

NOTE: SEE SHEET 2A 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-3100B	1	28
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34522.1.4	STP-16(4)	P.E.	
		RAW & UTIL.	

CONTENTS

LINE	STATION	PLAN	PROFILE	XSECT
-L-	15+35.00 to 198+28.48	4-17	18-24	
-Y2-	12+00.00 to 14+00.00	6	25	
-Y3-	13+20.00 to 17+20.30	6	25	
-Y4-	10+00.00 to 13+20.00	7	25	
-Y5-	11+00.00 to 15+00.91	9	25	
-Y6-	10+00.00 to 13+39.00	9	25	
-Y7-	10+00.00 to 13+00.00	10	26	
-Y8-	10+00.00 to 13+84.00	12	26	
-Y9-	12+61.00 to 14+11.71	13	26	
-Y10-	10+19.00 to 13+19.41	14	26	
-Y11-	10+00.00 to 14+63.00	15	26	
-Y12-	10+06.00 to 18+56.24	15	27	
SAMPLE RESULTS		28		

ROADWAY
SUBSURFACE INVESTIGATION

PROJ. REFERENCE NO. 34522.1.4 (R-3100B) F.A. PROJ. STP-16(4)
COUNTY CATAWBA
PROJECT DESCRIPTION NC 16 NORTH OF SR 1801 (CLAREMONT RD.)
AND NORTH OF SR 1814 (CALDWELL RD.)

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) 250-4088. 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 (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 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.

CONTRACT: ID: R-3100B

PERSONNEL
J.K. STICKNEY

C.L. SMITH

INVESTIGATED BY J.E. BEVERLY

CHECKED BY C.B. LITTLE

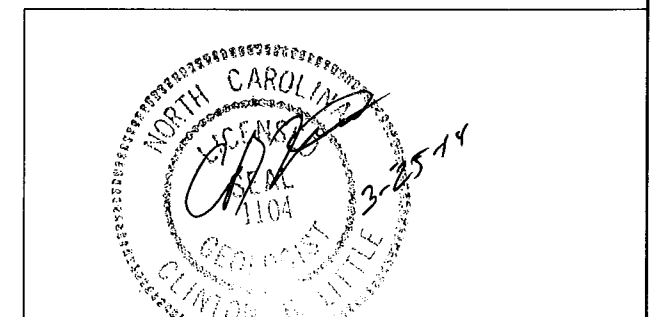
SUBMITTED BY C.B. LITTLE

DATE JANUARY 2014

DRAWN BY: J.K. McCLURE

NOTE - THE INFORMATION CONTAINED HEREIN IS NOT IMPLIED OR GUARANTEED BY THE N. C. DEPARTMENT OF TRANSPORTATION AS BEING ACCURATE NOR IS IT 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
See Sheet 1-B For Conventional Symbols

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

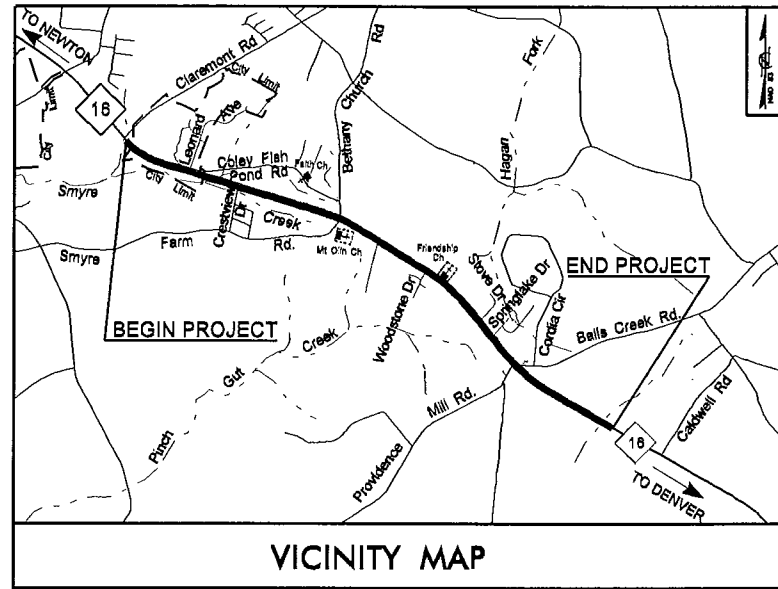
CATAWBA COUNTY

LOCATION: NC 16 NORTH OF SR 1801 (CLAREMONT RD) AND
NORTH OF SR 1814 (CALDWELL RD)

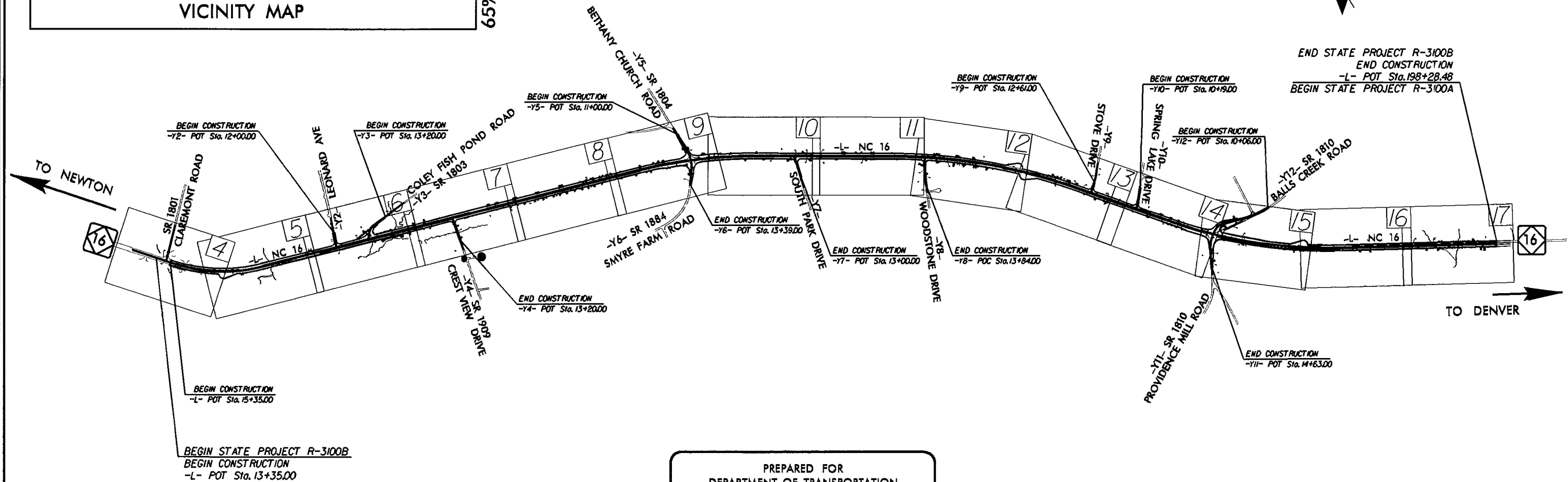
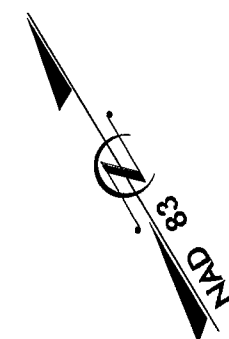
TYPE OF WORK: GRADING, DRAINAGE, PAVING & SIGNALS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-3100B	2A	
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
34522.1.4	STP-16(4)	PE	

TIP PROJECT: R-3100B



65% SUBMITTAL



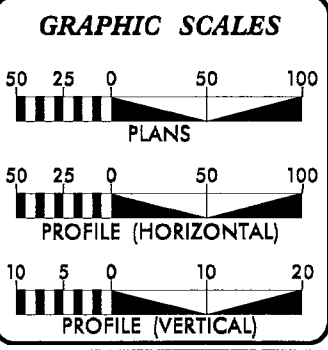
PREPARED FOR
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, NC

NCDOT CONTACT: Brenda Moore, PE, CPM

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

CONTRACT:



DESIGN DATA

ADT 2016 = 13,050
ADT 2036 = 20,200
DHV = 10 %
D = 65 %
T = 9 % *
V = 50 MPH
*(TTST 4% + DUAL 5%)
FUNC CL = RURAL ARTERIAL
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-3100B = 3.46 Miles
TOTAL LENGTH TIP PROJECT R-3100B = 3.46 Miles

Prepared in the Office of:
URS
URS Corporation - North Carolina
1400 Perimeter Park Drive
Marraville, North Carolina 27560
TELEPHONE (919) 461-1100 FAX (919) 461-1415
NC LICENSE # C-2203

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JANUARY 17, 2014

LETTING DATE:
JANUARY 19, 2016

EDWARD G. EDENS, PE
PROJECT ENGINEER

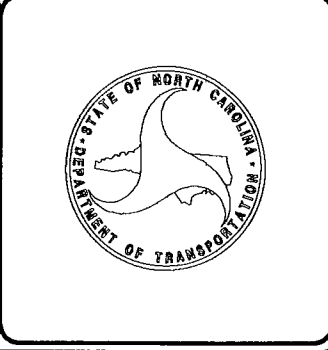
JEFFREY R. HEXT
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: _____ P.E.





STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

February 5, 2014

STATE PROJECT: 34522.1.4 (R-3100B)
F.A. PROJECT: STP-16(4)
COUNTY: Catawba
DESCRIPTION: NC 16 from North of SR 1801 (Claremont Rd.) and North of SR 1814 (Caldwell Rd.)

SUBJECT: Geotechnical Report – Inventory

This report presents the findings for the proposed multi-lane widening of NC 16 in Catawba County. Beginning and ending station limits for this section of the project are from -L- Sta. 15+35 to 198+28.48. The project begins very close to the intersection of NC 16 and Claremont Rd. and trends southeasterly for 3.46 miles before ending north of Caldwell Rd.

The geotechnical field investigation was conducted in the months of July and October of 2013. An ATV mounted CME 550X drill machine equipped with automatic drop hammer was utilized to perform test boring along the proposed corridor. The following survey lines are addressed in this report.

Line	Station
-L-	15+35 – 198+28.48
-Y2-	12+00 – 14+00
-Y3-	13+20 – 17+20.30
-Y4-	10+00 – 13+20
-Y5-	11+00 – 15+00.91
-Y6-	10+00 – 13+39.00
-Y7-	10+00 – 13+00
-Y8-	10+00 – 13+84
-Y9-	12+61 – 14+11.71
-Y10-	10+19 – 13+19.41
-Y11-	10+00 – 14+63
-Y12-	10+06 – 18+56.24

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
DIRECTOR OF PRECONSTRUCTION
1538 MAIL SERVICE CENTER
RALEIGH NC 27699-1538

TELEPHONE: 919-707-2540
FAX: 919-715-5361
WEBSITE: WWW.NCDOT.GOV

LOCATION:
TRANSPORTATION BUILDING
1 SOUTH WILMINGTON STREET
RALEIGH NC

Areas of Special Geotechnical Interest:

1. *Groundwater:*

Groundwater was only encountered in alluvial areas during the course of this investigation. The following is a list of those locations:

-L- Station / Offset	Relationship of groundwater to proposed grade
29+00, 94' RT	below grade
42+96, 72' RT	below grade
193+10, 44' RT	below grade

2. *Crystalline Rock:*

Rock was not encountered during the course of this investigation.

3. *High PI Soils: (PI's 28 and greater)*

High PI clay soils occur sporadically along the project corridor. Borings in the following locations encountered high PI clay soils that are shown to be, or likely to be, within 3 feet of proposed grade.

Station / Offset	AASHTO Soil Type	PI Value
-L- 26+60, 62' LT	A-7-5	36
-L- 65+88, 44' LT	A-7-5	35
-L- 69+00, 53' LT	A-7-5	29
-L- 91+60, 50' RT	A-7-5	32
-L- 129+80, 110' LT	A-7-5	47
-L- 132+10, 105' LT	A-7-5	35
-L- 145+05, 33' RT	A-7-5	31
-L- 148+18, 52' RT	A-7-5	49
-L- 169+43, 43' LT	A-7-5	42
-Y6- 11+69, 35' LT	A-7-5	31

4. *Alluvial Soils:*

Alluvial soils occur sporadically along the project corridor. They are the result of small creeks and drainage features that are mostly of little concern. Known alluvial soils types are very soft to soft clayey sandy silt (A-4, A-5), and very loose to loose silty sand (A-2-4). Measured thicknesses ranged from 2' to 9'.

Physiography / Geology:

The project area is in rural southeastern Catawba County between the cities of Newton and Denver. Topography is flat to rolling and traverses along woods, open fields, and residential structures.

Geologically the site lies in the Inner Piedmont and Kings Mountain Belt with micaceous residual soil types originating predominantly from mica schist (CZms) parent rock.

Soil Properties:

1. *Residual Soils:*

These soils are derived from in place weathering of parent materials. They occur in a variety of consistencies, classifications, and stratigraphic sequences. Residual soils are further subdivided into clays, silts, and sands. In most instances residual soils in this area are micaceous with mica amounts ranging from trace to high.

Clays are a prominent soil type along the project corridor. They are found as surface soils and subsoils. Typically they consist of medium stiff to very stiff sandy silty and/or silty sandy clay in the AASHTO classifications of A-7-5, A-7-6, and A-6. Clay soils appear well drained with a plasticity index ranging from 11 to 49. Corresponding liquid limit ranges are between 33 and 88.

Silts are also common and typically consist of medium stiff to very stiff clayey sandy silt. AASHTO classifications are A-4, and A-5. Silts may occur at all depth ranges.

Sands also occur throughout the project corridor at varying depths in the stratigraphic sequence. Sands are typically described as loose to very dense silty sand with AASHTO classifications of A-2-4, A-2-5 and A-1-b.

2. *Alluvial Soils:*

Alluvial soils originate from water transportation and deposition in a floodplain environment. Alluvial deposits along the project corridor are limited to creeks and drainage features. They are typically shallow with known soil types of very soft clayey sandy silt (A-4), loose silty sand (A-2-4), and soft sandy clayey silt (A-5).

3. *Fill Soils:*

Roadway embankment fill soils are present beneath existing NC 16 and its connectors. Roadway fill soils are likely comprised of medium stiff silty sandy clay (A-7, A-6), and medium stiff sandy silt (A-4).

Wells:

The vast majority of residential and business structures along the project corridor rely on well water. There were a number of discovered wells which lie within construction limits, and others in between construction and proposed right of way. In some instances construction limits and right of way boundaries will result in the loss of the primary residence or business structure leaving an abandoned well outside proposed DOT limits. The following list is of wells that are

known to exist in each of these instances. It is possible that there are additional wells that went undetected during our investigation.

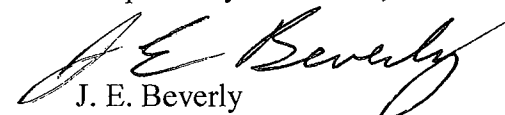
Well Station Location	Notes (ie. within construction limits, etc.)
RT of 55+80 -L-	House likely condemned, well outside R/W
RT of 66+20 -L-	Well within R/W
RT of 73+00 -L-	Well within R/W
LT of 77+20 -L-	Well within R/W
RT of 149+20 -L-	Condemned/Abandoned Gas Station, well outside R/W
LT of 11+50 -Y11-	Well within R/W
LT of 163+95 -L-	Well within construction limits
RT of 181+45 -L-	House likely condemned, well outside R/W
RT of 195+75 -L-	House likely condemned, well location unknown
RT of 196+90 -L-	House likely condemned, well outside R/W

Culverts:

There are 2 proposed culvert extensions and 1 culvert relocation along this section of NC 16. A single boring was performed on the outlet side of each culvert location. Vicinity soils in locations #1 and #3 consisted of 2 – 7' of alluvium in the form of very soft to soft clayey sandy silt (A-4, A-5) overlying residual loose to medium dense silty fine to coarse sand (A-2-4, A-1-b) with mica. In location #2 soils consist of 2' of alluvial soft clayey sandy silt (A-5) overlying residual soft to medium stiff clayey sandy silt (A-5) with mica. Culvert locations 1-3 are as follows:

- 1) -L- 29+00
- 2) -L- 43+60
- 3) -L- 193+00

Respectfully Submitted,

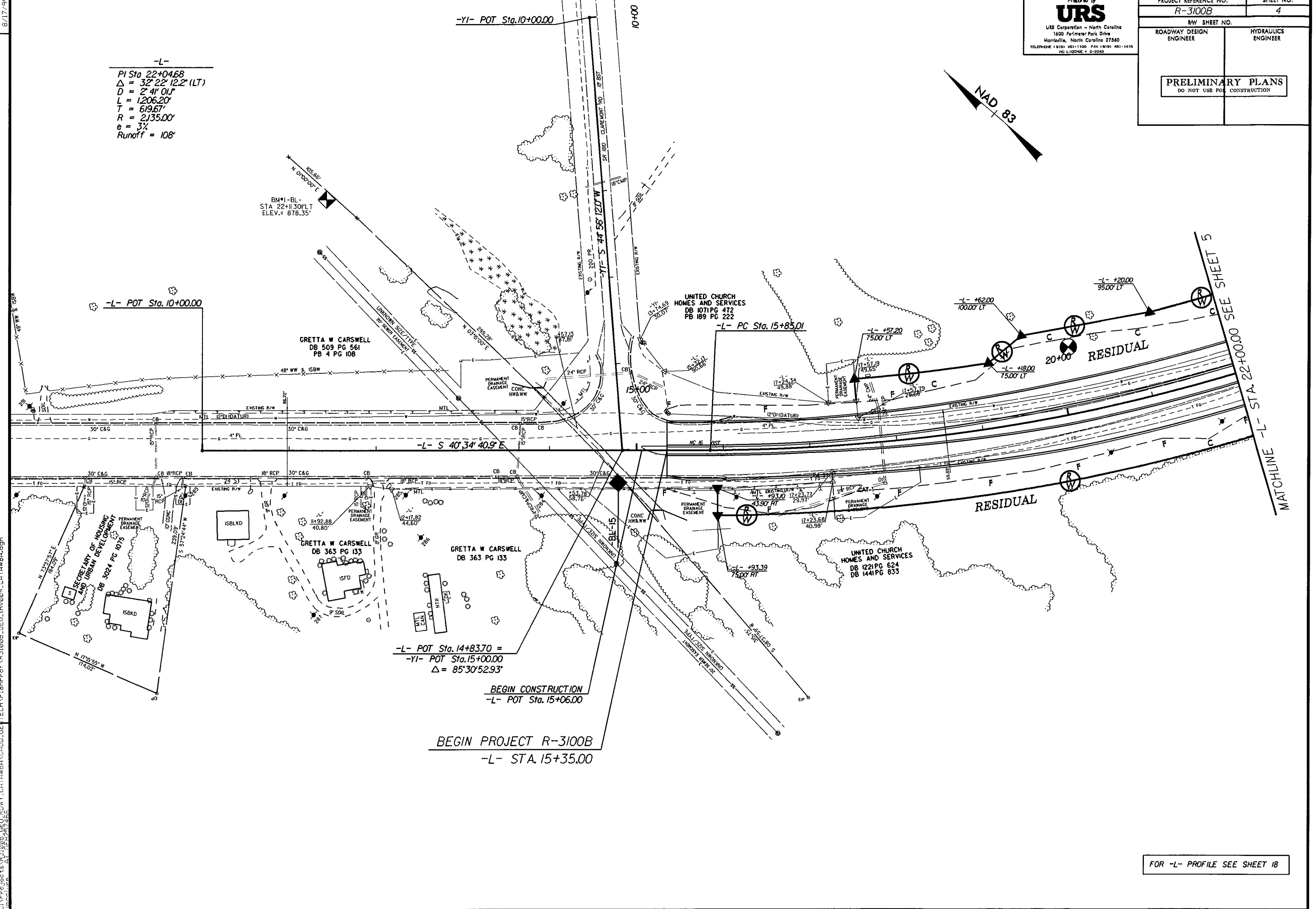
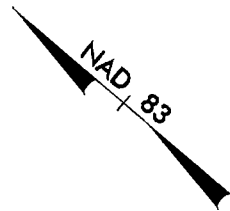

