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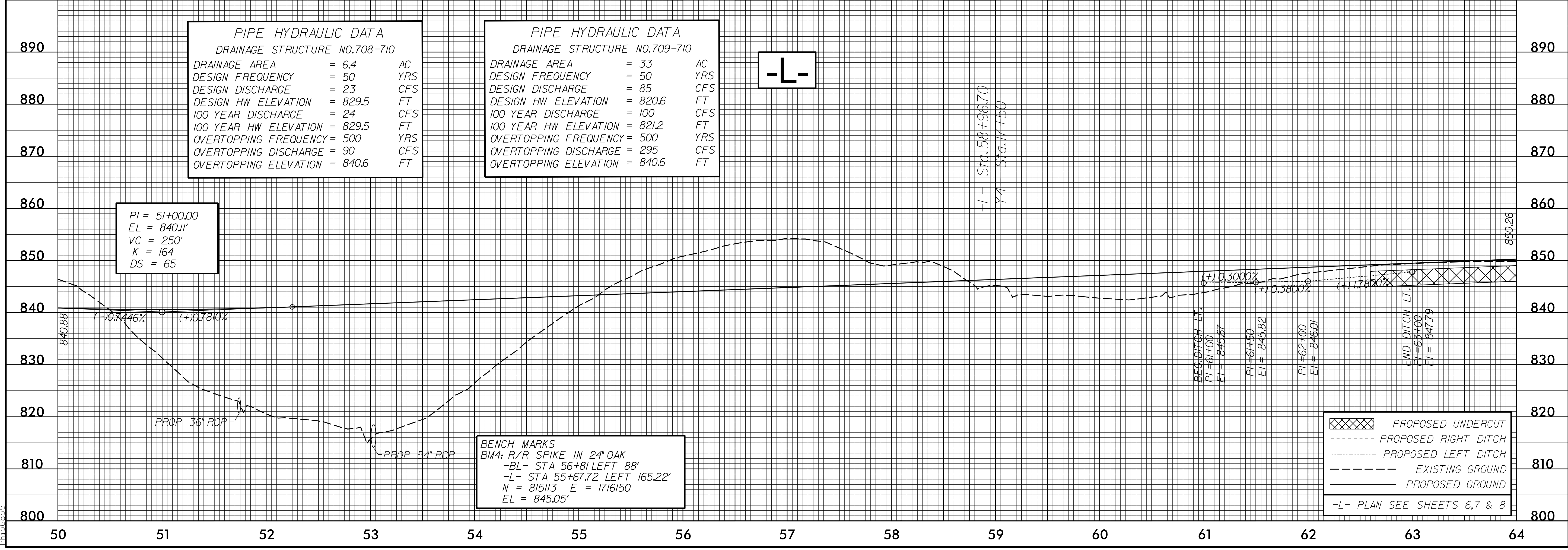
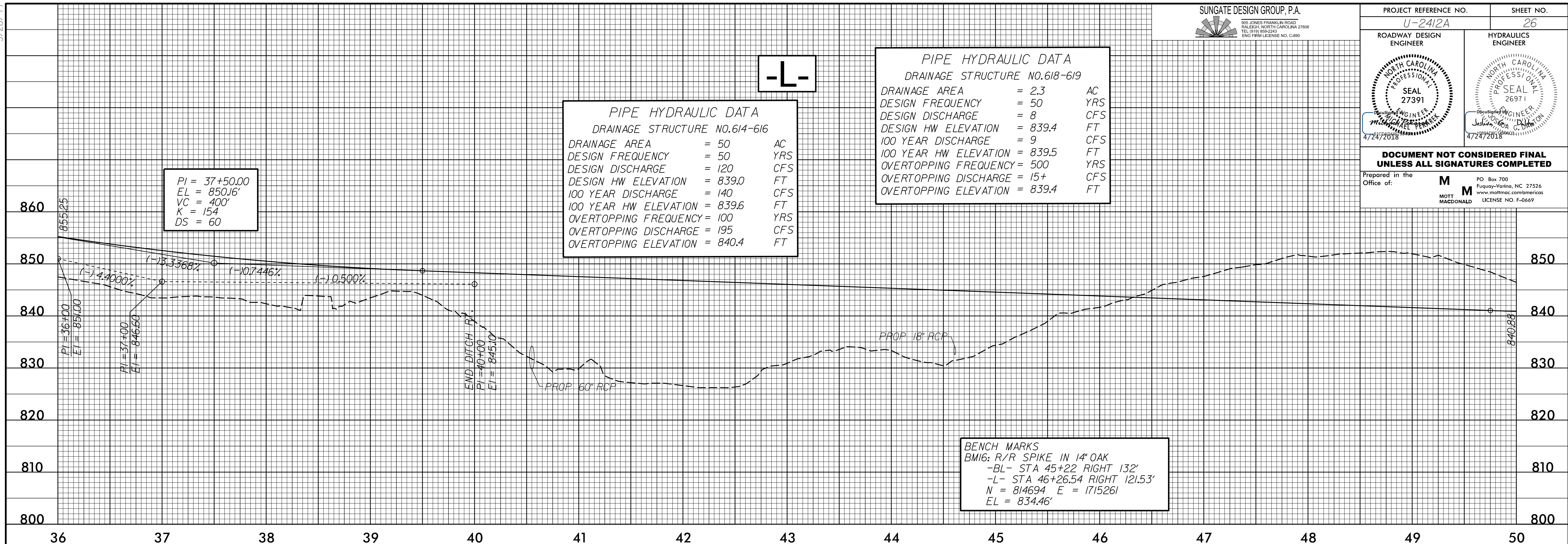
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5/28/19

PROJECT REFERENCE NO. U-2412A	SHEET NO. 26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

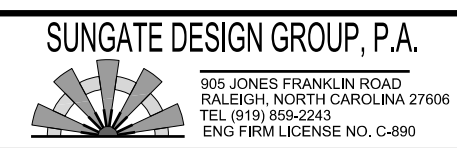
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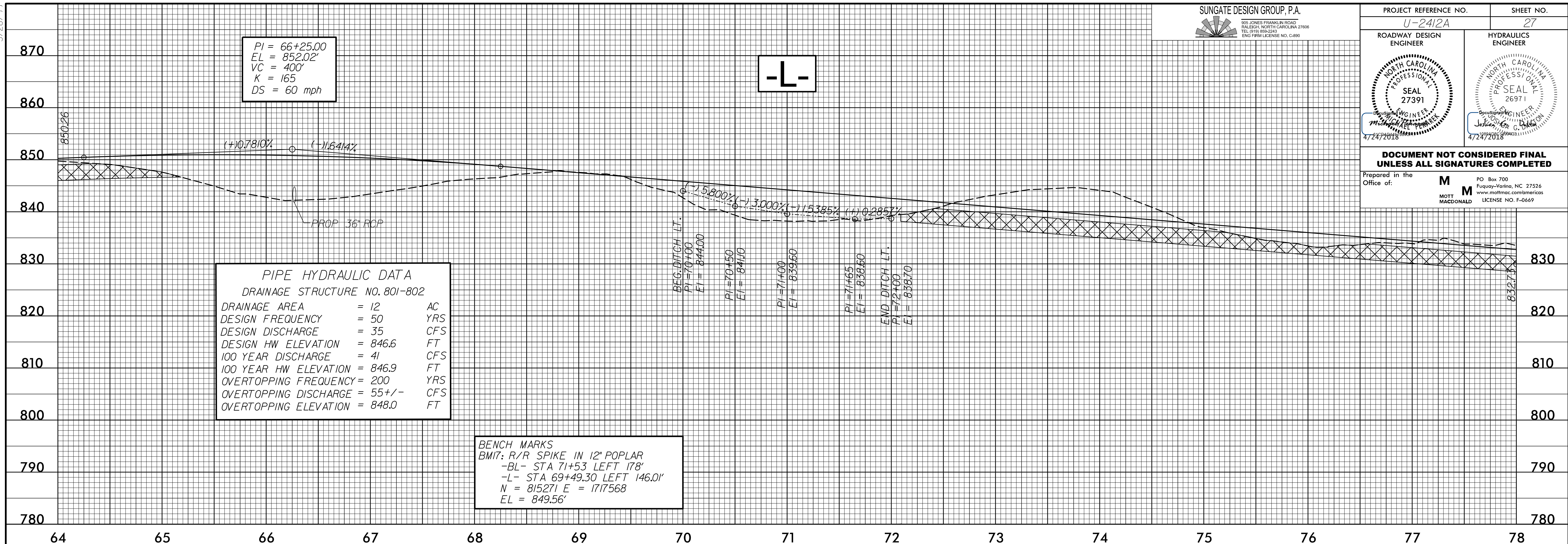


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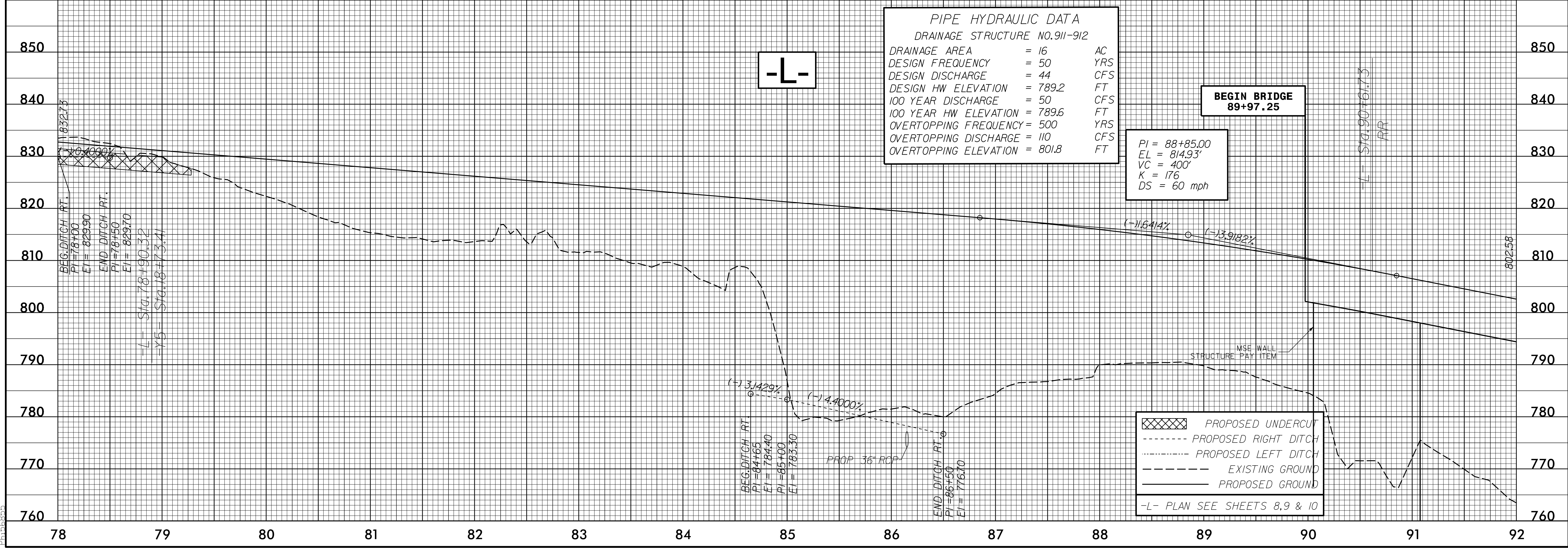
PROJECT REFERENCE NO. U-2412A	SHEET NO. 27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
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PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 801-802

DRAINAGE AREA	= 12	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 35	CFS
DESIGN HW ELEVATION	= 846.6	FT
100 YEAR DISCHARGE	= 41	CFS
100 YEAR HW ELEVATION	= 846.9	FT
OVERTOPPING FREQUENCY	= 200	YRS
OVERTOPPING DISCHARGE	= 55 +/-	CFS
OVERTOPPING ELEVATION	= 848.0	FT

