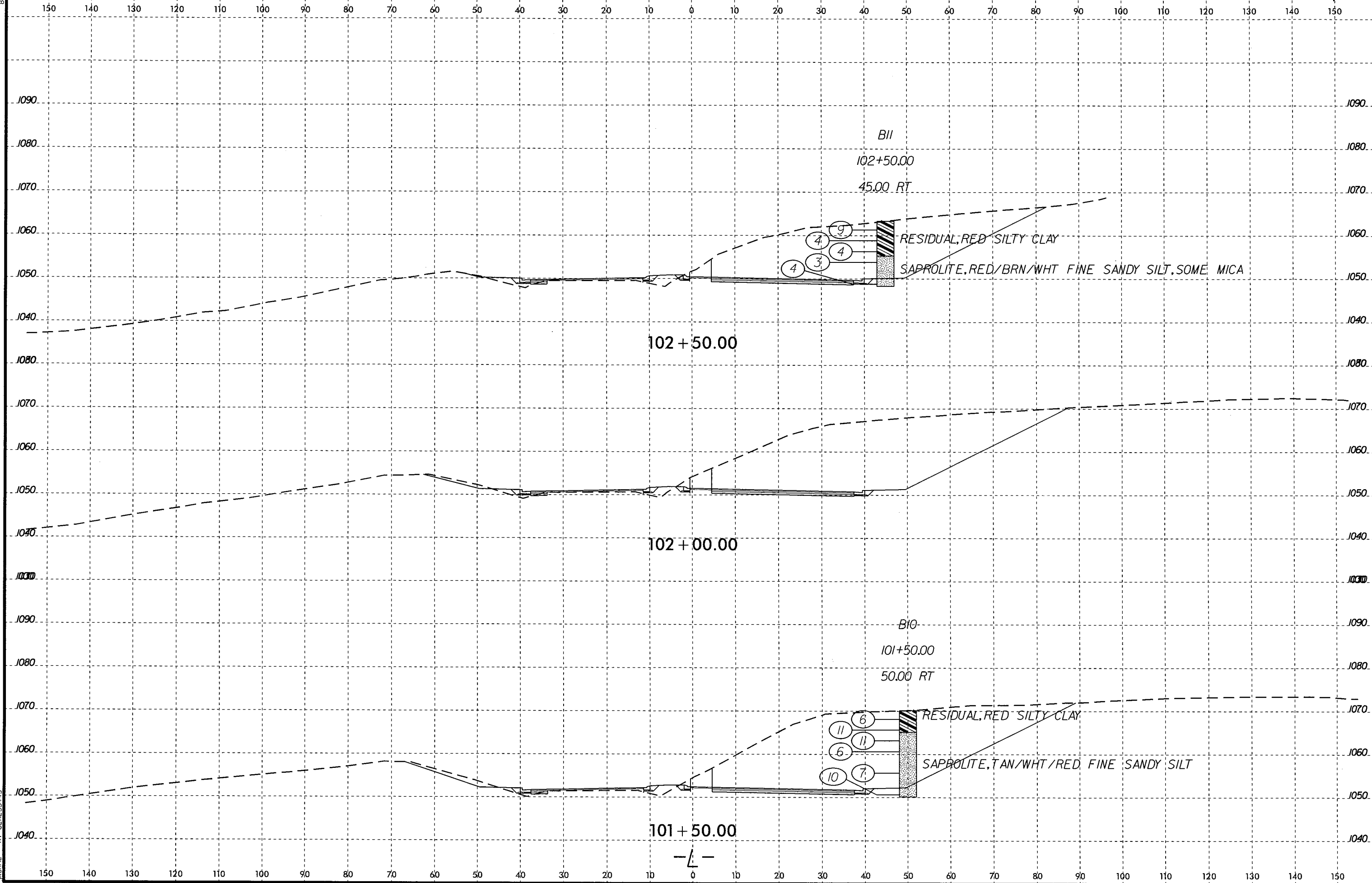
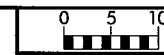
RESIDUAL, RED SILTY CLAY

SAPROLITE, TAN/WHT/RED SANDY SILT

8/23/99

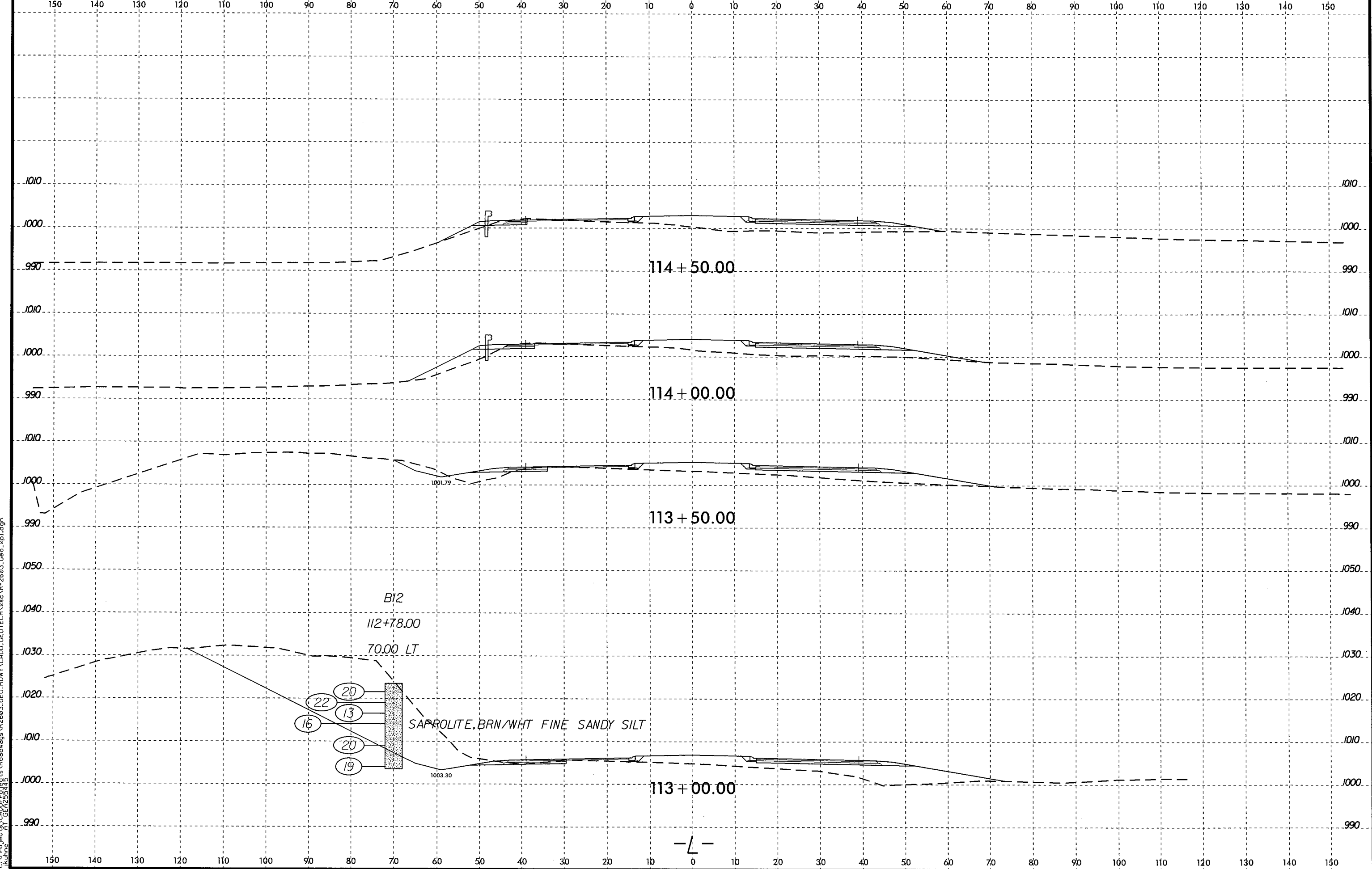






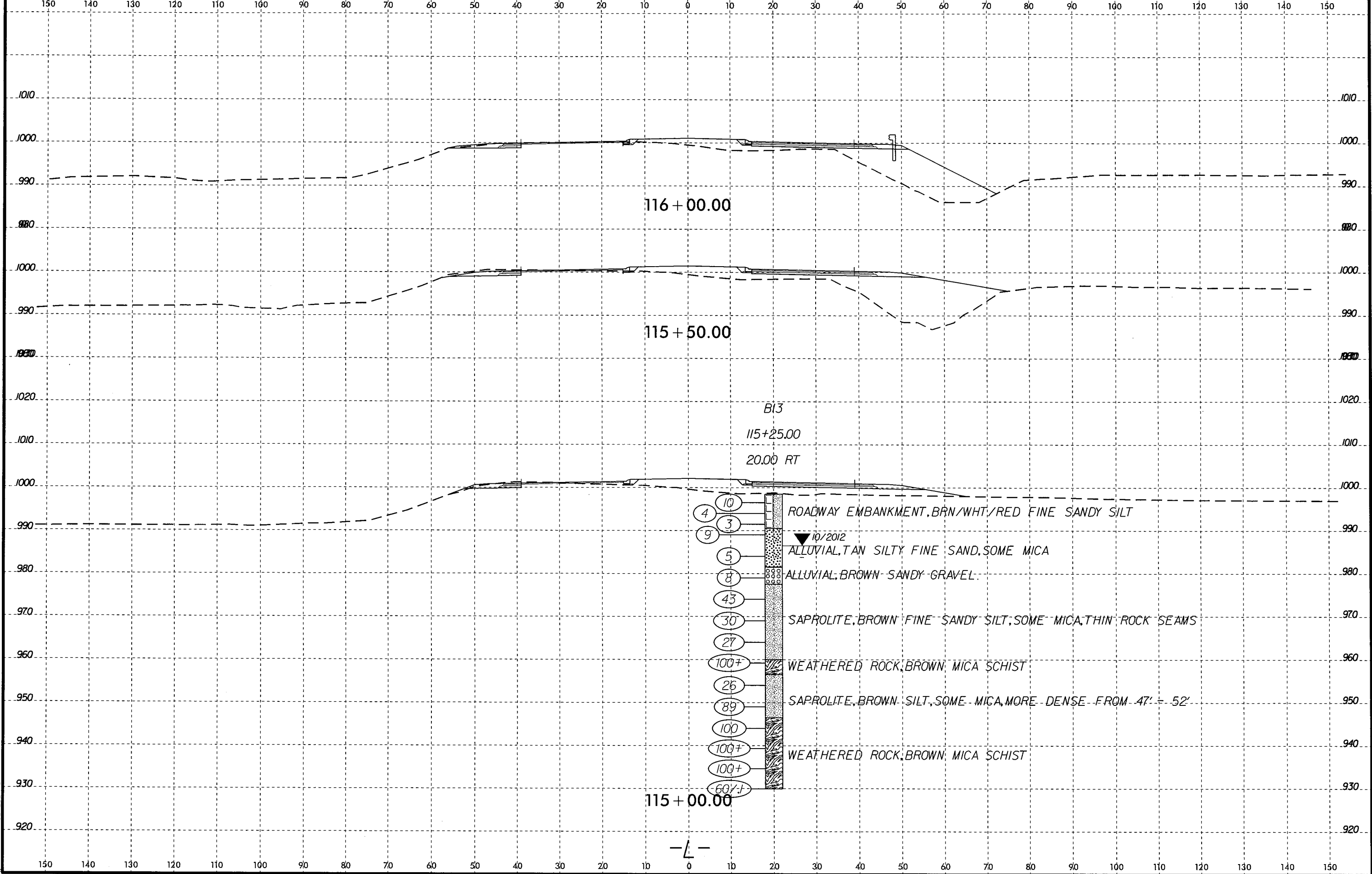
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 ikuhne AT GEI255425