J. E. Beverly
Project Engineering Geologist

06-JAN-2014 15:31 C:\Projects\3100B_GEO_RDMY_CATAWBANDADD_GEO\TECH\Plan\Prjof\NR3100B_GEO_mv004_CATAWBAND.dgn
 8/17/99

Prepared by
URS
 URS Corporation - North Carolina
 1600 Perimeter Park Drive
 Morrisville, North Carolina 27560
 TELEPHONE (919) 461-1100 FAX (919) 461-1415
 PG LICENSE # C-2243

PROJECT REFERENCE NO. R-3100B	SHEET NO. 4
RAW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-L-
 PI Sta. 22+04.68
 $\Delta = 32^{\circ} 22' 12.2" (LT)$
 $D = 2' 4" OLV$
 $L = 1,206.20'$
 $T = 619.67'$
 $R = 2,135.00'$
 $e = 3\%$
 Runoff = 108'



REVISIONS

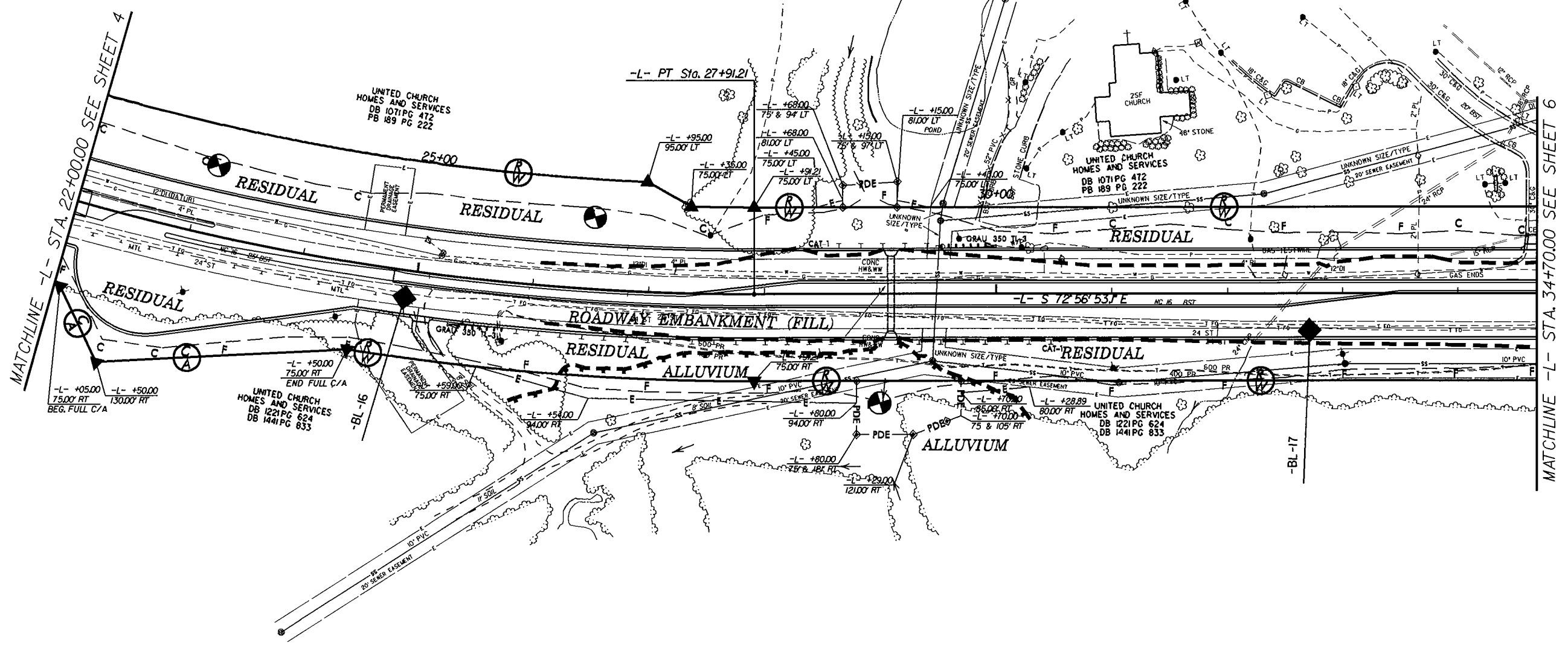
FOR -L- PROFILE SEE SHEET 18

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NO LICENSE - C-2842

PROJECT REFERENCE NO. R-3100B	SHEET NO. 5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-L-
 PI Sta 22+04.68
 $\Delta = 32' 22" 12.2" (LT)$
 $D = 2' 41" 01"$
 $L = 1,206.20'$
 $T = 619.67'$
 $R = 2,135.00'$
 $e = 3\%$
 Runoff = 108'



REVISIONS

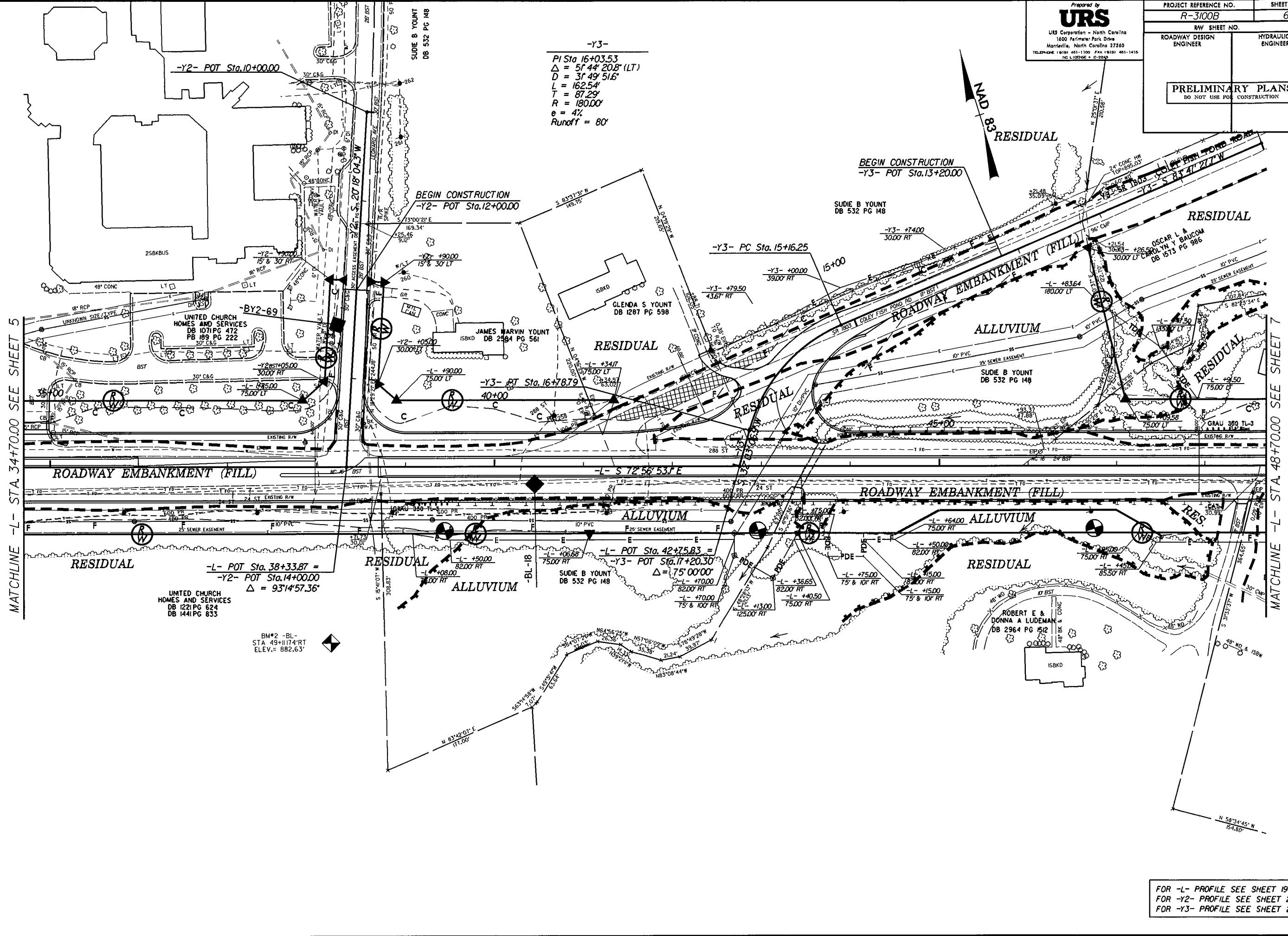
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FOR -L- PROFILE SEE SHEET 18

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 8/17/99

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 Morrisville, North Carolina 27560
 TELEPHONE (919) 461-1100 FAX (919) 461-1415
 NC LICENSE # C-2242

PROJECT REFERENCE NO.	R-3100B	SHEET NO.	6
RAW SHEET NO.		ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

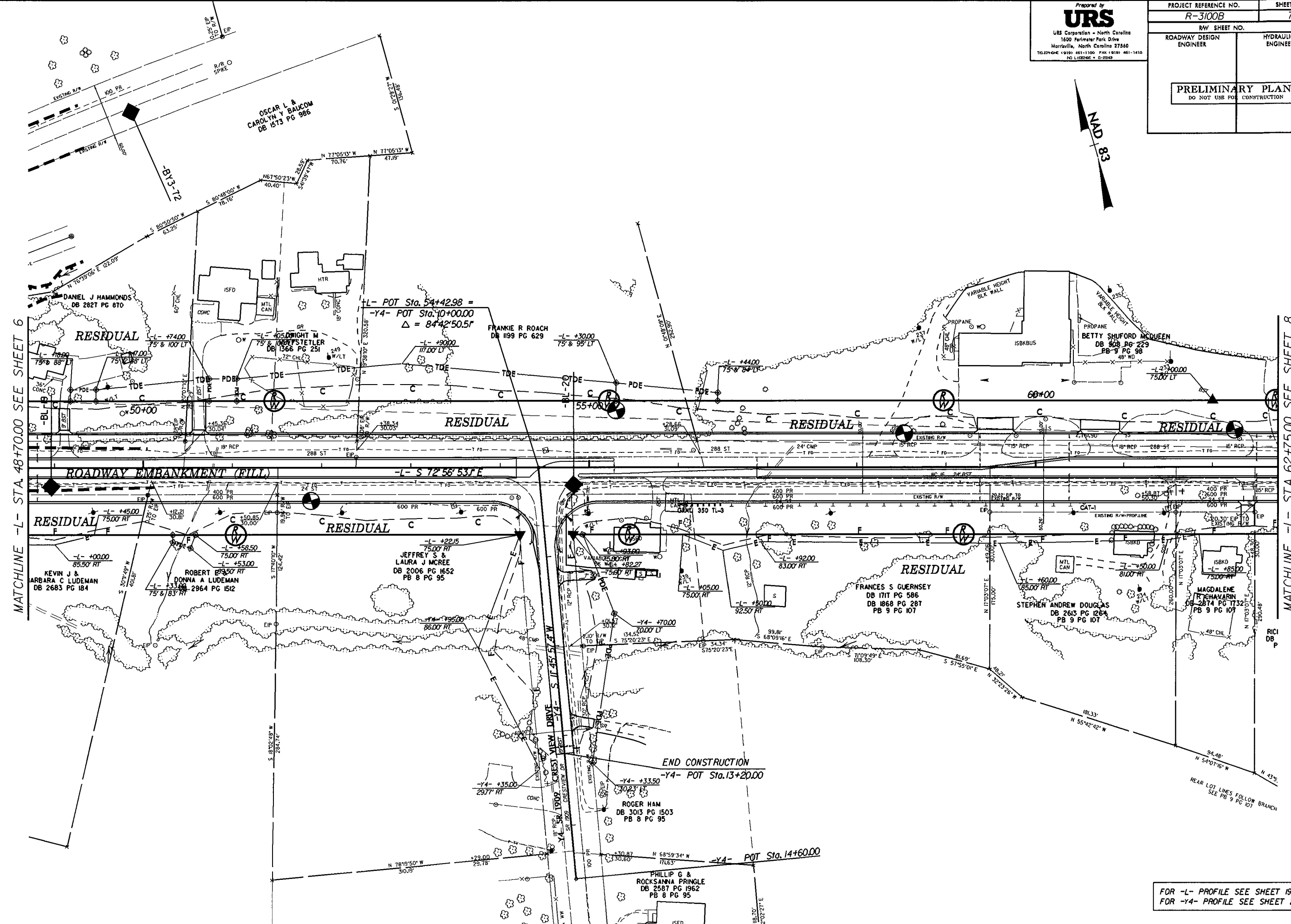
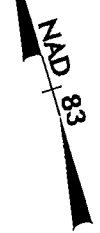


FOR -L- PROFILE SEE SHEET 19
 FOR -Y2- PROFILE SEE SHEET 25
 FOR -Y3- PROFILE SEE SHEET 25

8/17/99

Prepared by
URS
URS Corporation - North Carolina
1600 Perimeter Park Drive
Morrisville, North Carolina 27560
703.276.6000 FAX 703.276.6001
NO. 110200000 - 0-0000

PROJECT REFERENCE NO. R-3100B	SHEET NO. 7
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



MATCHLINE -L- STA 48+70.00 SEE SHEET 6

MATCHLINE -L- STA 62+75.00 SEE SHEET 8

REVISIONS

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FOR -L- PROFILE SEE SHEET 19
FOR -Y4- PROFILE SEE SHEET 25

END CONSTRUCTION
-Y4- POT Sta. 13+20.00

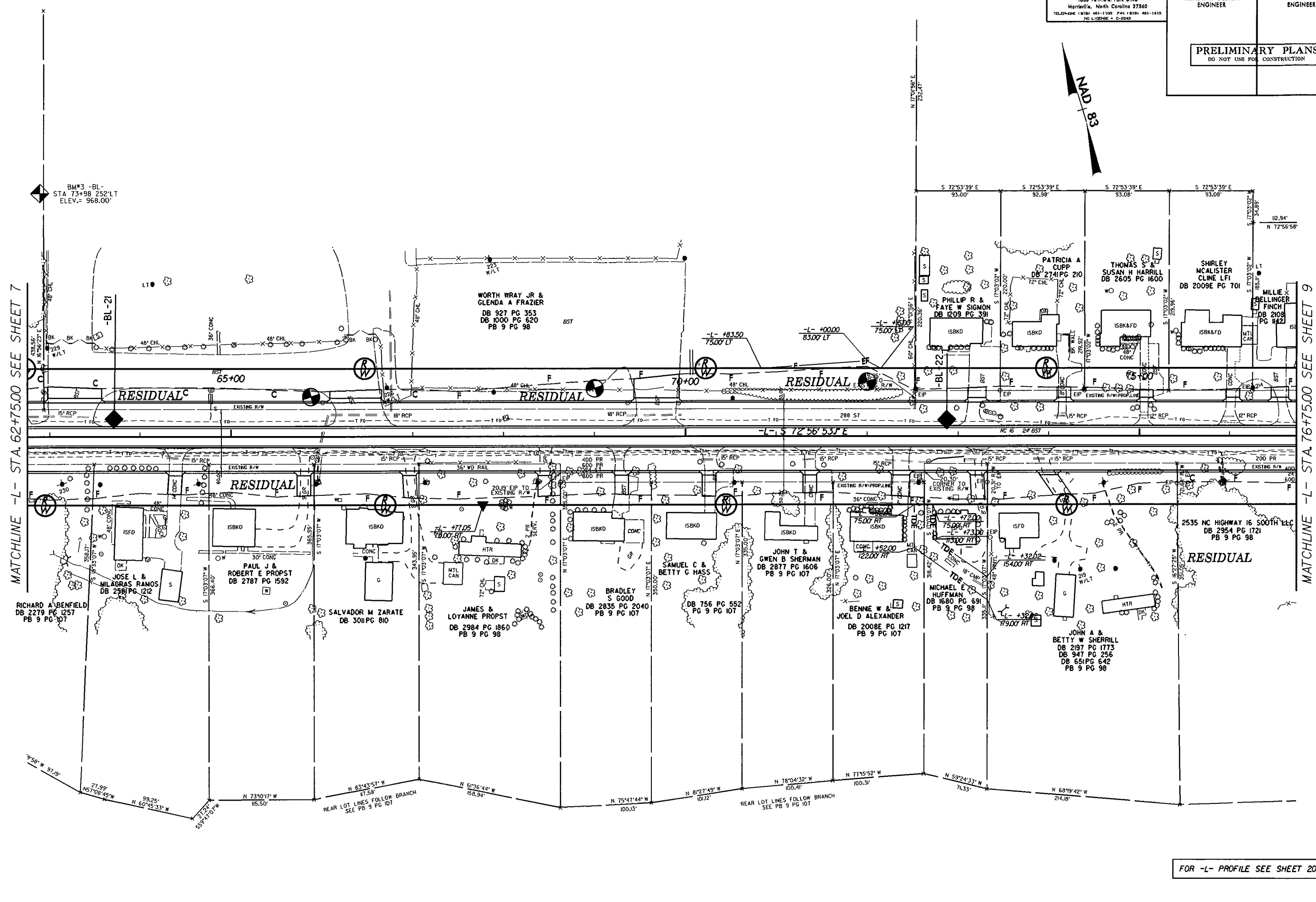
-Y4- POT Sta. 14+60.00

-L- POT Sta. 54+42.98 =
-Y4- POT Sta. 40+00.00
Δ = 84'42"50.51'