BENCH MARKS
BM1: R/R SPIKE IN 12" POPLAR
-BL- STA 71+53 LEFT 178'
-L- STA 69+49.30 LEFT 146.0'
N = 815271 E = 1717568
EL = 849.56'



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 911-912

DRAINAGE AREA	= 16	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 44	CFS
DESIGN HW ELEVATION	= 789.2	FT
100 YEAR DISCHARGE	= 50	CFS
100 YEAR HW ELEVATION	= 789.6	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 110	CFS
OVERTOPPING ELEVATION	= 801.8	FT

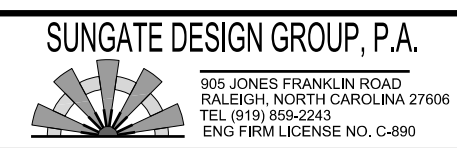
PI = 88+85.00
EL = 814.93'
VC = 400'
K = 176
DS = 60 mph

LEGEND

- PROPOSED UNDERCUT
- PROPOSED RIGHT DITCH
- PROPOSED LEFT DITCH
- EXISTING GROUND
- PROPOSED GROUND
- L- PLAN SEE SHEETS 8, 9 & 10

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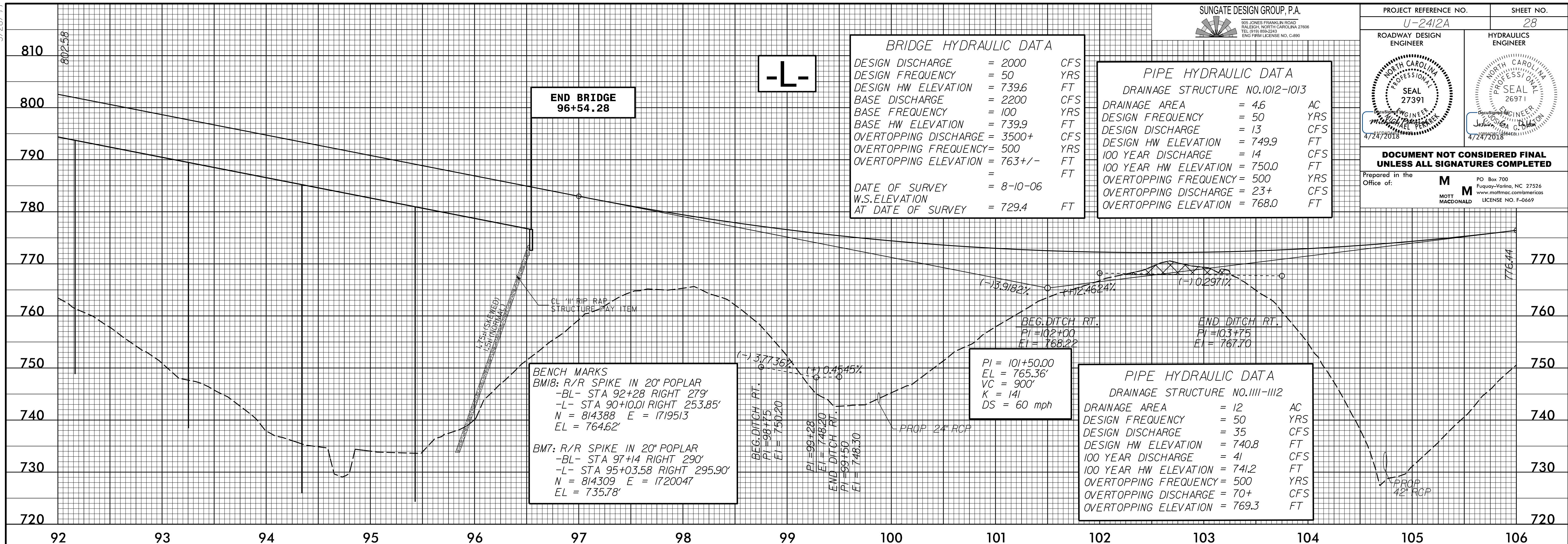
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ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
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BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 2000	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 739.6	FT
BASE DISCHARGE	= 2200	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 739.9	FT
OVERTOPPING DISCHARGE	= 3500+	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 763+/-	FT
DATE OF SURVEY	= 8-10-06	
W.S. ELEVATION AT DATE OF SURVEY	= 729.4	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.1012-1013

DRAINAGE AREA	= 4.6	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 13	CFS
DESIGN HW ELEVATION	= 749.9	FT
100 YEAR DISCHARGE	= 14	CFS
100 YEAR HW ELEVATION	= 750.0	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 23+	CFS
OVERTOPPING ELEVATION	= 768.0	FT

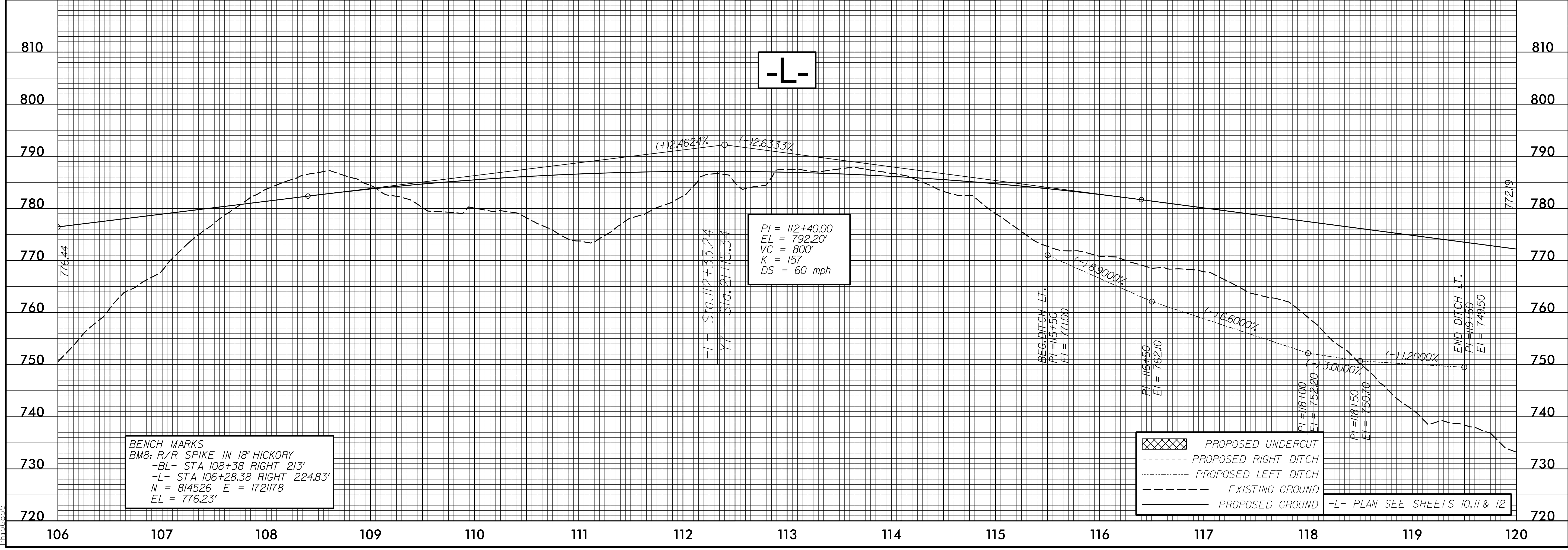


PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.1011-1012

DRAINAGE AREA	= 12	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 35	CFS
DESIGN HW ELEVATION	= 740.8	FT
100 YEAR DISCHARGE	= 41	CFS
100 YEAR HW ELEVATION	= 741.2	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 70+	CFS
OVERTOPPING ELEVATION	= 769.3	FT

BENCH MARKS
 BM8: R/R SPIKE IN 20" POPLAR
 -BL- STA 92+28 RIGHT 279'
 -L- STA 90+10.01 RIGHT 253.85'
 N = 814388 E = 1719513
 EL = 764.62'
 BM7: R/R SPIKE IN 20" POPLAR
 -BL- STA 97+14 RIGHT 290'
 -L- STA 95+03.58 RIGHT 295.90'
 N = 814309 E = 1720047
 EL = 735.78'

PI = 101+50.00
 EL = 765.36'
 VC = 900'
 K = 141
 DS = 60 mph



	PROPOSED UNDERCUT
	PROPOSED RIGHT DITCH
	PROPOSED LEFT DITCH
	EXISTING GROUND
	PROPOSED GROUND

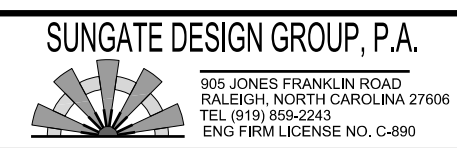
-L- PLAN SEE SHEETS 10, 11 & 12

BENCH MARKS
 BM8: R/R SPIKE IN 18" HICKORY
 -BL- STA 108+38 RIGHT 213'
 -L- STA 106+28.38 RIGHT 224.83'
 N = 814526 E = 1721178
 EL = 776.23'

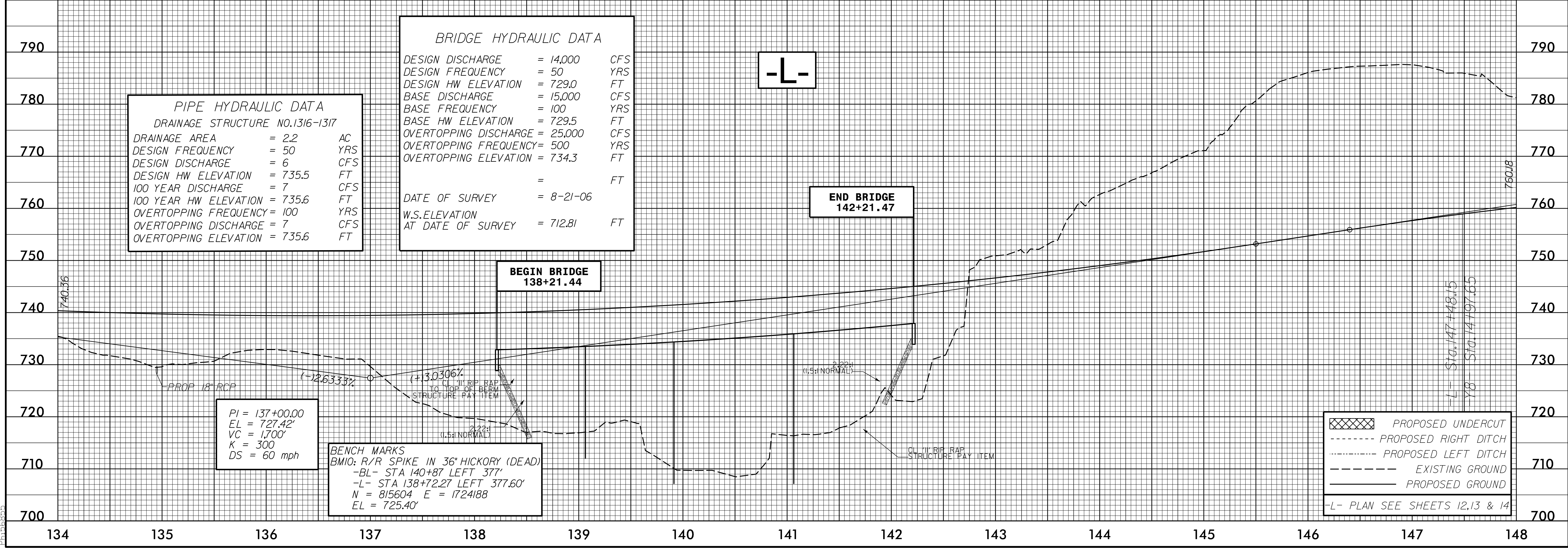
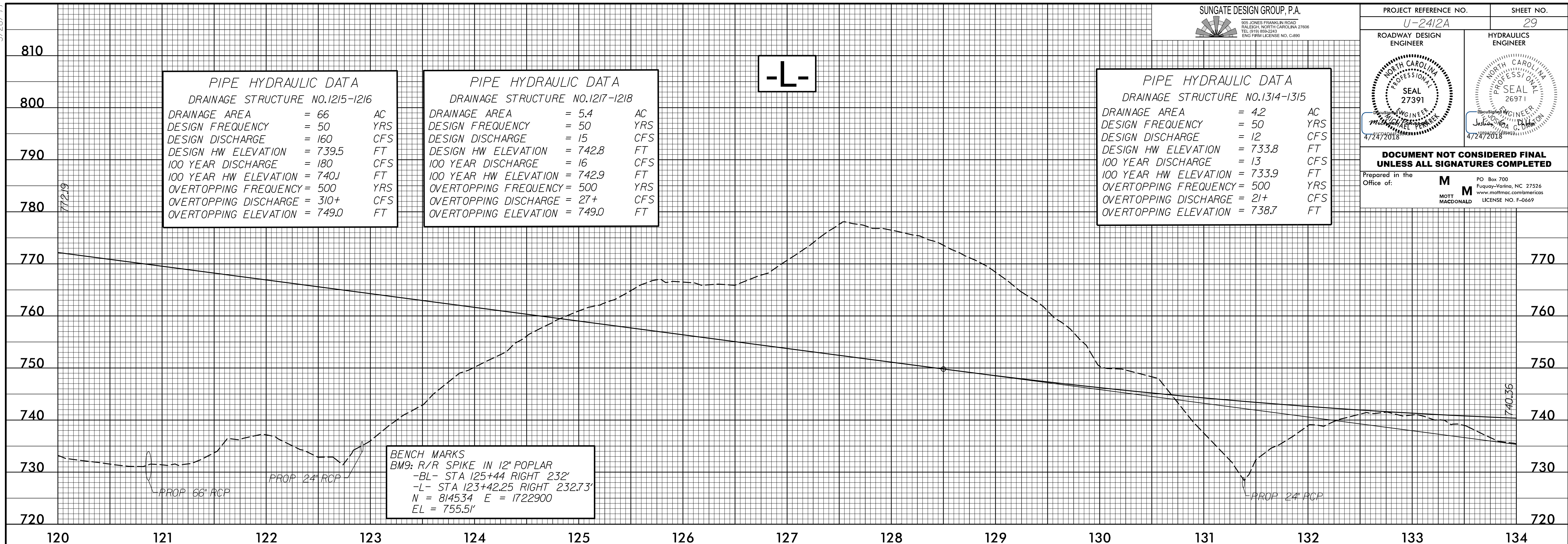
PI = 112+40.00
 EL = 792.20'
 VC = 800'
 K = 157
 DS = 60 mph