8/23/99



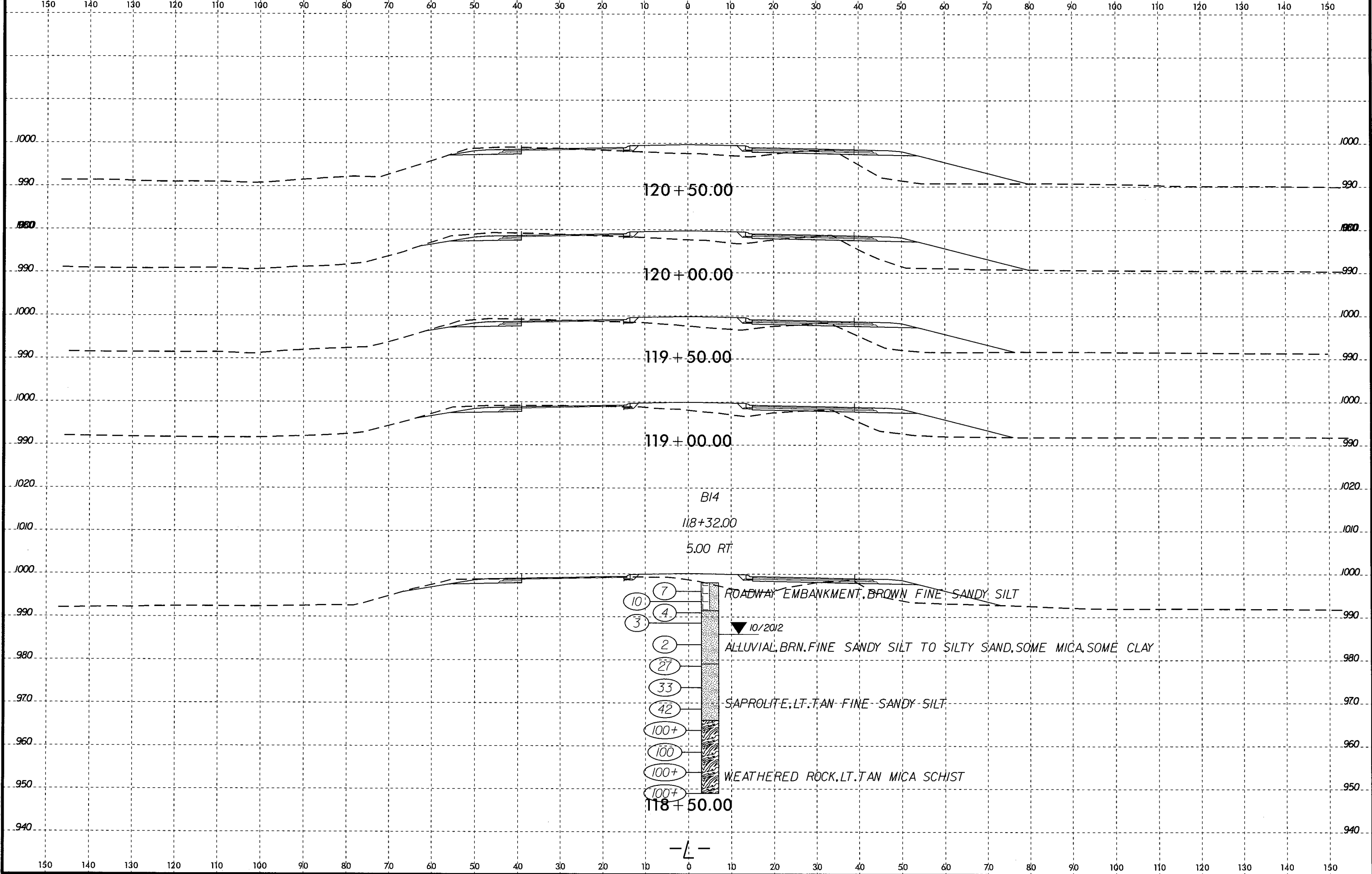
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 ikuhne AT GE25545

8/23/99



27-NOV-2012 15:35  
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 kuhn AT GE25545

8/23/99



120 + 50.00

120 + 00.00

119 + 50.00

119 + 00.00

B14  
118+32.00  
5.00 RT

- (7)
- (4)
- (3)
- (2)
- (27)
- (33)
- (42)
- (100+)
- (100)
- (100+)
- (100+)
- (100+)