8/17/99

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 Morrisville, North Carolina 27560
 TELEPHONE (919) 461-1100 FAX (919) 461-1414
 NO. L10296 - 0-2043

PROJECT REFERENCE NO.	SHEET NO.
R-3100B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	



MATCHLINE -L- STA. 62+75.00 SEE SHEET 7

MATCHLINE -L- STA. 76+75.00 SEE SHEET 9

REVISIONS

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FOR -L- PROFILE SEE SHEET 20

8/17/99

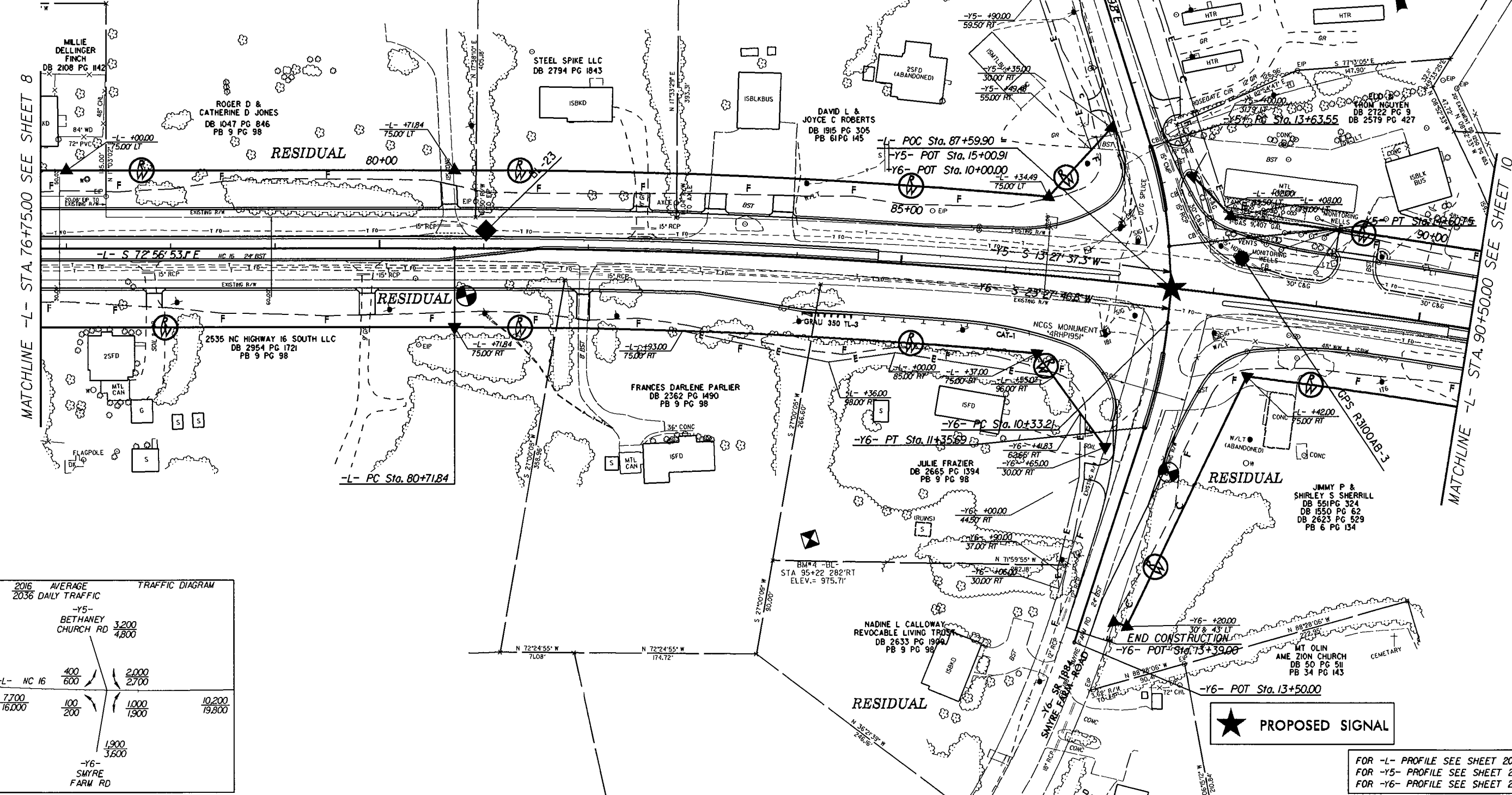
Prepared by
URS
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Morrisville, North Carolina 27560
TELEPHONE (919) 481-1100 FAX (919) 481-1415
PG 1.000000 - C-0000

PROJECT REFERENCE NO.	R-3100B	SHEET NO.	9
RAW SHEET NO.		ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

-L-
 PI Sta 88+49.20
 $\Delta = 14' 24" 28.5" (RT)$
 $D = 0' 55" 53.9"$
 $L = 1546.51'$
 $T = 777.36'$
 $R = 61500.0'$
 $e = RC$
 Runoff = 72'

-Y5-
 PI Sta 14+12.39
 $\Delta = 13' 55" 23.5" (RT)$
 $D = 14' 19" 26.2"$
 $L = 97.20'$
 $T = 48.84'$
 $R = 400.00'$
 $e = RC$
 Runoff = 80'

-Y6-
 PI Sta 10+84.63
 $\Delta = 11' 44" 35.3" (RT)$
 $D = 11' 27" 33.0"$
 $L = 102.48'$
 $T = 51.42'$
 $R = 500.00'$
 $e = RC$
 Runoff = 46'



2016 AVERAGE TRAFFIC DIAGRAM
2036 DAILY TRAFFIC

-Y5- BETHANEY CHURCH RD		3,200 4,800	
-L- NC 16	400 600	2,000 2,700	
	7,700 16,000	100 200	1,000 1,900
		1,900 3,600	10,200 19,800
-Y6- SMYRE FARM RD			

★ PROPOSED SIGNAL

FOR -L- PROFILE SEE SHEET 20
FOR -Y5- PROFILE SEE SHEET 25
FOR -Y6- PROFILE SEE SHEET 25

REVISIONS

07-JAN-2014 09:24
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MATCHLINE -L- STA. 76+75.00 SEE SHEET 8

MATCHLINE -L- STA. 90+50.00 SEE SHEET 10

8/17/99

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1600 Perimeter Park Drive
Harrisville, North Carolina 27540
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PG 110286E - C-2243

PROJECT REFERENCE NO.	SHEET NO.
R-3100B	10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	

-L-
 PI Sta 88+49.20
 $\Delta = 14' 24" 28.5' (RT)$
 $D = 0' 55" 53.9'$
 $L = 1,546.51'$
 $T = 777.36'$
 $R = 6,150.00'$
 $e = RC$
 Runoff = 72'

THELMA GANTT SHERRILL
 DB 467 PG 244
 DB 760 PG 104
 DB 1241 PG 903
 DB 1250 PG 653
 DB 1778 PG 651

JAMES W POWELL JR
 DB 1528 PG 581
 DB 1602 PG 456

DONALD RALPH SHERRILL
 DB 1678 PG 422

BM#5 -BL-
 STA 114+32 193'LT
 ELEV. = 1006.46'

RESIDUAL

BELLSOUTH
 TELECOMMUNICATIONS INC
 DB 1445 PG 993
 PB 6 PG 134

BILL CECIL SHERRILL
 DB 760 PG 102

-L- POT Sta. 101+53.73 =
 -Y7- POT Sta. 10+00.00
 $\Delta = 72' 30" 16.4'$

RESIDUAL

-L- IS 58' 32" 246' E

MATCHLINE -L- STA. 90+50.00 SEE SHEET 9

MATCHLINE -L- STA. 104+50.00 SEE SHEET 11

JIMMY P &
 SHIRLEY S SHERRILL
 DB 551 PG 324
 DB 550 PG 62
 DB 2623 PG 529
 PB 6 PG 134

JIMMY P &
 SHIRLEY S SHERRILL
 DB 551 PG 324
 DB 550 PG 62
 DB 2623 PG 529
 PB 6 PG 134

THELMA GANTT SHERRILL
 DB 1778 PG 651

RESIDUAL

DRUMS PARTNERSHIP #1
 DB 1917 PG 273
 PB 6 PG 134

DARRELL C &
 GLONDA L DRUM
 DB 1917 PG 273
 PB 6 PG 134

END CONSTRUCTION
 -Y7- POT Sta. 13+00.00

RESIDUAL

-Y7- POT Sta. 14+49.87

FOR -L- PROFILE SEE SHEET 21
 FOR -Y7- PROFILE SEE SHEET 26

REVISIONS

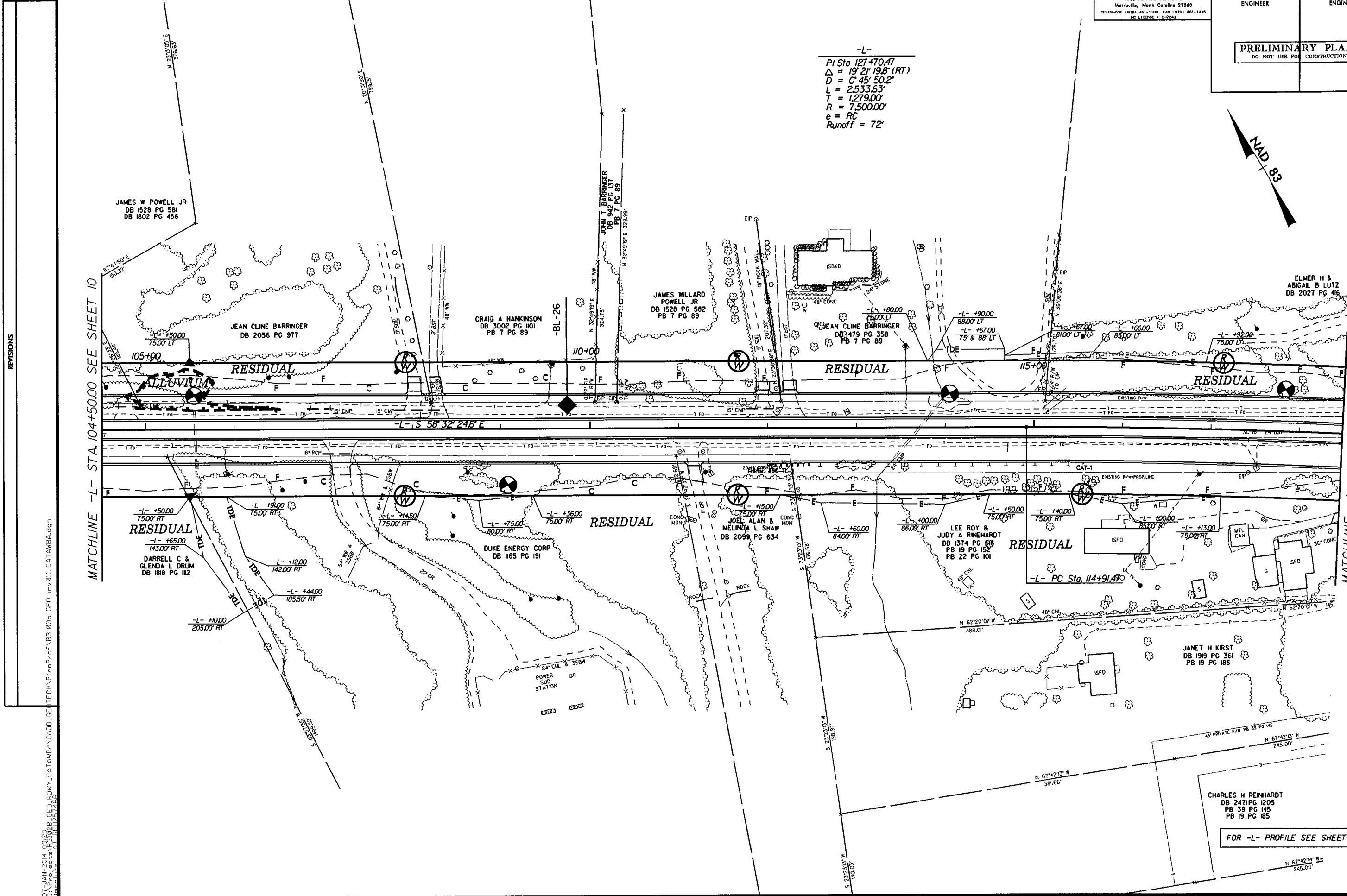
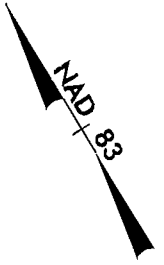
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 PROJECTS AT 07/25/2014

8/17/99

Prepared by
URS
URS Corporation - North Carolina
1600 Piedmont Park Drive
Morrisville, North Carolina 27560
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NC LICENSE # C-2243

PROJECT REFERENCE NO.	SHEET NO.
R-3100B	11
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	

-L-
 PI Sta 127+70.47
 $\Delta = 19' 21" 19.8" (RT)$
 $D = 0' 45" 50.2"$
 $L = 2533.63'$
 $T = 1279.00'$
 $R = 7500.00'$
 $e = RC$
 Runoff = 72'



MATCHLINE -L- STA. 104+50.00 SEE SHEET 10

MATCHLINE -L- STA. 118+50.00 SEE SHEET 12

REVISIONS

07 JAN 2014 08:55
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 11/15/99
 11/15/99

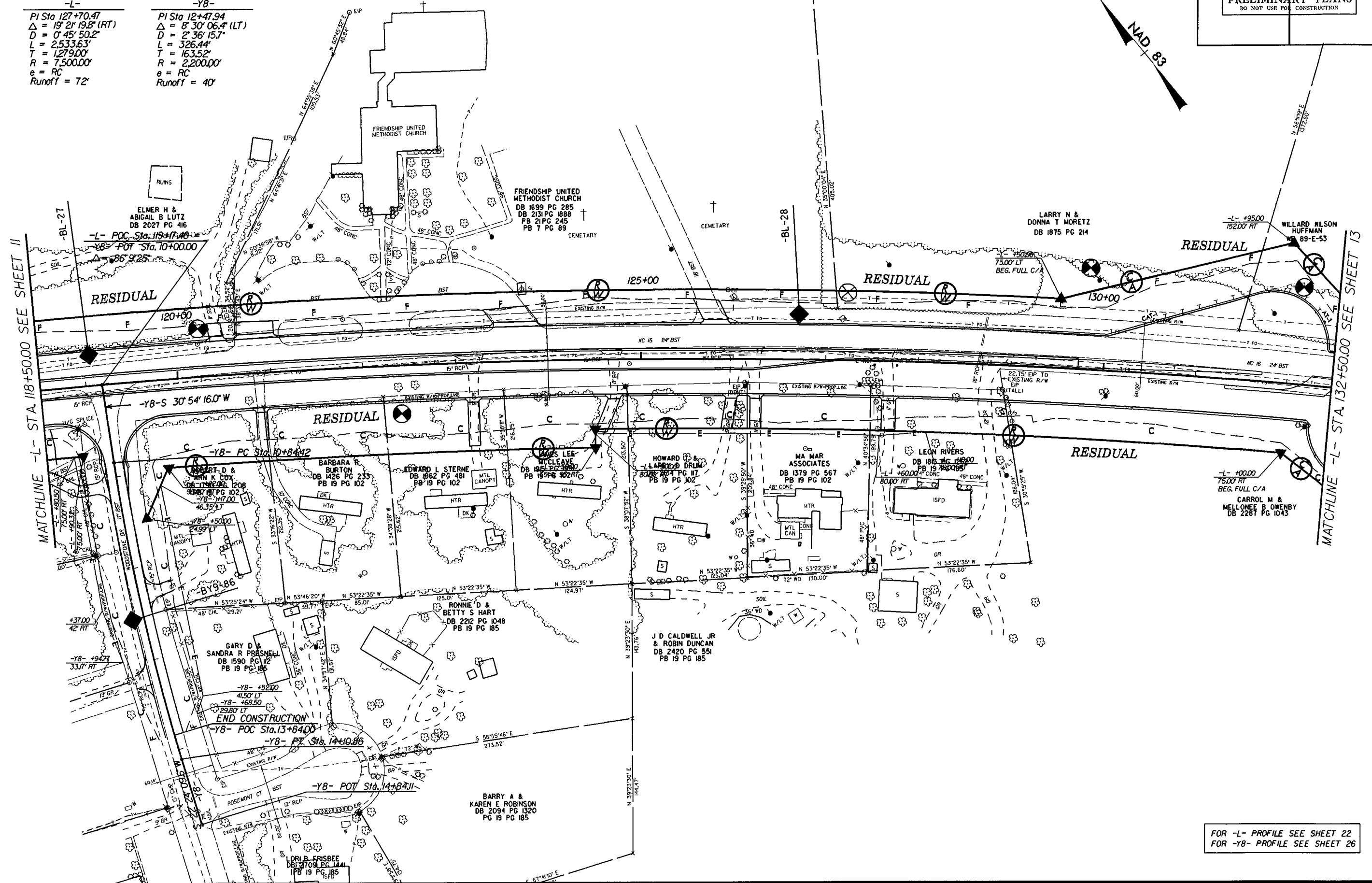
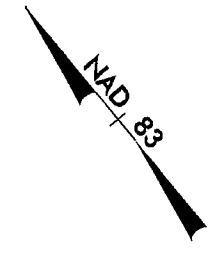
FOR -L- PROFILE SEE SHEET 21

8/17/99

Prepared by
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NC LICENSE # 0-2843

PROJECT REFERENCE NO.	SHEET NO.
R-3100B	12
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	

<p>-L-</p> <p>PI Sta 127+70.47 $\Delta = 19' 21" 19.8" (RT)$ $D = 0' 45' 50.2"$ $L = 2,533.63'$ $T = 1,279.00'$ $R = 7,500.00'$ $e = RC$ Runoff = 72'</p>	<p>-Y8-</p> <p>PI Sta 12+47.94 $\Delta = 8' 30' 06.4" (LT)$ $D = 2' 36' 15.7"$ $L = 326.44'$ $T = 163.52'$ $R = 2,200.00'$ $e = RC$ Runoff = 40'</p>
--	---



