

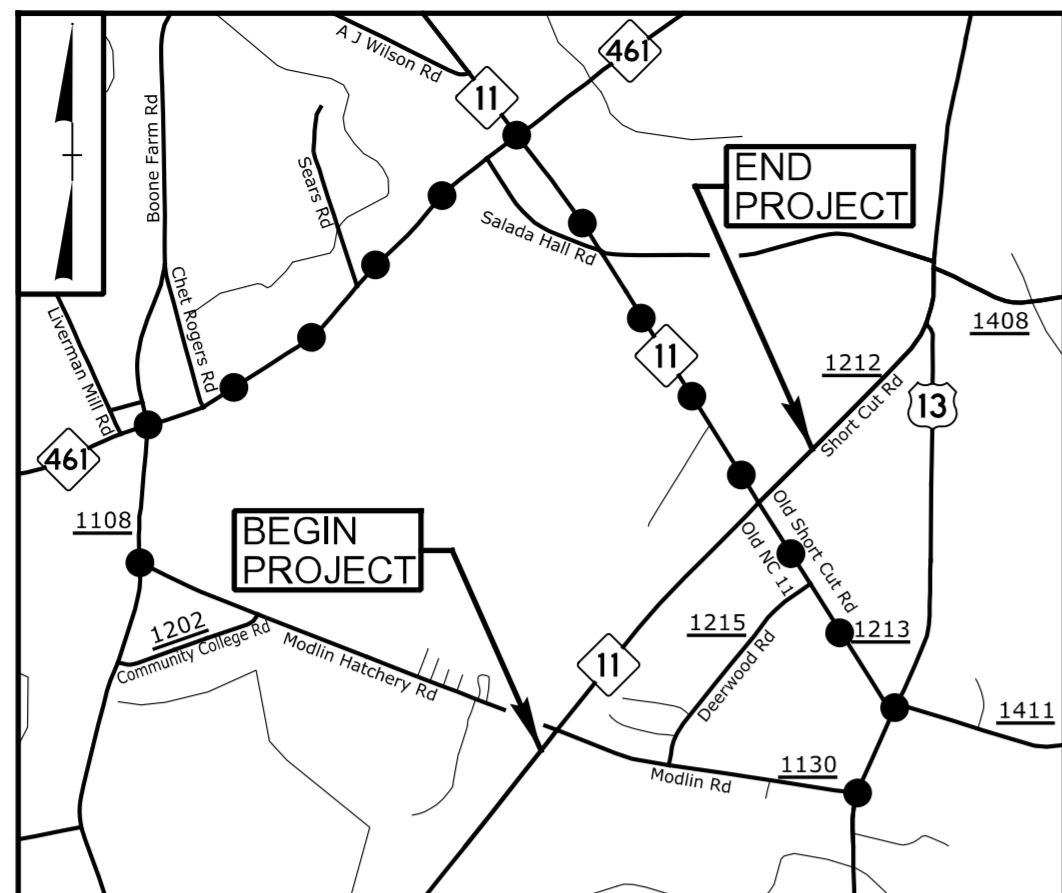
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09/08/09

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



VICINITY MAP

● ● ● DETOUR ROUTE

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

HERTFORD COUNTY

LOCATION: US 13/NC 11 FROM WEST OF MODLIN ROAD TO EAST OF NC 11/SR 1213 (OLD NC 11 ROAD). CONSTRUCT GRADE SEPARATION AT SR 1130 (MODLIN ROAD) AND INTERCHANGE AT OLD NC 11/SR 1213 (OLD NC 11 ROAD).

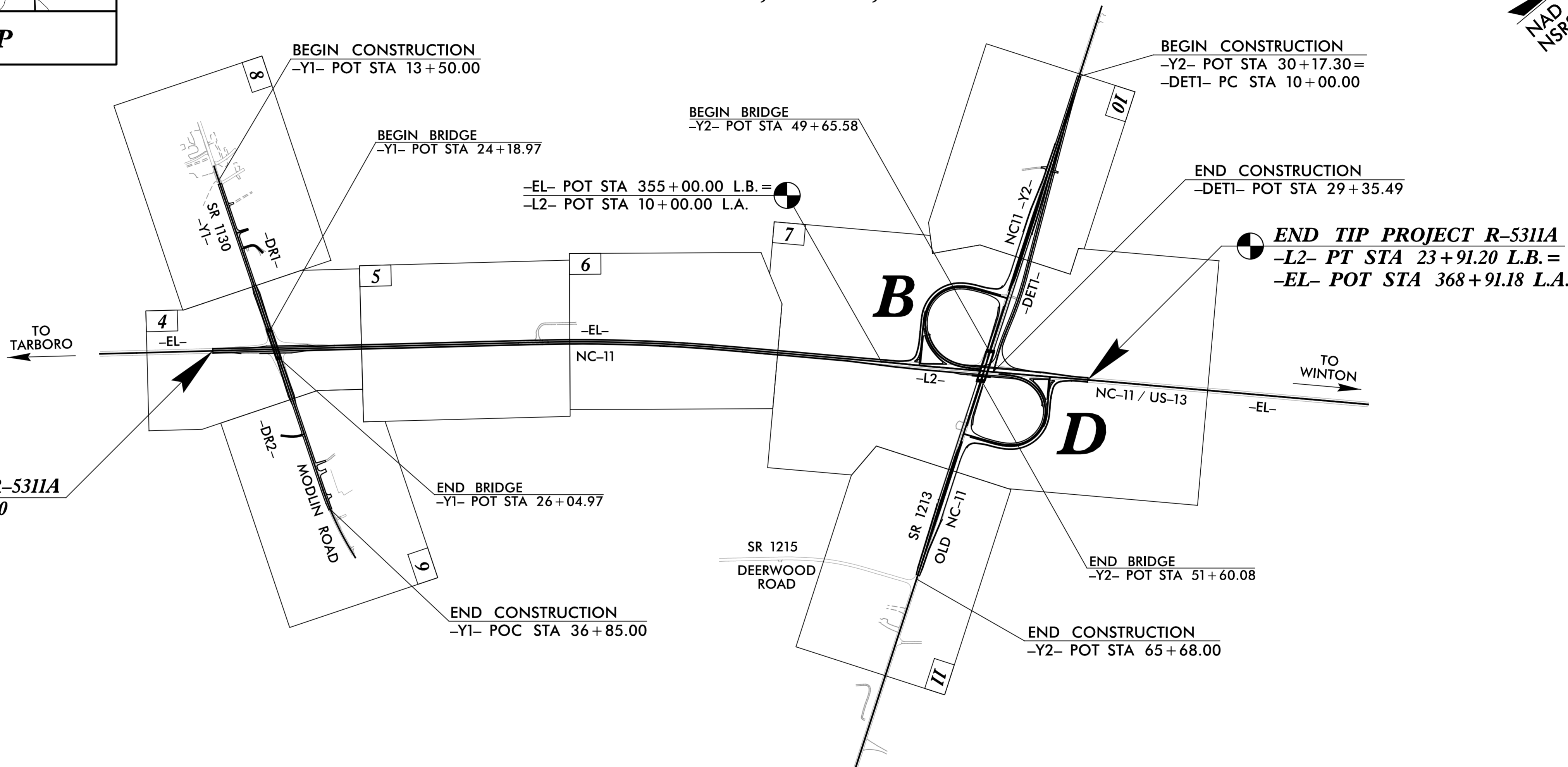
TYPE OF WORK: GRADING, PAVING, DRAINAGE AND STRUCTURES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-5311A	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
45449.1.2	NHF-0013(37)	P.E.	
45449.2.FS1	NHF-0013(37)	R/W	
45449.3.3	NHF-0013(37)	CONST.	



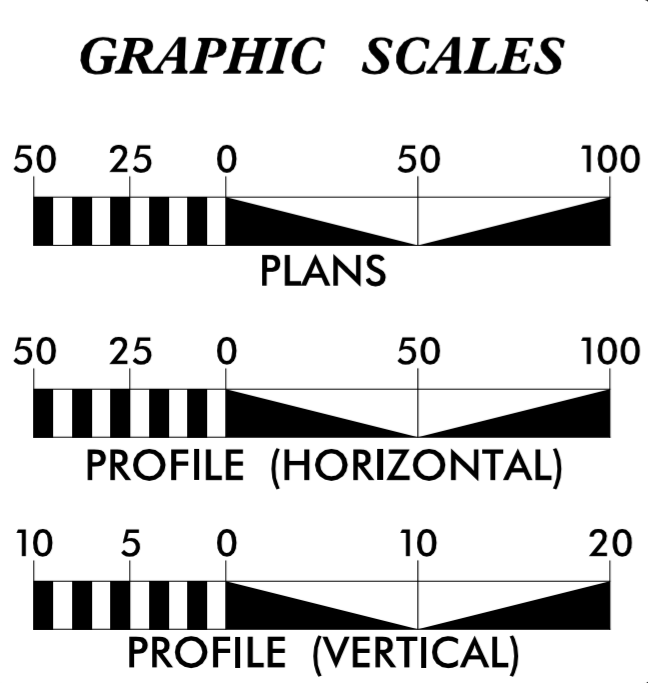
TIP PROJECT: R-5311A

CONTRACT: C203941



NOTES:
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DESIGN DATA

ADT (2017) =	7,500
ADT (2037) =	10,830
K =	10%
D =	55%
T =	26%*
V =	60 MPH
* TTST = 22% DUAL 4%	
FUNC CLASS =	ARTERIAL REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-5311A =	1.116 MILES
TOTAL LENGTH TIP PROJECT R-5311A =	1.116 MILES

Prepared for the North Carolina Department of Transportation in the office of:

ICA Engineering
5121 Kingdom Way, Suite 100, Raleigh, NC 27607, NC License No: F0258

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 17, 2016

LETTING DATE: JUNE 20, 2017

DENA C. SNEAD, PE
PROJECT ENGINEER

JORDAN C. BOND
PROJECT DESIGN ENGINEER

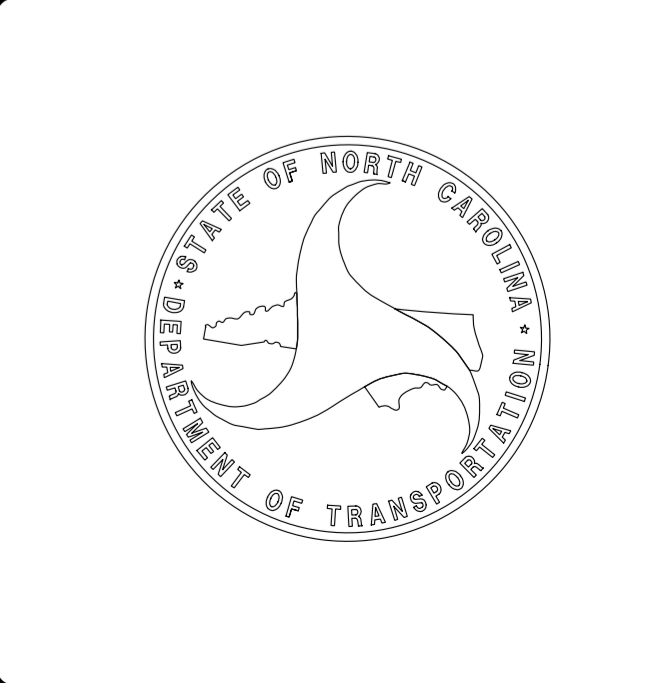
GARY LOVERING, PE
ROADWAY DESIGN - PROJECT ENGINEER

HYDRAULICS ENGINEER


TRENTON J. CORMIER
5/10/2017
P.E.

ROADWAY DESIGN ENGINEER

DENA C. SNEAD
5/10/2017
P.E.



5/10/2017 P:\TIP\5311A\Roadway\Proc\NSRS311A_RDY_TSH.dgn ICA ENGINEERING, INC.