ROADWAY EMBANKMENT, BROWN FINE SANDY SILT

10/2012  
ALLUVIAL, BRN. FINE SANDY SILT TO SILTY SAND, SOME MICA, SOME CLAY

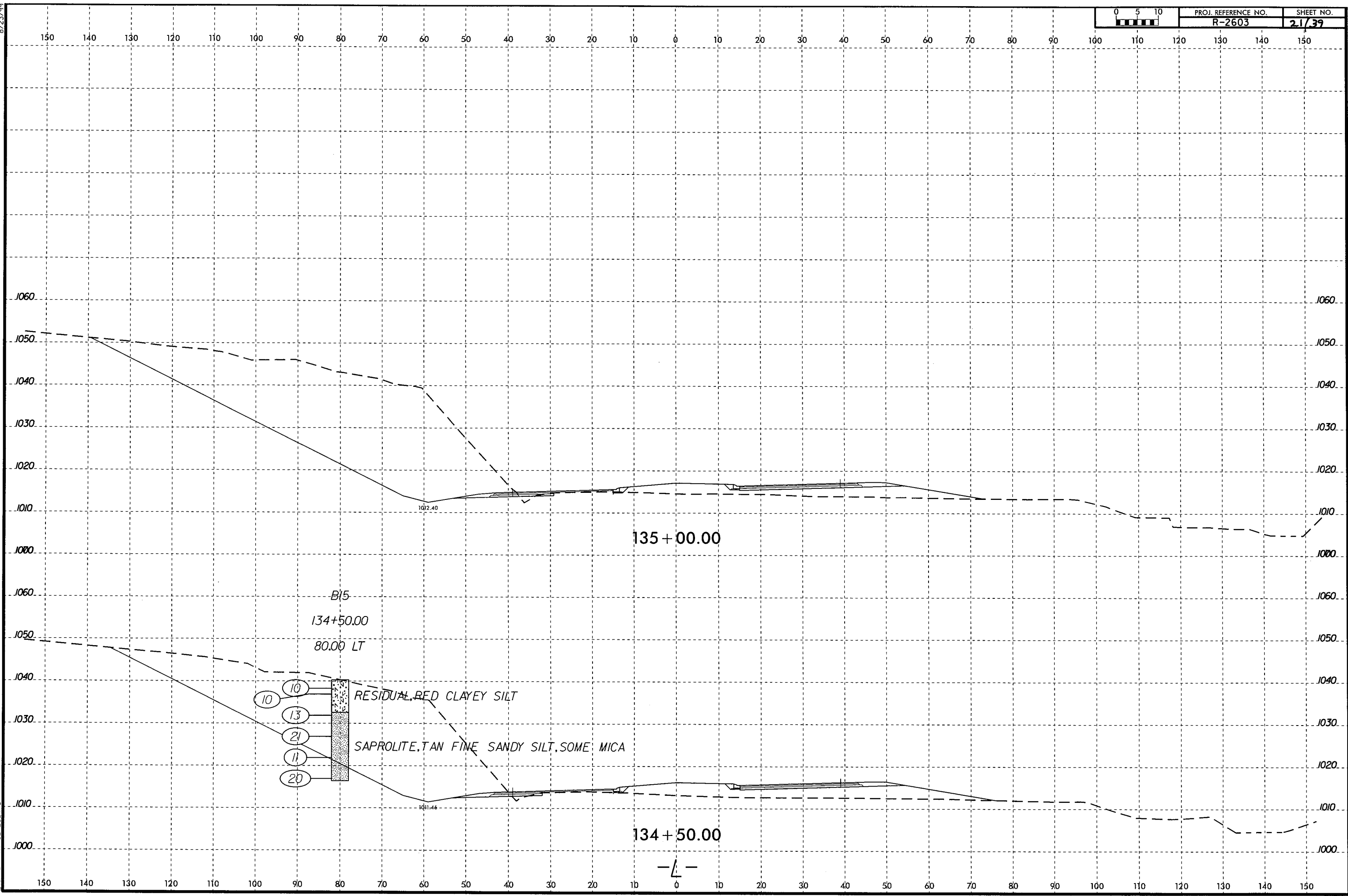
SAPROLITE, LT. TAN FINE SANDY SILT

WEATHERED ROCK, LT. TAN MICA SCHIST

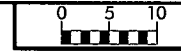
118 + 50.00

-L-

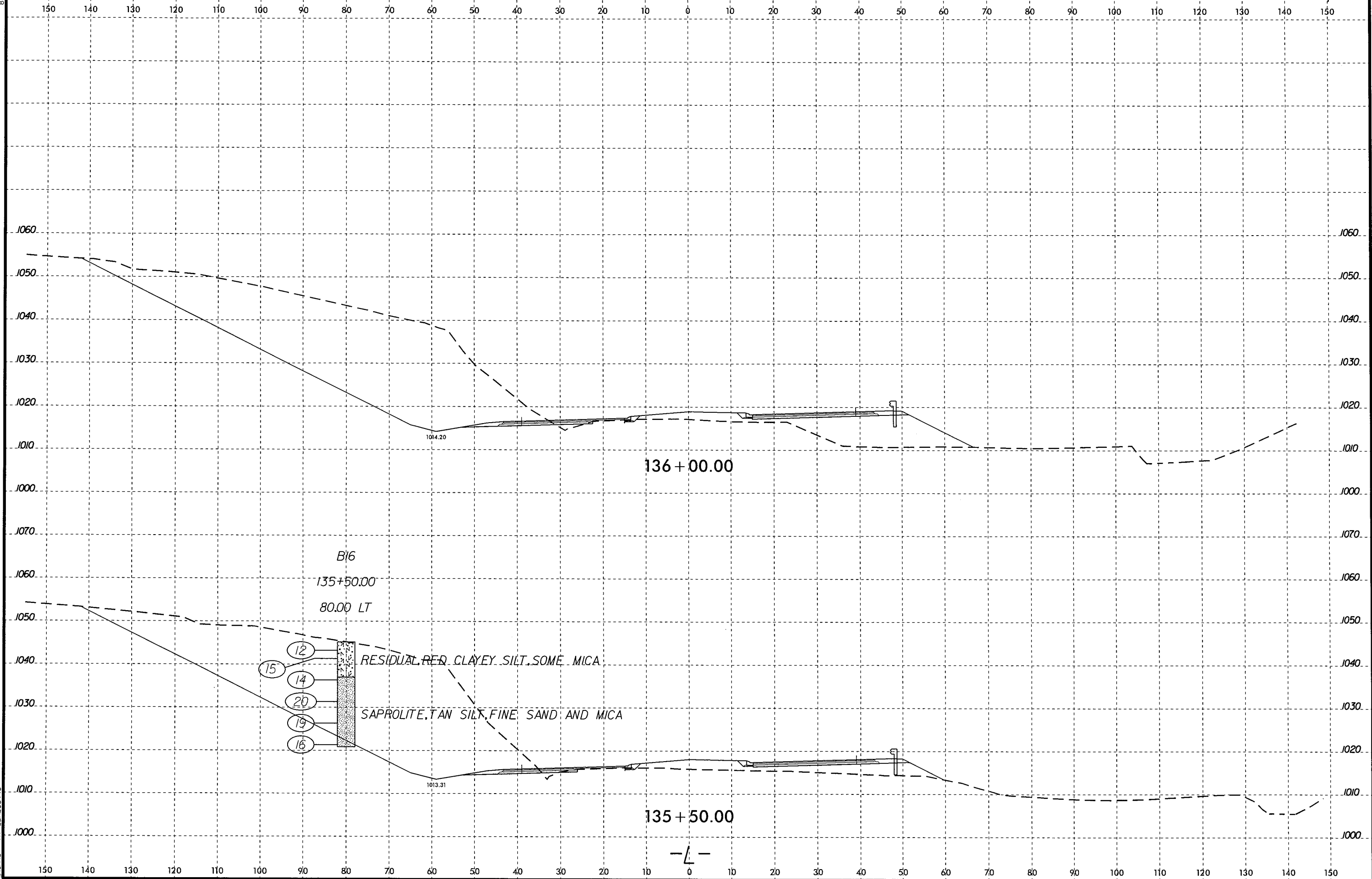
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AT GEA25545



8/23/99  
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PROJ. REFERENCE NO.	SHEET NO.
R-2603	22/39



136 + 00.00

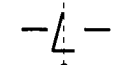
B16  
135 + 50.00  
80.00 LT

- 12
- 14
- 15
- 16
- 19
- 20

RESIDUAL RED CLAYEY SILT, SOME MICA

SAPROLITE, TAN SILT, FINE SAND AND MICA

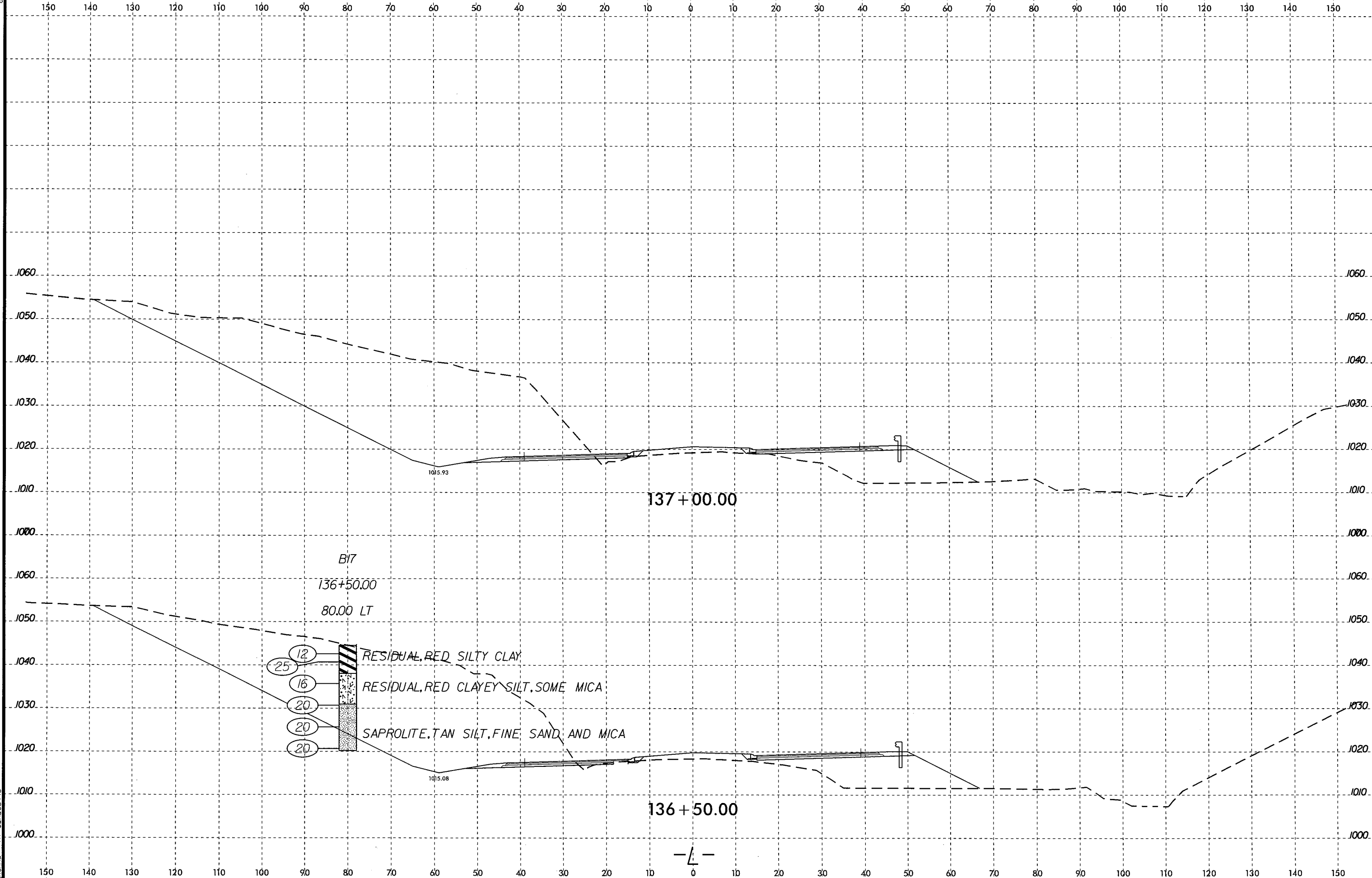
135 + 50.00



8/23/99



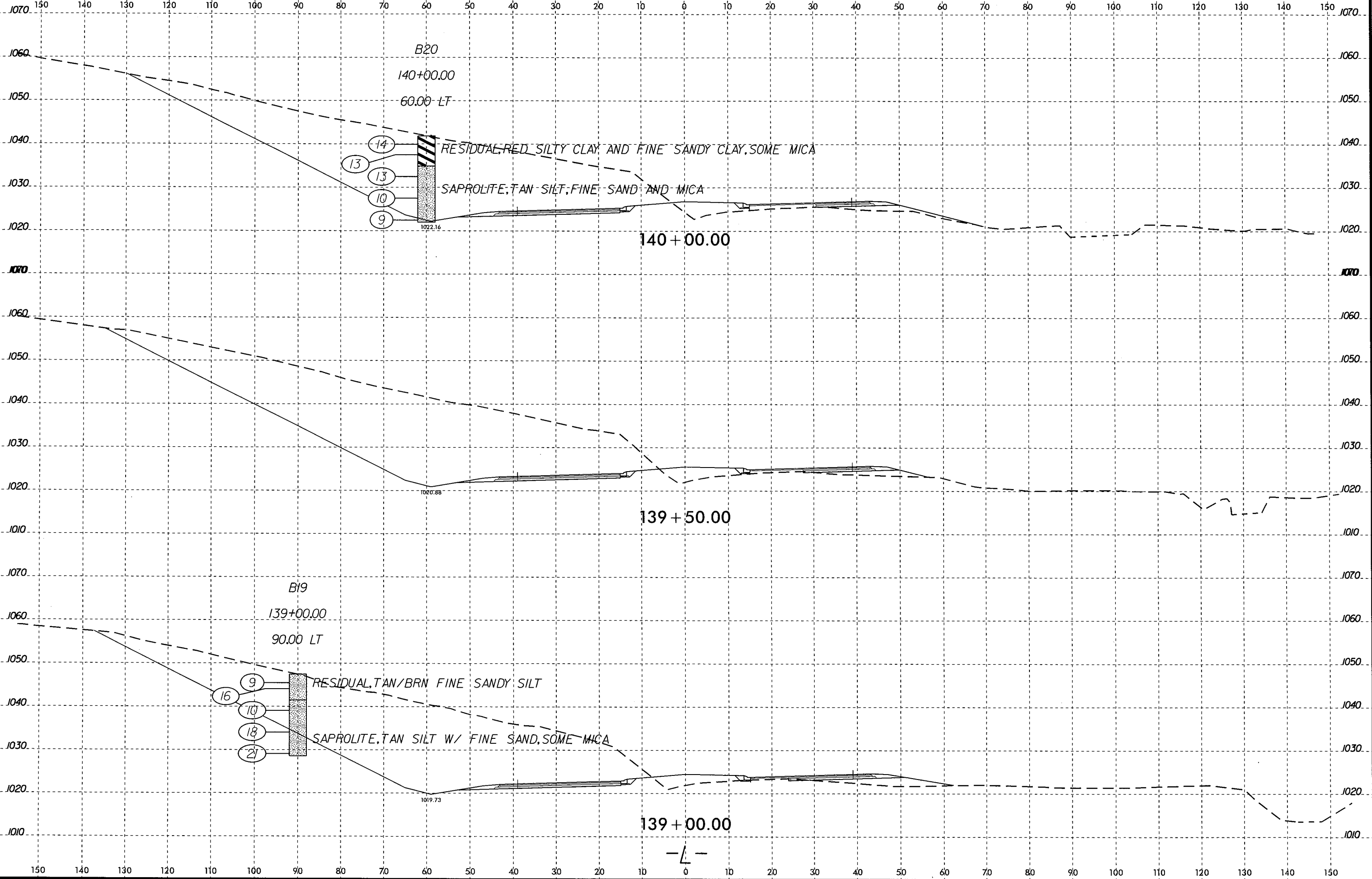
PROJ. REFERENCE NO.	SHEET NO.
R-2603	23/29