REVISIONS

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FOR -L- PROFILE SEE SHEET 22
FOR -Y8- PROFILE SEE SHEET 26

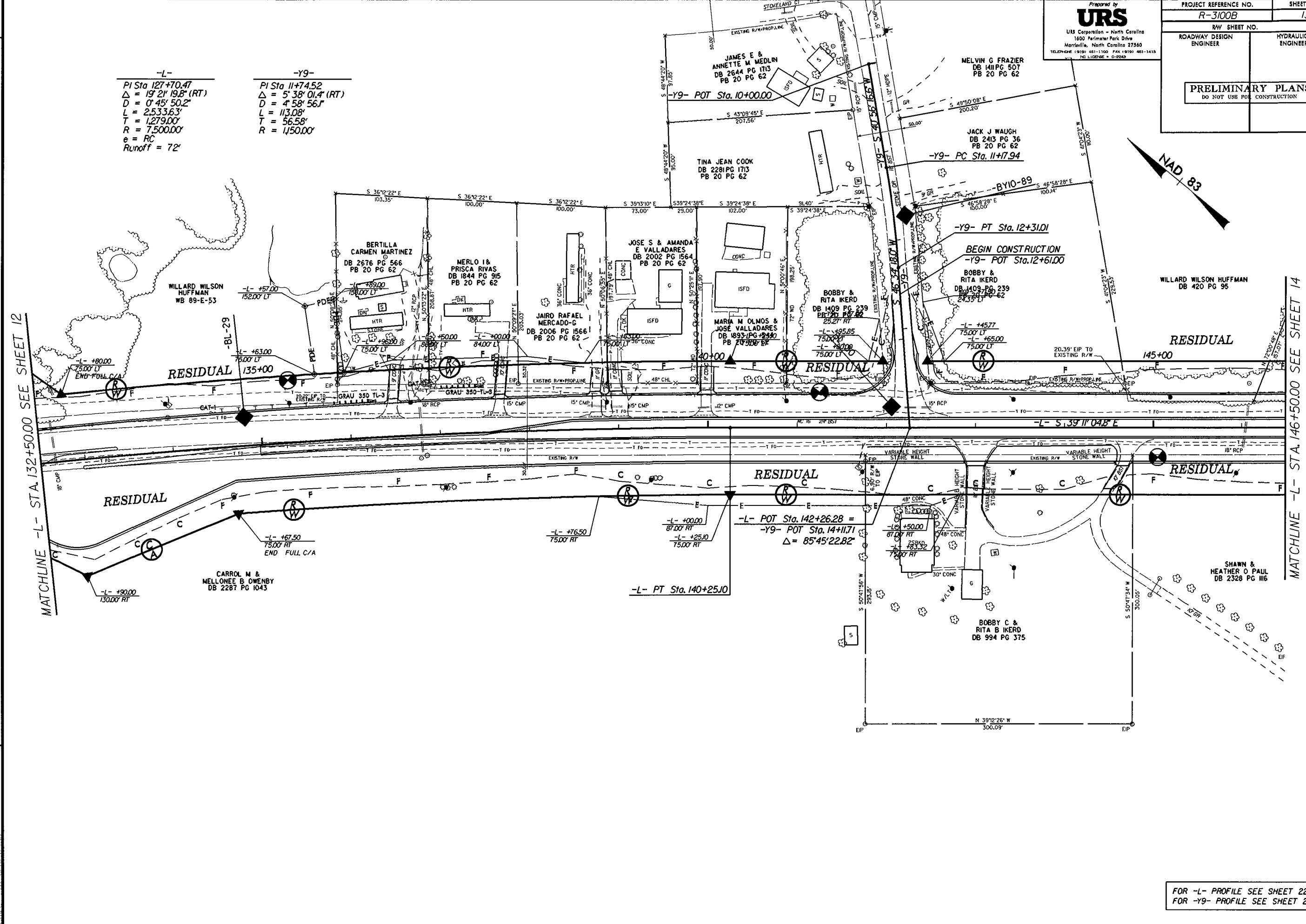
8/17/99

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N.C. LICENSE # C-2043

PROJECT REFERENCE NO. R-3100B	SHEET NO. 13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-L-
PI Sta 127+70.47
 $\Delta = 19' 21'' 19.8''$ (RT)
 $D = 0' 45'' 50.2''$
 $L = 2,533.63'$
 $T = 1,279.00'$
 $R = 7,500.00'$
 $e = RC$
Runoff = 72'

-Y9-
PI Sta 11+74.52
 $\Delta = 5' 38'' 01.4''$ (RT)
 $D = 4' 58'' 56.1''$
 $L = 113.08'$
 $T = 56.58'$
 $R = 1,150.00'$



REVISIONS

MATCHLINE -L- STA. 132+50.00 SEE SHEET 12

MATCHLINE -L- STA. 146+50.00 SEE SHEET 14

FOR -L- PROFILE SEE SHEET 22
FOR -Y9- PROFILE SEE SHEET 26

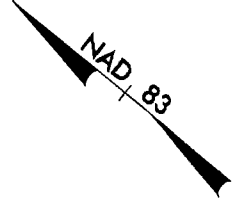
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8/17/99

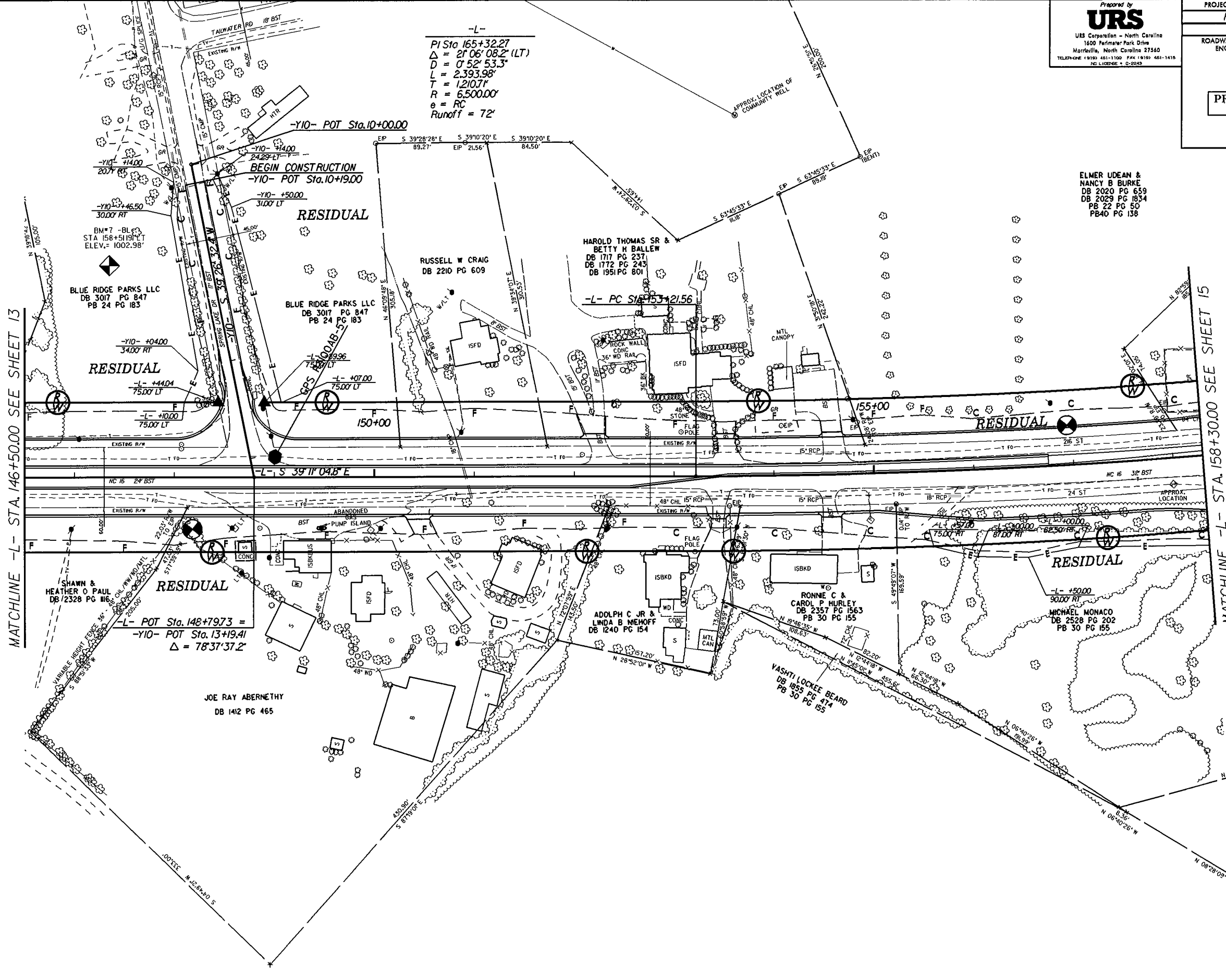
Prepared by
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Morrisville, North Carolina 27560
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NO. L10000000 - 0-2049

PROJECT REFERENCE NO.	SHEET NO.
R-3100B	14
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

ELMER UDEAN &
NANCY B BURKE
DB 2020 PG 659
DB 2029 PG 1894
PB 22 PG 50
PB40 PG 138



-L-
PI Sta 165+32.27
 $\Delta = 21^{\circ} 06' 08.2" (LT)$
 $D = 0^{\circ} 52' 53.3"$
 $L = 2,393.98'$
 $T = 1210.71'$
 $R = 6,500.00'$
 $e = RC$
Runoff = 72'



MATCHLINE -L- STA. 146+50.00 SEE SHEET 13

MATCHLINE -L- STA. 158+30.00 SEE SHEET 15

REVISIONS

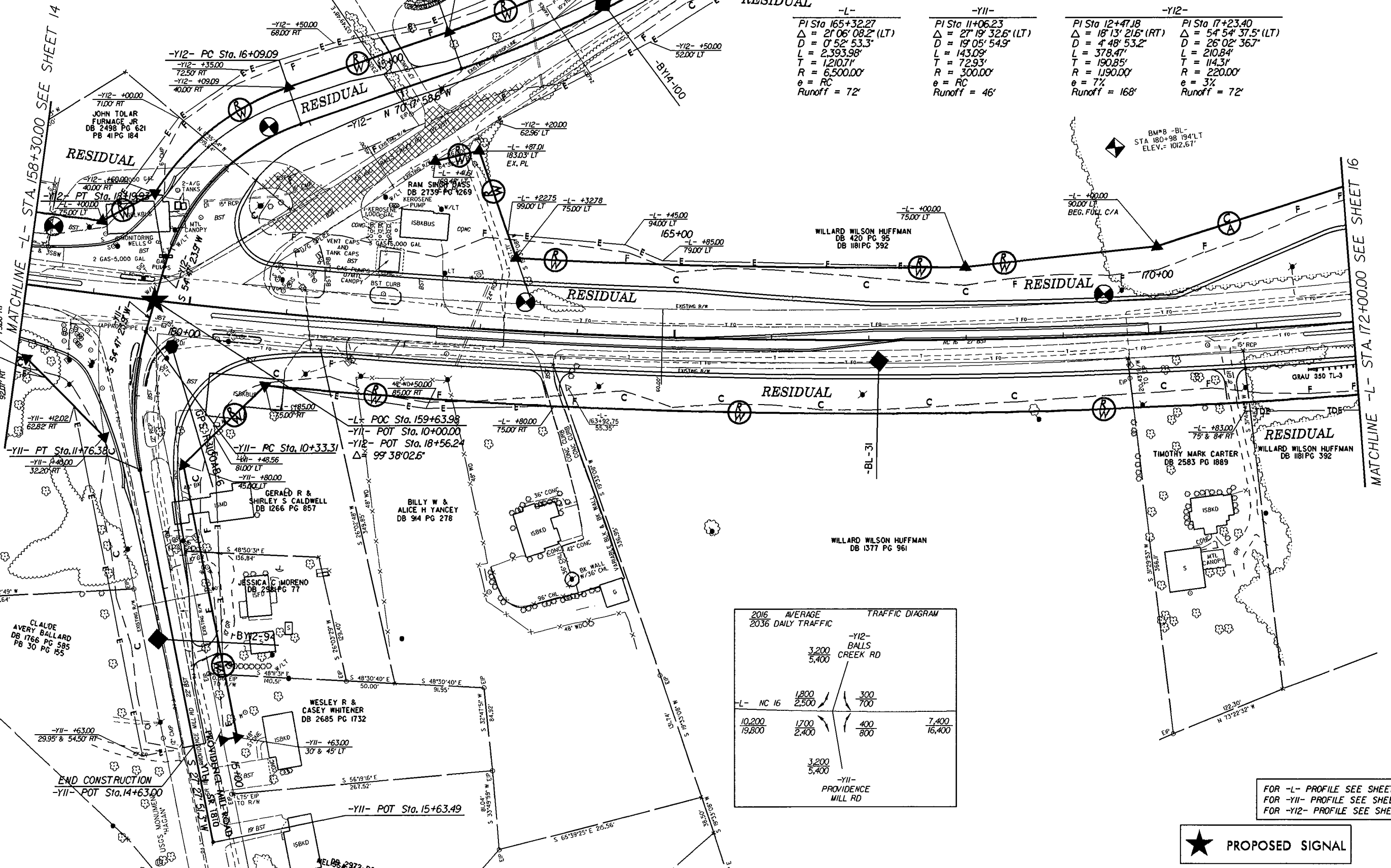
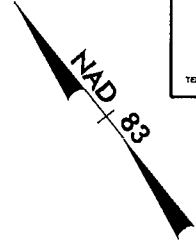
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FOR -L- PROFILE SEE SHEET 23
FOR -Y10- PROFILE SEE SHEET 26

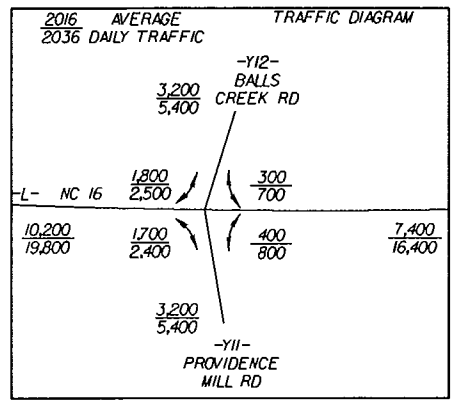
8/17/09
07-JAN-2014 09:36
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TECH\PLN\PROJ\14000\14000.dgn

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PROJECT REFERENCE NO.	SHEET NO.
R-3100B	15
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	



-L-	-YII-	-YI2-
PI Sta 165+32.27 Δ = 21° 06' 08.2" (LT) D = 0' 52' 53.3" L = 2,393.98' T = 1,210.71' R = 6,500.00' e = RC Runoff = 72'	PI Sta 11+06.23 Δ = 27° 19' 32.6" (LT) D = 19' 05' 54.9" L = 143.09' T = 72.93' R = 300.00' e = RC Runoff = 46'	PI Sta 12+47.18 Δ = 18' 13' 21.6" (RT) D = 4' 48' 53.2" L = 378.47' T = 190.85' R = 1,190.00' e = 7% Runoff = 168'
PI Sta 17+23.40 Δ = 54° 54' 37.5" (LT) D = 26' 02' 36.7" L = 210.84' T = 114.31' R = 220.00' e = 3% Runoff = 72'		



FOR -L- PROFILE SEE SHEET 23
FOR -YII- PROFILE SEE SHEET 26
FOR -YI2- PROFILE SEE SHEET 27

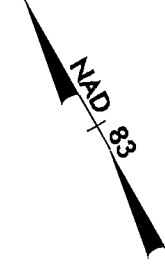


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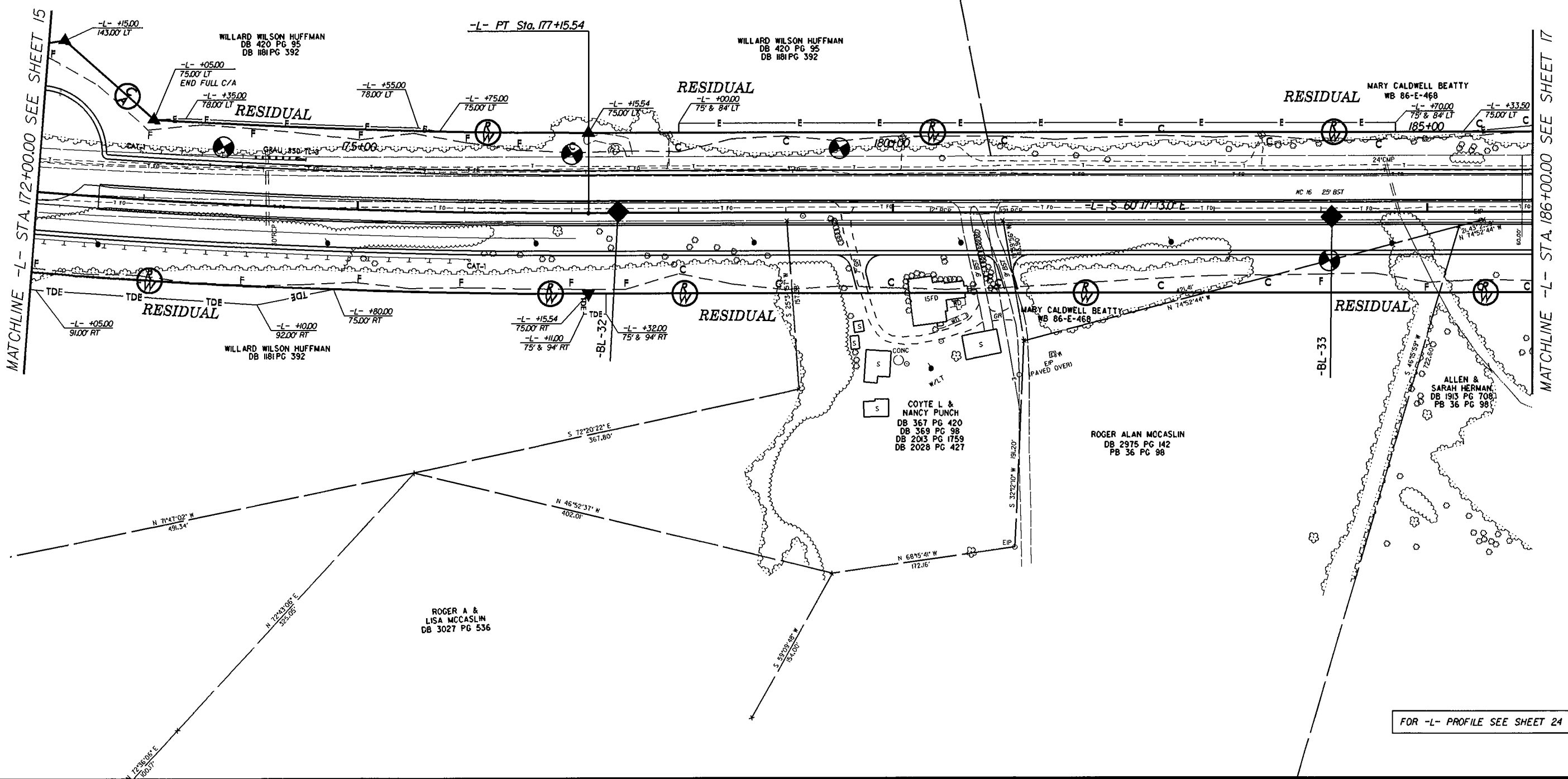
8/17/99

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NC LICENSE # C-2243

PROJECT REFERENCE NO. R-3100B	SHEET NO. 16
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