 ICA Engineering 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No: F-0258	PROJECT REFERENCE NO.	SHEET NO.
	R-5311A	1A
RW SHEET NO.		
ROADWAY DESIGN ENGINEER SEAL 032074 DENA C. SNEAD		
Documented by: <i>Dena C. Snead</i> 5/10/2017		

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

INDEX OF SHEETS

SHEET NUMBER	SHEET
1	TITLE SHEET
1A	INDEX OF SHEETS, GENERAL NOTES AND STANDARD DRAWINGS
1B	CONVENTIONAL SYMBOLS
1C-1 THRU 1C-2	SURVEY CONTROL SHEETS
2A-1 THRU 2A-4	PAVEMENT SCHEDULE AND TYPICAL SECTIONS
2B-1 THRU 2B-3	STRUCTURE TYPICAL SECTIONS
2B-4	PAVEMENT-BRIDGE RELATIONSHIP SKETCH
2B-5	SHEAR POINT DIAGRAM
2B-6 THRU 2B-7	DETOUR 1 PLAN AND PROFILE
2B-8 THRU 2B-11	INTERSECTION DETAILS
2C-1	SHOULDER WEDGE DETAILS
2C-2	STRUCTURE ANCHOR UNIT DETAILS
2C-3	GUIDE FOR PAVING SHOULDERS UNDER BRIDGES DETAILS
2C-4	MODIFIED SHOULDER BERM GUTTER DETAILS
2G-1 THRU 2G-2	REINFORCED SOIL SLOPE DETAIL
2G-3	STANDARD EMBANKMENT MONITORING DETAIL
3B-1	EARTHWORK SUMMARY
3B-2	GUARDRAIL SUMMARY
3B-3	PAVEMENT REMOVAL & SHOULDER BERM GUTTER SUMMARY
3D-1 THRU 3D-2	DRAINAGE SUMMARIES
3G-1	GEOTECHNICAL SUMMARIES
3P-1	PARCEL INDEX SHEET
4 THRU 21	PLAN AND PROFILE SHEETS
TMP-1 THRU TMP-12	TRAFFIC MANAGEMENT PLANS
PMP-1 THRU PMP-5	PAVEMENT MARKING PLANS
EC-1 THRU EC-23	EROSION CONTROL PLANS
SIGN-1 THRU SIGN-6D	SIGNING PLANS
UC-1 THRU UC-6	UTILITIES CONSTRUCTION PLANS
UO-1 THRU UO-7	UTILITIES BY OTHERS PLANS
X-1	INDEX OF CROSS SECTIONS
X-1A THRU X-1B	CROSS-SECTION SUMMARY SHEETS
X-2 THRU X-60	CROSS-SECTIONS
S01-1 THRU S01-30	Y1 STRUCTURE PLANS
S02-1 THRU S02-31	Y2 STRUCTURE PLANS
W-1 THRU W-4	WALL PLANS

GENERAL NOTES:

2012 SPECIFICATIONS
 EFFECTIVE: 01-17-2012
 REVISED: 10-31-2014

GRADING AND SURFACING OR RESURFACING AND WIDENING:
 THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. WHERE NO GRADE LINES ARE SHOWN, THE PROFILES SHOWN DENOTE THE TOP ELEVATION OF THE EXISTING PAVEMENT ALONG THE CENTER LINE OF SURVEY ON WHICH THE PROPOSED RESURFACING WILL BE PLACED. GRADE LINES MAY BE ADJUSTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.

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

SUPERELEVATION:
 ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.

SHOULDER CONSTRUCTION:
 ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.02

SIDE ROADS:
 THE CONTRACTOR WILL BE REQUIRED TO DO ALL NECESSARY WORK TO PROVIDE SUITABLE CONNECTIONS WITH ALL ROADS, STREETS, AND DRIVES ENTERING THIS PROJECT. THIS WORK WILL BE PAID FOR AT THE CONTRACT UNIT PRICE FOR THE PARTICULAR ITEMS INVOLVED.

SUBSURFACE DRAINS:
 SUBSURFACE DRAINS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 815.02 AT LOCATIONS DIRECTED BY THE ENGINEER.

GUARDRAIL:
 THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.

TEMPORARY SHORING:
 SHORING REQUIRED FOR THE MAINTENANCE OF TRAFFIC WILL BE PAID FOR AS "EXTRA WORK" IN ACCORDANCE WITH SECTION 104-7.

END BENTS:
 THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.

UTILITIES:
 UTILITY OWNERS ON THIS PROJECT ARE Dominion North Carolina Power, AT&T, Century Link, Time Warner Cable, Piedmont Natural Gas, Hertford County Rural Water, & Town of Union. ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS, EXCEPT AS SHOWN ON THE PLANS.

RIGHT-OF-WAY MARKERS:
 ALL RIGHT-OF-WAY MARKERS ON THIS PROJECT SHALL BE PLACED BY OTHERS.

2012 ROADWAY ENGLISH STANDARD DRAWINGS

The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:

STD.NO.	TITLE
DIVISION 2 - EARTHWORK	
200.03	Method of Clearing - Method III
225.01	Guide for Grading Subgrade - Interstate and Freeway
225.02	Guide for Grading Subgrade - Secondary and Local
225.03	Deceleration and Acceleration Lanes
225.04	Method of Obtaining Superelevation - Two Lane Pavement
225.09	Guide for Shoulder and Ditch Transition at Grade Separations
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
310.10	Driveway Pipe Construction
DIVISION 4 - MAJOR STRUCTURES	
422.10	Reinforced Bridge Approach Fills
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
560.02	Method of Shoulder Construction - High Side of Superelevated Curve - Method II (Sheet 2 of 3 is no longer applicable)
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
654.01	Pavement Repairs
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
840.00	Concrete Base Pad for Drainage Structures
840.01	Brick Catch Basin - 12" thru 54" Pipe
840.02	Concrete Catch Basin - 12" thru 54" Pipe
840.03	Frame, Grates and Hood - for Use on Standard Catch Basin
840.14	Concrete Drop Inlet - 12" thru 30" Pipe
840.15	Brick Drop Inlet - 12" thru 30" Pipe
840.16	Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.19	Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.24	Frames and Narrow Slot Sag Grates
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.27	Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.28	Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe
840.29	Frames and Narrow Slot Flat Grates
840.31	Concrete Junction Box - 12" thru 66" Pipe
840.32	Brick Junction Box - 12" thru 66" Pipe
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.45	Precast Drainage Structure
840.46	Traffic Bearing Precast Drainage Structure
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
852.01	Concrete Islands
852.06	Method for Placement of Drop Inlets in Concrete Islands
857.01	Precast Reinforced Concrete Barrier - 41" Single Faced
862.01	Guardrail Placement
862.02	Guardrail Installation
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
866.02	Woven Wire Fence - with Wood Post
876.02	Guide for Rip Rap at Pipe Outlets

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 ICA ENGINEERING, INC.

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale *S.U.E. = *Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

State Line	_____
County Line	_____
Township Line	_____
City Line	_____
Reservation Line	_____
Property Line	_____
Existing Iron Pin	
Property Corner	
Property Monument	
Parcel/Sequence Number	
Existing Fence Line	—X—X—X—
Proposed Woven Wire Fence	—○—
Proposed Chain Link Fence	—□—
Proposed Barbed Wire Fence	—◇—
Existing Wetland Boundary	—WLB—
Proposed Wetland Boundary	—WLB—
Existing Endangered Animal Boundary	—EAB—
Existing Endangered Plant Boundary	—EPB—
Existing Historic Property Boundary	—HPB—
Known Contamination Area: Soil	—X—X—
Potential Contamination Area: Soil	—X—X—
Known Contamination Area: Water	—X—X—
Potential Contamination Area: Water	—X—X—
Contaminated Site: Known or Potential	

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	
Sign	
Well	
Small Mine	
Foundation	
Area Outline	
Cemetery	
Building	
School	
Church	
Dam	

HYDROLOGY:

Stream or Body of Water	_____
Hydro, Pool or Reservoir	
Jurisdictional Stream	—JS—
Buffer Zone 1	—BZ 1—
Buffer Zone 2	—BZ 2—
Flow Arrow	
Disappearing Stream	—>—
Spring	
Wetland	
Proposed Lateral, Tail, Head Ditch	
False Sump	

RAILROADS:

Standard Gauge	
RR Signal Milepost	
Switch	
RR Abandoned	_____
RR Dismantled	_____

RIGHT OF WAY:

Baseline Control Point	
Existing Right of Way Marker	
Existing Right of Way Line	_____
Proposed Right of Way Line	—RW—
Proposed Right of Way Line with Iron Pin and Cap Marker	
Proposed Right of Way Line with Concrete or Granite R/W Marker	
Proposed Control of Access Line with Concrete C/A Marker	
Existing Control of Access	
Proposed Control of Access	
Existing Easement Line	—E—
Proposed Temporary Construction Easement	—E—
Proposed Temporary Drainage Easement	—TDE—
Proposed Permanent Drainage Easement	—PDE—
Proposed Permanent Drainage / Utility Easement	—DUE—
Proposed Permanent Utility Easement	—PUE—
Proposed Temporary Utility Easement	—TUE—
Proposed Aerial Utility Easement	—AUE—
Proposed Permanent Easement with Iron Pin and Cap Marker	

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	_____
Existing Curb	_____
Proposed Slope Stakes Cut	—C—
Proposed Slope Stakes Fill	—F—
Proposed Curb Ramp	
Existing Metal Guardrail	
Proposed Guardrail	
Existing Cable Guiderail	
Proposed Cable Guiderail	
Equality Symbol	
Pavement Removal	

VEGETATION:

Single Tree	
Single Shrub	
Hedge	
Woods Line	

Orchard	
Vineyard	

EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	
Bridge Wing Wall, Head Wall and End Wall	
MINOR:	
Head and End Wall	
Pipe Culvert	
Footbridge	
Drainage Box: Catch Basin, DI or JB	
Paved Ditch Gutter	
Storm Sewer Manhole	
Storm Sewer	

UTILITIES:

POWER:	
Existing Power Pole	
Proposed Power Pole	
Existing Joint Use Pole	
Proposed Joint Use Pole	
Power Manhole	
Power Line Tower	
Power Transformer	
U/G Power Cable Hand Hole	
H-Frame Pole	
U/G Power Line LOS B (S.U.E.*)	—P—
U/G Power Line LOS C (S.U.E.*)	—P—
U/G Power Line LOS D (S.U.E.*)	—P—

TELEPHONE:

Existing Telephone Pole	
Proposed Telephone Pole	
Telephone Manhole	
Telephone Pedestal	
Telephone Cell Tower	
U/G Telephone Cable Hand Hole	
U/G Telephone Cable LOS B (S.U.E.*)	—T—
U/G Telephone Cable LOS C (S.U.E.*)	—T—
U/G Telephone Cable LOS D (S.U.E.*)	—T—
U/G Telephone Conduit LOS B (S.U.E.*)	—TC—
U/G Telephone Conduit LOS C (S.U.E.*)	—TC—
U/G Telephone Conduit LOS D (S.U.E.*)	—TC—
U/G Fiber Optics Cable LOS B (S.U.E.*)	—TFO—
U/G Fiber Optics Cable LOS C (S.U.E.*)	—TFO—
U/G Fiber Optics Cable LOS D (S.U.E.*)	—TFO—

WATER:

Water Manhole	
Water Meter	
Water Valve	
Water Hydrant	
U/G Water Line LOS B (S.U.E.*)	—W—
U/G Water Line LOS C (S.U.E.*)	—W—
U/G Water Line LOS D (S.U.E.*)	—W—
Above Ground Water Line	—A/G Water—

TV:

TV Pedestal	
TV Tower	
U/G TV Cable Hand Hole	
U/G TV Cable LOS B (S.U.E.*)	—TV—
U/G TV Cable LOS C (S.U.E.*)	—TV—
U/G TV Cable LOS D (S.U.E.*)	—TV—
U/G Fiber Optic Cable LOS B (S.U.E.*)	—TV FO—
U/G Fiber Optic Cable LOS C (S.U.E.*)	—TV FO—
U/G Fiber Optic Cable LOS D (S.U.E.*)	—TV FO—

GAS:

Gas Valve	
Gas Meter	
U/G Gas Line LOS B (S.U.E.*)	—G—
U/G Gas Line LOS C (S.U.E.*)	—G—
U/G Gas Line LOS D (S.U.E.*)	—G—
Above Ground Gas Line	—A/G Gas—

SANITARY SEWER:

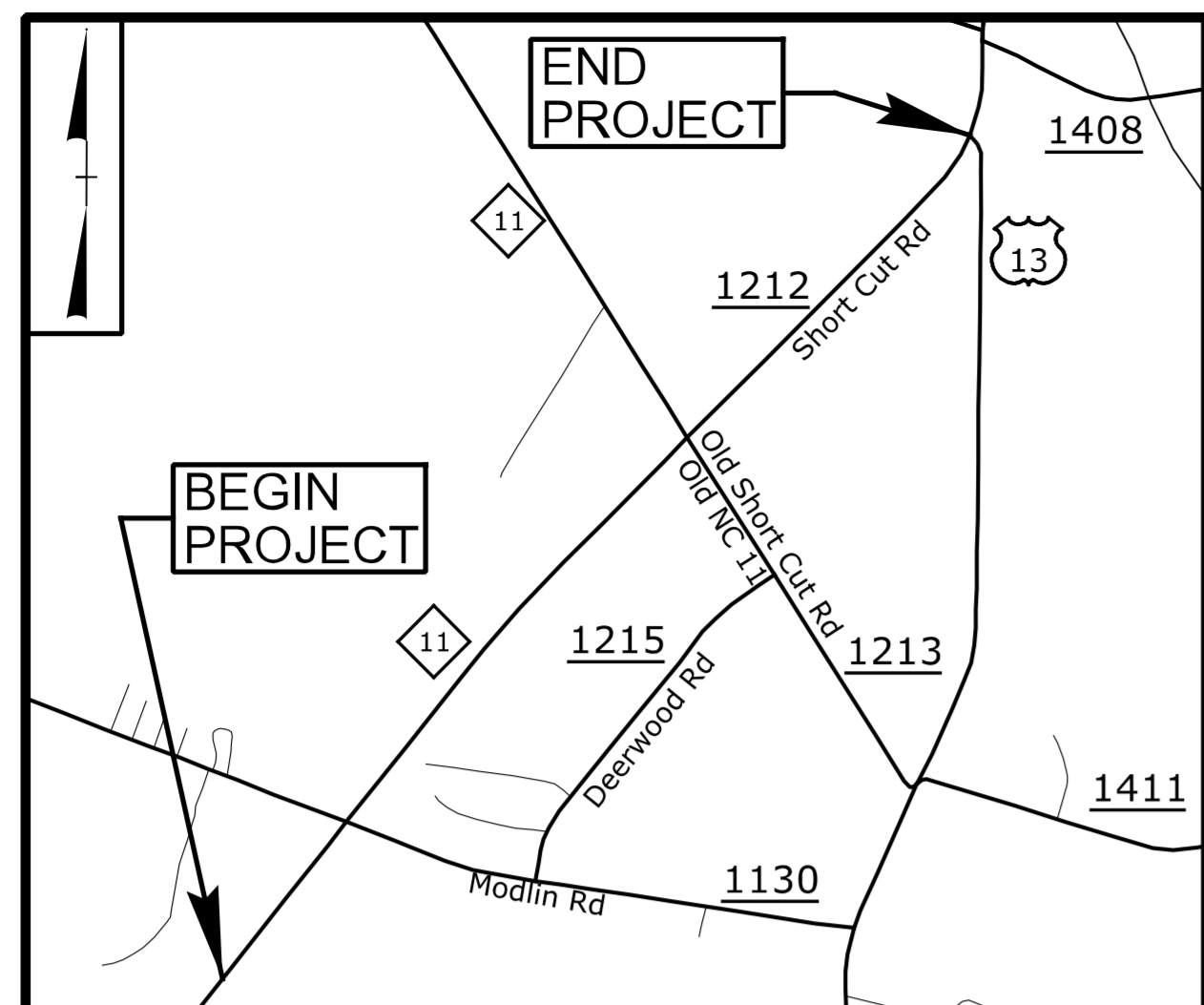
Sanitary Sewer Manhole	
Sanitary Sewer Cleanout	
U/G Sanitary Sewer Line	—SS—
Above Ground Sanitary Sewer	—A/G Sanitary Sewer—
SS Forced Main Line LOS B (S.U.E.*)	—FSS—
SS Forced Main Line LOS C (S.U.E.*)	—FSS—
SS Forced Main Line LOS D (S.U.E.*)	—FSS—

MISCELLANEOUS:

Utility Pole	
Utility Pole with Base	
Utility Located Object	
Utility Traffic Signal Box	
Utility Unknown U/G Line LOS B (S.U.E.*)	—ZUTL—
U/G Tank; Water, Gas, Oil	
Underground Storage Tank, Approx. Loc.	
A/G Tank; Water, Gas, Oil	
Geoenvironmental Boring	
U/G Test Hole LOS A (S.U.E.*)	
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

04/06/15
3/30/2017
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SURVEY CONTROL SHEET R-5311A



VICINITY MAP

BL	POINT	DESC.	NORTH	EAST	ELEVATION	EL STATION	OFFSET
20		R5311A-L-20	939493.2050	2586869.4914	57.83	289+65.95	24.97 LT
21		R5311A-L-21	939983.8809	2587258.9612	58.66	295+92.40	23.49 LT
22		R5311A-L-22	940631.4773	2587768.9701	59.98	304+16.71	24.68 LT
1		R5311A-1	941344.1050	2588425.6240	57.79	313+82.95	48.90 RT
23		R5311A-L-23	942020.3909	2588928.1016	57.13	322+25.11	24.01 RT
24		R5311A-L-24	942870.0080	2589602.6489	55.43	333+10.29	25.51 RT
25		R5311A-L-25	943592.1326	2590241.2233	53.56	342+76.69	25.25 RT
26		R5311A-L-26	944310.6607	2590887.9908	52.42	352+42.65	21.12 LT
3		R5311A-3	944967.4450	2591619.5340	50.96	362+24.19	34.54 RT
27		R5311A-L-27	945629.4681	2592261.3834	50.45	371+46.21	22.91 RT
28		R5311A-L-28	946091.9486	2592724.9064	51.42	378+00.99	25.52 RT
29		R5311A-L-29	946732.1480	2593359.6548	53.39	387+02.52	24.24 RT
30		R5311A-L-30	947287.2707	2593907.8358	53.03	394+82.68	21.56 RT
31		R5311A-L-31	947868.9895	2594266.5279	49.07	401+48.10	134.25 LT
209		R5311A-BY5-209	948542.7695	2594458.8461	48.14	407+61.49	472.94 LT
5		R5311A-5	948723.2700	2594339.5430	49.33	408+05.37	684.81 LT
32		R5311A-L-32	949049.2108	2594312.9509	48.23	410+17.76	933.49 LT
33		R5311A-L-33	949520.7869	2594402.1563	48.87	414+15.06	1202.73 LT

10000	ELEVATION = 56.97	266	ELEVATION = 57.10
N 939435	E 2586923	N 948264	E 2589403
EL STATION 289+54.00	53 RIGHT	Y2 STATION 11+52.00	75 RIGHT
TBM1		TBM7	
256	ELEVATION = 55.41	264	ELEVATION = 52.90
N 941556	E 2588303	N 946790	E 2590481
EL STATION 314+73.00	178 LEFT	Y2 STATION 29+74.00	50 LEFT
TBM2		TBM8	
260	ELEVATION = 54.01	263	ELEVATION = 53.18
N 942815	E 2589619	N 945769	E 2590966
EL STATION 332+78.00	73 RIGHT	Y2 STATION 40+95.00	85 RIGHT
TBM3		TBM4	
268	ELEVATION = 54.02	275	ELEVATION = 50.04
N 946728	E 2593201	N 943743	E 2592407
EL STATION 385+87.00	86 LEFT	Y2 STATION 65+78.00	52 LEFT
TBM5		TBM9	
271	ELEVATION = 52.37	276	ELEVATION = 48.00
N 948663	E 2594393	N 941878	E 2593644
EL STATION 408+01.00	604 LEFT	Y2 STATION 88+16.00	103 LEFT
TBM6		TBM10	

BY	POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
200		R5311A-BY-200	941725.4696	2587628.6820	54.73	17+01.48	15.29 LT
201		R5311A-BY-201	941552.5199	2587989.9629	54.35	21+00.86	15.23 RT
1		R5311A-1	941344.1050	2588425.6240	57.79	25+82.42	51.90 RT
2		R5311A-2	941093.7940	2589303.7020	52.74	34+91.57	32.44 LT

BL1	POINT	DESC.	NORTH	EAST	ELEVATION	Y2 STATION	OFFSET
9		R5311A-9	948823.0410	2589173.1680	53.79	OUTSIDE PROJECT LIMITS	
34		R5311A-L1-34	948236.9524	2589487.2470	54.45	12+19.48	18.28 RT
35		R5311A-L1-35	947451.5353	2589979.4218	52.02	21+46.36	21.28 RT
36		R5311A-L1-36	946667.6890	2590472.1054	50.11	30+72.18	23.01 RT
4		R5311A-4	945890.7420	2590964.4000	51.02	39+91.96	21.39 RT
3		R5311A-3	944967.4450	2591619.5340	50.96	51+22.42	39.83 LT
37		R5311A-L1-37	944315.7932	2592004.4425	49.66	58+78.93	17.51 LT
38		R5311A-L1-38	943713.9638	2592385.8199	49.54	65+91.42	18.81 LT
39		R5311A-L1-39	943030.2072	2592816.2043	49.33	73+99.35	17.82 LT
40		R5311A-L1-40	942348.6785	2593248.1817	47.20	82+06.25	19.36 LT
41		R5311A-L1-41	941662.1246	2593677.2136	43.31	OUTSIDE PROJECT LIMITS	

BEGIN CONSTRUCTION
-Y1- POT STA 13+75.00
 LOCALIZED PROJECT COORDINATES
 N = 941,829.3430
 E = 2,587,318.7859

BEGIN TIP PROJECT R-5311A
-EL- POT STA 310+00.00
 LOCALIZED PROJECT COORDINATES
 N = 941,073.9005
 E = 2,588,149.8816

BEGIN CONSTRUCTION
-Y2- POT STA 35+00.00
 LOCALIZED PROJECT COORDINATES
 N = 946,318.1884
 E = 2,590,719.9080

NCDOT GPS STATION "R5311A-4"
LOCALIZED PROJECT COORDINATES
 N = 945,890.7420
 E = 2,590,964.4000

NCDOT GPS STATION "R5311A-3"
LOCALIZED PROJECT COORDINATES
 N = 944,967.4450
 E = 2,591,619.5340

END TIP PROJECT R-5311A
-EL- POT STA 368+91.18
 LOCALIZED PROJECT COORDINATES
 N = 945,464.7750
 E = 2,592,065.3207

NCDOT GPS STATION "R5311A-6"
LOCALIZED PROJECT COORDINATES
 N = 948,973.7350
 E = 2,593,501.6370

NCDOT GPS STATION "R5311A-5"
LOCALIZED PROJECT COORDINATES
 N = 948,723.2700
 E = 2,594,339.5430

END CONSTRUCTION
-Y1- POT STA 36+85.00
 LOCALIZED PROJECT COORDINATES
 N = 940,997.9559
 E = 2,589,473.8800

END CONSTRUCTION
-Y2- POT STA 65+40.00
 LOCALIZED PROJECT COORDINATES
 N = 943,747.4112
 E = 2,592,342.4692

NCDOT GPS STATION "R5311A-8"
LOCALIZED PROJECT COORDINATES
 N = 940,884.1480
 E = 2,593,329.9760

NCDOT GPS STATION "R5311A-7"
LOCALIZED PROJECT COORDINATES
 N = 940,126.1580
 E = 2,592,997.2430

DATUM DESCRIPTION
 THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "CENTROID1" WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 951,000,000(ft) EASTING: 2,593,600.035(ft)
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.00005802
 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "CENTROID1" TO STATION 310+00.00 IS S 28°46'12.00" W 11,323.94 (FT)
 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
 VERTICAL DATUM USED IS NAVD 88

NOTES:
 THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTP://WWW.NCDOT.GOV/DOH/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/](http://www.ncdot.gov/doh/preconstruct/highway/location/project/)
 THE FILES TO BE FOUND ARE AS FOLLOWS:
 TIP R5311A_LS_CONTROL.TXT
 SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
 INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
 PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.