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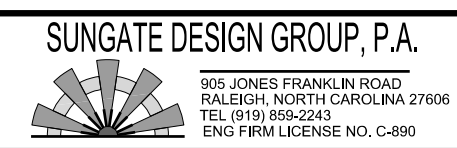


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ROADWAY DESIGN ENGINEER [Signature]	HYDRAULICS ENGINEER [Signature]
NORTH CAROLINA PROFESSIONAL SEAL 27391 4/24/2018	NORTH CAROLINA PROFESSIONAL SEAL 26971 4/24/2018
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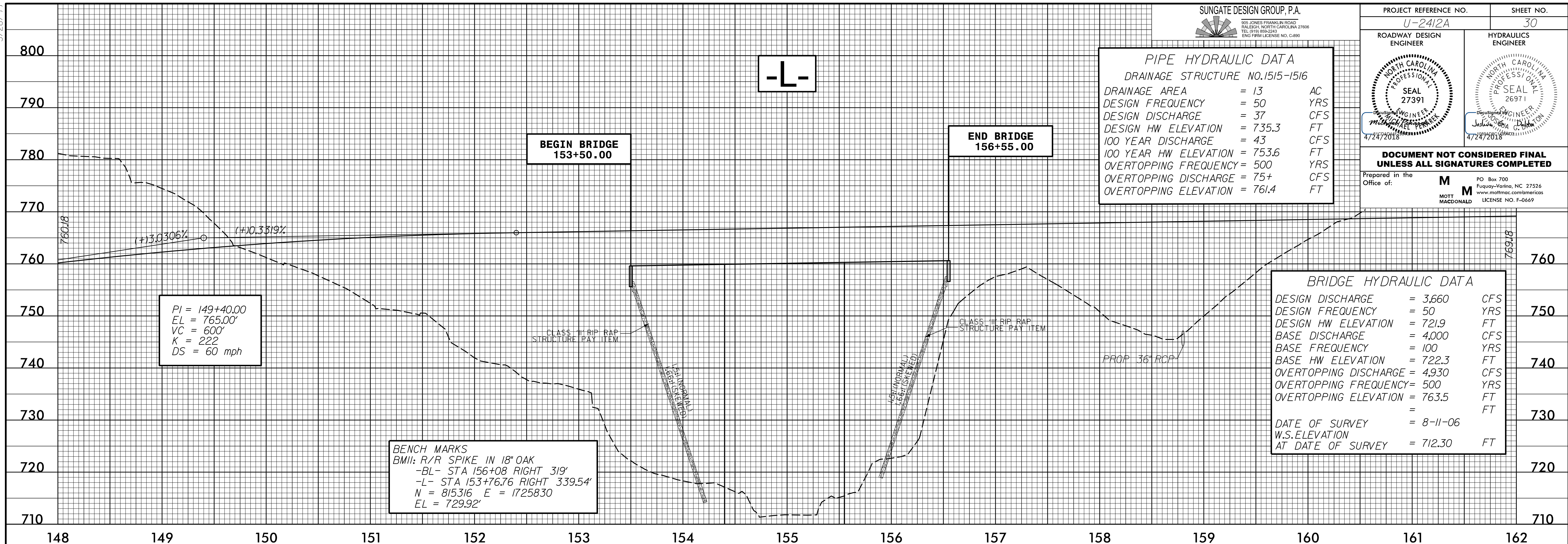
PROJECT REFERENCE NO. U-2412A	SHEET NO. 30
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.1515-1516

DRAINAGE AREA	= 13	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 37	CFS
DESIGN HW ELEVATION	= 735.3	FT
100 YEAR DISCHARGE	= 43	CFS
100 YEAR HW ELEVATION	= 753.6	FT
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING DISCHARGE	= 75+	CFS
OVERTOPPING ELEVATION	= 761.4	FT

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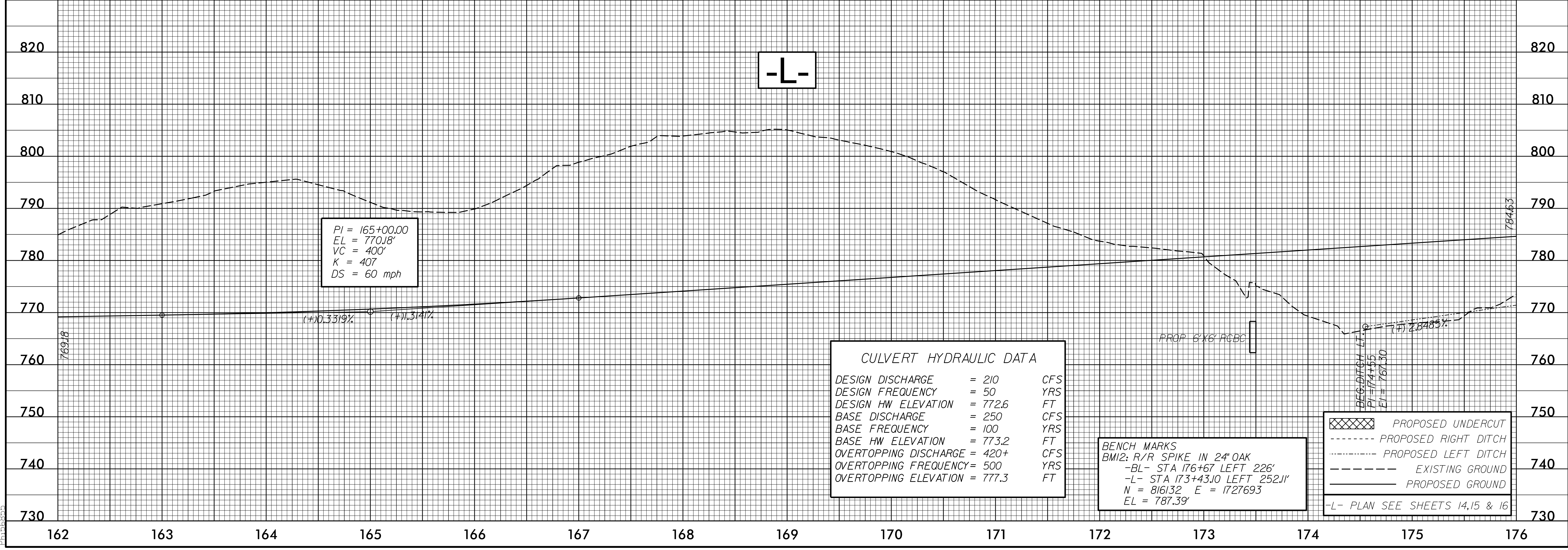


BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 3,660	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 721.9	FT
BASE DISCHARGE	= 4,000	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 722.3	FT
OVERTOPPING DISCHARGE	= 4,930	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 763.5	FT
DATE OF SURVEY	= 8-11-06	
W.S. ELEVATION AT DATE OF SURVEY	= 712.30	FT

BENCH MARKS
 BM1: R/R SPIKE IN 18" OAK
 -BL- STA 156+08 RIGHT 319'
 -L- STA 153+76.76 RIGHT 339.54'
 N = 815316 E = 1725830
 EL = 729.92'

PI = 149+40.00
 EL = 765.00'
 VC = 600'
 K = 222
 DS = 60 mph



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 210	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 772.6	FT
BASE DISCHARGE	= 250	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 773.2	FT
OVERTOPPING DISCHARGE	= 420+	CFS
OVERTOPPING FREQUENCY	= 500	YRS
OVERTOPPING ELEVATION	= 777.3	FT

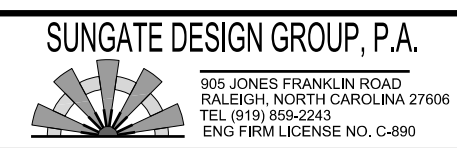
BENCH MARKS
 BM2: R/R SPIKE IN 24" OAK
 -BL- STA 176+67 LEFT 226'
 -L- STA 173+43.00 LEFT 252.11'
 N = 816132 E = 1727693
 EL = 787.39'

PI = 165+00.00
 EL = 770.18'
 VC = 400'
 K = 407
 DS = 60 mph

- PROPOSED UNDERCUT
 - PROPOSED RIGHT DITCH
 - PROPOSED LEFT DITCH
 - EXISTING GROUND
 - PROPOSED GROUND
- L- PLAN SEE SHEETS 14,15 & 16