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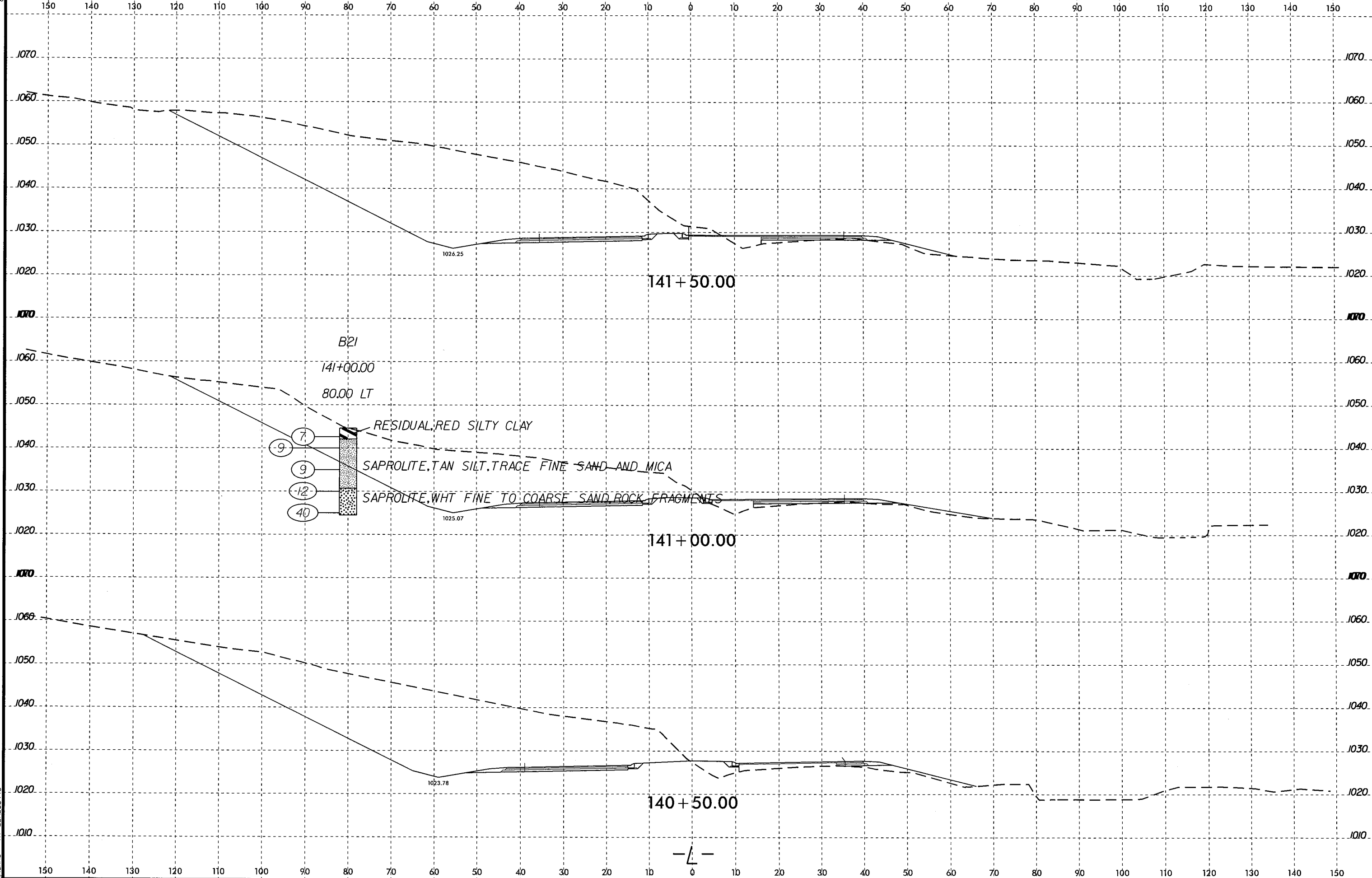