NOTE: DRAWING NOT TO SCALE

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SURVEY CONTROL SHEET R-5311A

FINAL ROW /EASEMENT POINTS

PROJECT REFERENCE NO.	SHEET NO.
R-5311A	1C-2
Location and Surveys	

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
EL	312+27.27	-180.00	941363.81860	2588149.50435
EL	315+07.21	-180.00	941583.49666	2588323.02515

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
EL	315+19.51	-180.00	941593.14614	2588330.64715

ROW MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y1	18+00.00	85.00	941593.43959	2587691.69817
Y1	18+11.34	-85.00	941750.71426	2587756.31887
Y1	18+60.00	-91.72	941739.37101	2587804.11268
Y1	19+20.00	-100.00	941725.38426	2587863.04462
Y1	20+00.00	105.00	941505.32783	2587863.45474
Y1	22+50.00	130.00	941391.57007	2588087.47298
Y1	28+05.00	107.08	941212.13190	2588613.16501
Y1	29+00.00	96.00	941188.09299	2588705.73917
Y1	29+50.00	89.50	941176.06235	2588754.70358
Y1	31+00.00	70.00	941139.97044	2588901.59682
Y1	33+69.12	50.00	941061.24570	2589159.72273

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y1	13+80.00	30.00	941799.56637	2587312.59298
Y1	13+80.00	50.00	941780.92130	2587305.35686
Y1	13+80.00	-30.00	941855.50158	2587334.30132
Y1	13+80.00	-50.00	941874.14665	2587341.53743
Y1	14+84.25	-50.00	941836.43103	2587438.72373
Y1	16+04.00	58.57	941691.89147	2587511.08255
Y1	21+31.00	-125.00	941672.34959	2588068.79526
Y1	28+56.00	-128.24	941413.06386	2588745.85244
Y1	30+07.00	-123.00	941353.54300	2588884.72600
Y1	32+65.00	-90.00	941229.43307	2589113.30756
Y1	33+88.00	75.00	941031.10913	2589168.27681
Y1	33+88.00	50.00	941054.41547	2589177.32195
Y1	34+90.00	50.00	941017.51129	2589272.41181
Y1	34+90.00	72.00	940997.00171	2589264.45208

CONTROL ACCESS MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y1	28+60.00	-120.19	941404.11090	2588746.66849
Y1	29+50.00	75.00	941189.58003	2588759.94976

ROW MARKER PERMANENT EASEMENT-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y2	39+31.00	100.00	945900.33900	2590865.38400
Y2	40+82.05	115.88	945764.12583	2590932.57874

CONTROL ACCESS MARKER IRON PIN AND CAP-E

ALIGN	STATION	OFFSET	NORTH	EAST
Y2	37+50.00	-100.00	946160.14953	2590937.90738
Y2	37+50.00	100.00	946053.40209	2590768.77731
Y2	40+66.11	100.00	945786.08482	2590937.49618
Y2	65+67.17	100.00	943671.05863	2592272.40857
Y2	65+68.00	-100.00	943777.10674	2592441.97887

CONTROL ACCESS EXIST RIGHT OF WAY MONUMENT

ALIGN	STATION	OFFSET	NORTH	EAST
Y2	40+66.23	-99.89	945892.67300	2591106.59400
Y2	62+13.67	100.37	943969.80600	2592083.41900

6/2/17

FINAL PAVEMENT SCHEDULE
(JUNE 14, 2016)

C1	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	D2	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	E4	PROP. APPROX. 4 1/2" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	D3	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" IN DEPTH OR GREATER THAN 4" IN DEPTH.	E5	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	D4	PROP. APPROX. 2 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	R1	PROP. 2'-6" CONCRETE CURB & GUTTER
C4	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	D5	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	R2	PROP. MONOLITHIC CONCRETE ISLAND (KEYED IN) (SEE PLANS FOR LOCATION)
C5	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	D6	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" IN DEPTH OR GREATER THAN 4" IN DEPTH.	R3	PROP. MODIFIED SHOULDER BERM GUTTER
C6	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	T	EARTH MATERIAL
D1	PROP. APPROX. 2 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.	U	EXISTING PAVEMENT
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE. FOR CROSSOVER AREAS, PLEASE SEE PLANS.		E3	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL ON THIS PAGE.)



PROJECT REFERENCE NO. **R-5311A** SHEET NO. **2A-1**

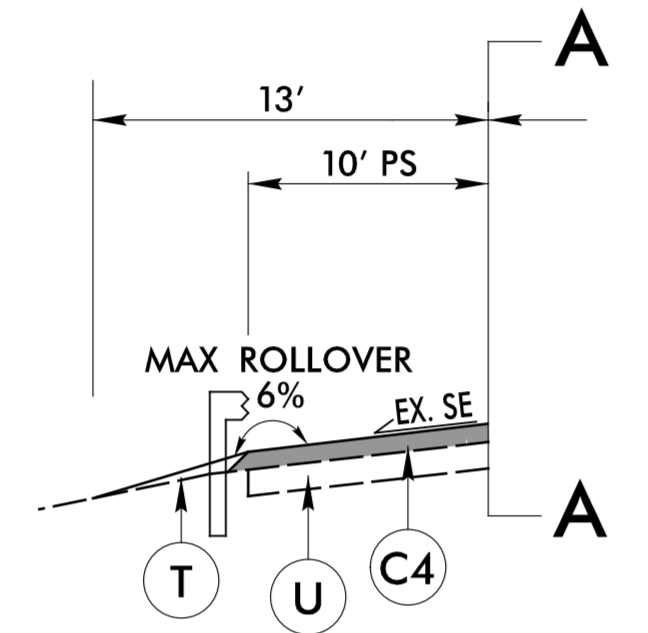
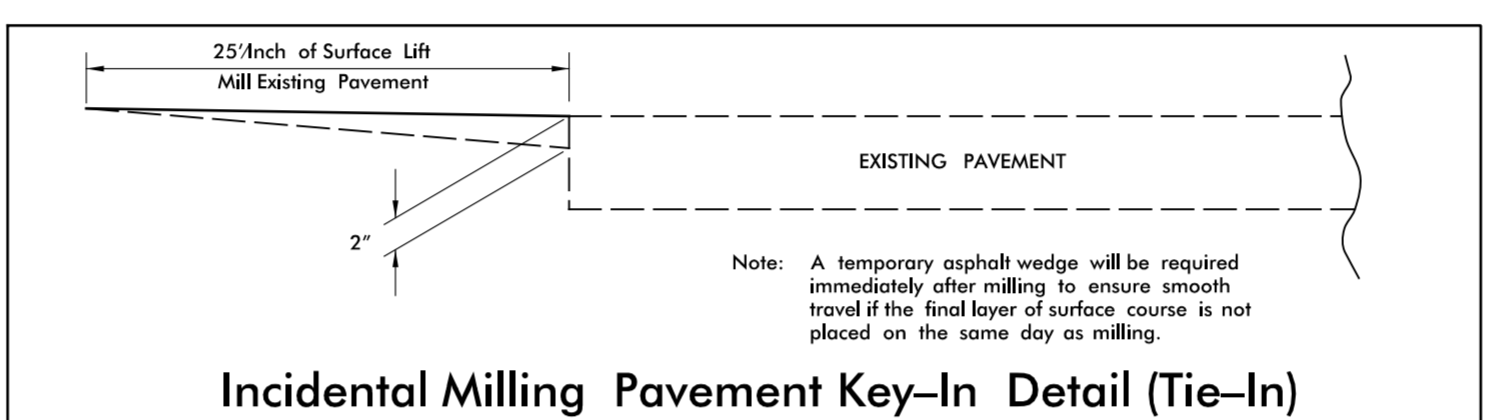
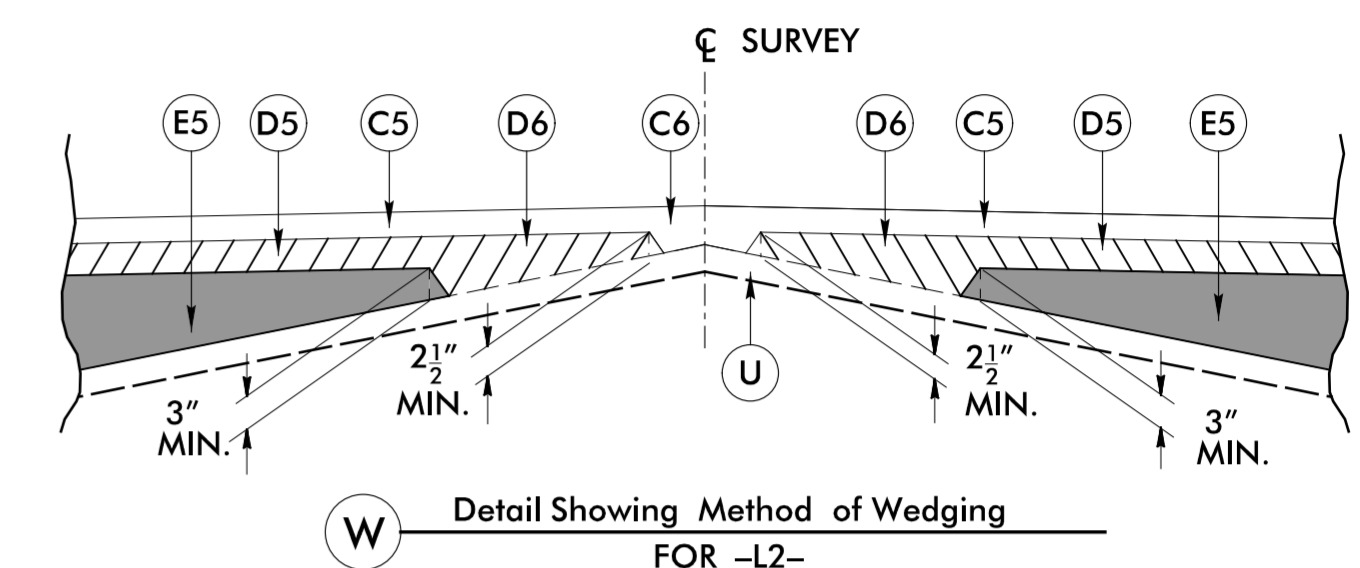
ROADWAY DESIGN ENGINEER: **DEBRA C. SNEAD** (Seal 032074)

PAVEMENT DESIGN ENGINEER: **CLARK S. MORRISON** (Seal 022896)

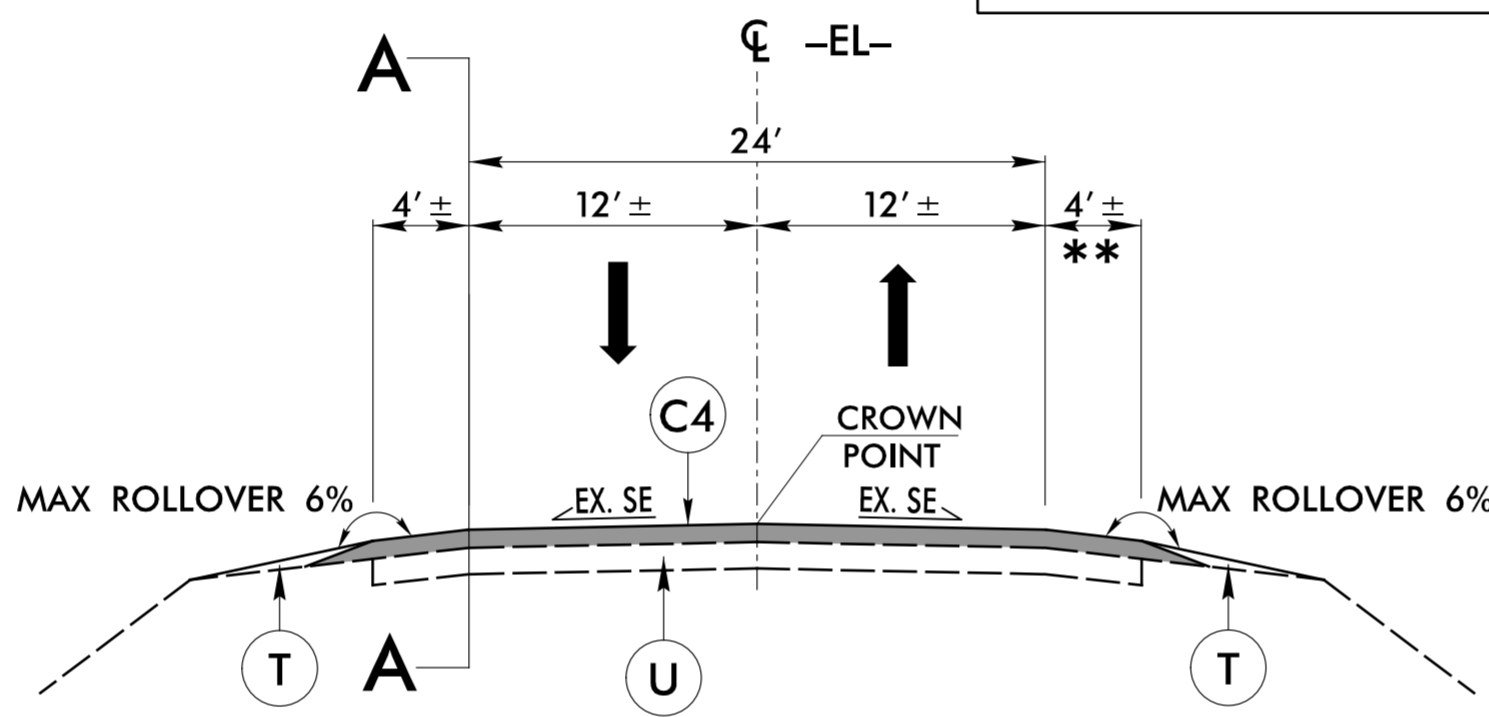
DocuSigned by: **Bona L. Sneed** 5/1/2017

DocuSigned by: **Clark S. Morrison** 5/2/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