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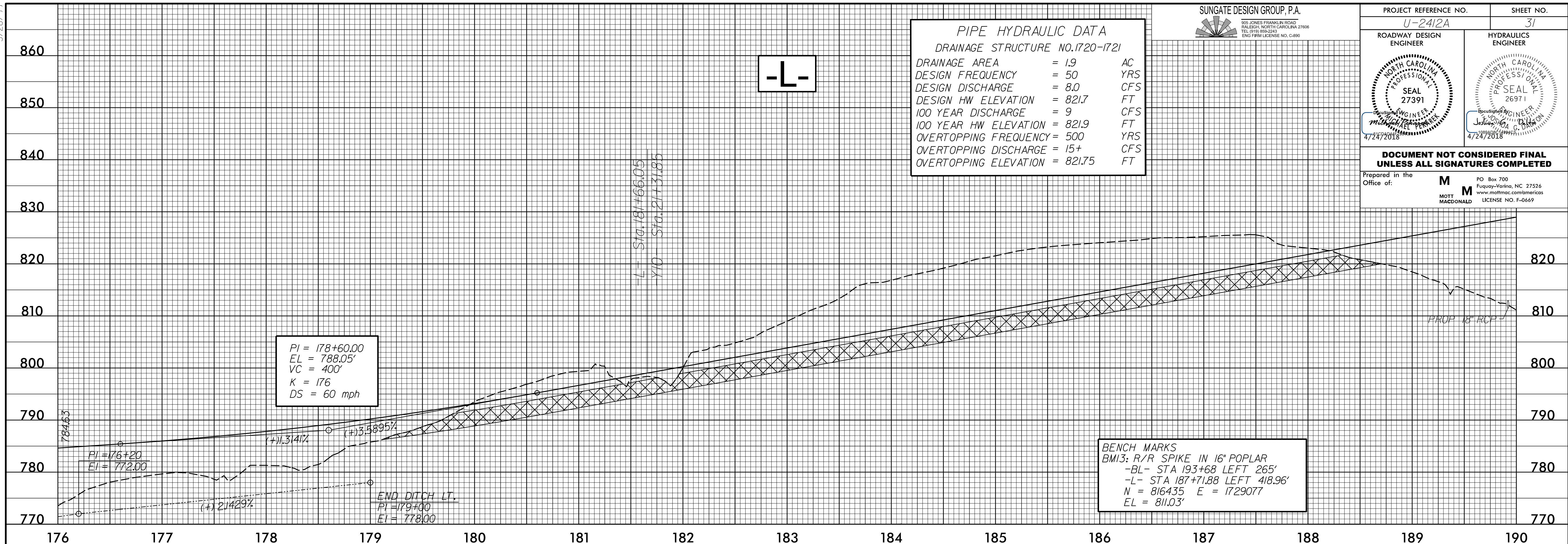


PROJECT REFERENCE NO. U-2412A	SHEET NO. 31
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO. 1720-1721	
DRAINAGE AREA	= 1.9 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 8.0 CFS
DESIGN HW ELEVATION	= 821.7 FT
100 YEAR DISCHARGE	= 9 CFS
100 YEAR HW ELEVATION	= 821.9 FT
OVERTOPPING FREQUENCY	= 500 YRS
OVERTOPPING DISCHARGE	= 15+ CFS
OVERTOPPING ELEVATION	= 821.75 FT

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-L- STA 187+71.88 LEFT 418.96'
Y10 STA 211+31.85

PI = 178+60.00
 EL = 788.05'
 VC = 400'
 K = 176
 DS = 60 mph

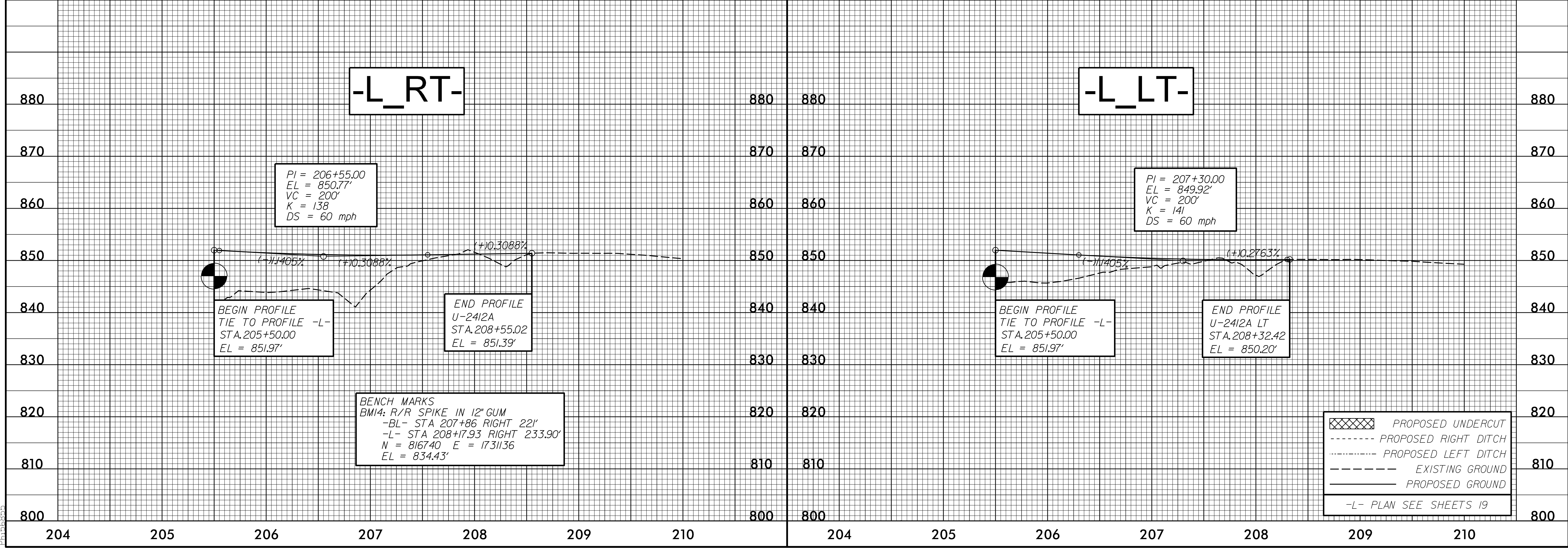
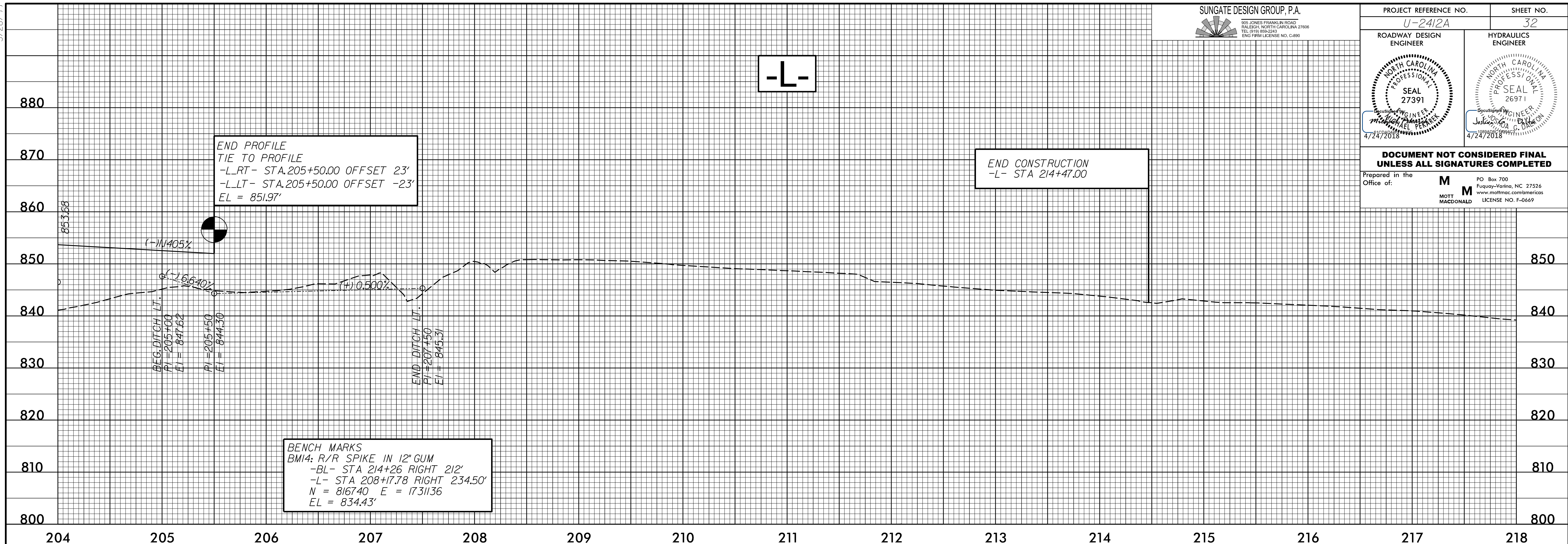
BENCH MARKS
 BMI3: R/R SPIKE IN 16' POPLAR
 -BL- STA 193+68 LEFT 265'
 -L- STA 187+71.88 LEFT 418.96'
 N = 816435 E = 1729077
 EL = 811.03'

- PROPOSED UNDERCUT
 - PROPOSED RIGHT DITCH
 - PROPOSED LEFT DITCH
 - EXISTING GROUND
 - PROPOSED GROUND
- L- PLAN SEE SHEETS 16, 17, 18, & 19