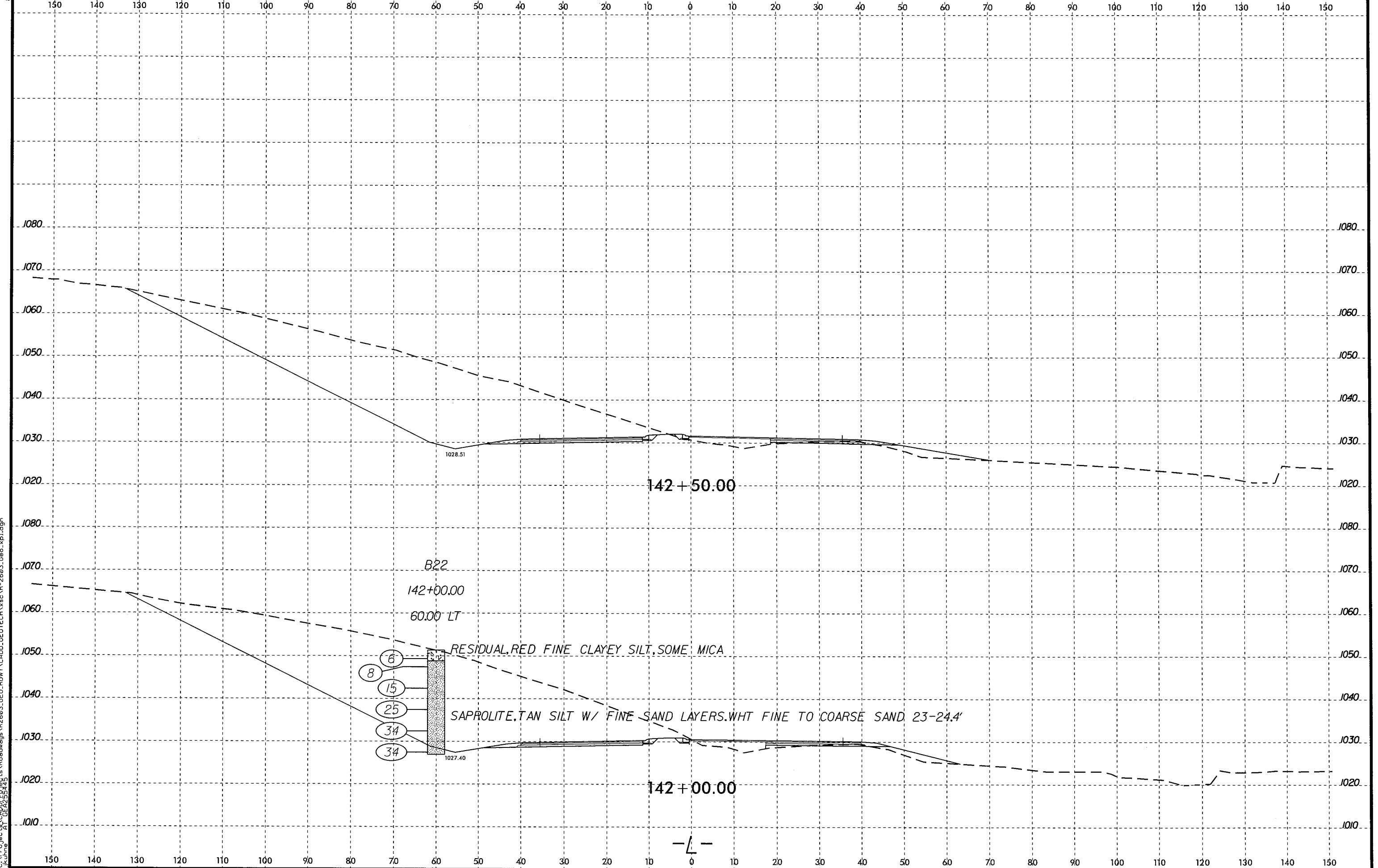


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 kluhn AT GEA25545

8/23/99

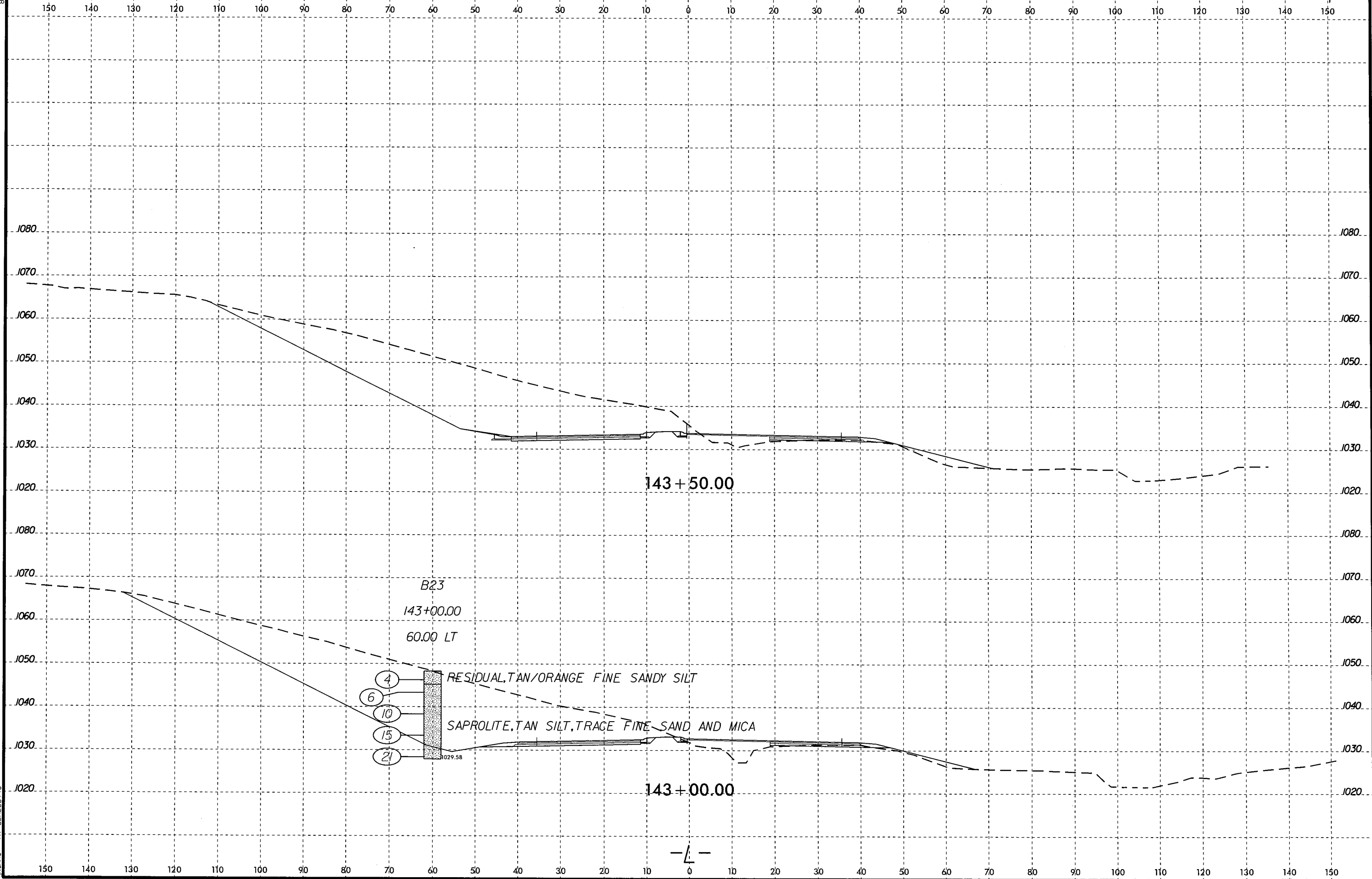


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 ifukhne AT GE25545



27-NOV-2002 15:40  
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kuhne



143 + 50.00

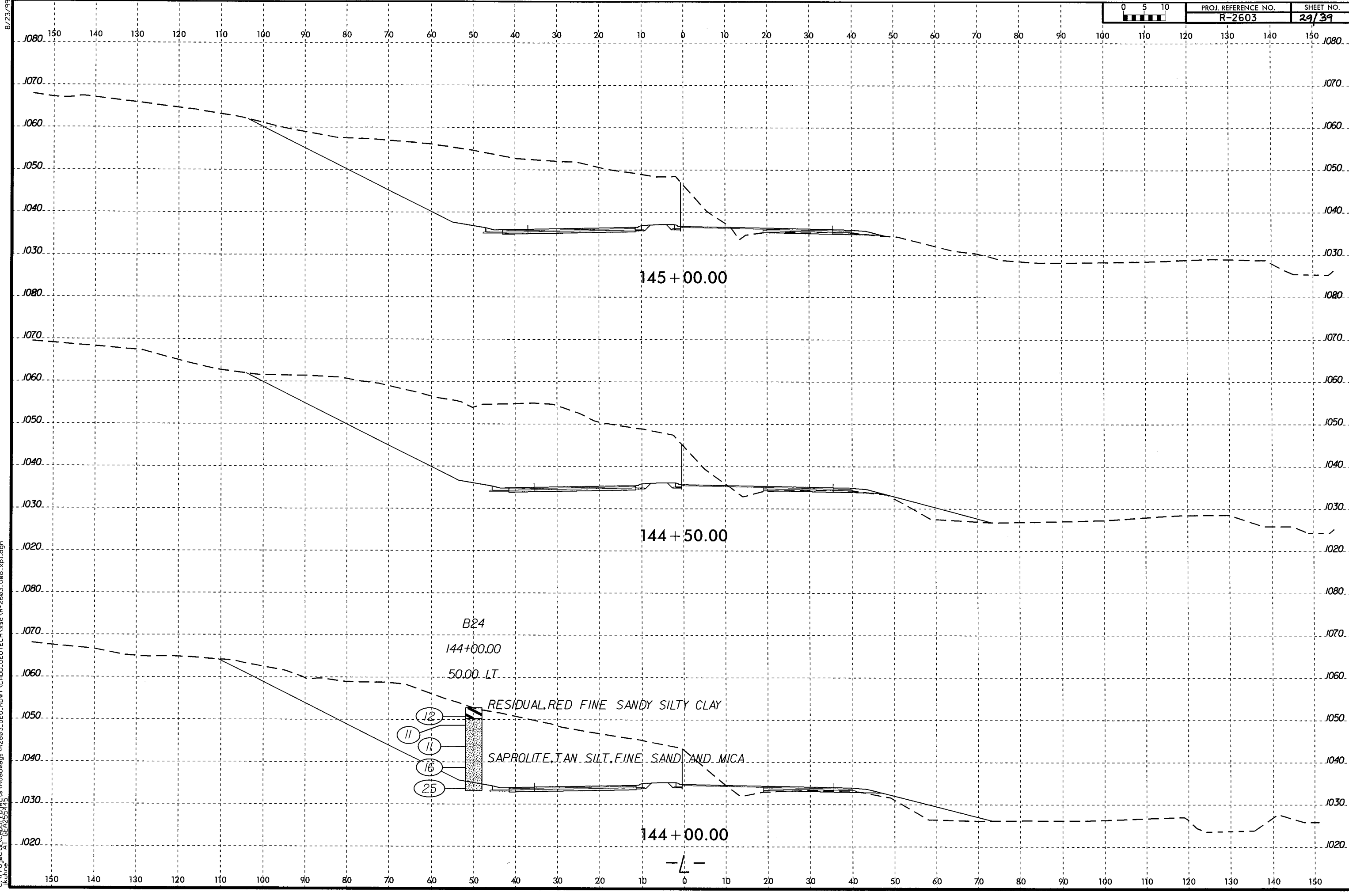
B23  
143+00.00  
60.00 LT

④  
⑥  
⑩  
⑮  
⑳