-L-
 PI Sta 165+32.27
 $\Delta = 21' 06" 08.2" (LT)$
 $D = 0' 52" 53.3"$
 $L = 2,393.98'$
 $T = 1,210.71'$
 $R = 6,500.00'$
 $e = RC$
 Runoff = 72'



REVISIONS

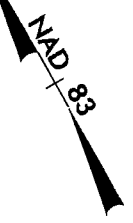
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 11/11/2013 10:46:26 AM

FOR -L- PROFILE SEE SHEET 24

8/17/99

Prepared by
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 NC LICENSE # C-2043

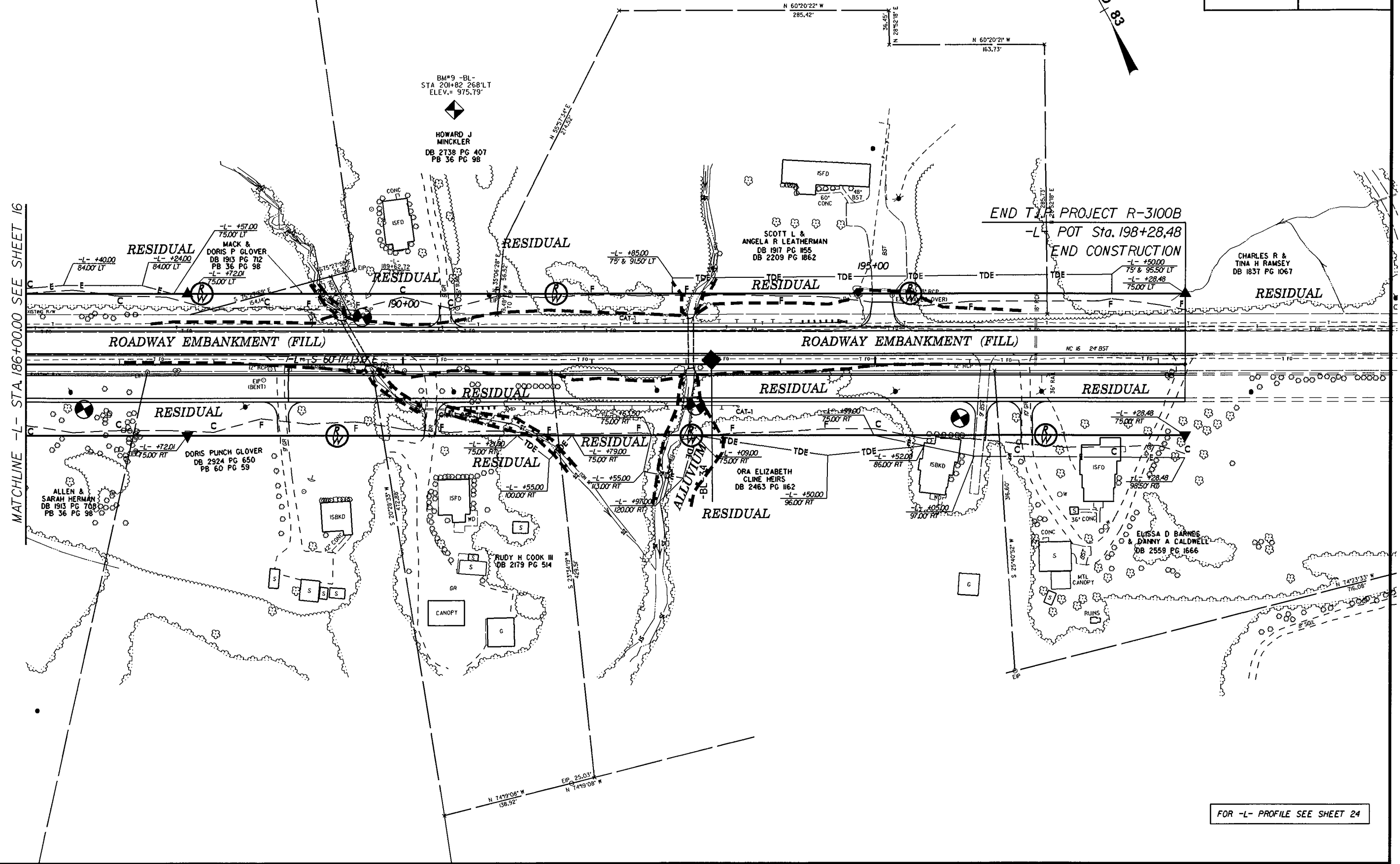
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R-3100B	17
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



MATCHLINE -L- STA. 186+00.00 SEE SHEET 16

REVISIONS

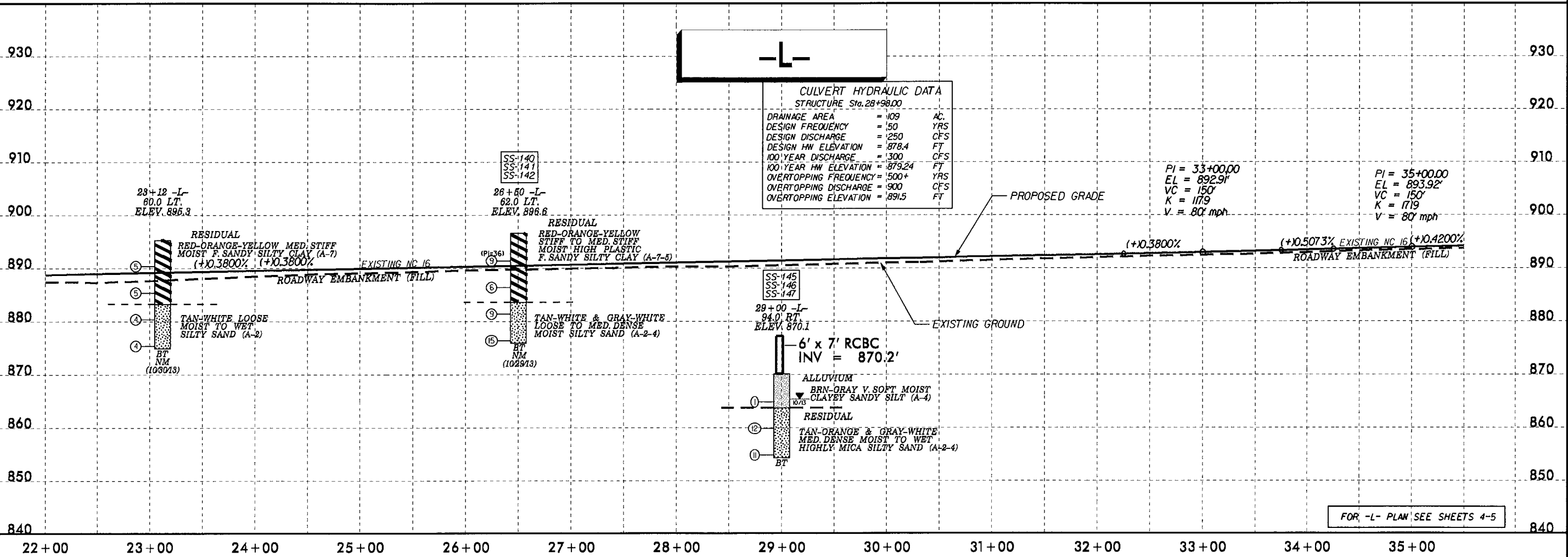
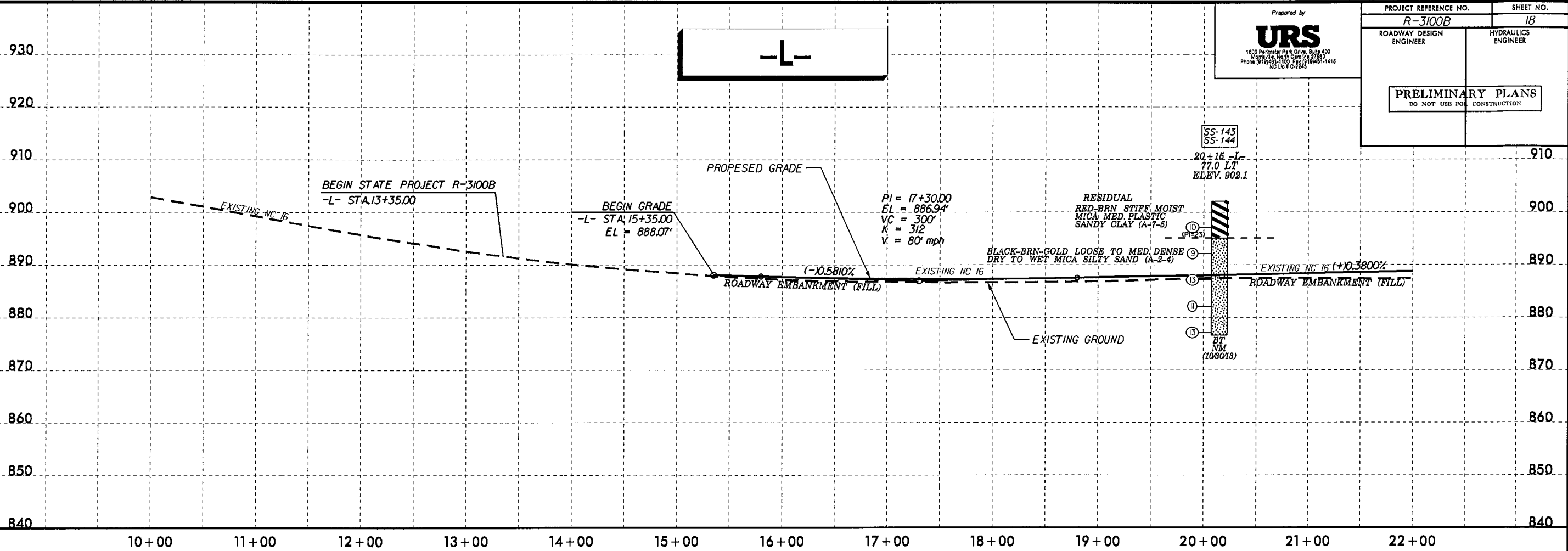
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FOR -L- PROFILE SEE SHEET 24

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Prepared by <h2 style="text-align: center;">URS</h2> <small>1800 Parkway Park Drive, Suite 400 Winston-Salem, North Carolina 27603 Phone (703) 441-1000 Fax (703) 441-1418 NO Lic # 0-2245</small>		PROJECT REFERENCE NO. <h3 style="text-align: center;">R-3100B</h3>	SHEET NO. <h3 style="text-align: center;">18</h3>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER		
PRELIMINARY PLANS <small>DO NOT USE FOR CONSTRUCTION</small>			



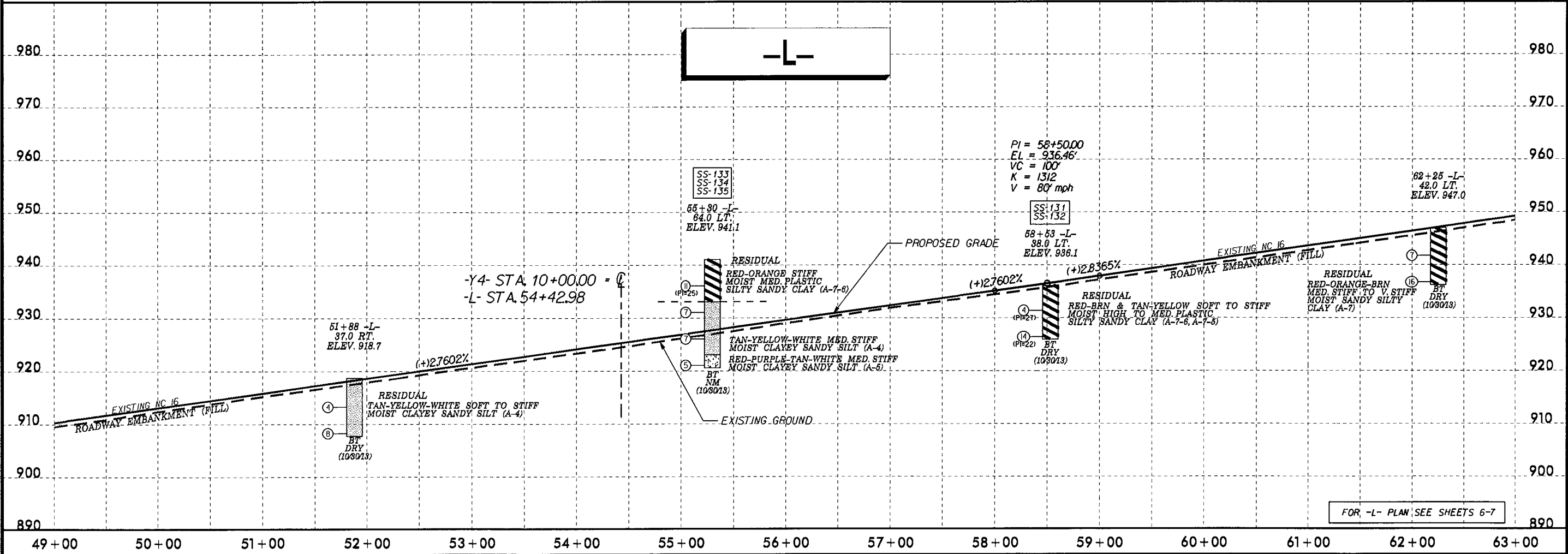
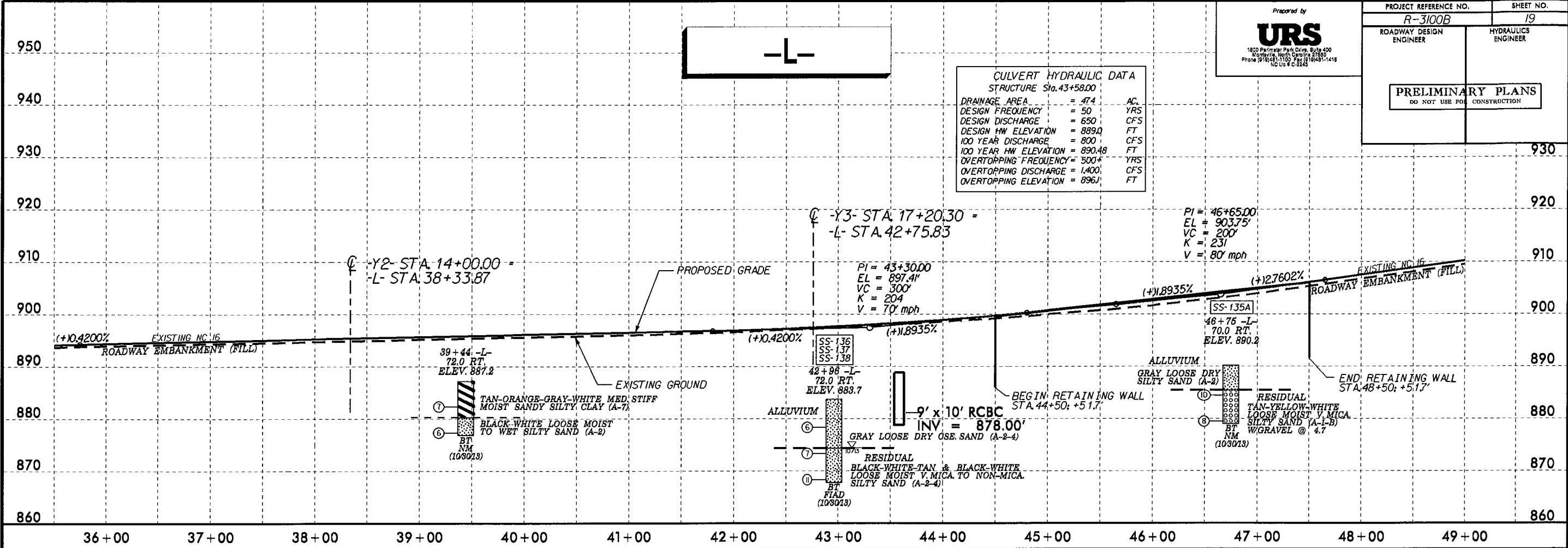
FOR -L- PLAN SEE SHEETS 4-5

5/28/99



PROJECT REFERENCE NO. R-3100B	SHEET NO. 19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

CULVERT HYDRAULIC DATA	
STRUCTURE STA. 43+58.00	
DRAINAGE AREA	= 474 AC.
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 650 CFS
DESIGN HW ELEVATION	= 889.0 FT
100 YEAR DISCHARGE	= 800 CFS
100 YEAR HW ELEVATION	= 890.48 FT
OVERTOPPING FREQUENCY	= 500 YRS
OVERTOPPING DISCHARGE	= 1,400 CFS
OVERTOPPING ELEVATION	= 896.1 FT