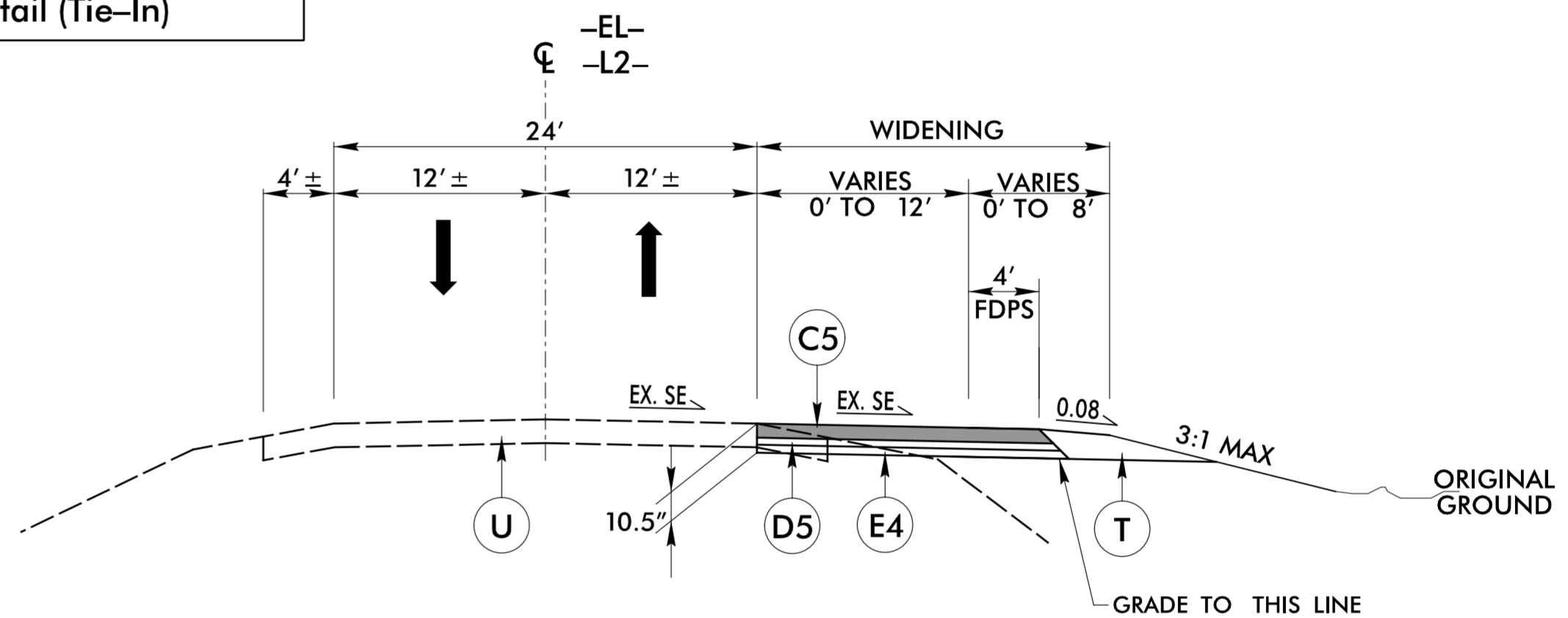


PARTIAL TYPICAL SECTION NO. 1A
USE PARTIAL TYPICAL SECTION NO. 1A IN CONJUNCTION WITH TYPICAL SECTION NO. 1 AS FOLLOWS:
-EL- STA 313+62 TO STA 316+37 RT



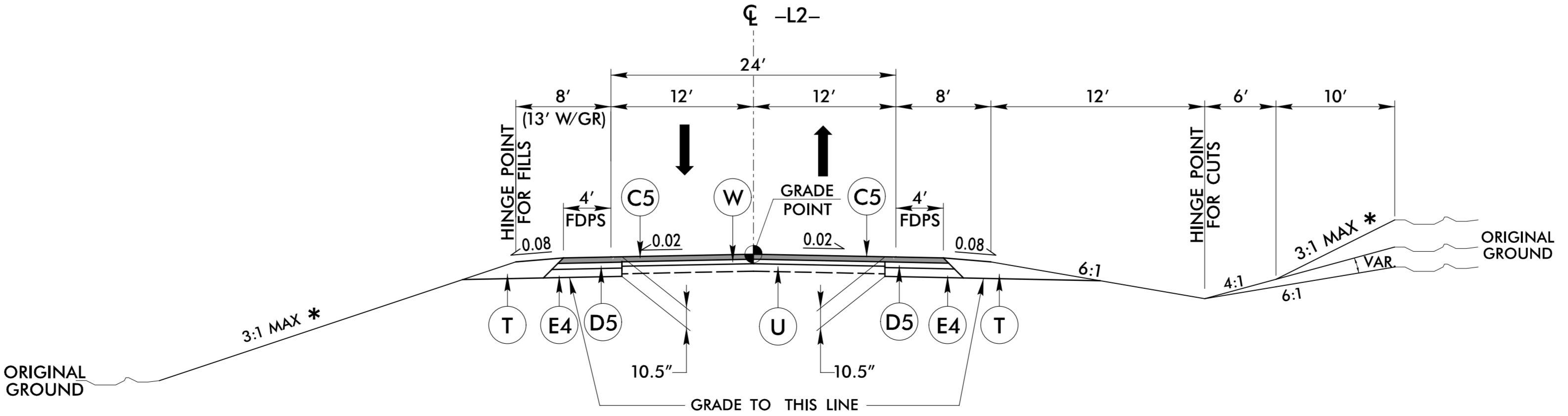
TYPICAL SECTION NO. 1
NC 11SR 1212 SHORT CUT RD

USE TYPICAL SECTION NO. 1 FOR:
-EL- STA 310+00.00 TO 355+00.00 LB = -L2- STA 10+00.00 LA
** SEE TYPICAL SECTION NO. 2 FOR FULL DEPTH PAVED SHOULDER WIDENING
-EL- STA 315+97.00 TO 316+23.89 RT



TYPICAL SECTION NO. 2
NC 11SR 1212 SHORT CUT RD

USE TYPICAL SECTION NO. 2 FOR:
WIDENING FOR TRAFFIC CONTROL TO REMAIN IN PLACE:
-EL- STA 352+70.00 TO 355+00.00 LB = -L2- STA 10+00.00 LA TO STA 17+00.00
TEMPORARY WIDENING FOR TRAFFIC CONTROL:
-EL- STA 352+70.00 TO 355+00.00 LB = -L2- STA 10+00.00 LA TO STA 11+00.00
SEE PSH 7 AND TMP-4 FOR LOCATION



TYPICAL SECTION NO. 3
NC 11SR 1212 SHORT CUT RD

USE TYPICAL SECTION NO. 3 FOR:
-EL- STA 355+00.00 LB = -L2- STA 10+00.00 LA TO STA 23+91.20

* 4:1 MAX INSIDE INTERCHANGE

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6/2/17

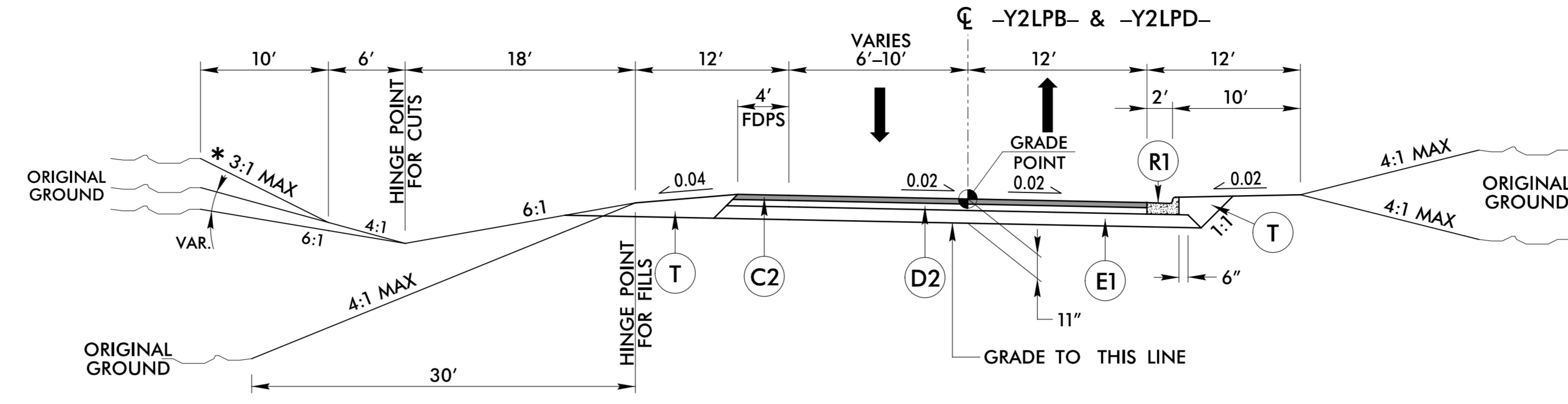
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C2	3" S9.5B
C3	VAR S9.5B
C4	1 1/2" S9.5C
C5	3" S9.5C
C6	VAR S9.5C
D1	2 1/2" I19.0B
D2	4" I19.0B
D3	VAR I19.0B
D4	2 1/2" I19.0C
D5	3" I19.0C
D6	VAR I19.0C
E1	4" B25.0B
E2	VAR B25.0B
E3	4" B25.0C
E4	4 1/2" B25.0C
E5	VAR B25.0C
R1	2'-6" C&G
R2	MONOLITHIC CONCRETE ISLAND
R3	MODIFIED SBG
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	VAR WEDGING

ICA Engineering
 5121 Kingdom Way,
 Suite 100
 Raleigh, NC 27607
 NC License No: F-0258

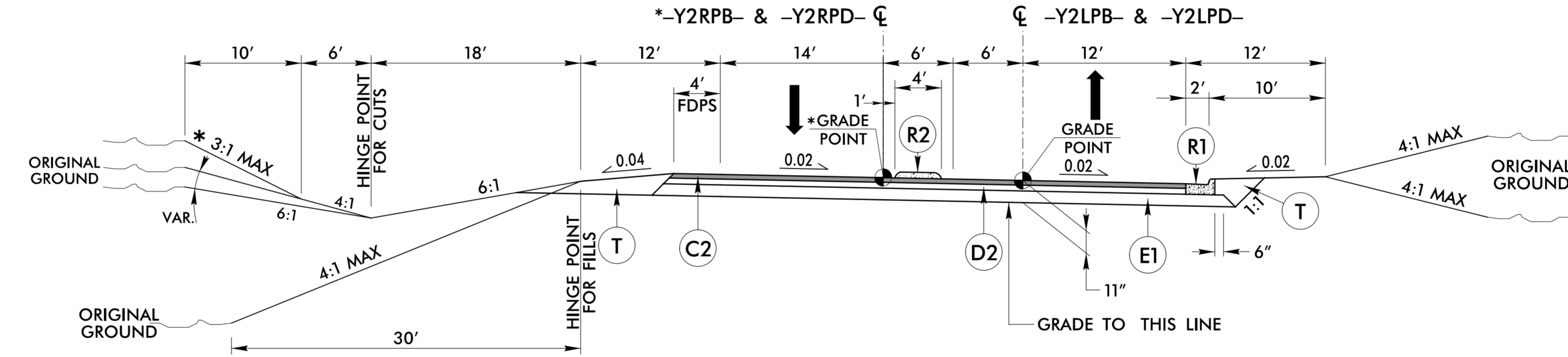
PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. <i>2A-2</i>
ROADWAY DESIGN ENGINEER <i>DENA C. SNEAD</i> SEAL 032074 5/1/2017	PAVEMENT DESIGN ENGINEER <i>CLARK S. MORRISON</i> SEAL 022896 5/2/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