RESIDUAL, TAN/ORANGE FINE SANDY SILT  
SAPROLITE, TAN SILT, TRACE FINE SAND AND MICA

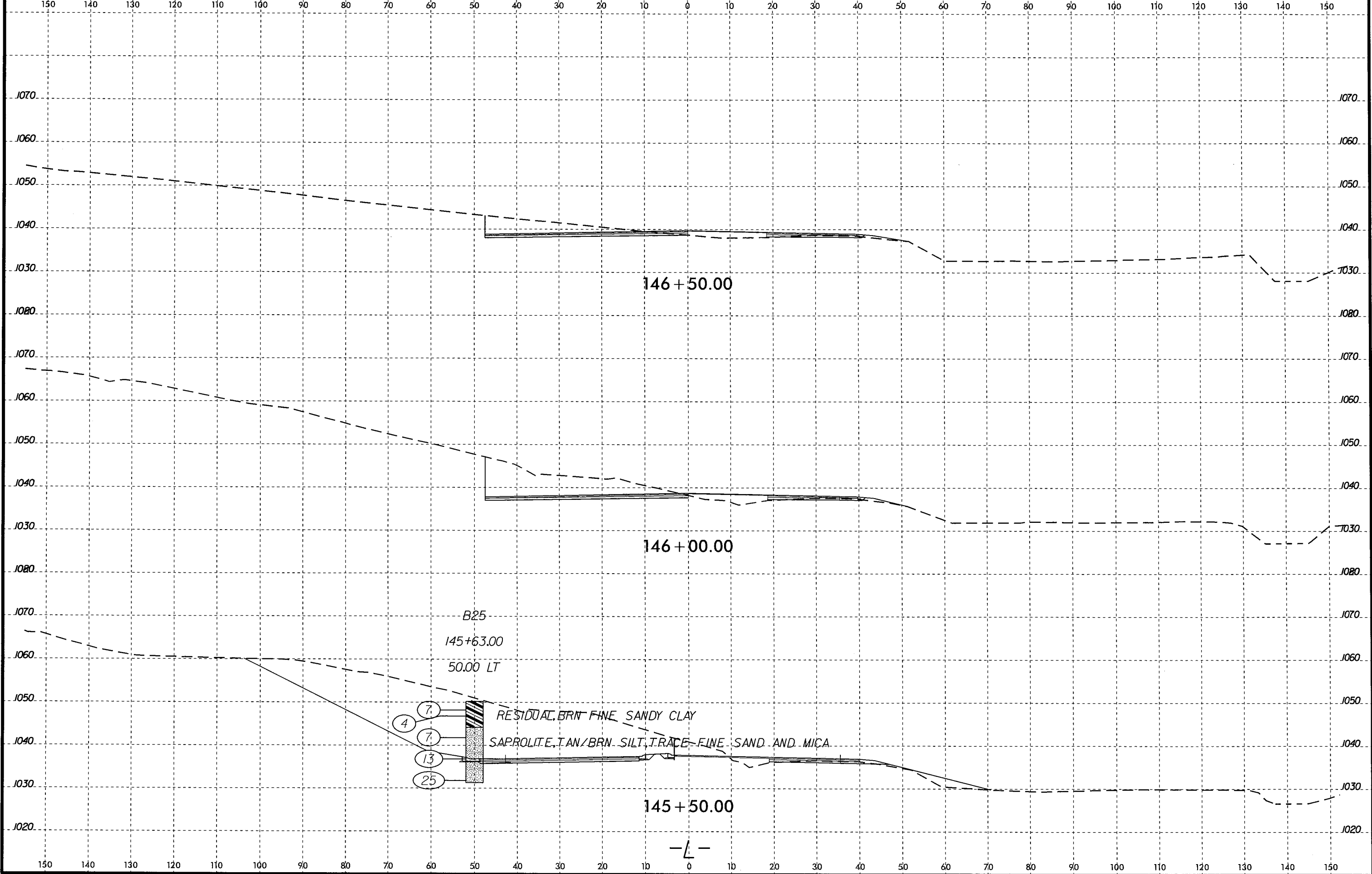
143 + 00.00

10

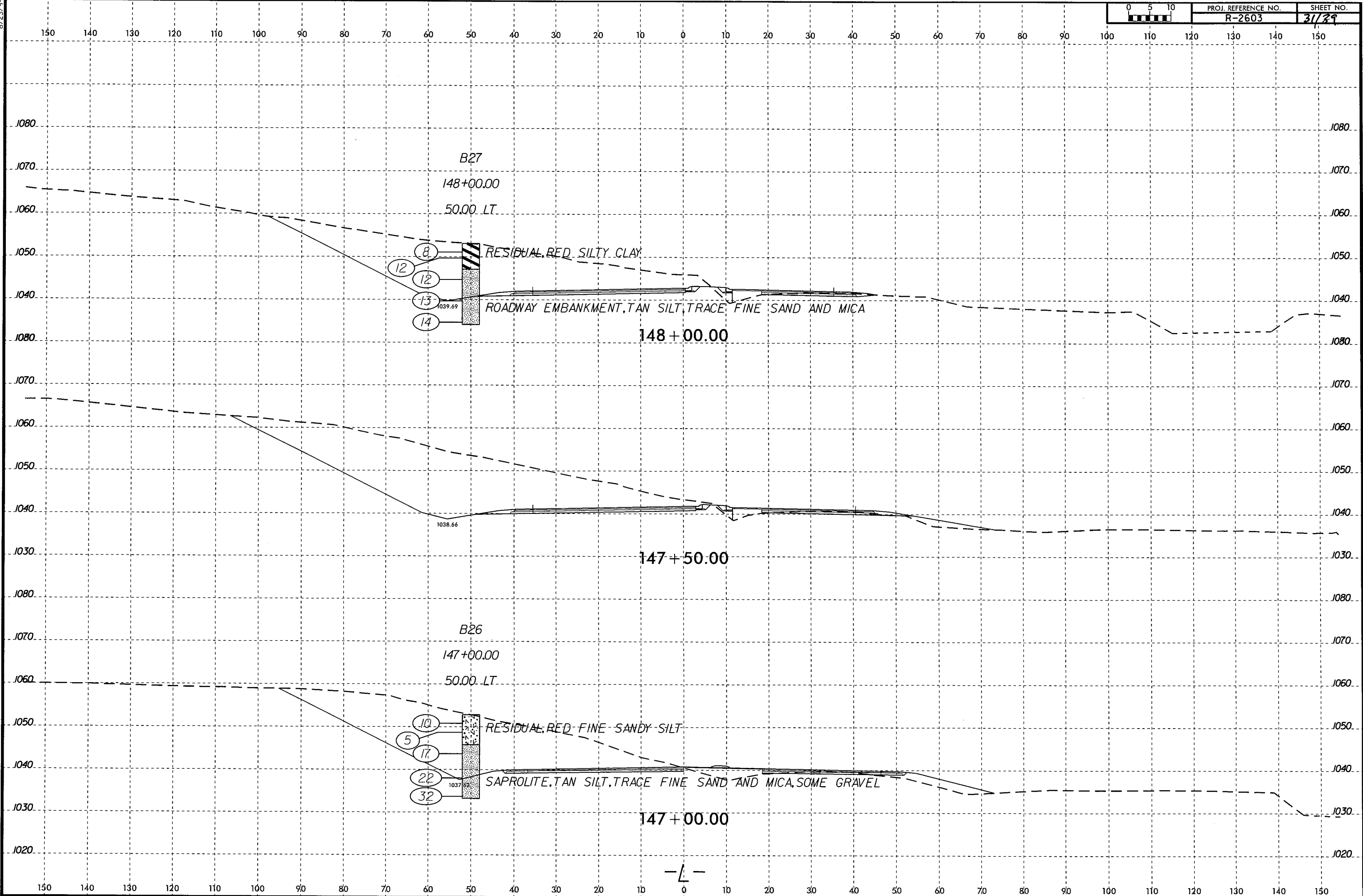


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8/23/99

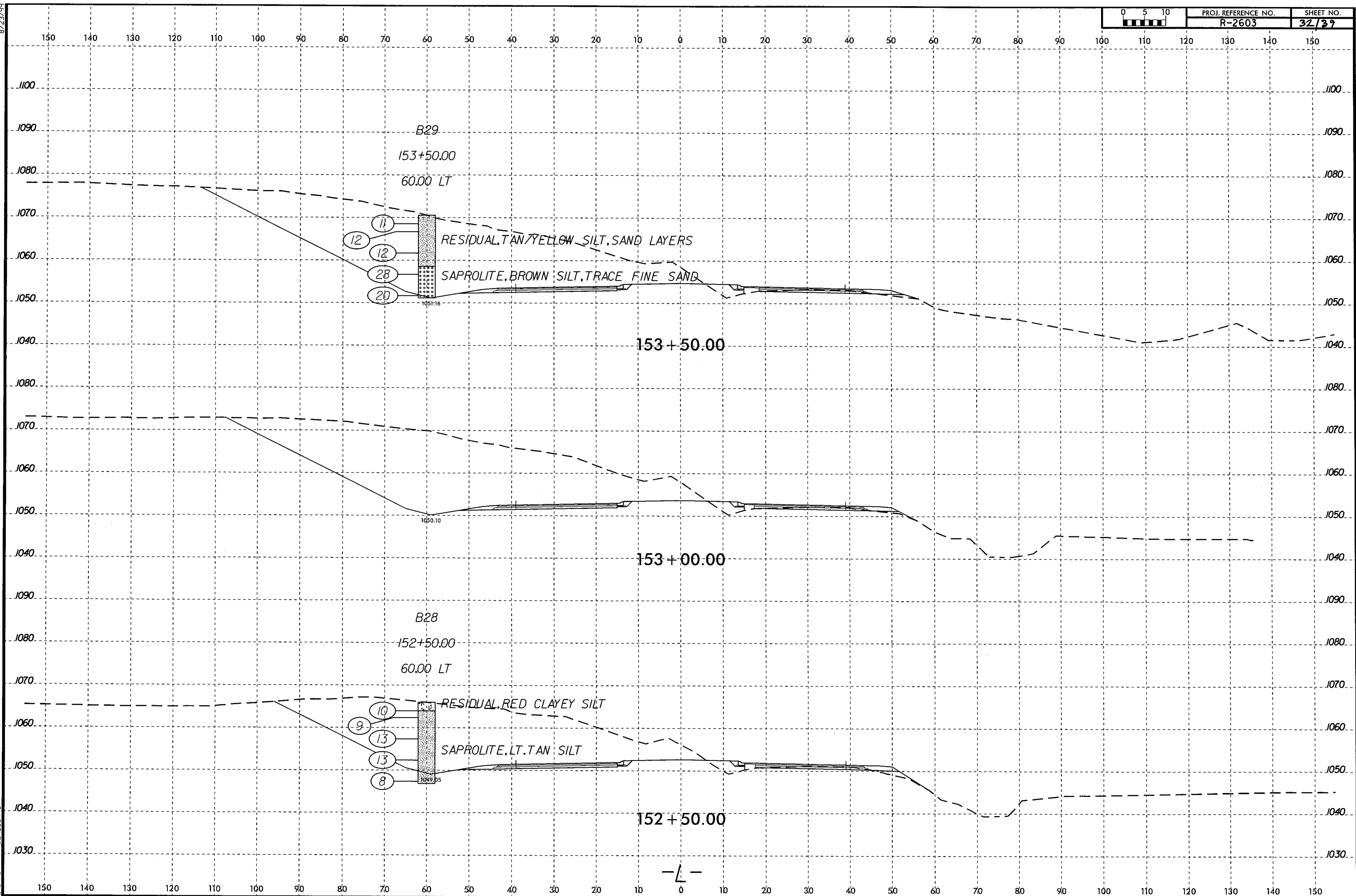


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 kuhn AT GE255425

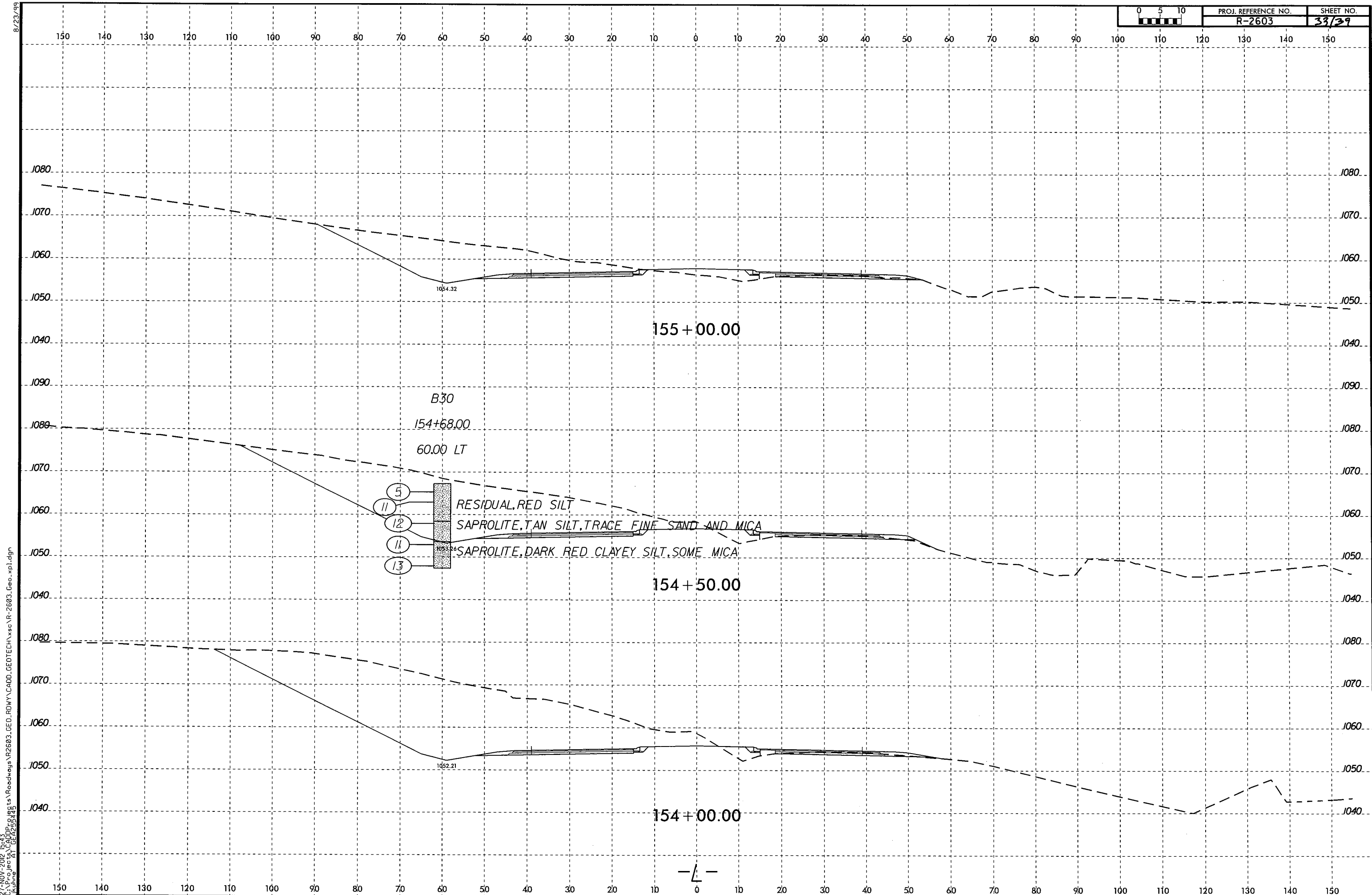