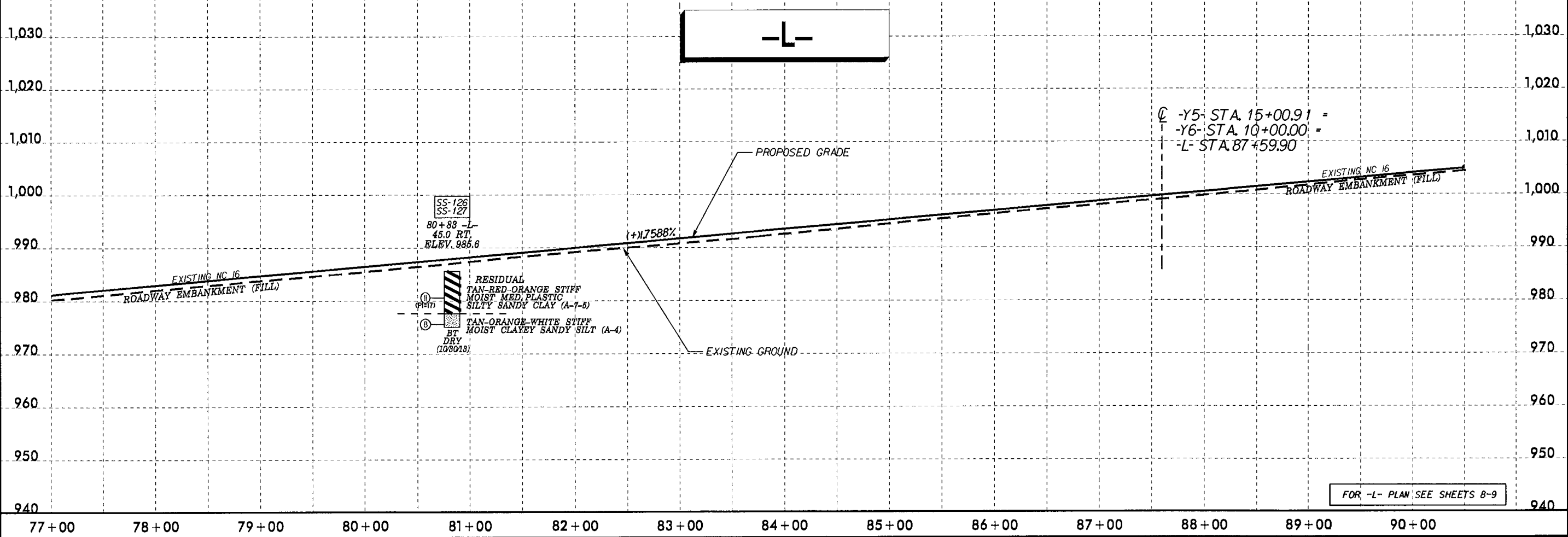
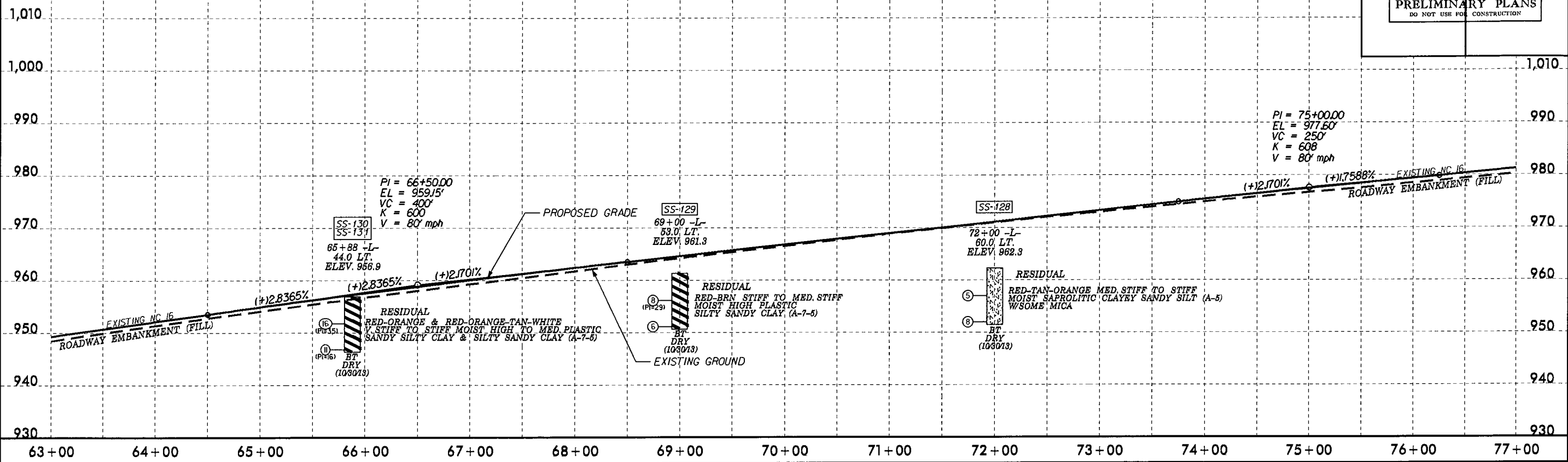
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5/28/99

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PROJECT REFERENCE NO. R-3100B	SHEET NO. 20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



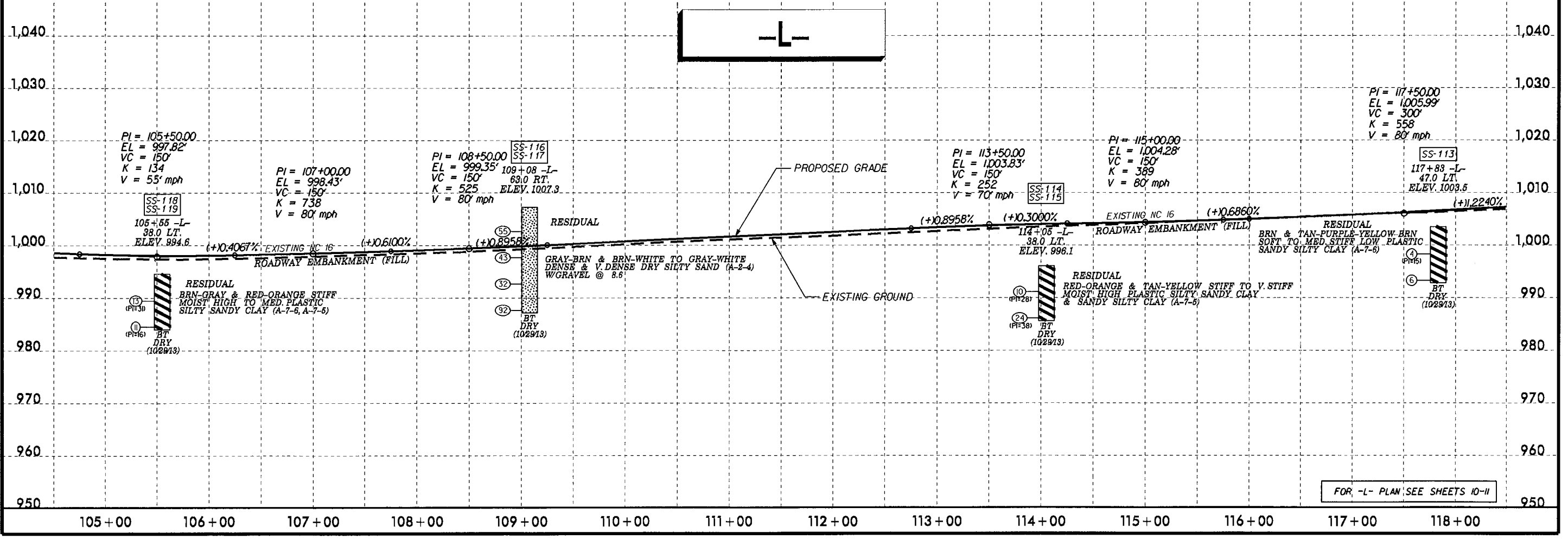
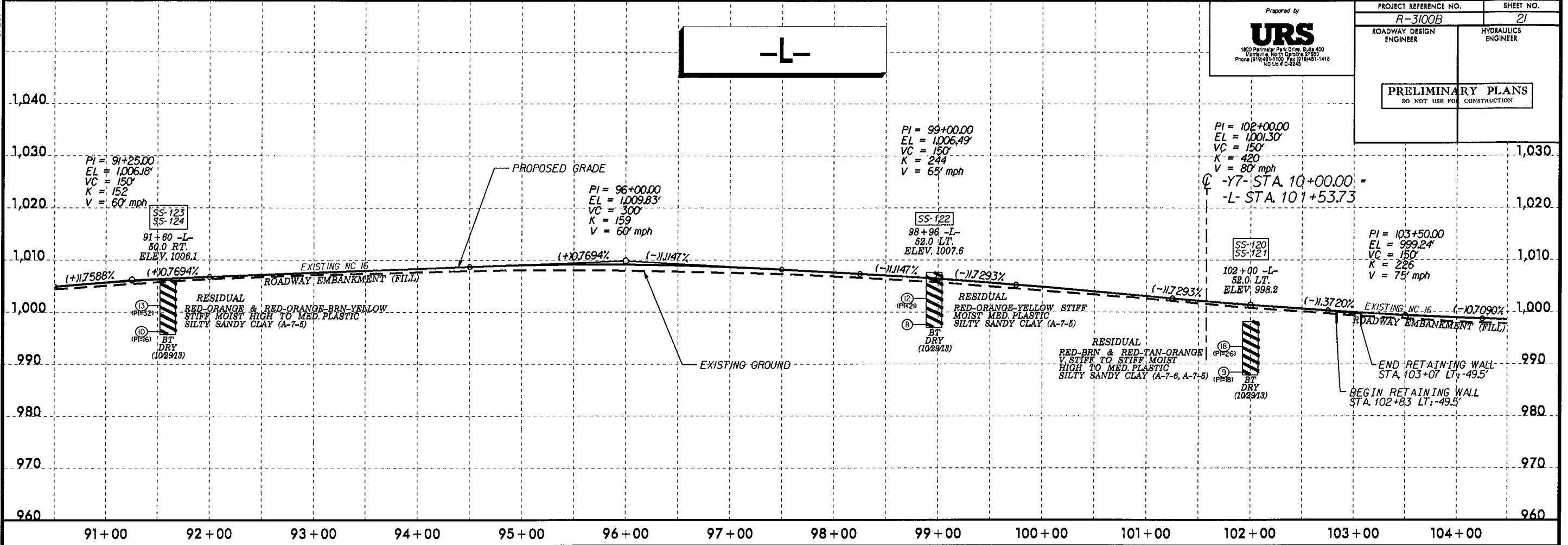
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5/28/09

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 1800 Peninsula Park Drive, Suite 400
 Walnut Creek, CA 94597
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PROJECT REFERENCE NO. R-3100B	SHEET NO. 21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



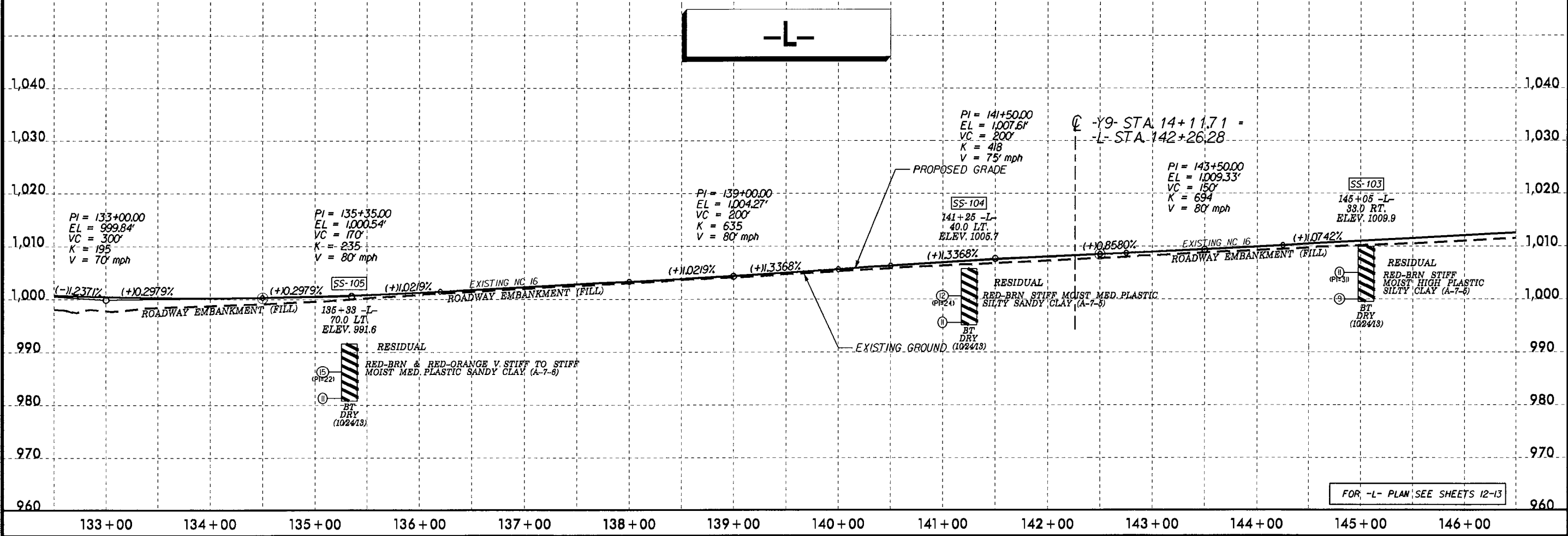
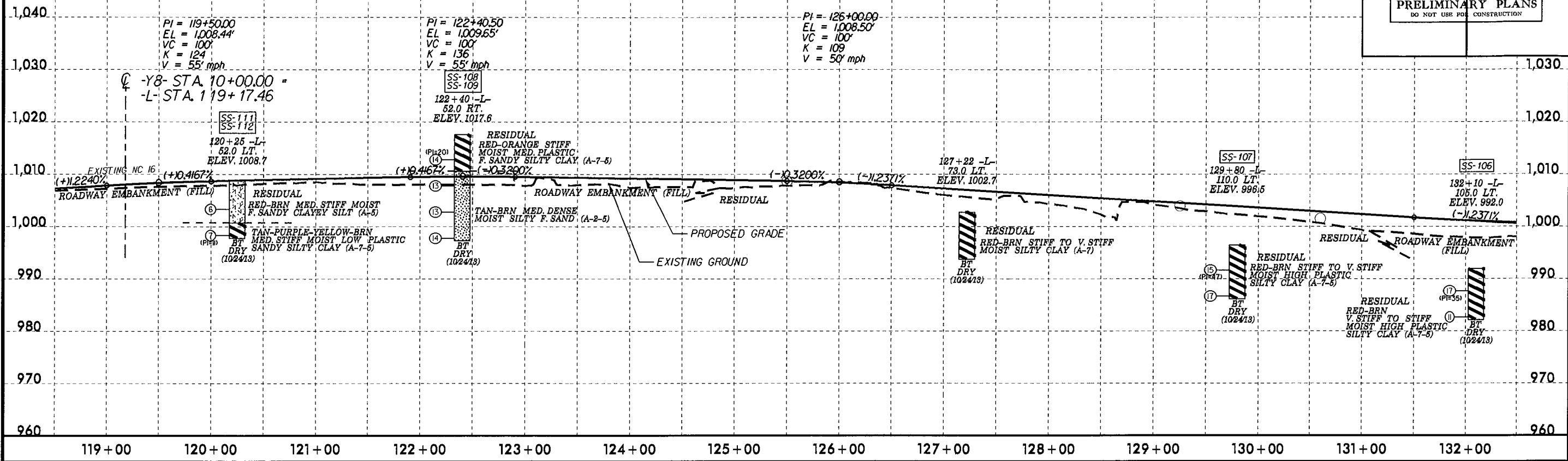
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5/28/95

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PROJECT REFERENCE NO. R-3100B	SHEET NO. 22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



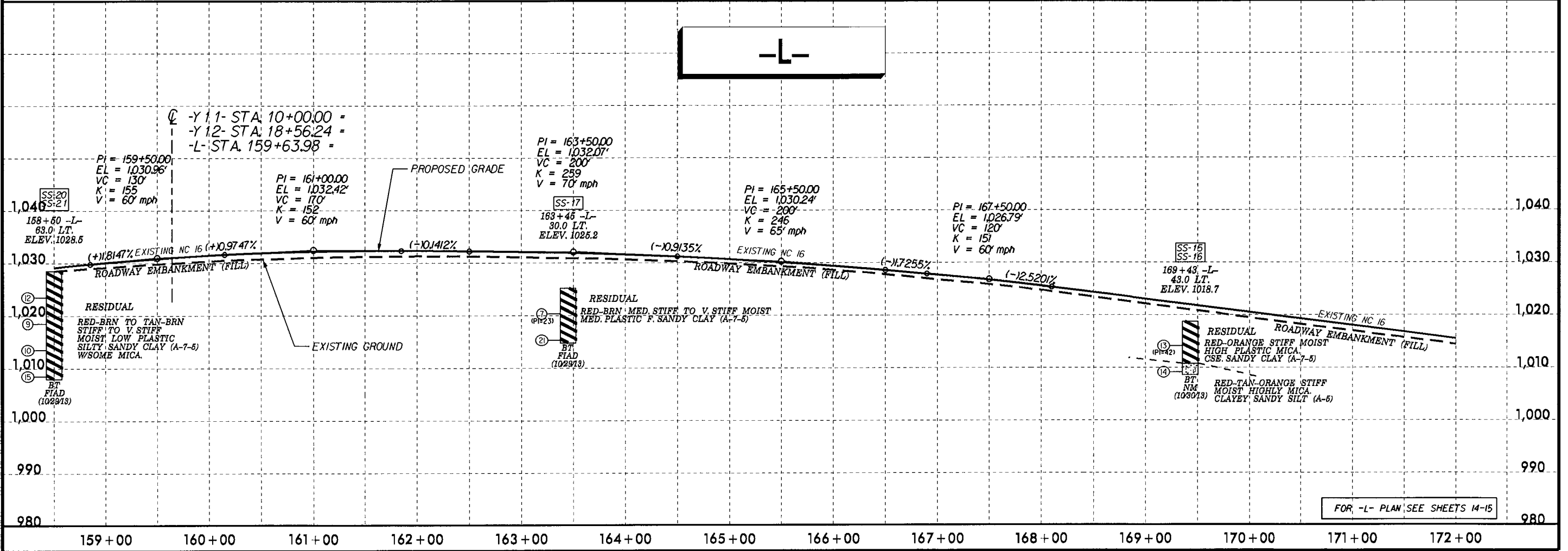
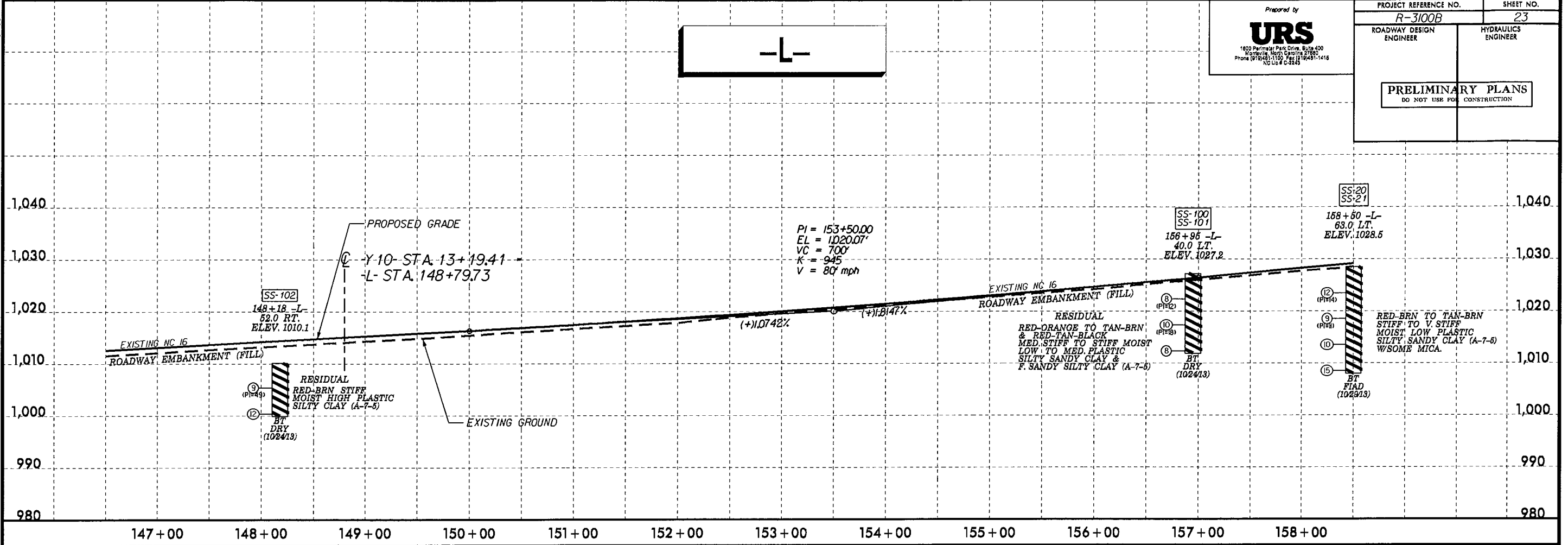
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5/28/99