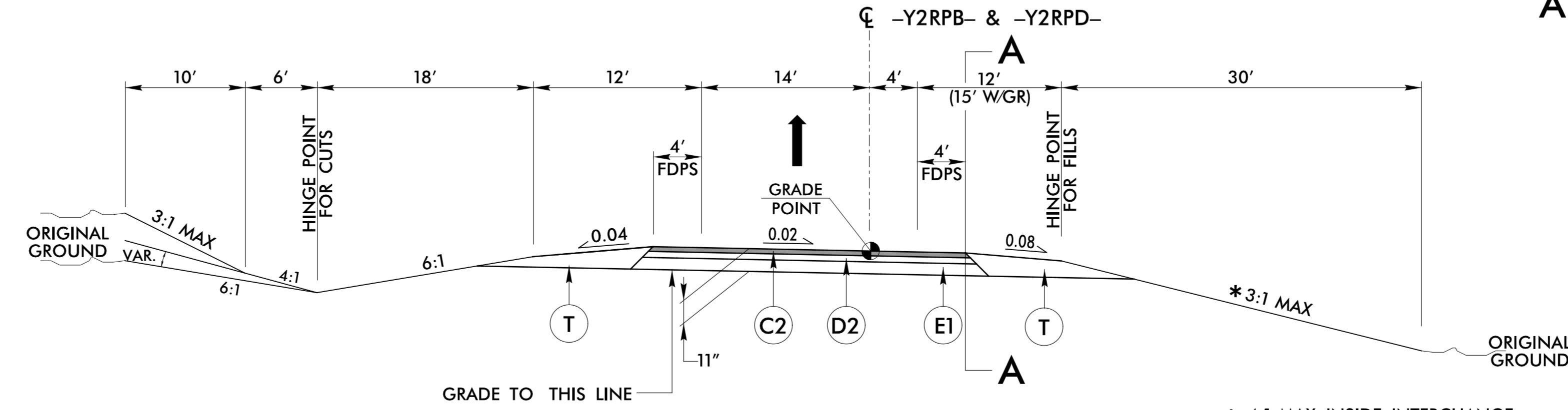
TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4 FOR:
 -Y2LPB- STA 12+47.44 TO STA 15+58.95
 -Y2LPD- STA 12+28.10 TO STA 14+59.90



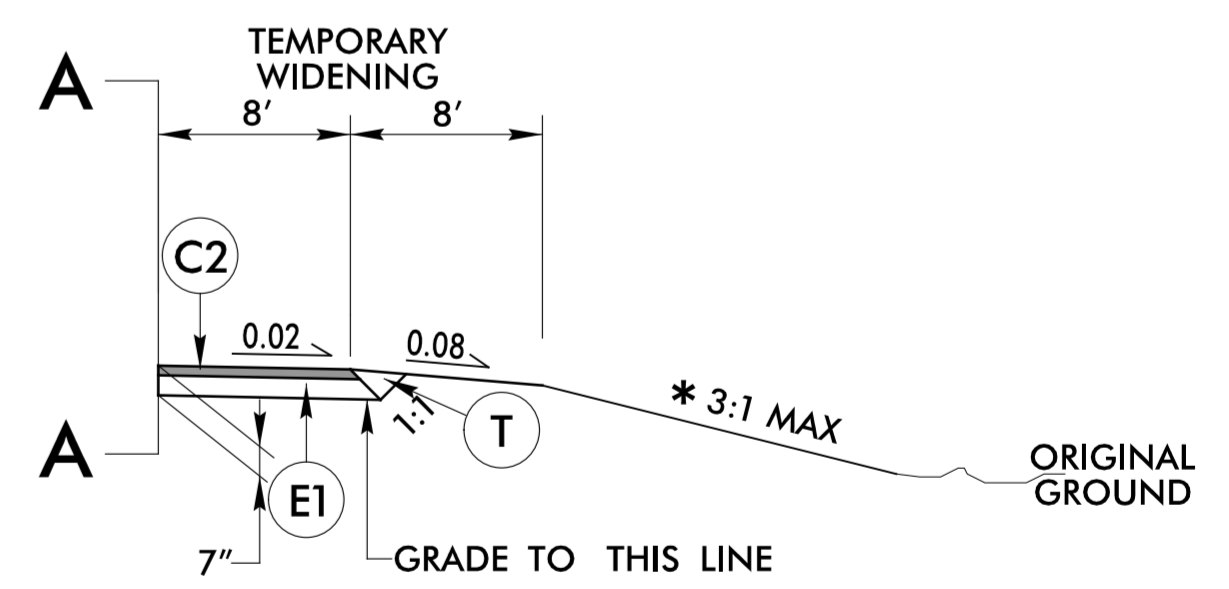
TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5 FOR:
 -Y2LPB- STA 15+58.95 TO STA 21+60.58
 -Y2LPD- STA 14+59.90 TO STA 20+55.61
 *-Y2RPB- STA 13+10.50 TO STA 13+65.06
 *-Y2RPD- STA 12+47.96 TO STA 13+37.49



TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6 FOR:
 -Y2RPB- STA 10+72.39 TO STA 13+10.50
 -Y2RPD- STA 10+71.73 TO STA 12+47.96



DETAIL OF TEMPORARY WIDENING
 TO BE USED IN CONJUNCTION WITH
 TYPICAL SECTION NO. 6
 FROM -Y2RPB- STA. 10+19 RT TO -Y2RPB- STA. 12+07 RT

* 4:1 MAX INSIDE INTERCHANGE

6/2/17

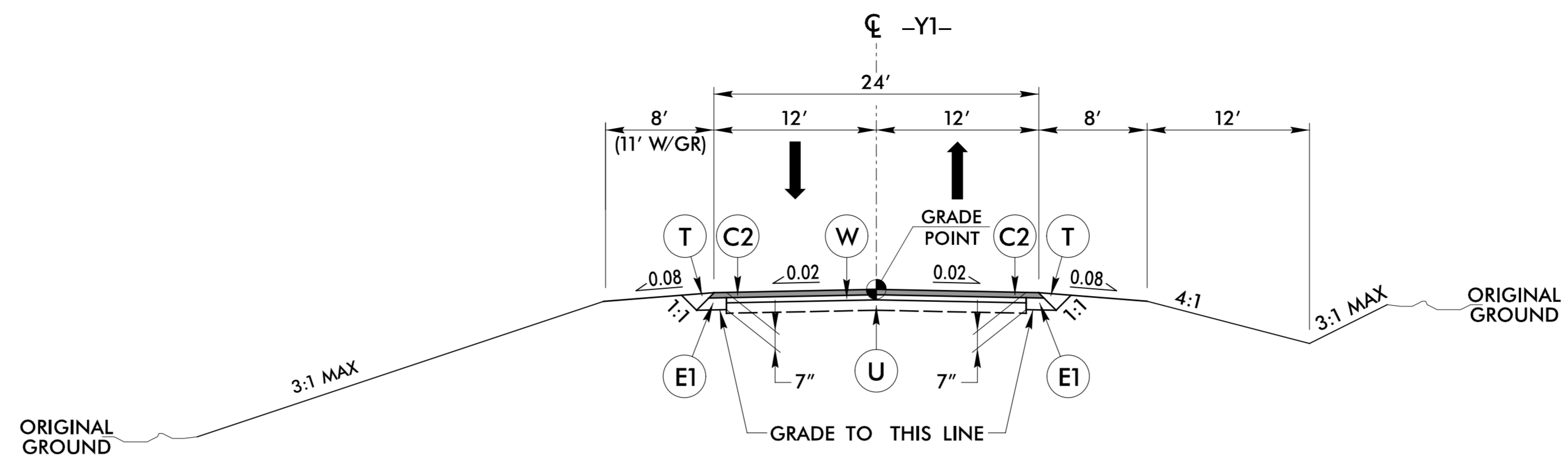
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 ICA ENGINEERING, INC.

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C2	3" S9.5B
C3	VAR S9.5B
C4	1½" S9.5C
C5	3" S9.5C
C6	VAR S9.5C
D1	2½" I19.0B
D2	4" I19.0B
D3	VAR I19.0B
D4	2½" I19.0C
D5	3" I19.0C
D6	VAR I19.0C
E1	4" B25.0B
E2	VAR B25.0B
E3	4" B25.0C
E4	4½" B25.0C
E5	VAR B25.0C
R1	2'-6" C&G
R2	MONOLITHIC CONCRETE ISLAND
R3	MODIFIED SBG
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	VAR WEDGING

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 NC License No: F-0258

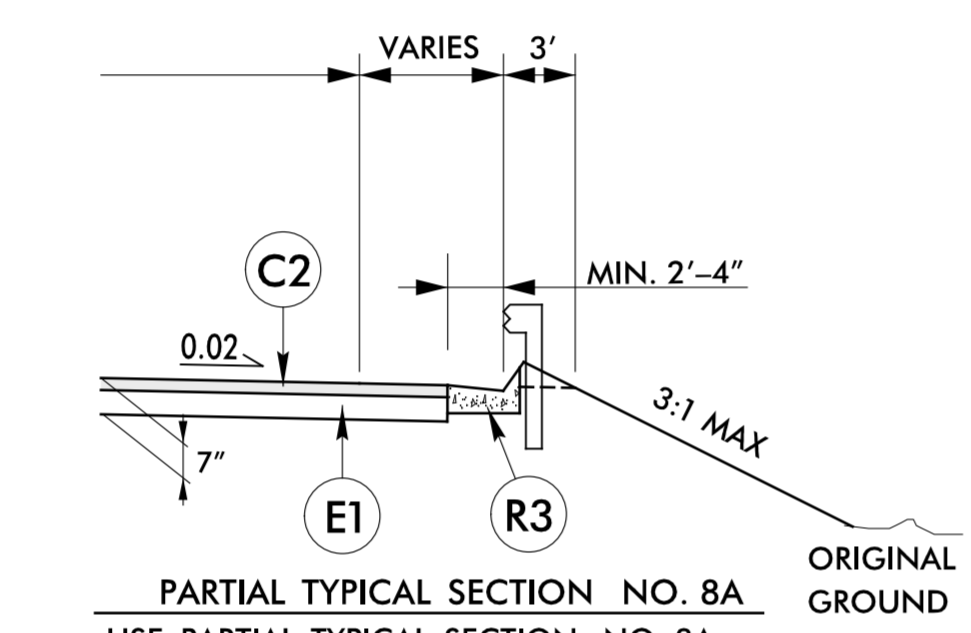
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ROADWAY DESIGN ENGINEER <i>DENA C. SNEAD</i> SEAL 032074	PAVEMENT DESIGN ENGINEER <i>CLARK S. MORRISON</i> SEAL 022896
DocuSigned by: <i>Dena C. Snoad</i> 5/1/2017	DocuSigned by: <i>Clark S. Morrison</i> 5/2/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