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 Kubine AT 6E425545

8/23/99  
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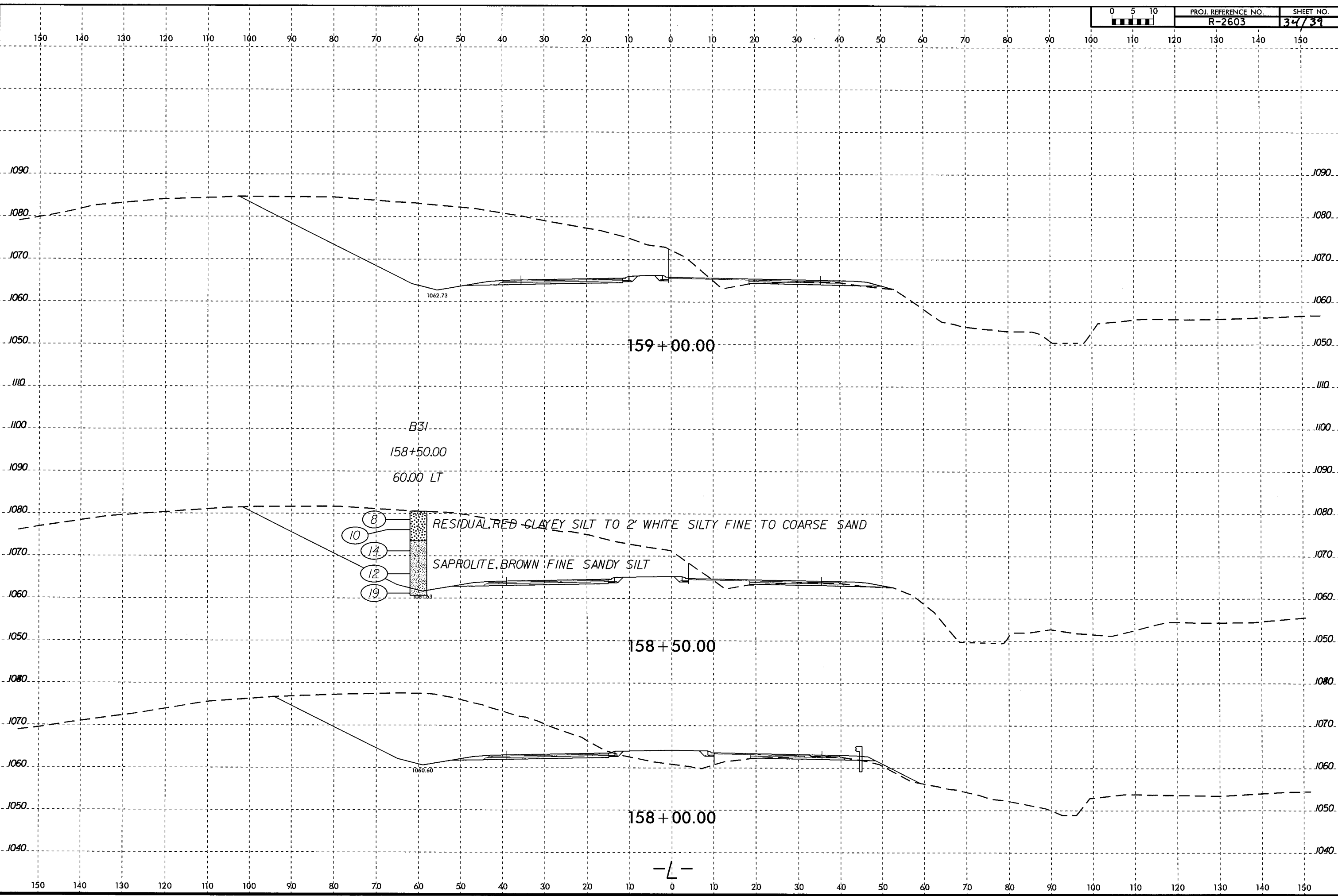




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 ikuhn AT GEORGINIA

—L—

8/23/99  
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R-2603



8  
10  
14  
12  
19  
RESIDUAL, RED CLAYEY SILT TO 2' WHITE SILTY FINE TO COARSE SAND  
SAPROLITE, BROWN FINE SANDY SILT