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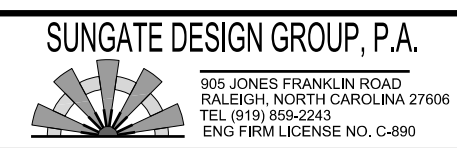
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ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER
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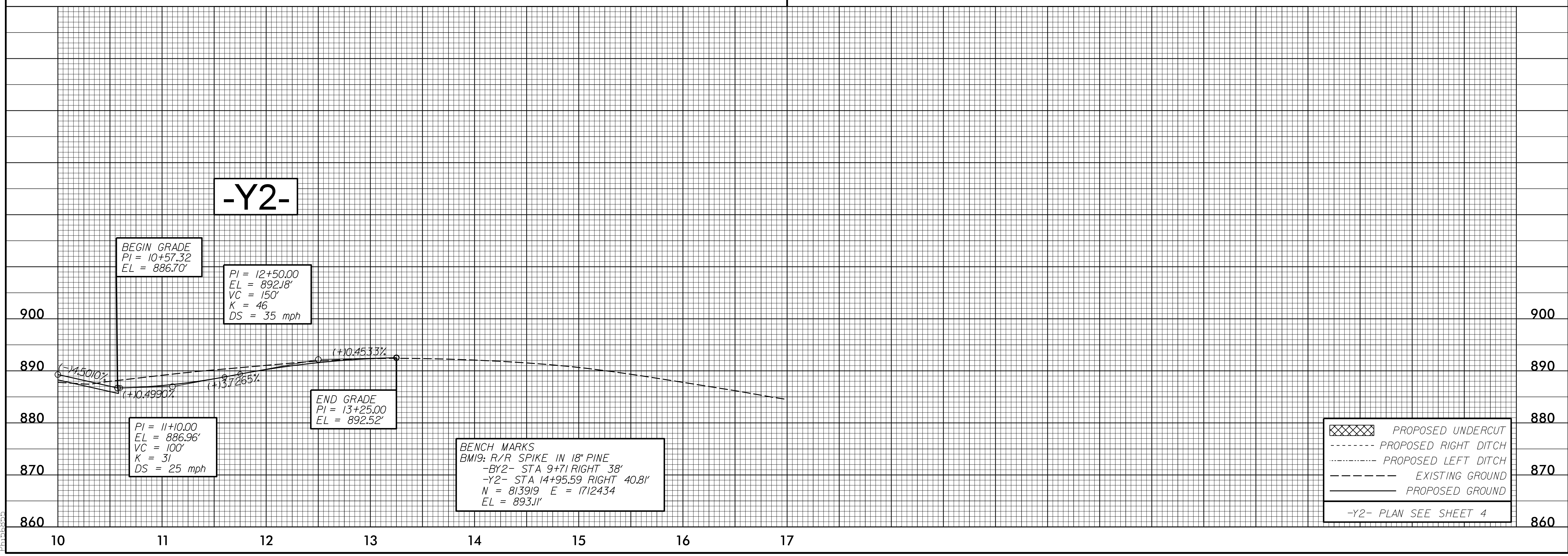
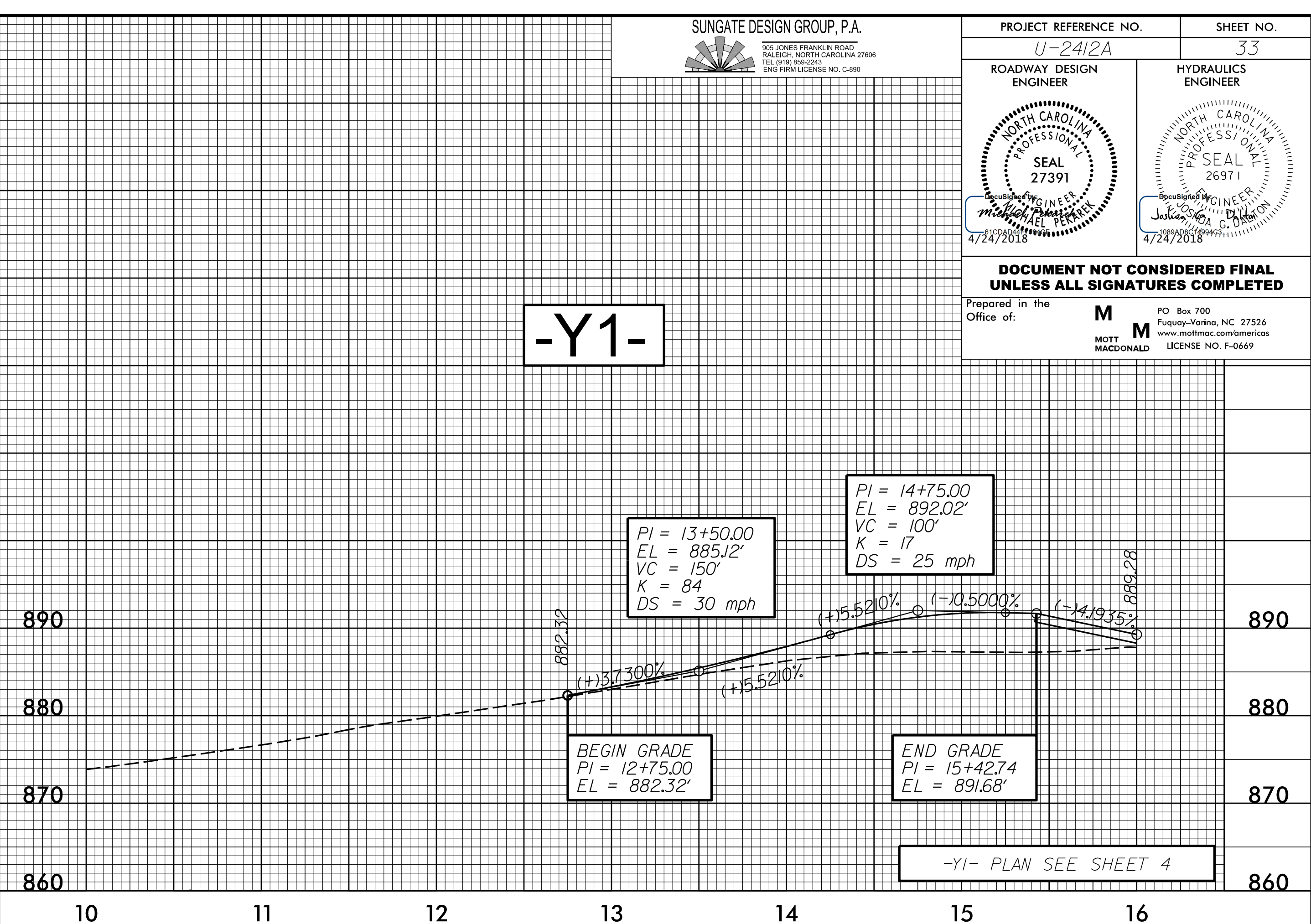
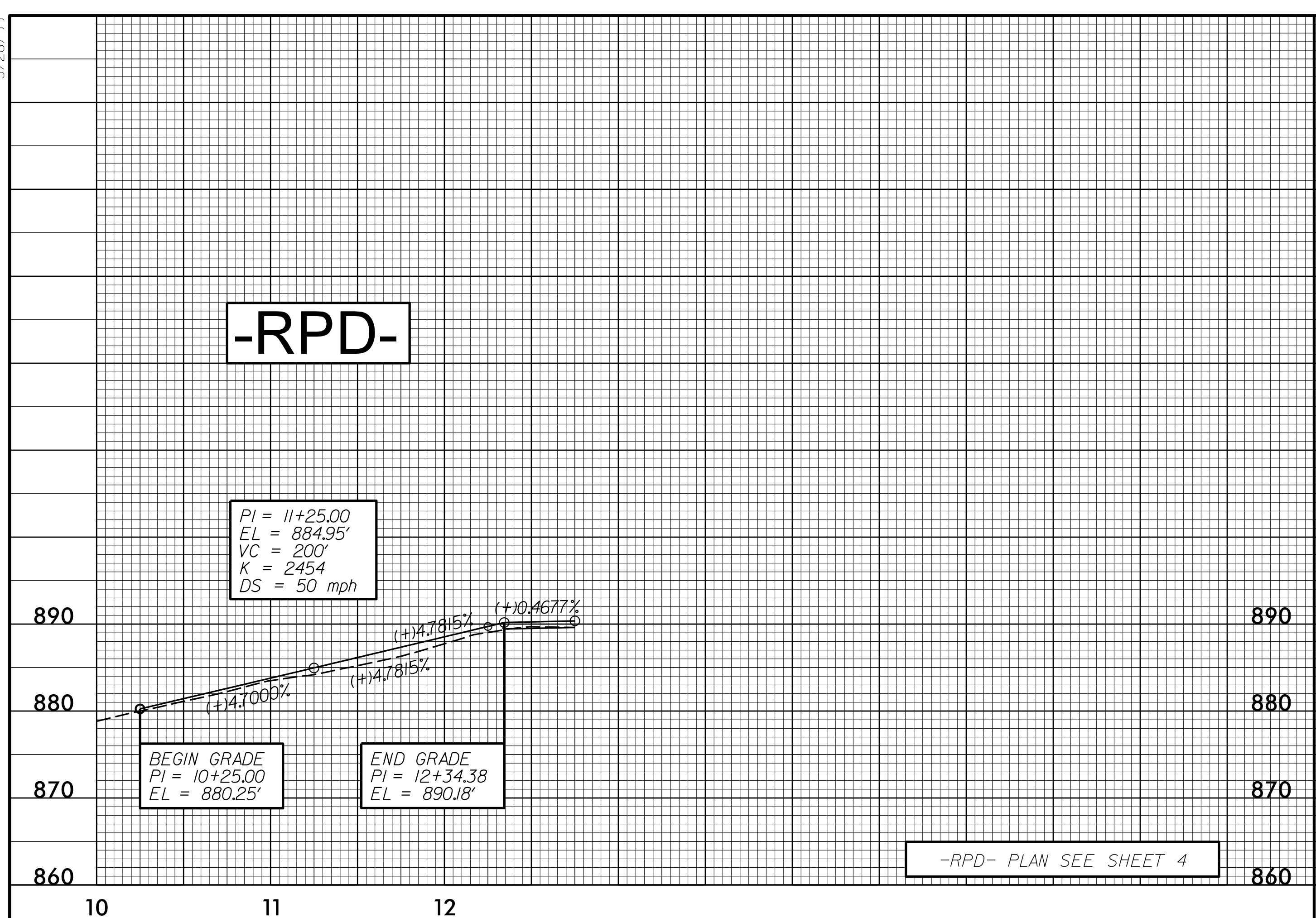
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PROJECT REFERENCE NO. U-2412A	SHEET NO. 33
ROADWAY DESIGN ENGINEER MICHAEL PERNER 4/24/2018	HYDRAULICS ENGINEER JULIAN G. DAVIS 4/24/2018

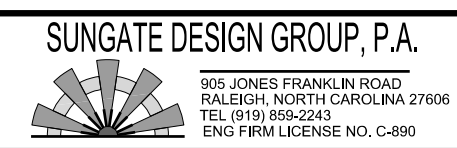
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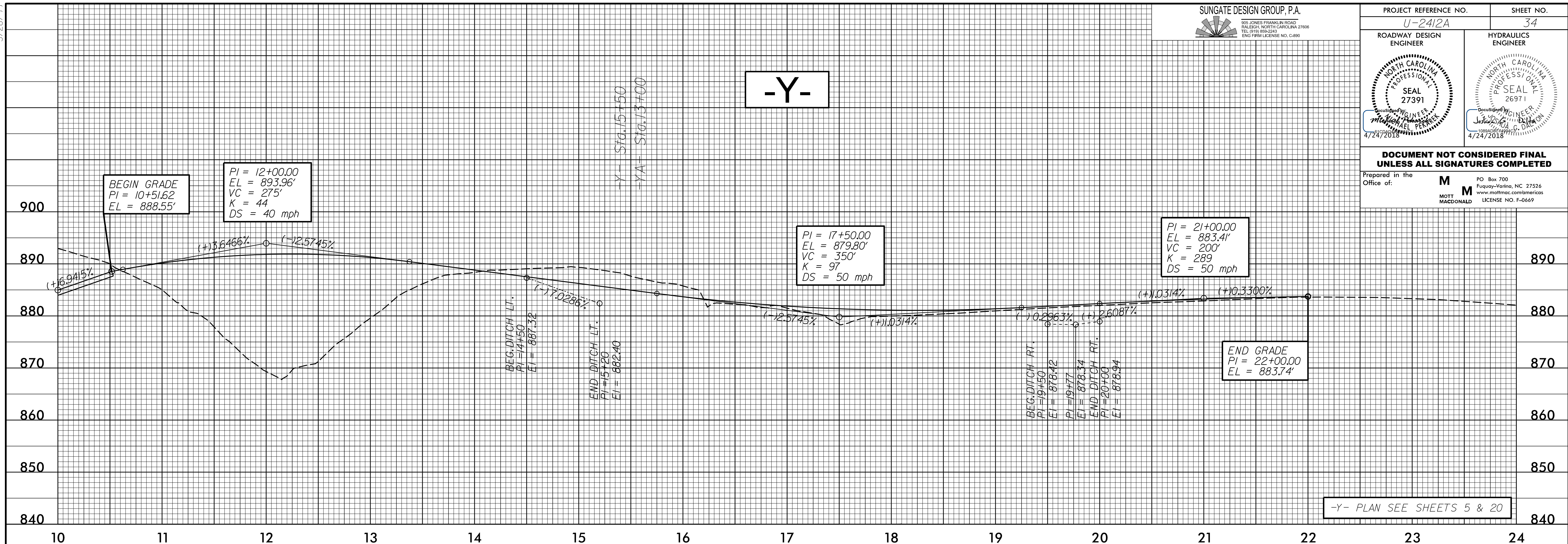
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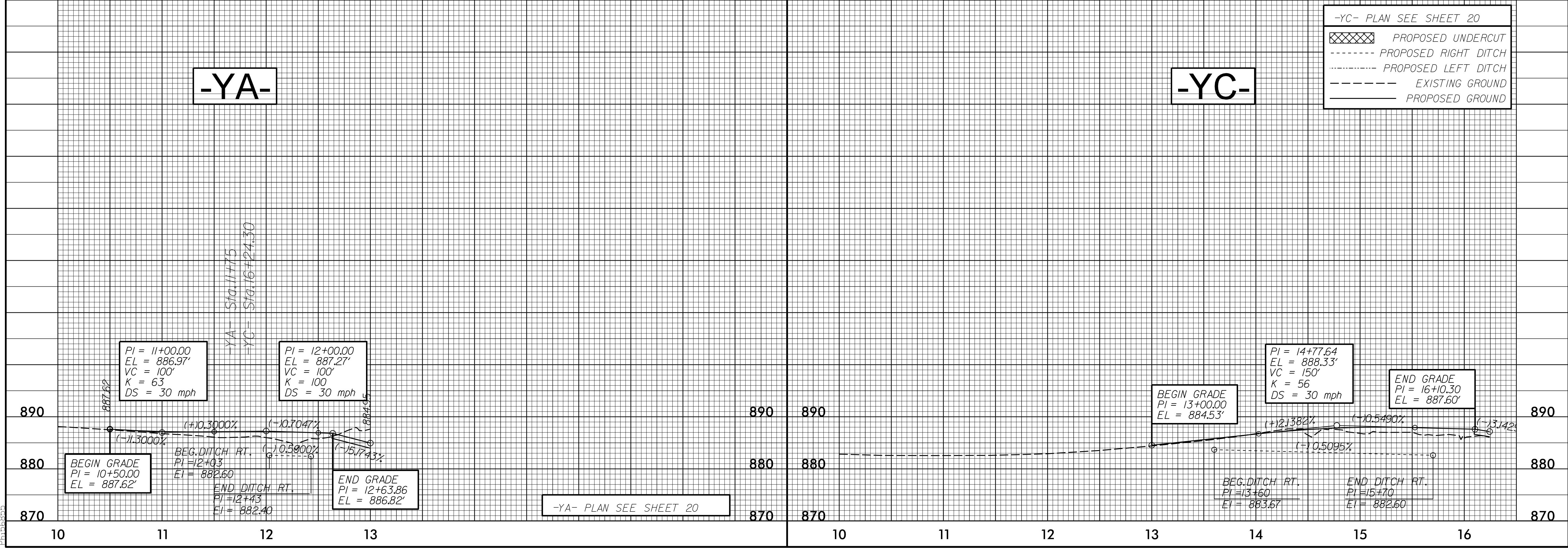
PROJECT REFERENCE NO. U-2412A	SHEET NO. 34
ROADWAY DESIGN ENGINEER Michael Perrier	HYDRAULICS ENGINEER Julius G. Dalton