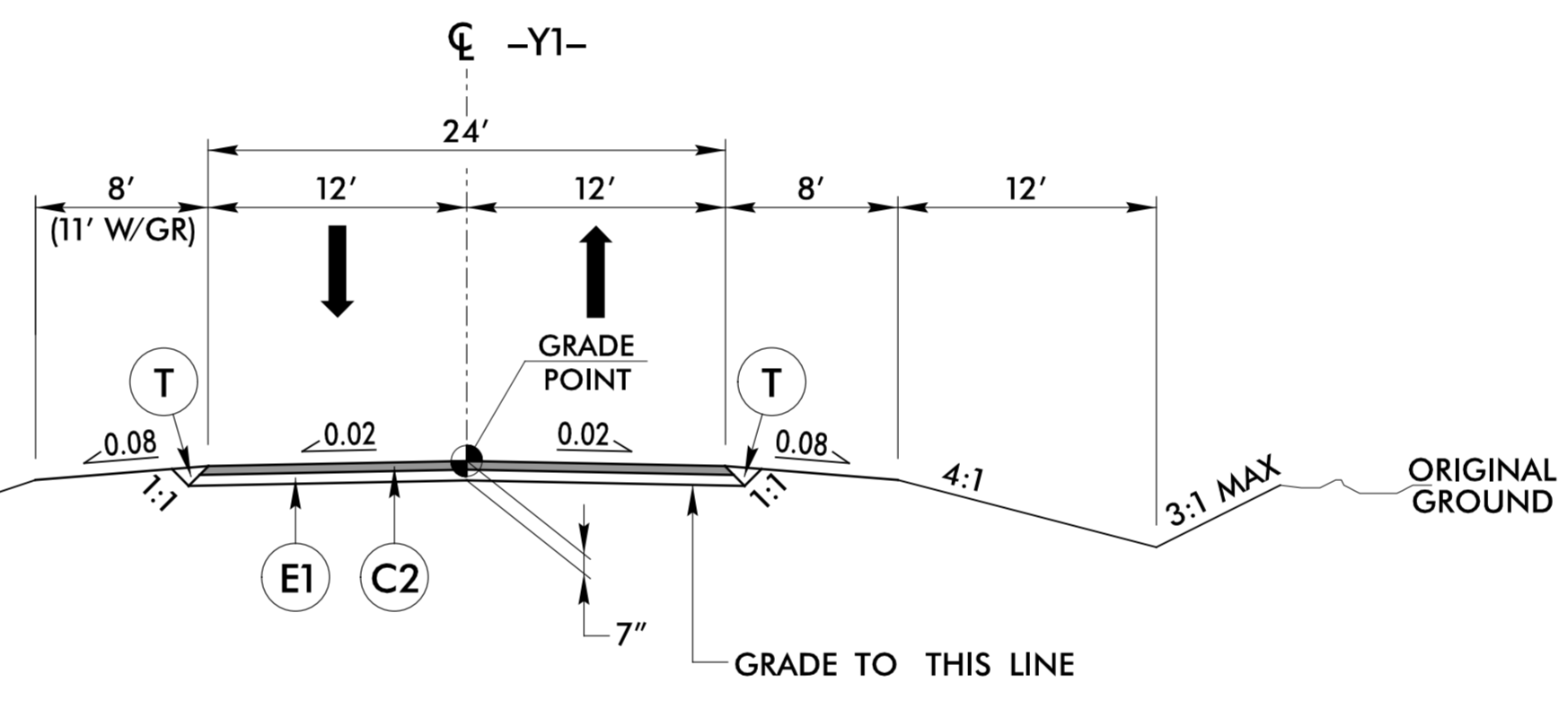


TYPICAL SECTION NO. 7
 SR 1130 MODLIN RD

USE TYPICAL SECTION NO. 7 FOR:
 -Y1- STA 13+75.00 TO STA 14+75.00
 -Y1- STA 35+50.00 TO STA 36+85.00

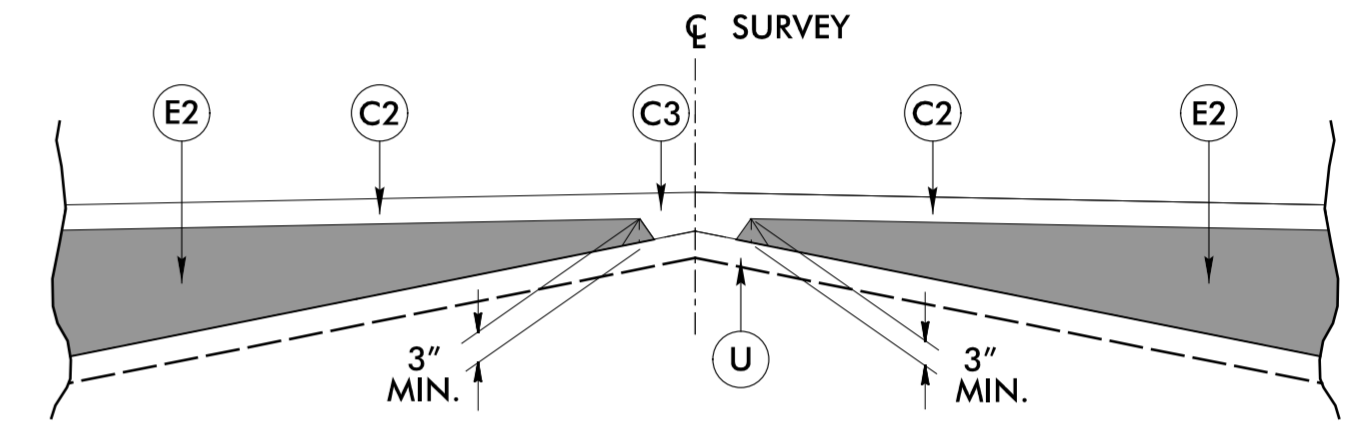


PARTIAL TYPICAL SECTION NO. 8A
 USE PARTIAL TYPICAL SECTION NO. 8A IN CONJUNCTION WITH TYPICAL SECTION NO. 8 AS FOLLOWS:
 -Y1- STA 23+84 TO -Y1- STA 24+01 RT
 AND -Y1- STA 23+84 TO -Y1- STA 24+09 LT

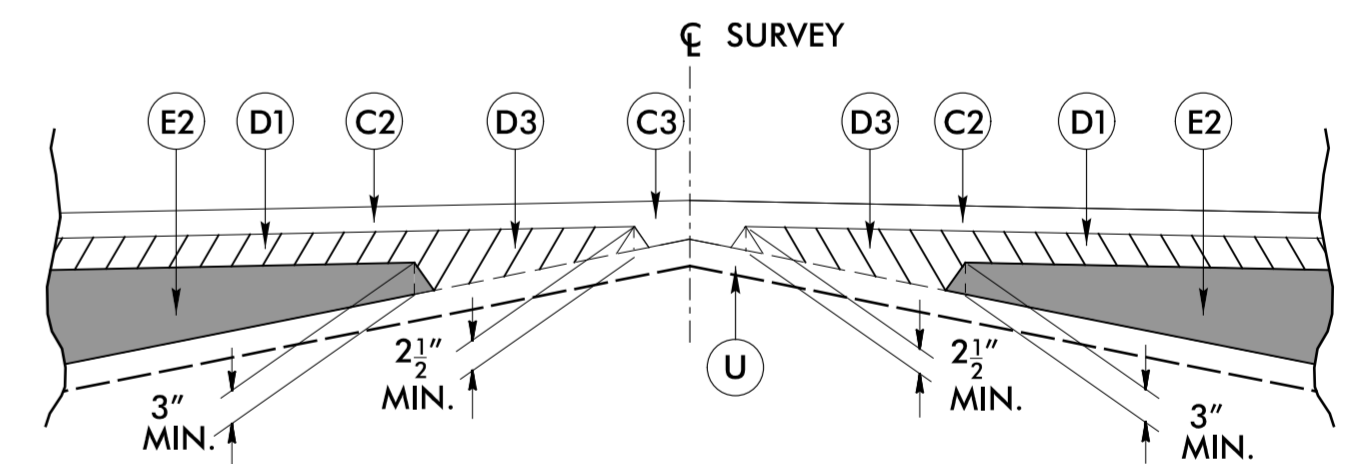


TYPICAL SECTION NO. 8
 SR 1130 MODLIN HATCHERY RD

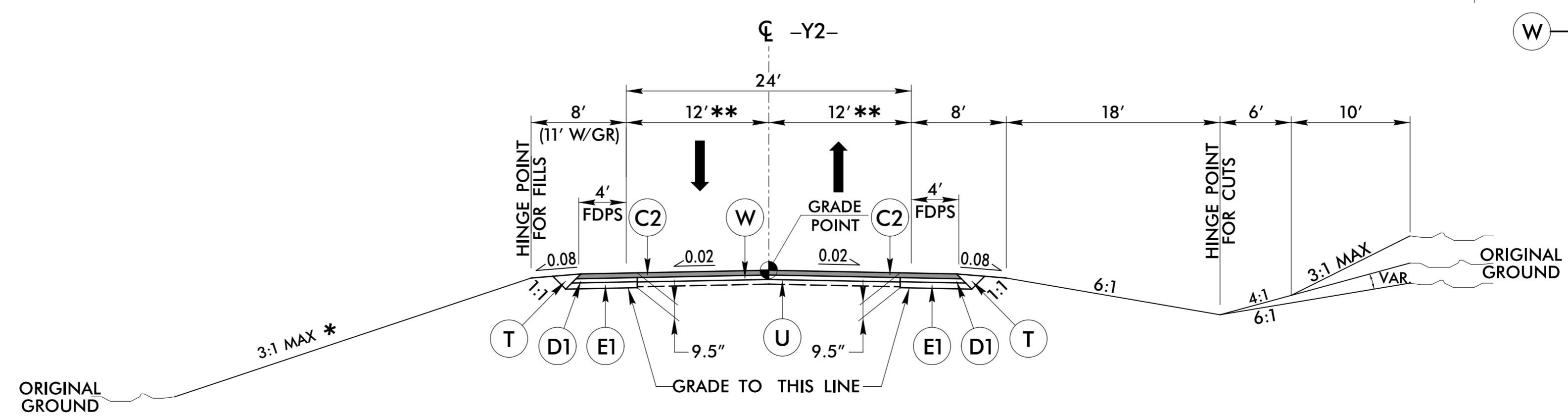
USE TYPICAL SECTION NO. 8 FOR:
 -Y1- STA 14+75.00 TO STA 24+18.97 (BEGIN BRIDGE)
 -Y1- STA 26+04.97 (END BRIDGE) TO STA 35+50.00



W Detail Showing Method of Wedging FOR -Y1-



W Detail Showing Method of Wedging FOR -Y2-



TYPICAL SECTION NO. 9
 NCI10LD NC 11

USE TYPICAL SECTION NO. 9 FOR:
 -Y2- STA 35+00.00 TO STA 37+00.00
 -Y2- STA 63+50.00 TO STA 65+40.00

**** -Y2- STA 30+17.30 TO STA 35+00.00 RESURFACE ONLY**

* 4:1 MAX INSIDE INTERCHANGE

6/2/17

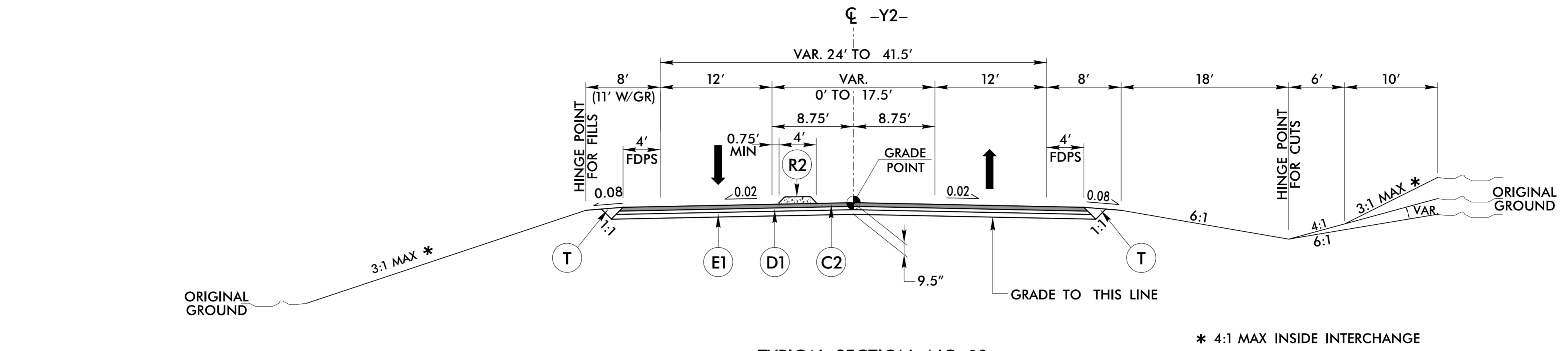
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 ICA ENGINEERING, INC.

C1	1 1/2" S9.5B
C2	3" S9.5B
C3	VAR S9.5B
C4	1 1/2" S9.5C
C5	3" S9.5C
C6	VAR S9.5C
D1	2 1/2" I19.0B
D2	4" I19.0B
D3	VAR I19.0B
D4	2 1/2" I19.0C
D5	3" I19.0C
D6	VAR I19.0C
E1	4" B25.0B
E2	VAR B25.0B
E3	4" B25.0C
E4	4 1/2" B25.0C
E5	VAR B25.0C
R1	2'-6" C&G
R2	MONOLITHIC CONCRETE ISLAND
R3	MODIFIED SBG
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	VAR WEDGING

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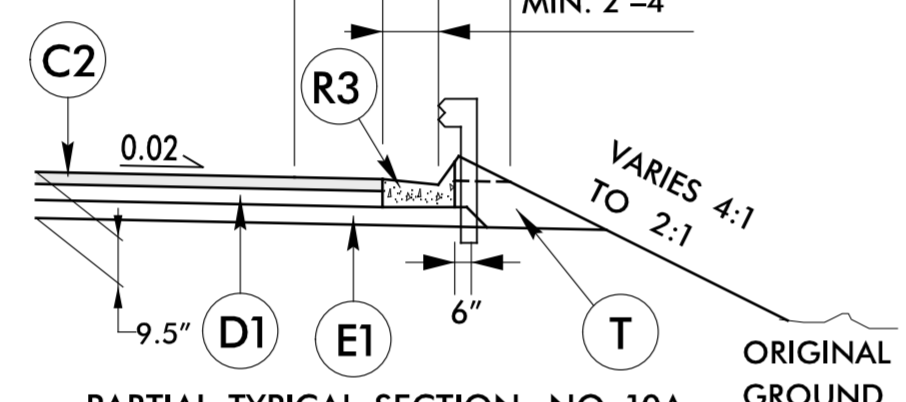
PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. <i>2A-4</i>
ROADWAY DESIGN ENGINEER <i>Dena C. Sneed</i> SEAL 032074 NORTH CAROLINA PROFESSIONAL ENGINEER	PAVEMENT DESIGN ENGINEER <i>Clark S. Morrison</i> SEAL 022896 NORTH CAROLINA PROFESSIONAL ENGINEER
DocuSigned by: <i>Dena C. Sneed</i> 5/1/2017	DocuSigned by: <i>Clark S. Morrison</i> 5/2/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