B31  
158+50.00  
60.00 LT

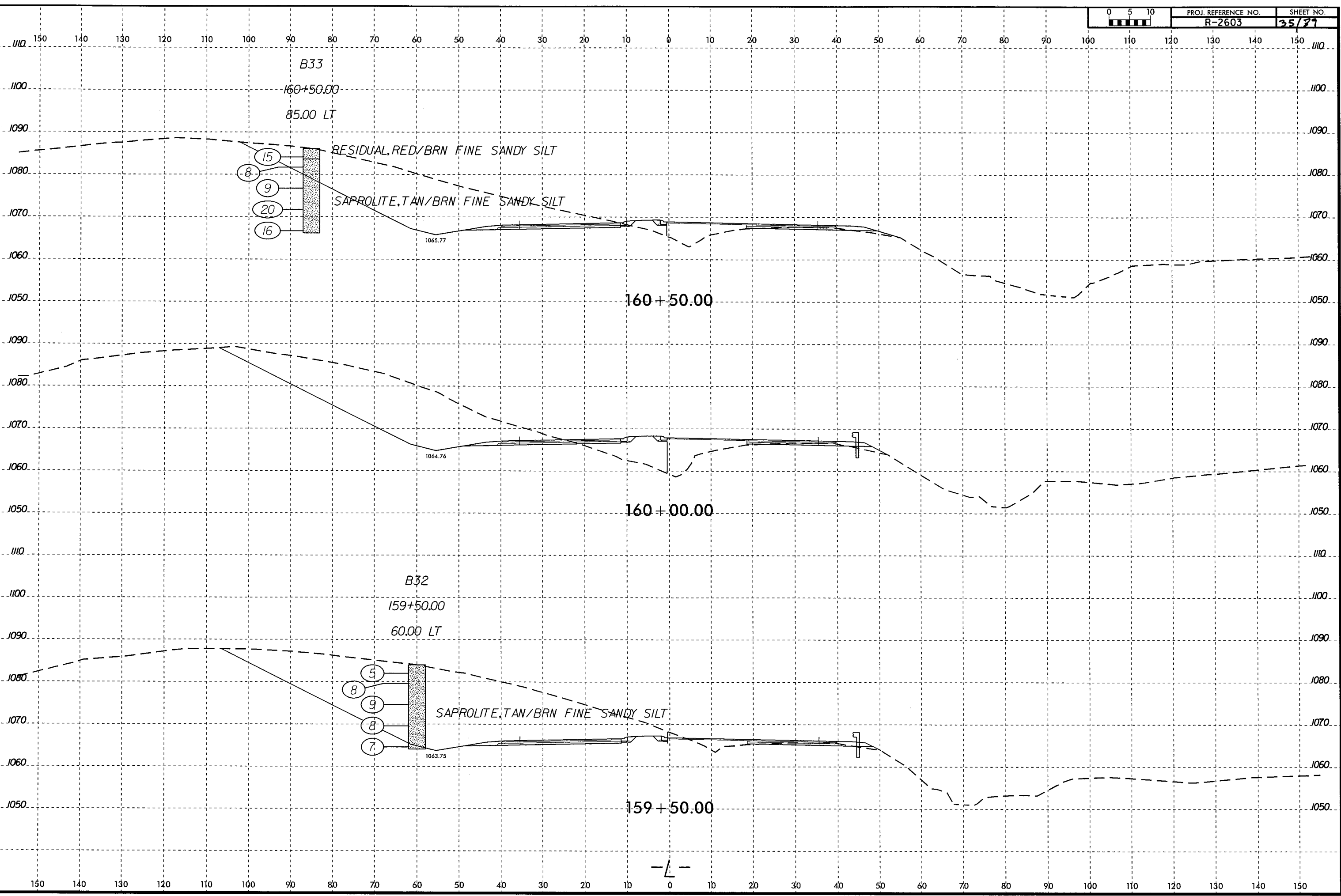
159+00.00

158+50.00

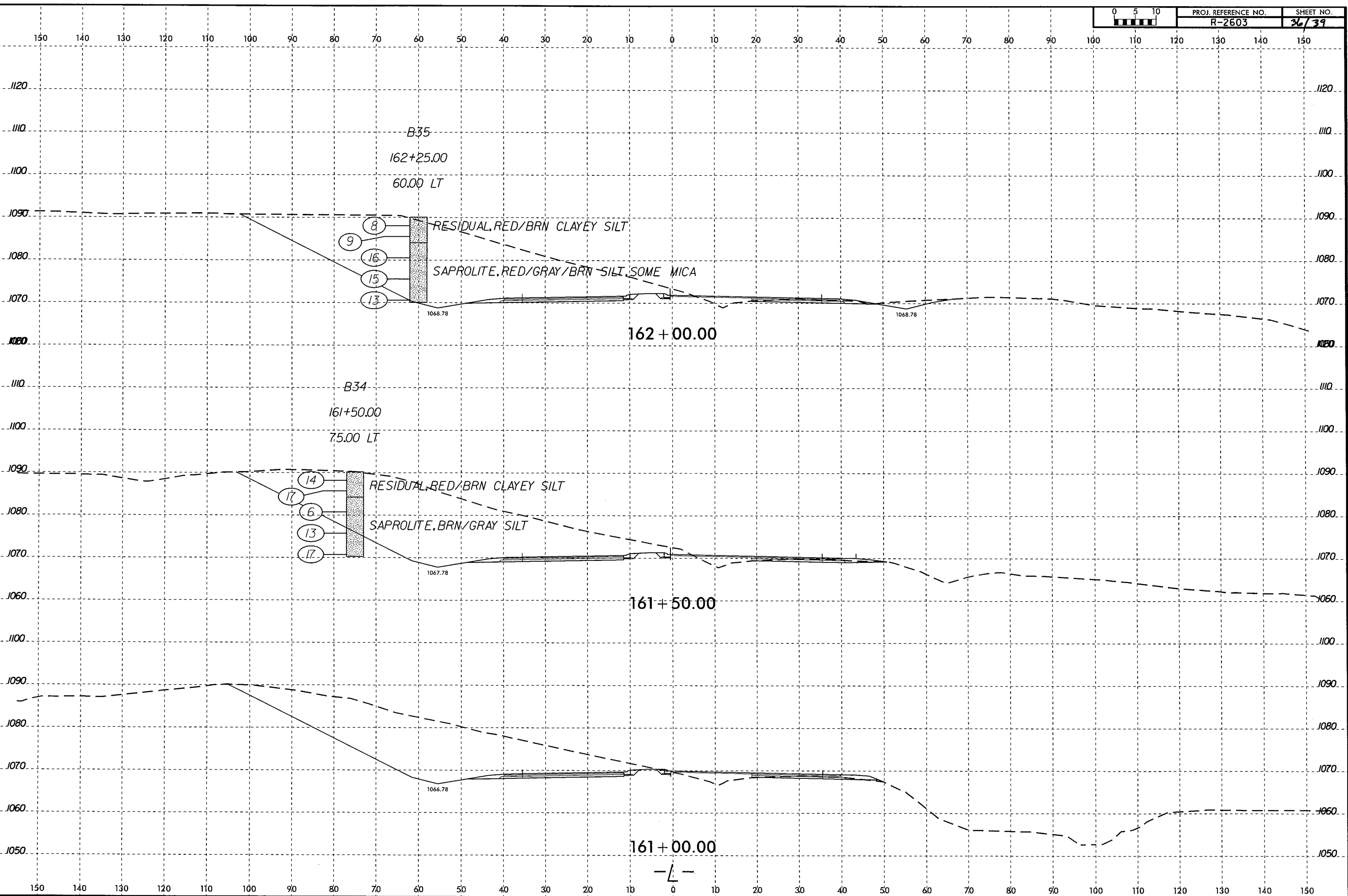
158+00.00

-L-

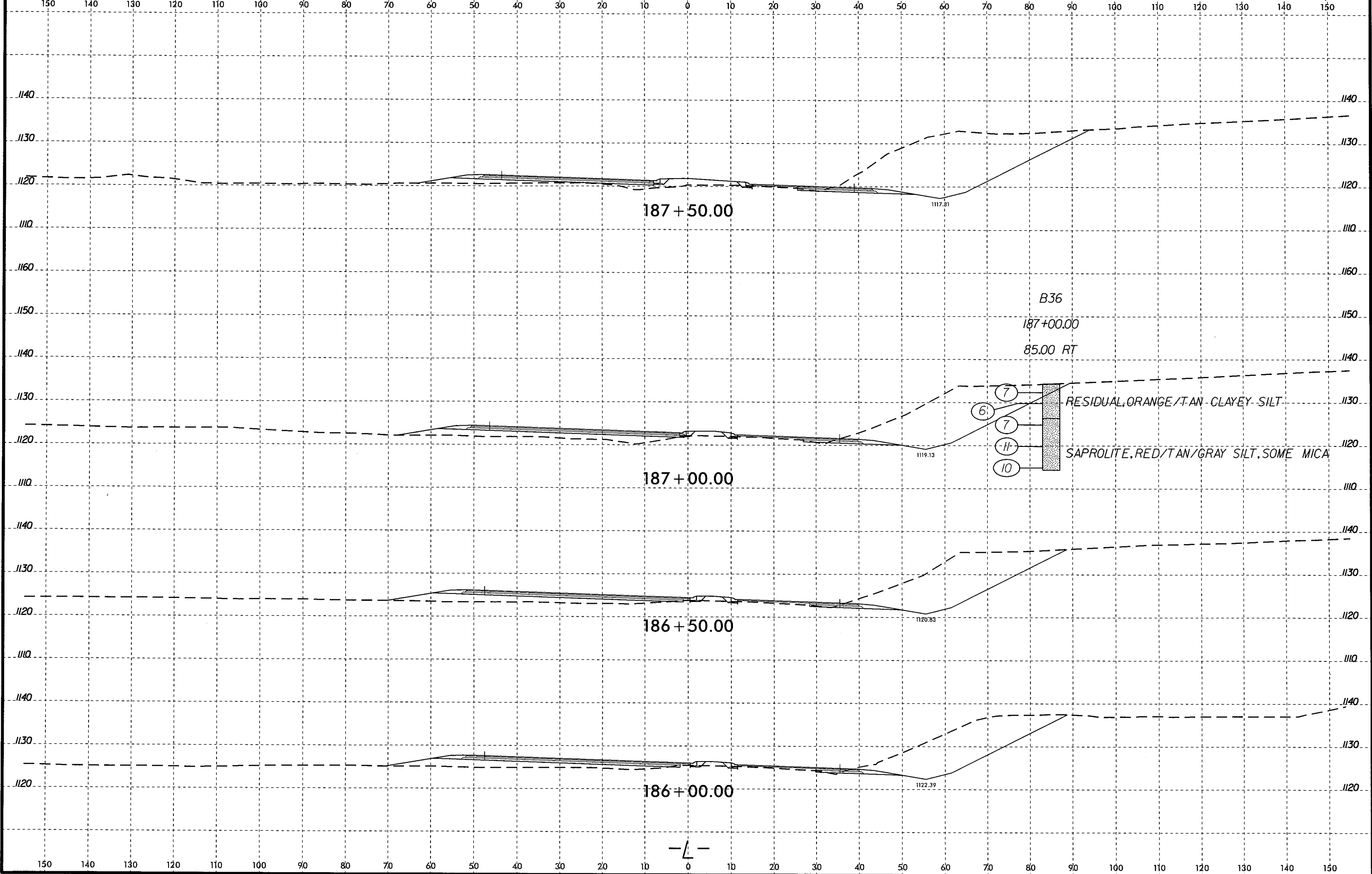
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 ikuhne AT GE025545



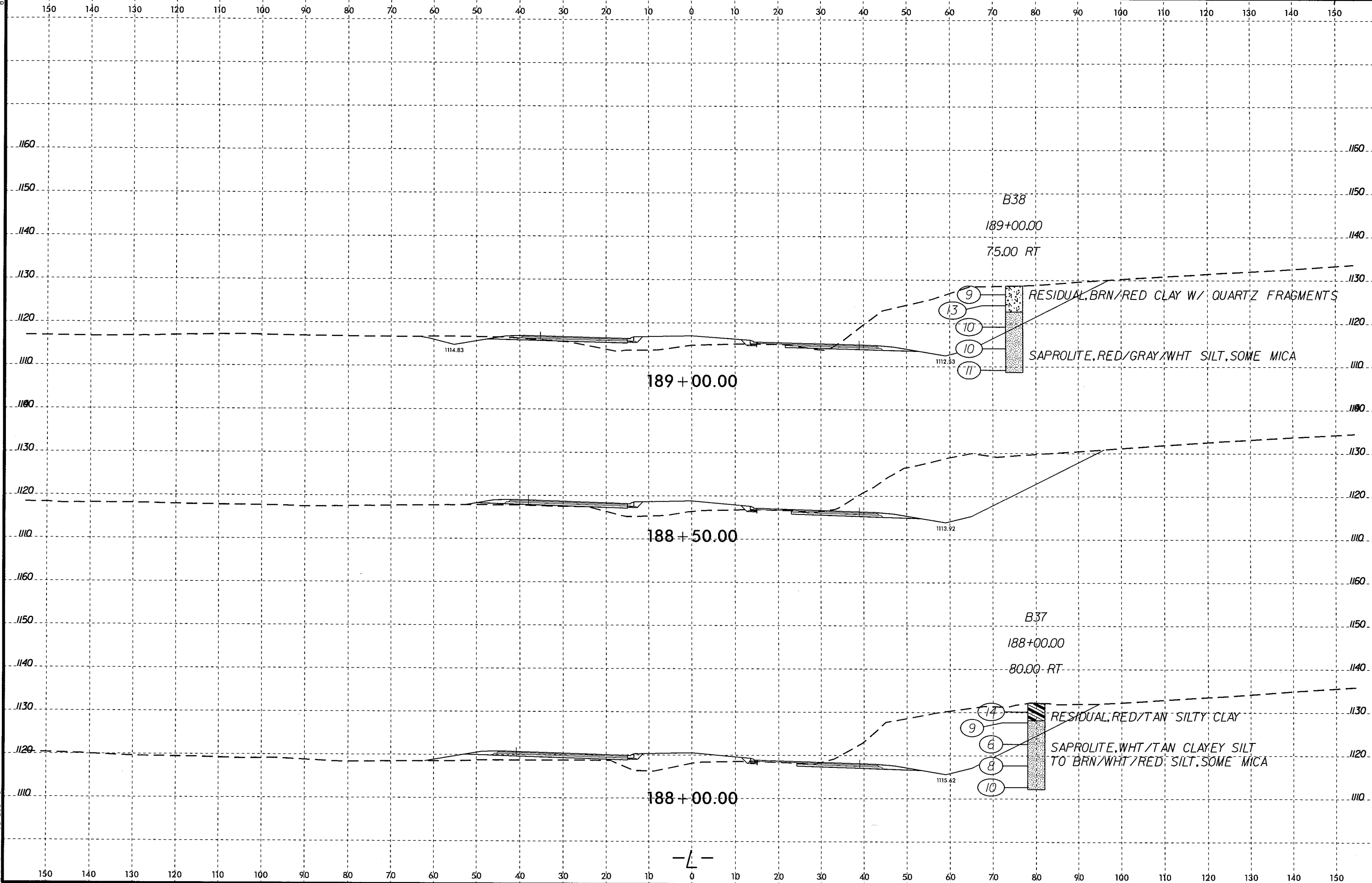
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kubne AT GEA25545



8/23/99



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klhne AT GE255425



27-NOV-2012 15:47  
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