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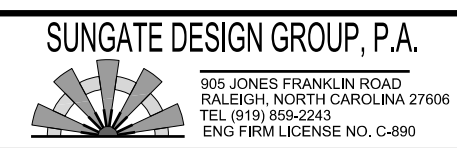


-Y- PLAN SEE SHEETS 5 & 20



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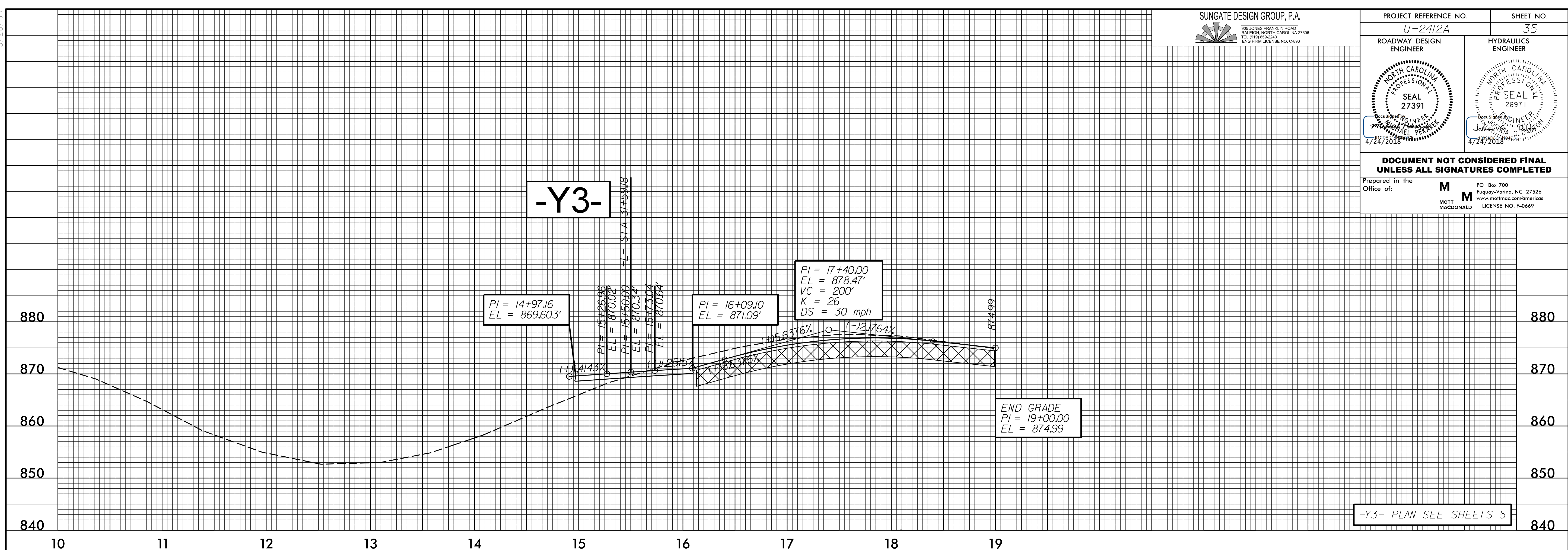


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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

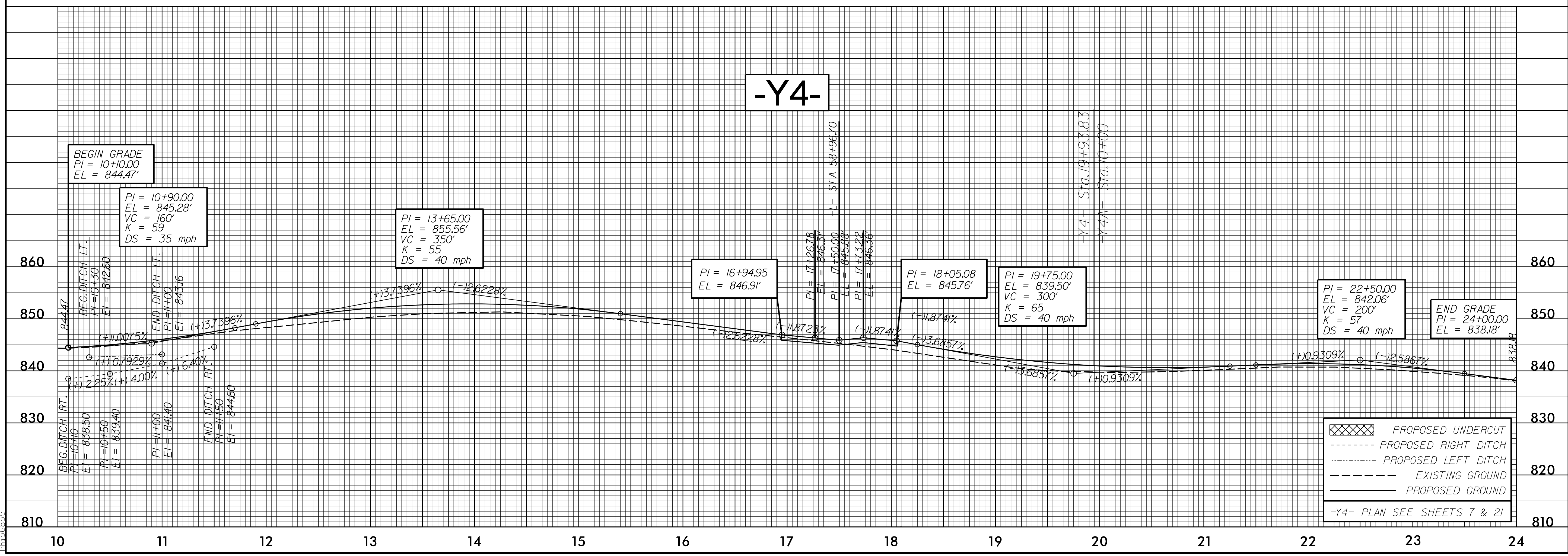
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-Y3- PLAN SEE SHEETS 5

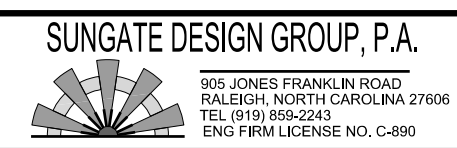


	PROPOSED UNDERCUT
	PROPOSED RIGHT DITCH
	PROPOSED LEFT DITCH
	EXISTING GROUND
	PROPOSED GROUND

-Y4- PLAN SEE SHEETS 7 & 21

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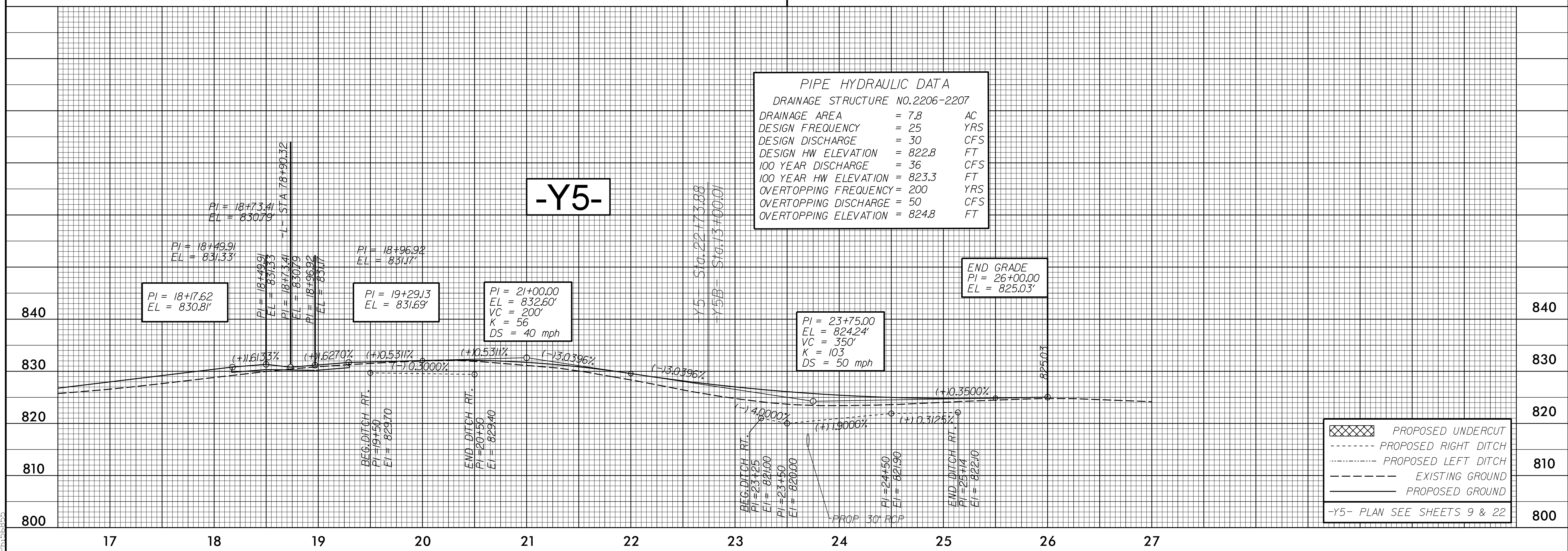
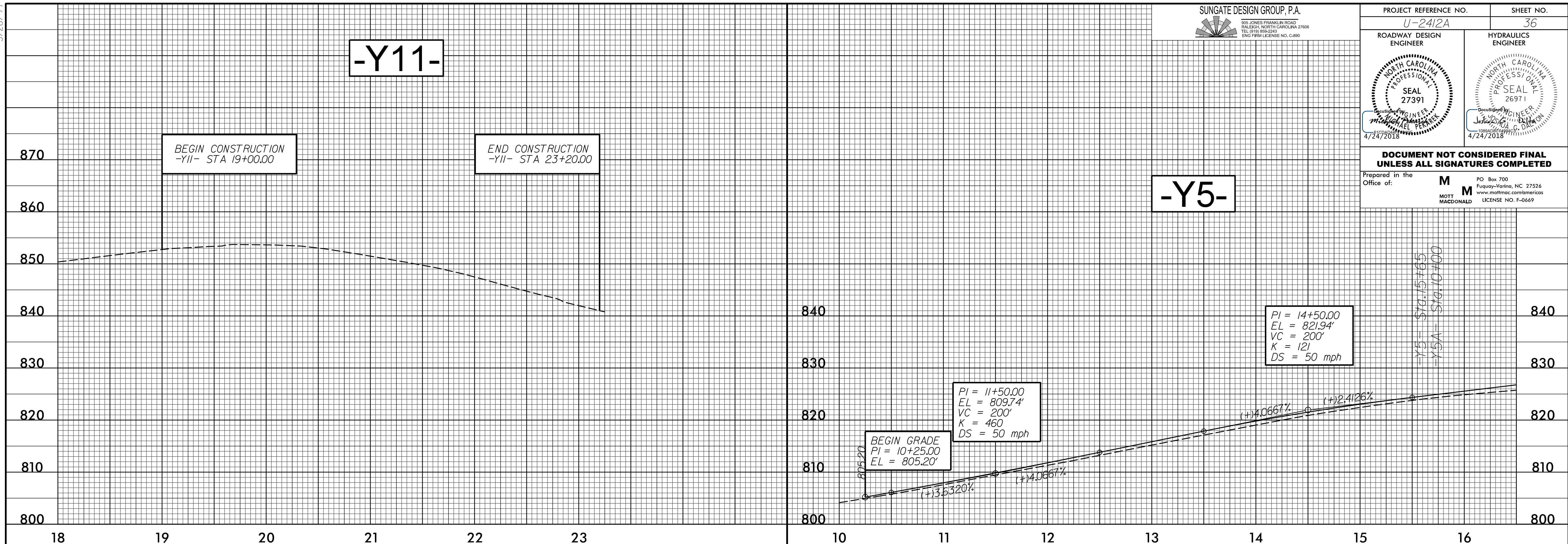
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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