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 NC Lic # C-2245

PROJECT REFERENCE NO. R-3100B	SHEET NO. 23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



FOR -L- PLAN SEE SHEETS 14-15

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 10/23/03 10:33:00 AM

Prepared by

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 Raleigh, NC 27607
 Phone: (919) 481-1100 Fax: (919) 481-1416
 NG Lic # C-2243

PROJECT REFERENCE NO. **R-3100B**

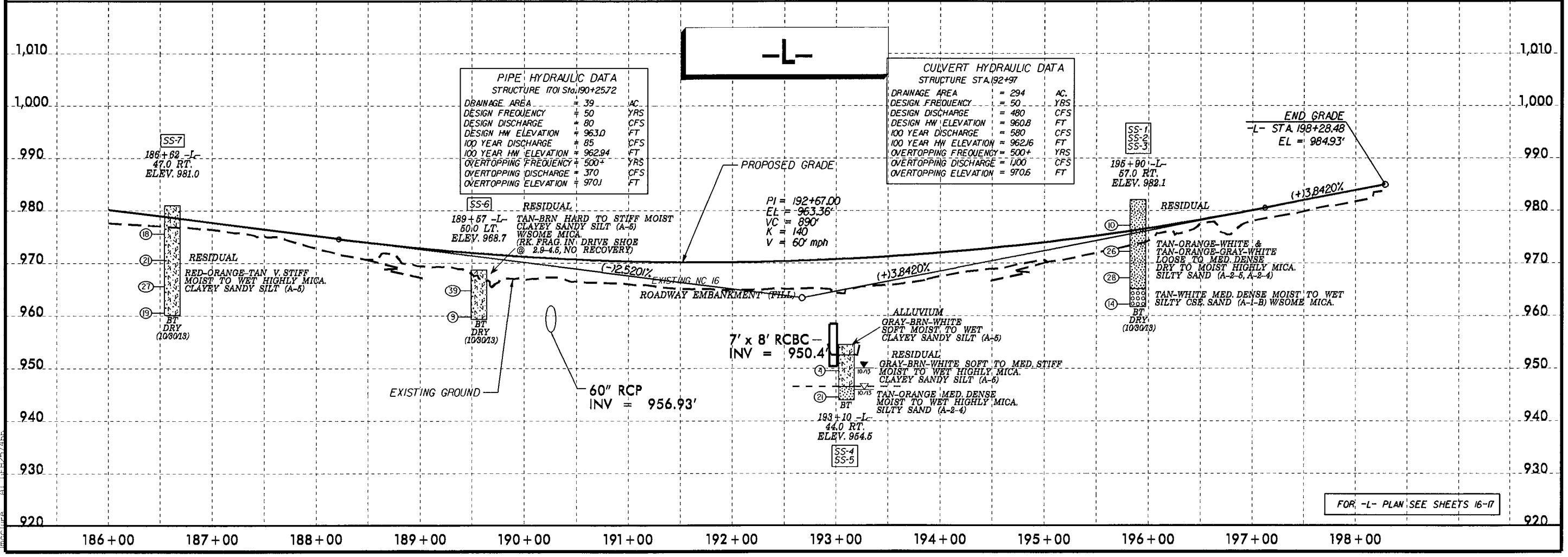
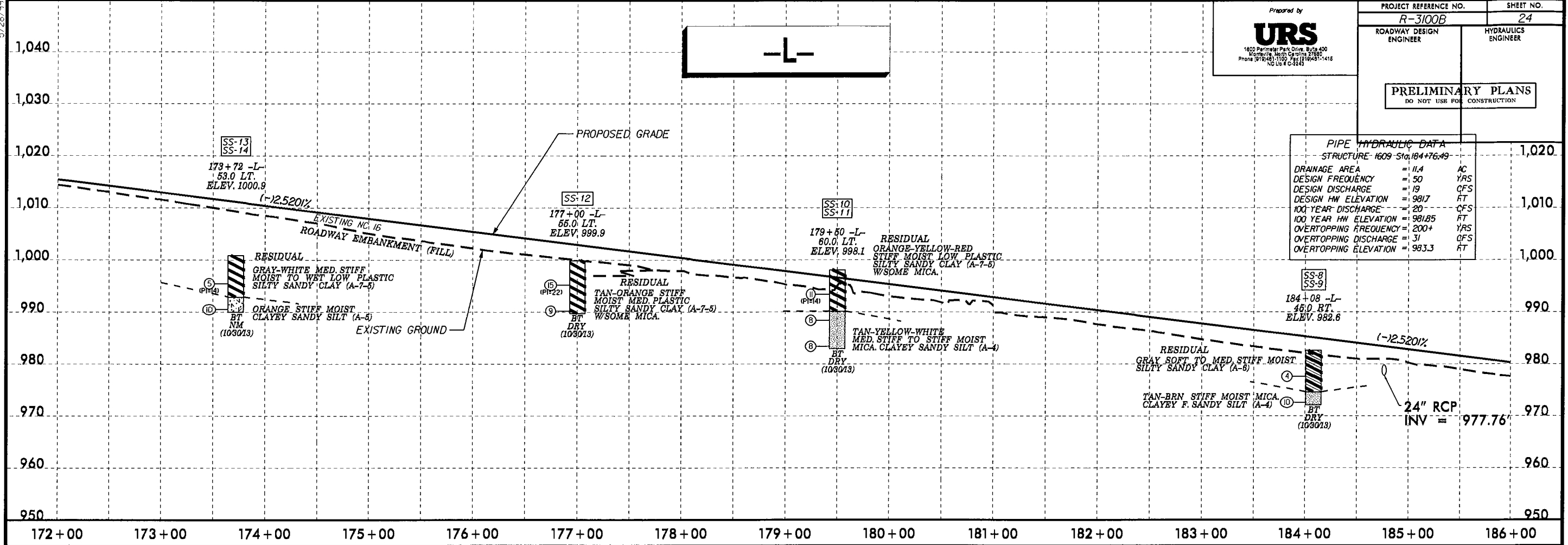
SHEET NO. **24**

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

PRELIMINARY PLANS
 DO NOT USE FOR CONSTRUCTION

PIPE HYDRAULIC DATA	
STRUCTURE STA. 184+76.49	
DRAINAGE AREA	= 11.4 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 19 CFS
DESIGN HW ELEVATION	= 981.7 FT
100 YEAR DISCHARGE	= 20 CFS
100 YEAR HW ELEVATION	= 981.85 FT
OVERTOPPING FREQUENCY	= 200+ YRS
OVERTOPPING DISCHARGE	= 31 CFS
OVERTOPPING ELEVATION	= 983.3 FT



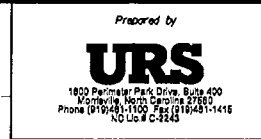
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STRUCTURE STA. 190+25.72	
DRAINAGE AREA	= 39 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 80 CFS
DESIGN HW ELEVATION	= 963.0 FT
100 YEAR DISCHARGE	= 85 CFS
100 YEAR HW ELEVATION	= 962.94 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 370 CFS
OVERTOPPING ELEVATION	= 970.1 FT

CULVERT HYDRAULIC DATA	
STRUCTURE STA. 192+97	
DRAINAGE AREA	= 294 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 480 CFS
DESIGN HW ELEVATION	= 960.8 FT
100 YEAR DISCHARGE	= 580 CFS
100 YEAR HW ELEVATION	= 962.16 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 1100 CFS
OVERTOPPING ELEVATION	= 970.6 FT

PI = 192+67.00
 EL = 963.36'
 VC = 890'
 K = 140
 V = 60' mph

FOR -L- PLAN SEE SHEETS 16-17

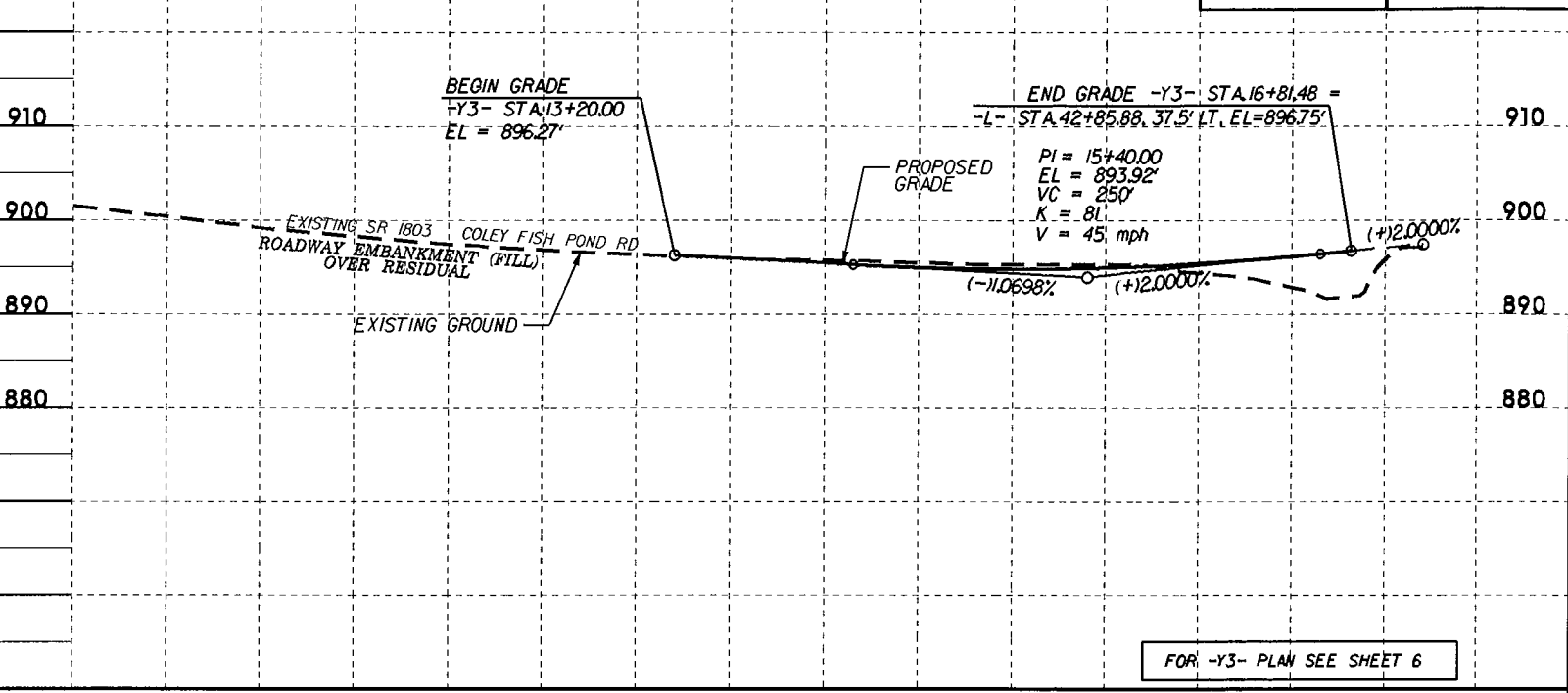
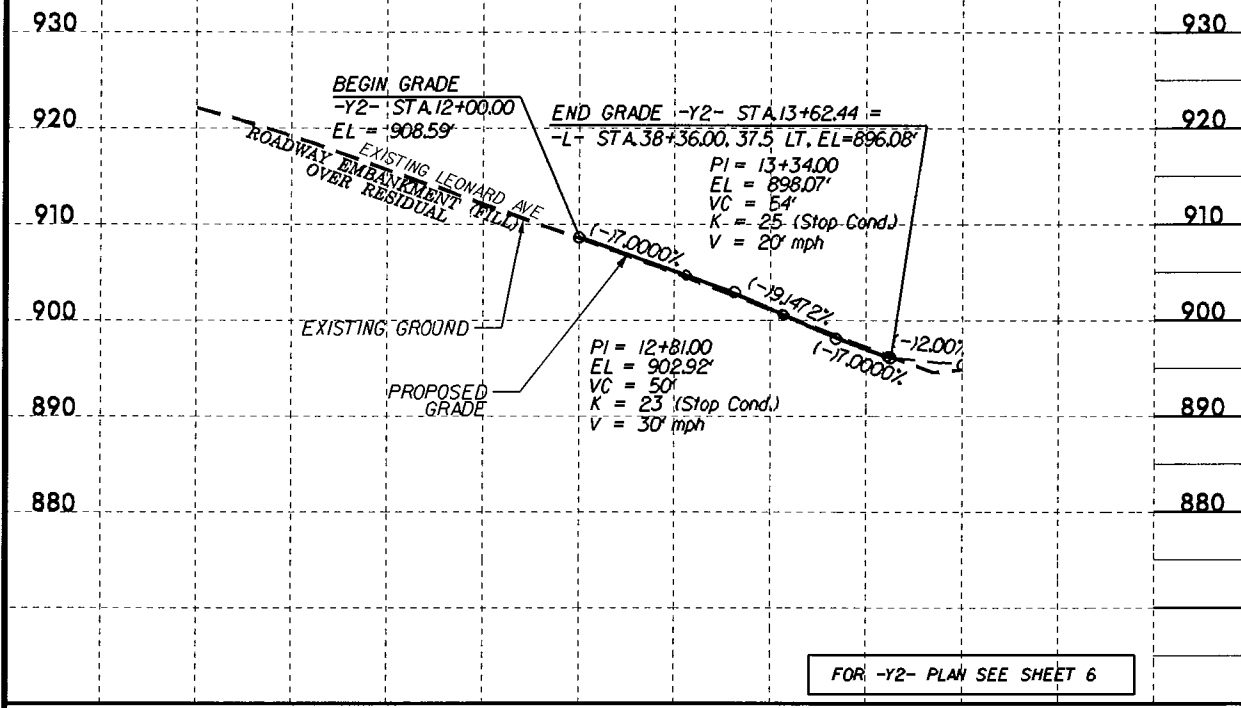
5/28/13



PROJECT REFERENCE NO. R-3100B	SHEET NO. 25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-Y2-

-Y3-

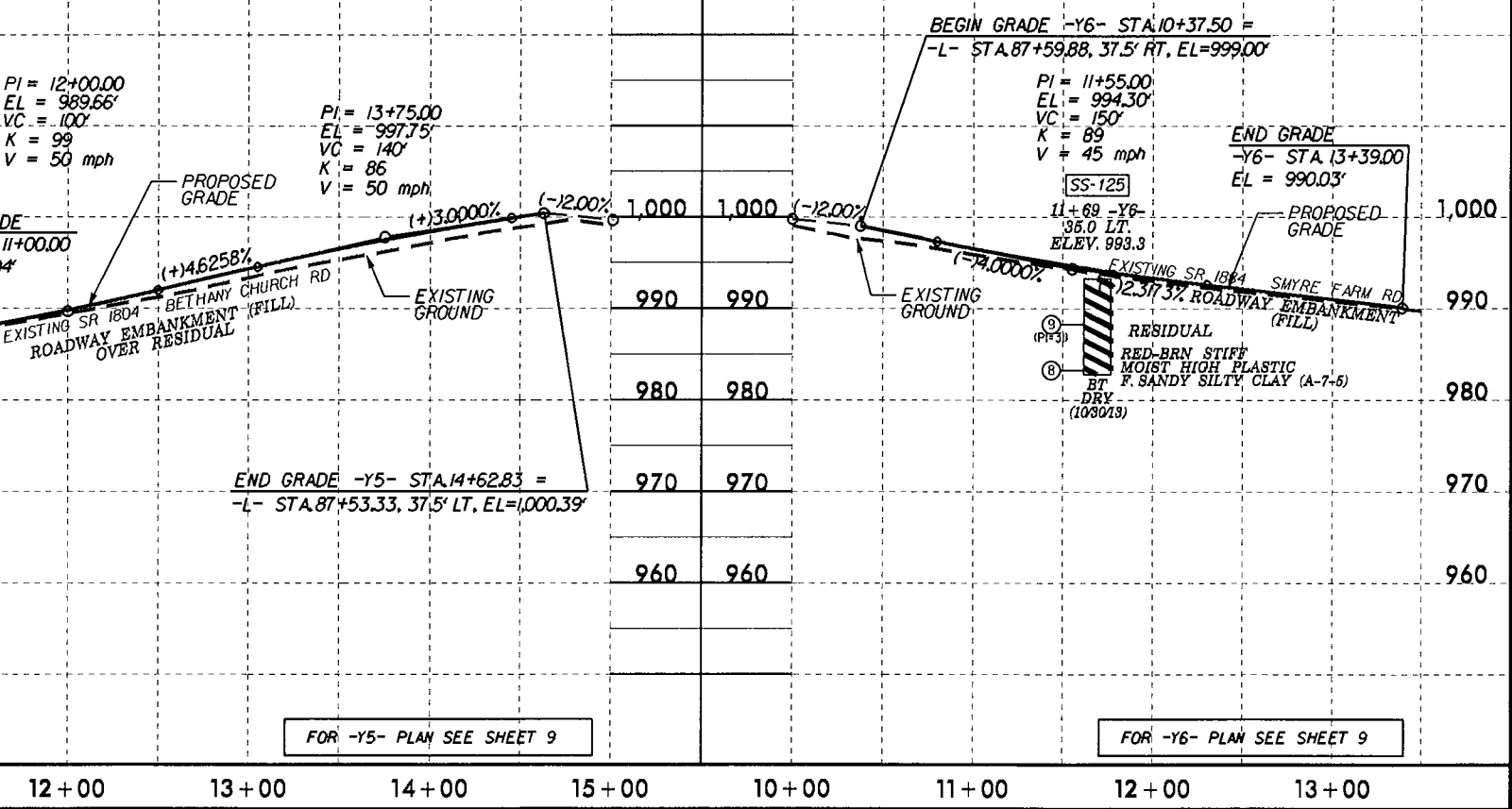
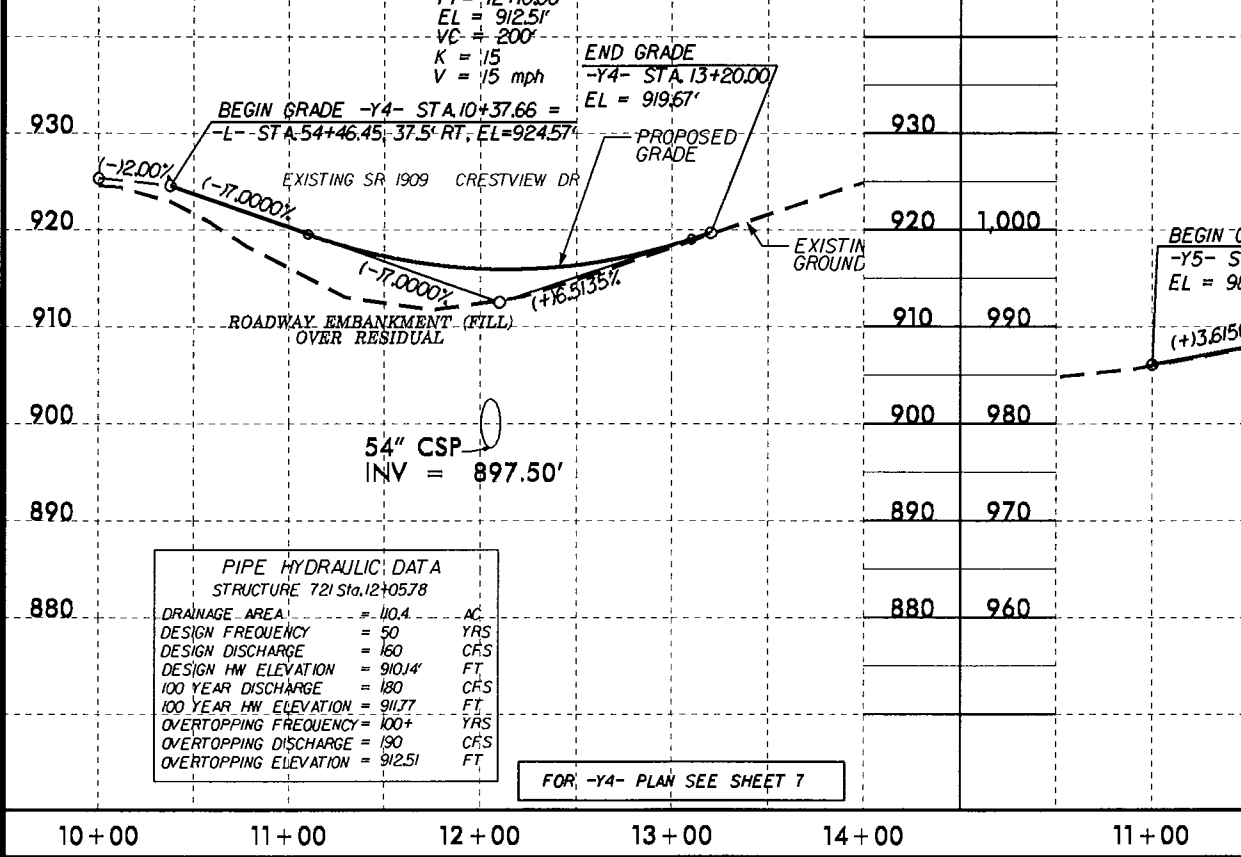