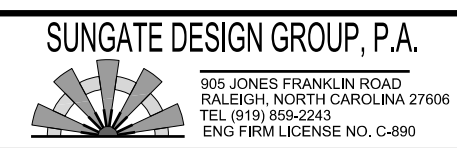
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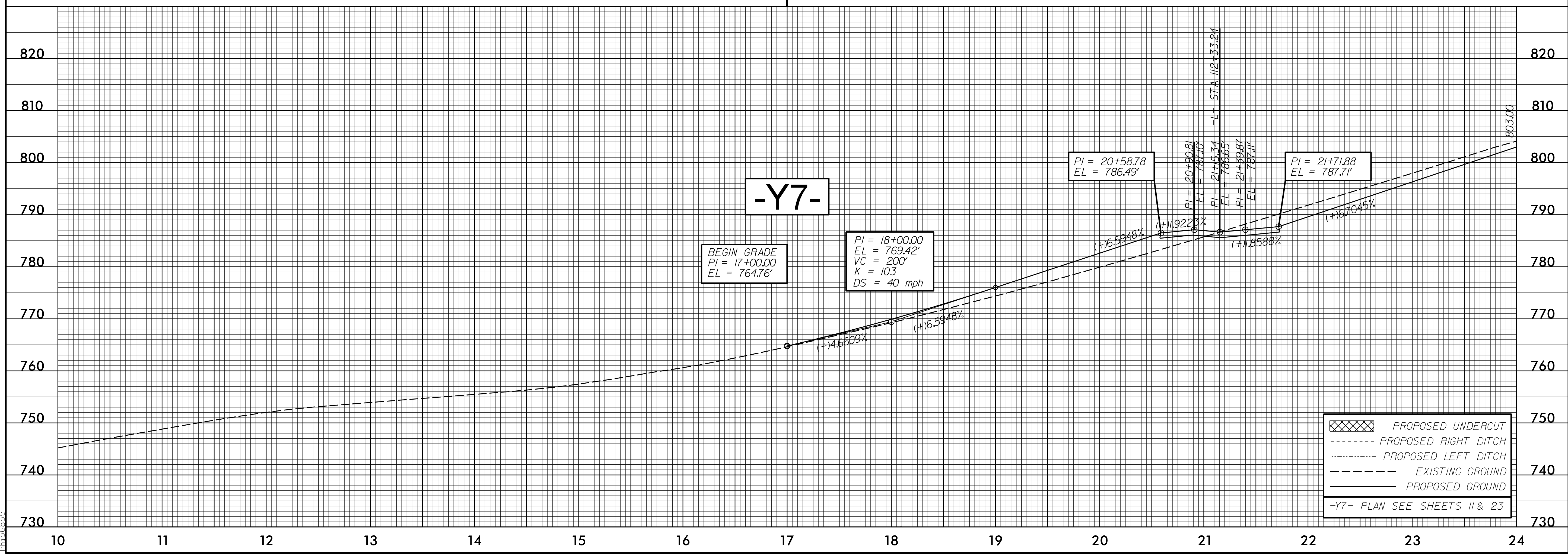
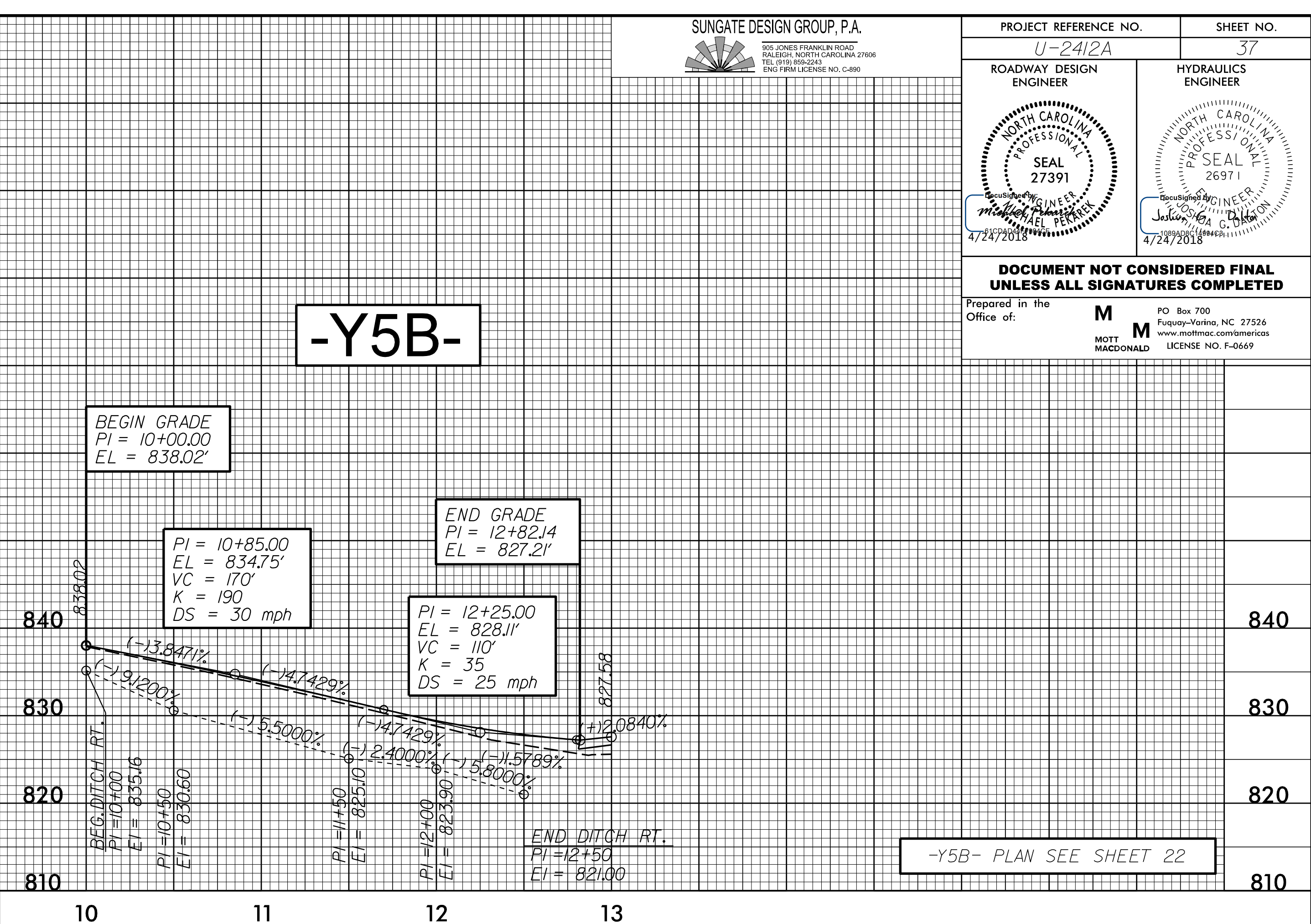
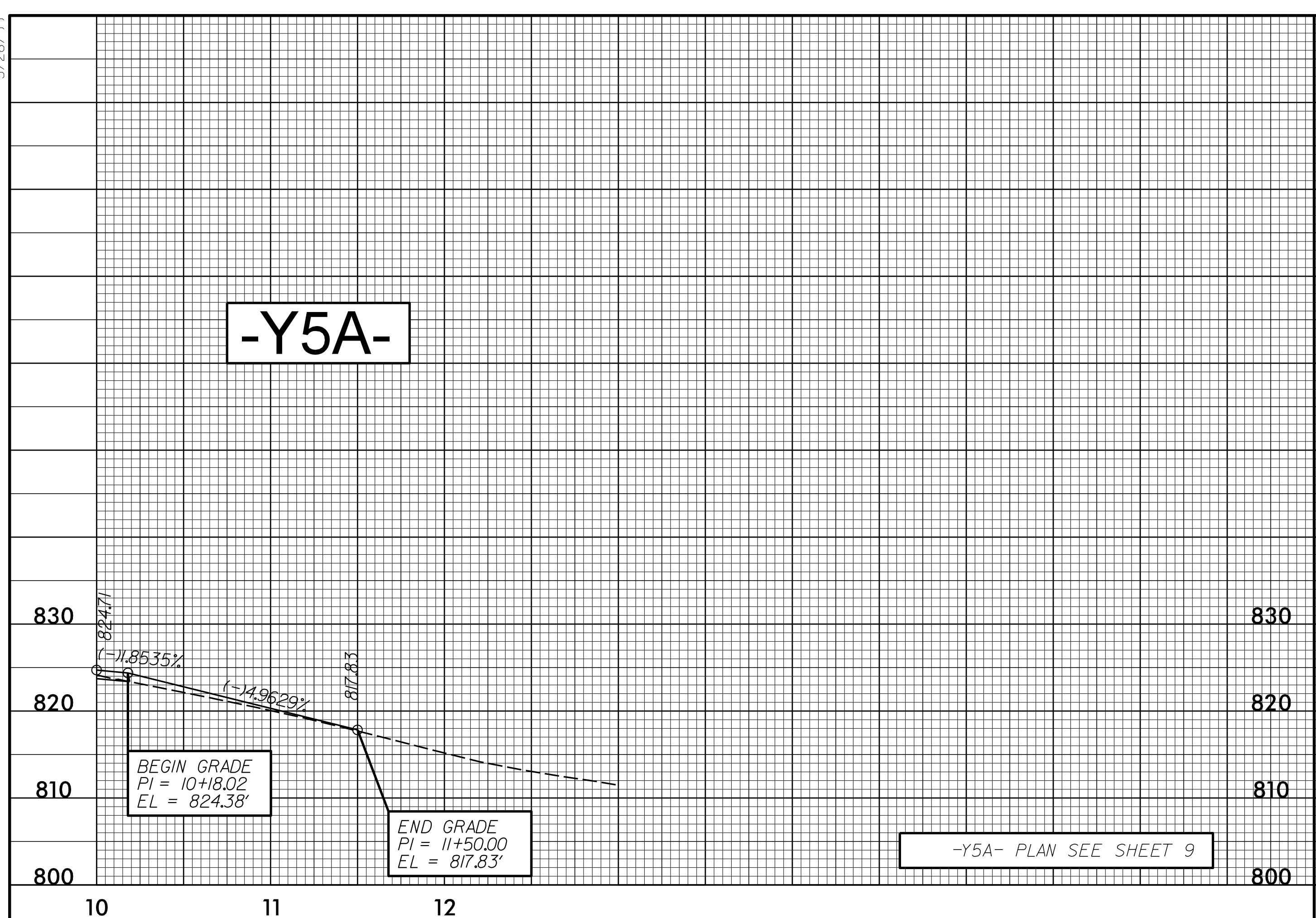
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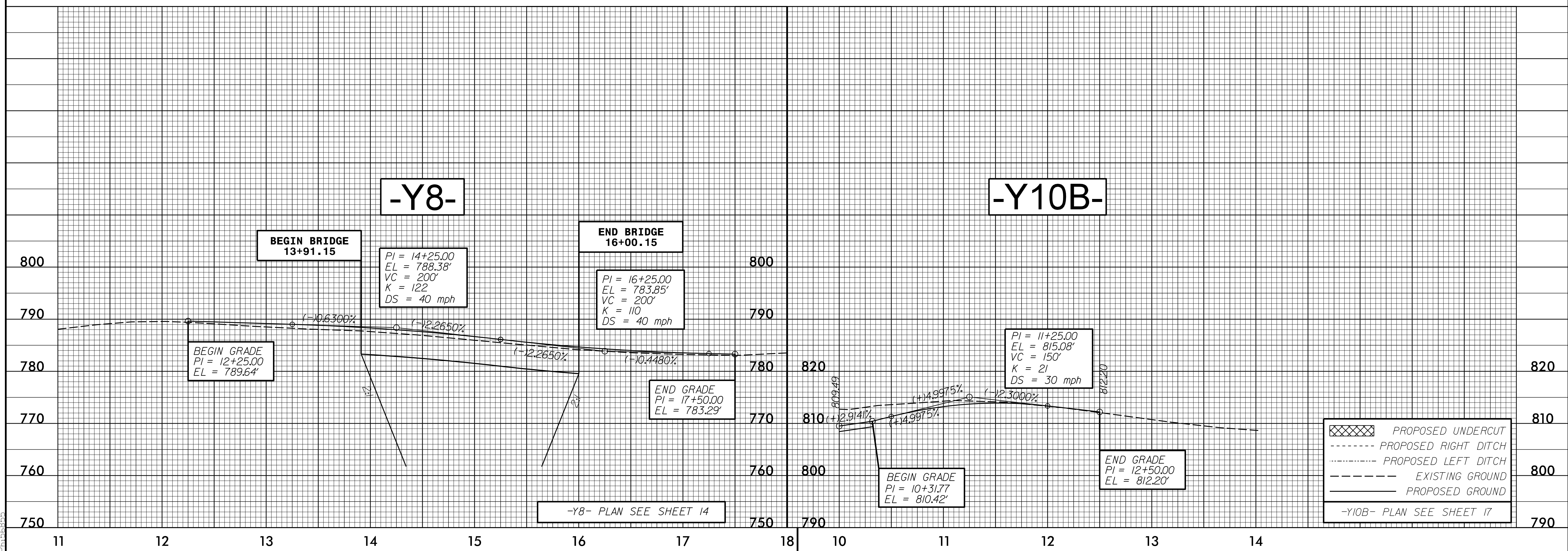
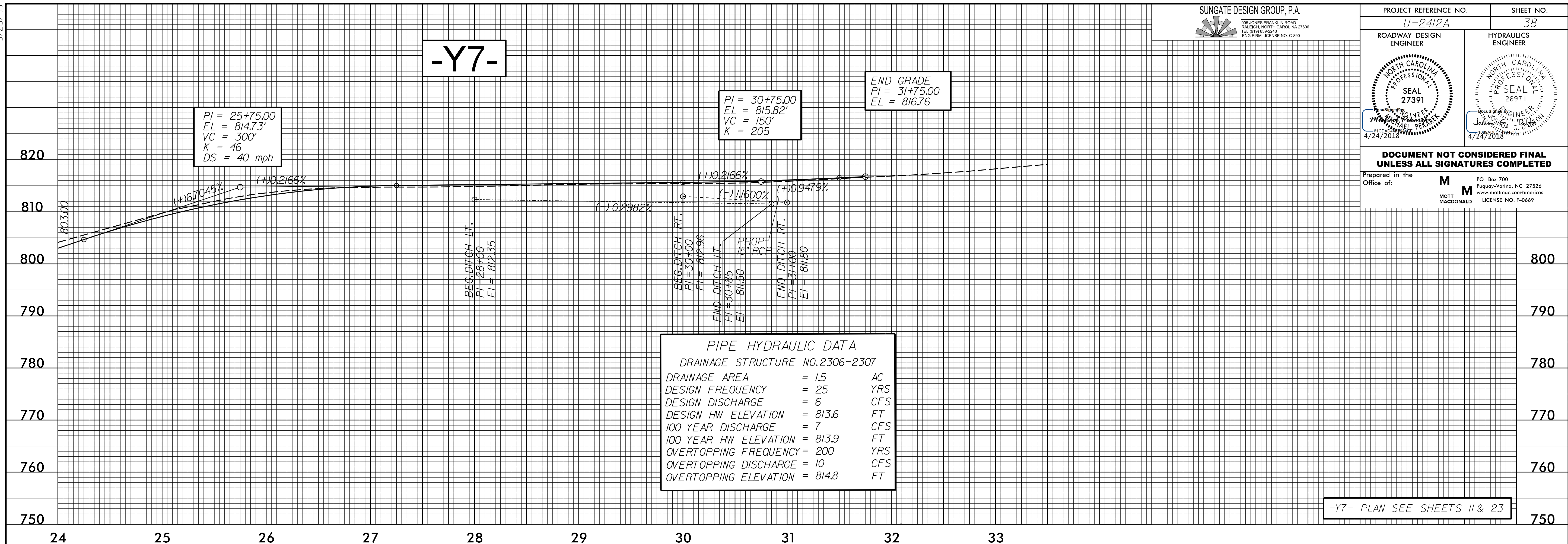
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ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER

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ROADWAY DESIGN ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 27391
MICHAEL PERKINS
4/24/2018

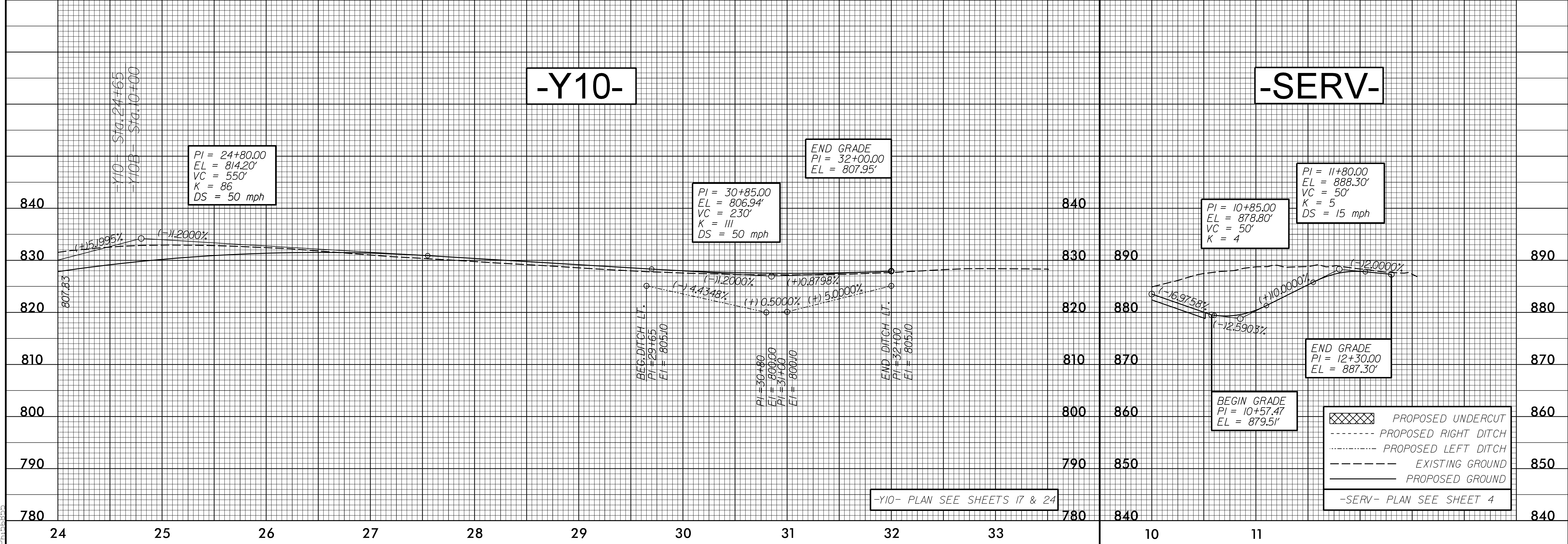
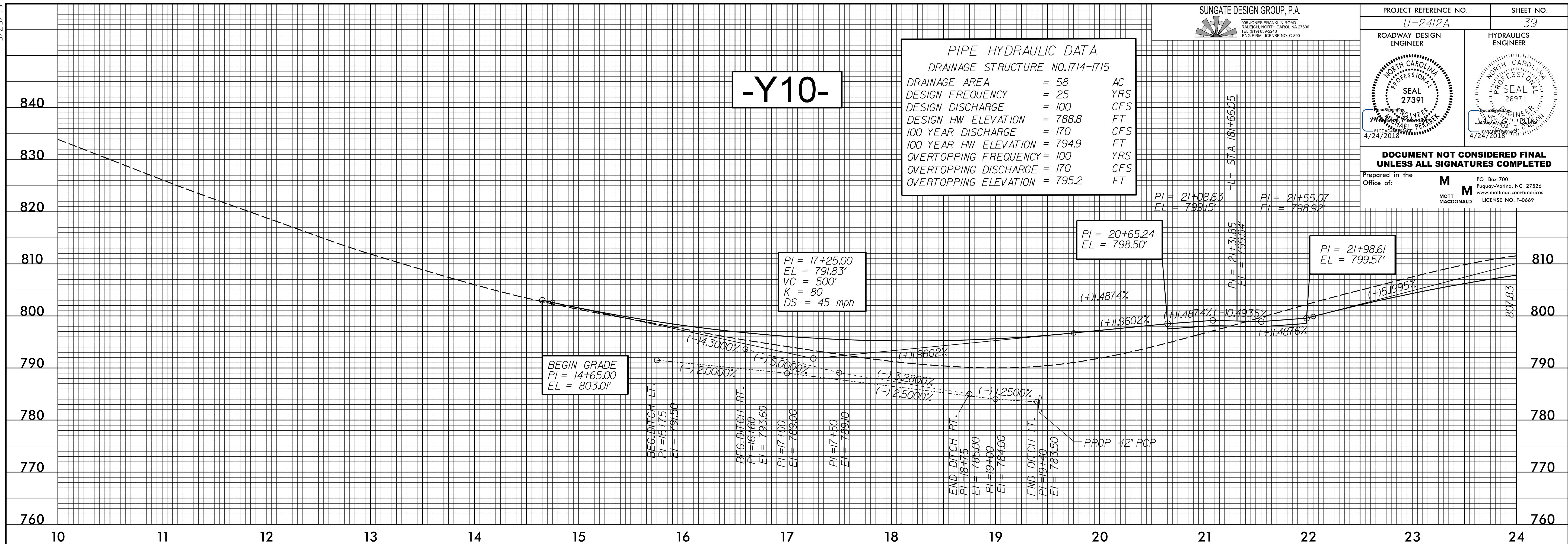
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 26971
JAMES G. DAVIS
4/24/2018

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

Prepared in the Office of: **M** MOTT MACDONALD
PO Box 700
Fuquay-Varina, NC 27526
www.mottmac.com/america
LICENSE NO. F-0669

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 1714-1715

DRAINAGE AREA	= 58	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 100	CFS
DESIGN HW ELEVATION	= 788.8	FT
100 YEAR DISCHARGE	= 170	CFS
100 YEAR HW ELEVATION	= 794.9	FT
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 170	CFS
OVERTOPPING ELEVATION	= 795.2	FT



PROPOSED UNDERCUT
PROPOSED RIGHT DITCH
PROPOSED LEFT DITCH
EXISTING GROUND
PROPOSED GROUND

-SERV- PLAN SEE SHEET 4

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