10+00 11+00 12+00 10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00

-Y4-

-Y5-

-Y6-



10+00 11+00 12+00 13+00 14+00 11+00 12+00 13+00 14+00 15+00 10+00 11+00 12+00 13+00

DRAINAGE AREA	= 110.4	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 160	CFS
DESIGN HW ELEVATION	= 910.14'	FT
100 YEAR DISCHARGE	= 180	CFS
100 YEAR HW ELEVATION	= 911.77	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 190	CFS
OVERTOPPING ELEVATION	= 912.51	FT

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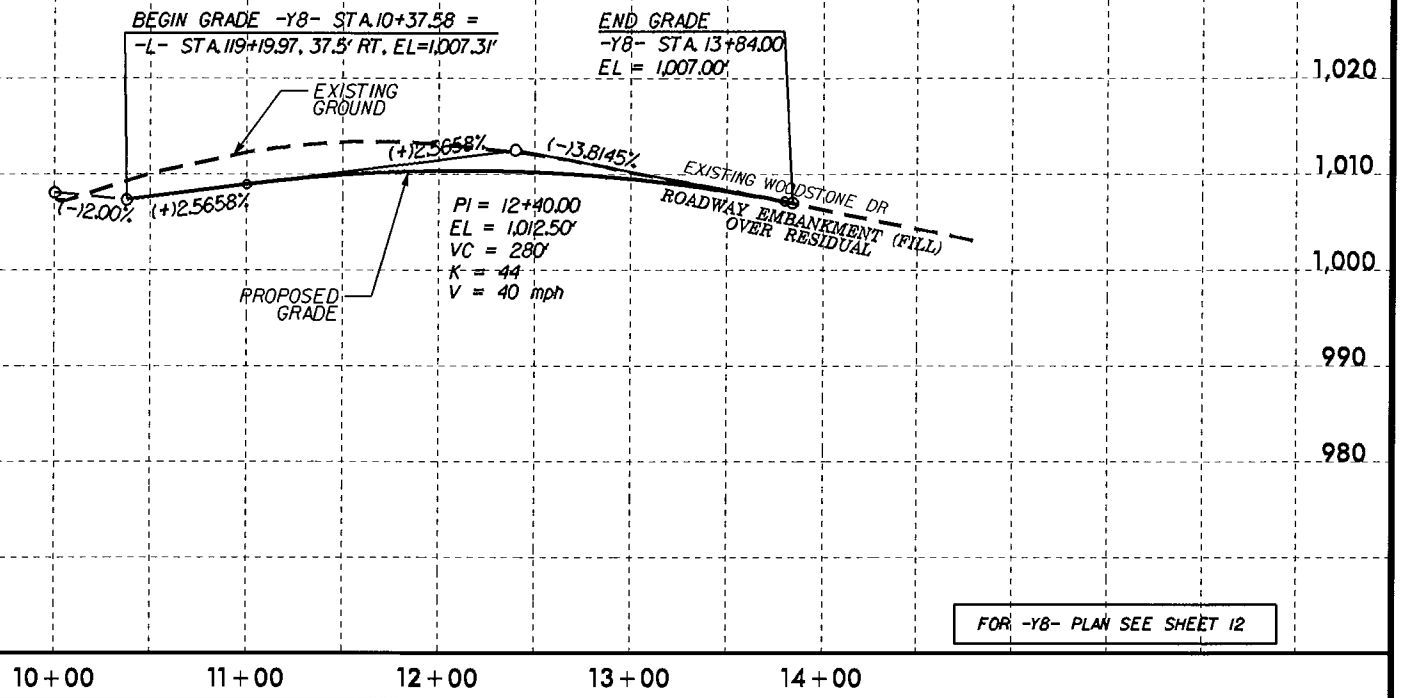
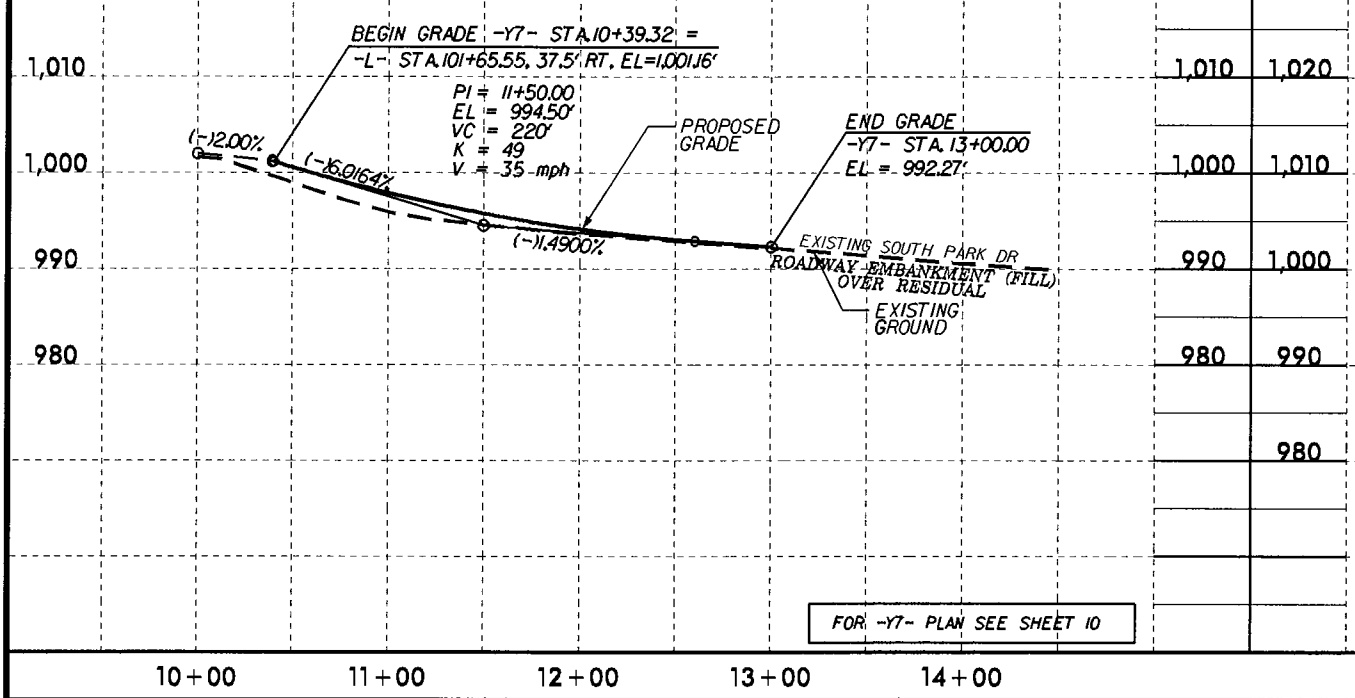
5/28/99

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PROJECT REFERENCE NO. R-3100B	SHEET NO. 26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-Y7-

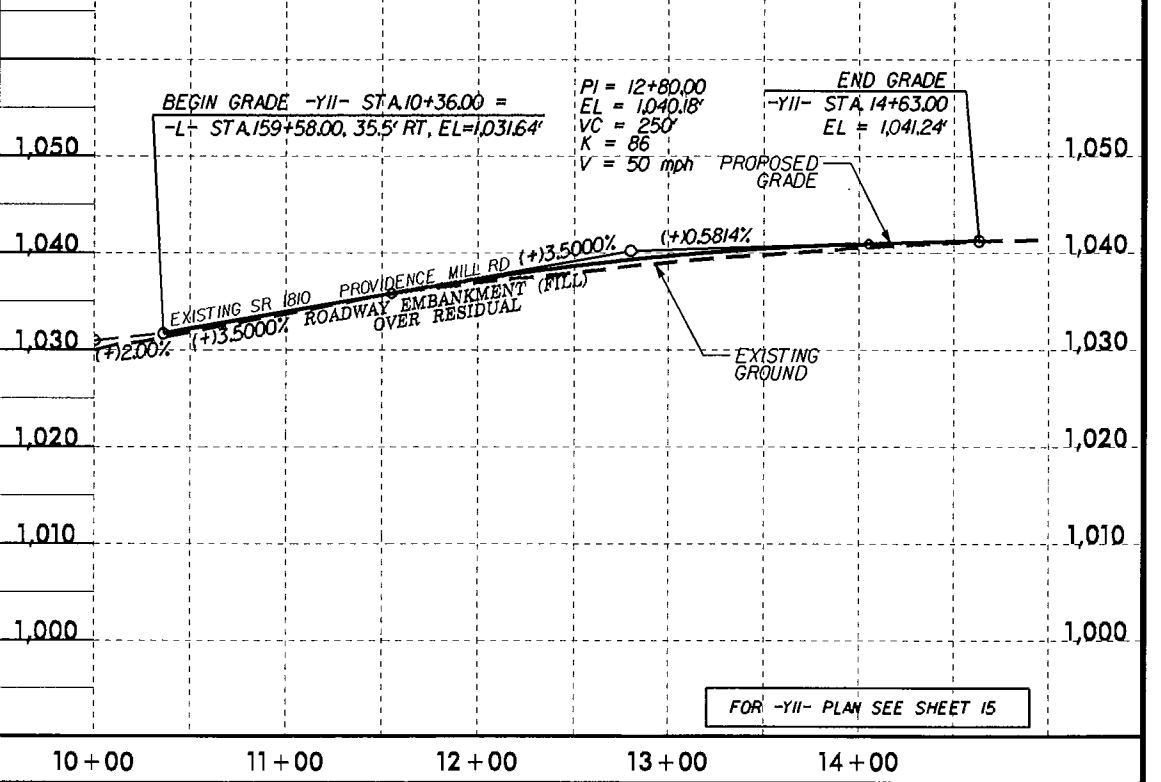
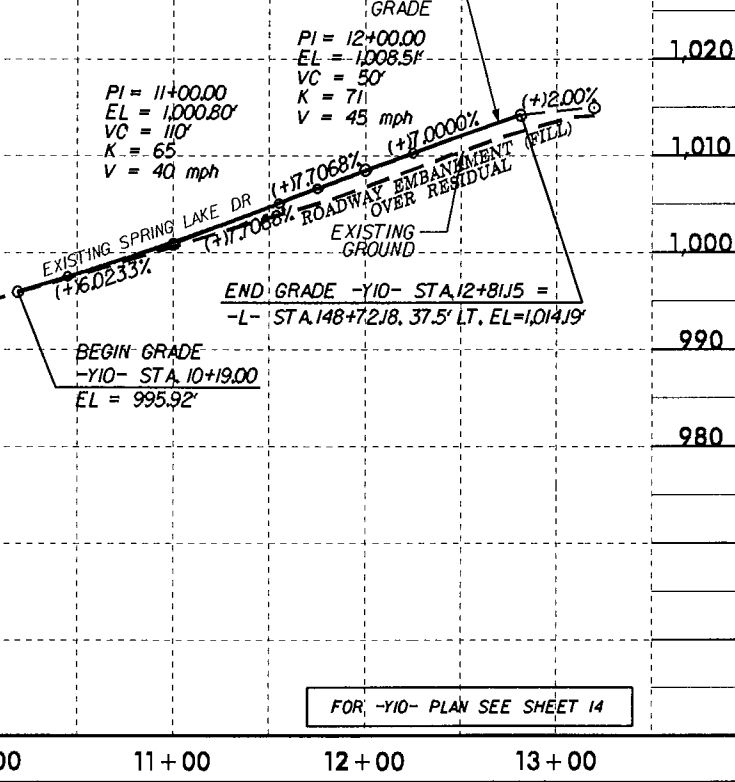
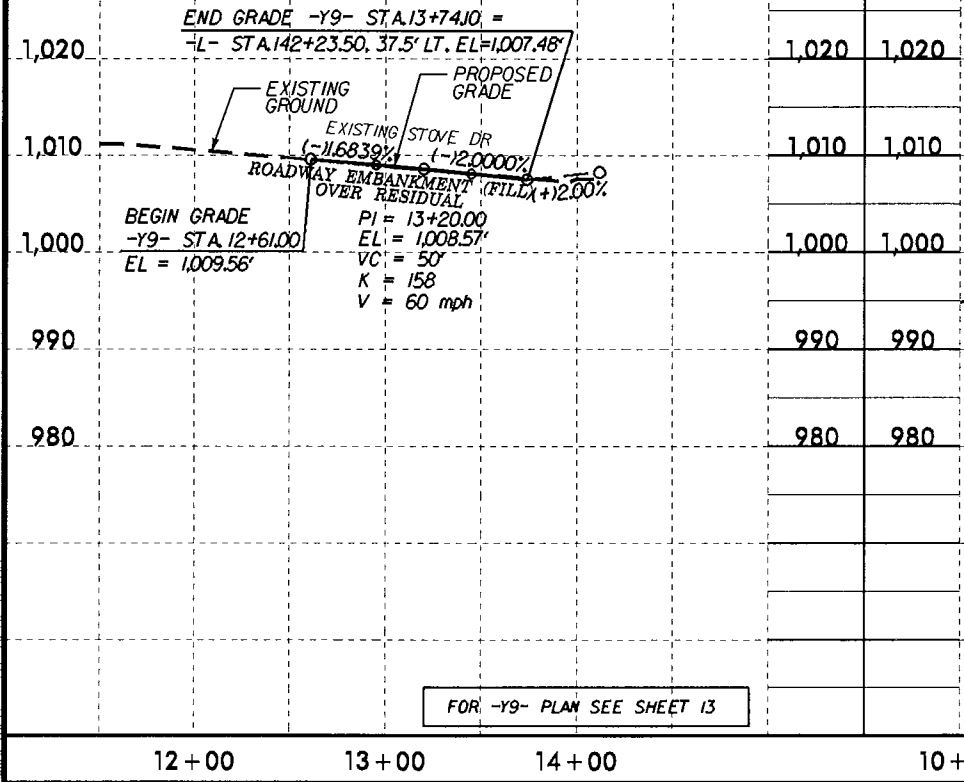
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-Y9-

-Y10-

-Y11-



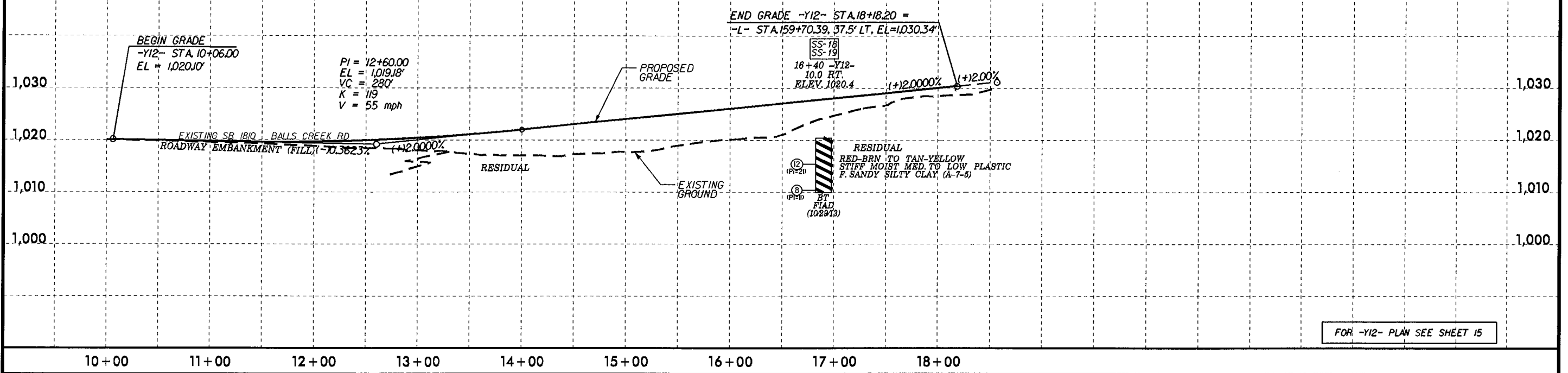
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5/28/99

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PROJECT REFERENCE NO. R-3100B	SHEET NO. 27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-Y12-



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