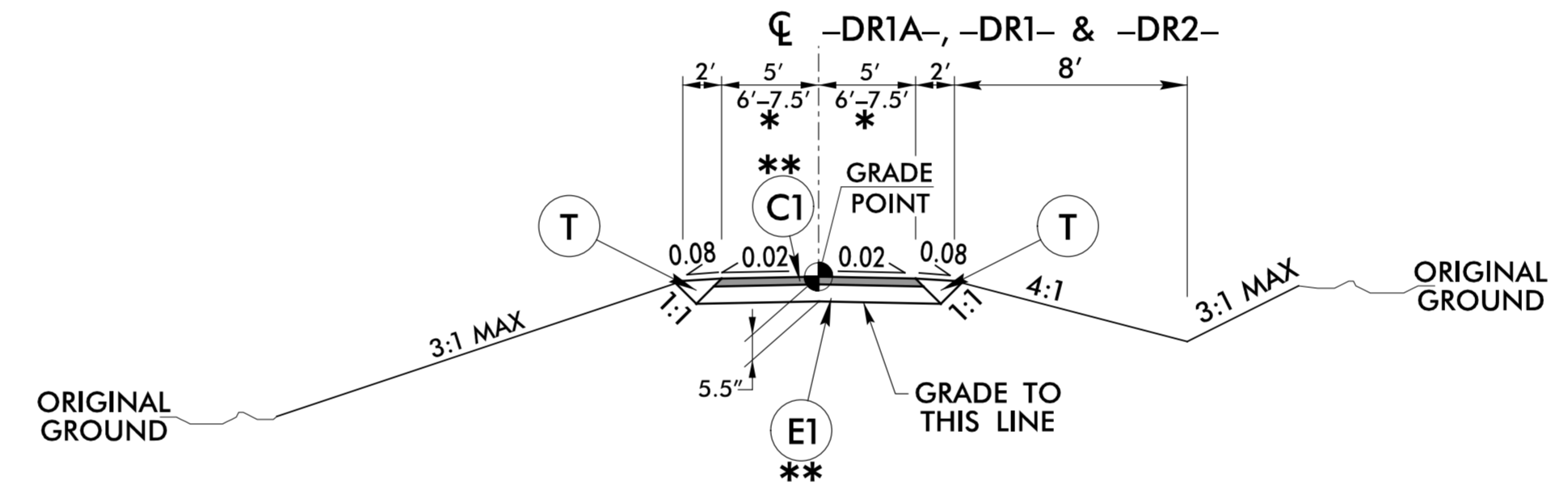
TYPICAL SECTION NO. 10
 NC11/OLD NC 11

USE TYPICAL SECTION NO. 10 FOR:
 -Y2- STA 37+00.00 TO STA 49+65.58 (BEGIN BRIDGE)
 -Y2- STA 51+60.08 (END BRIDGE) TO STA 63+50.00



PARTIAL TYPICAL SECTION NO. 10A
 USE PARTIAL TYPICAL SECTION NO. 10A IN CONJUNCTION WITH TYPICAL SECTION NO. 10 AS FOLLOWS:

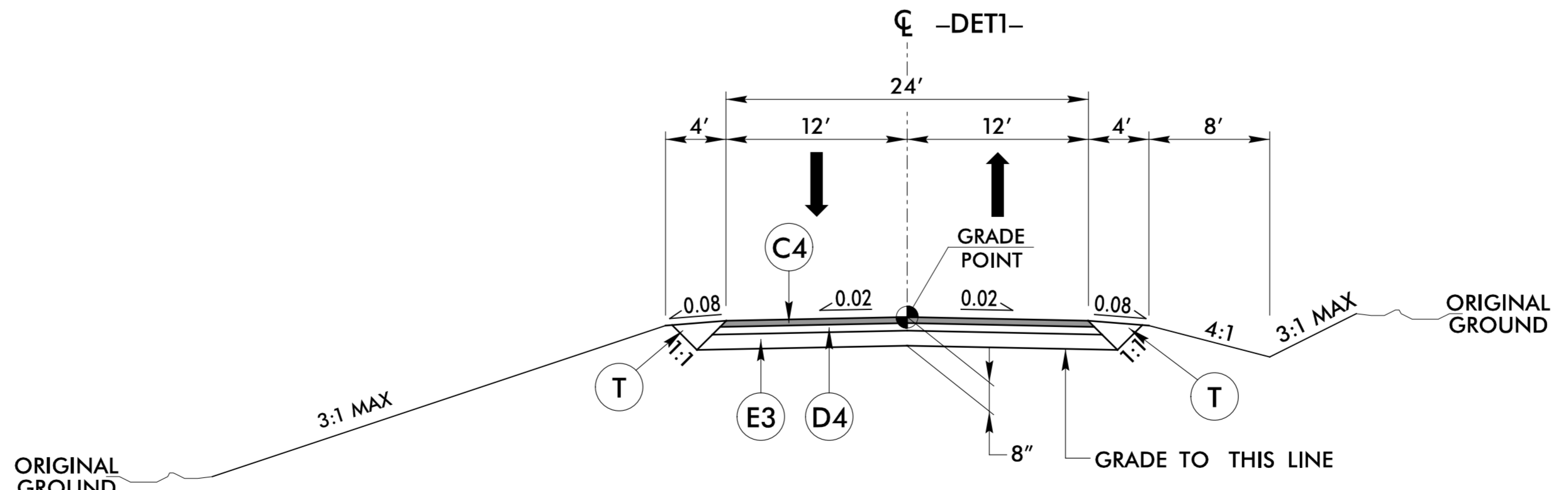
-Y2- STA 41+25 TO -Y2- STA 49+46 LT
 -Y2- STA 41+25 TO -Y2- STA 45+11 RT
 -Y2- STA 49+14 TO -Y2- STA 49+56 RT
 -Y2- STA 51+69 TO -Y2- STA 52+00 LT
 -Y2- STA 51+79 TO -Y2- STA 60+45 RT
 -Y2- STA 56+24 TO -Y2- STA 60+85 LT



TYPICAL SECTION NO. 11
 -DRIA-, -DRI- AND -DR2-

USE TYPICAL SECTION NO. 11 FOR:
 *-DRIA- STA 10+12.00 TO STA 10+80.00
 -DRI- STA 10+00.00 TO STA 11+50.00
 -DR2- STA 10+00.00 TO STA 11+44.56

** USE PAVEMENT DESIGN FOR DRIVEWAY LOCATED AT:
 -Y1- STA 33+65 LT



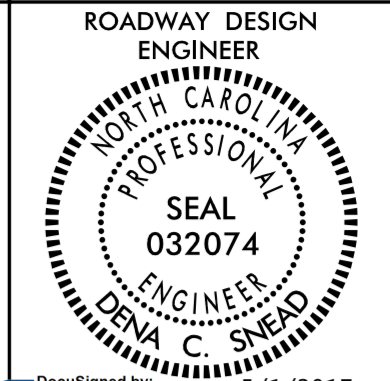
TYPICAL SECTION NO. 12
 -DET1-

USE TYPICAL SECTION NO. 12 FOR:
 -DET1- STA 13+48.08 TO STA 29+11.11

TRANSITION BETWEEN EXISTING AND TYPICAL SECTION NO. 12
 -DET1- STA 10+00.00 TO STA 13+48.08

STRUCTURE TYPICAL SECTIONS

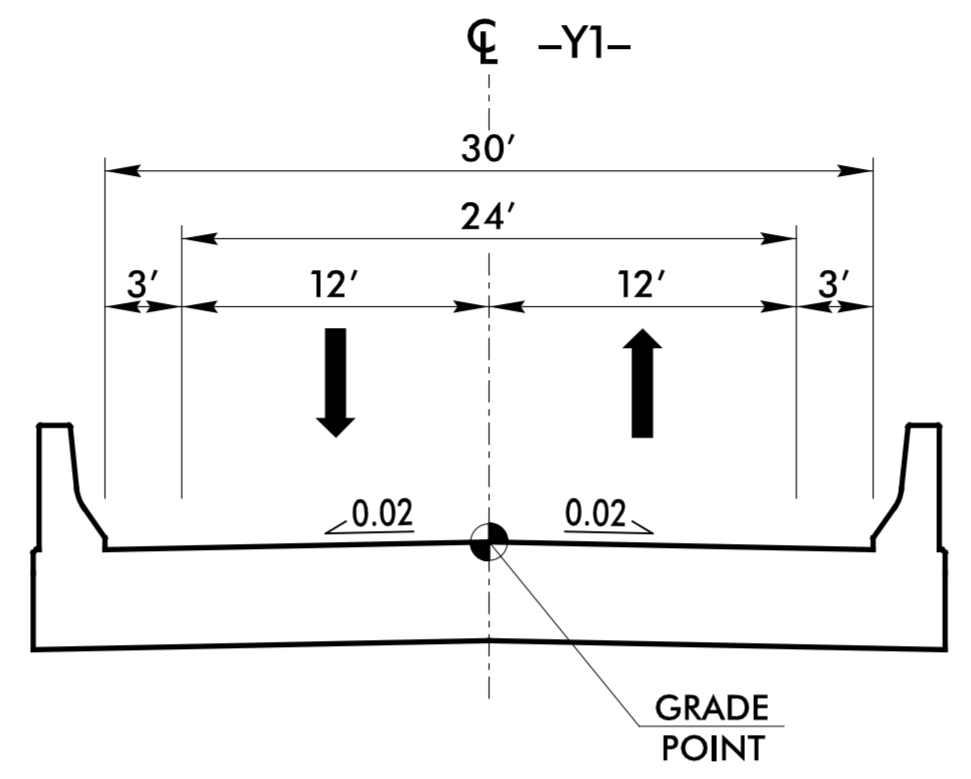
SITE 1 : -Y1- (SR 1130 /MODLIN RD.) STRUCTURE OVER
 -L- FUTURE FREEWAY NC 11 /SR 1212 (NC 11 /SHORT CUT RD.)



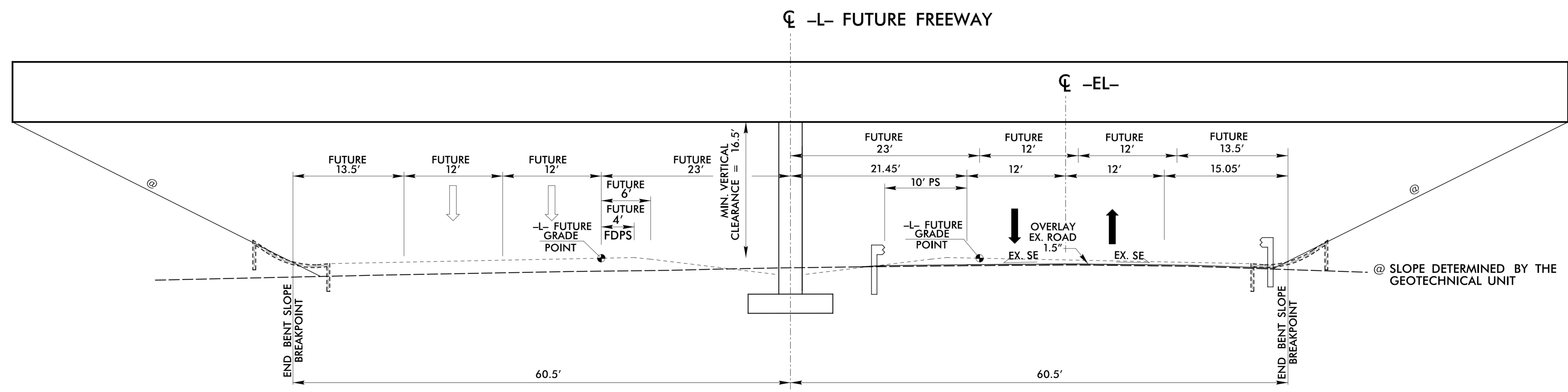
DocuSigned by:
 Dena C. Sneed
 5/1/2017

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FOR BRIDGE /PAVEMENT RELATIONSHIP SKETCH,
 SEE SHEET 2B-4



TYPICAL SECTION ON STRUCTURE
 (LOOKING STATIONS AHEAD)



TYPICAL SECTION ON ROADWAY UNDER STRUCTURE
 (LOOKING STATIONS AHEAD)

DESIGN DATA -Y1- (SR 1130 /MODLIN RD.)

ADT 2017 = 1500
 ADT 2037 = 2170
 K = 10%
 D = 55%
 T = 3%*
 V = 50 MPH
 *(TTST = 2% + DUAL = 1%)

FUNCT. CLASS : MINOR COLLECTOR

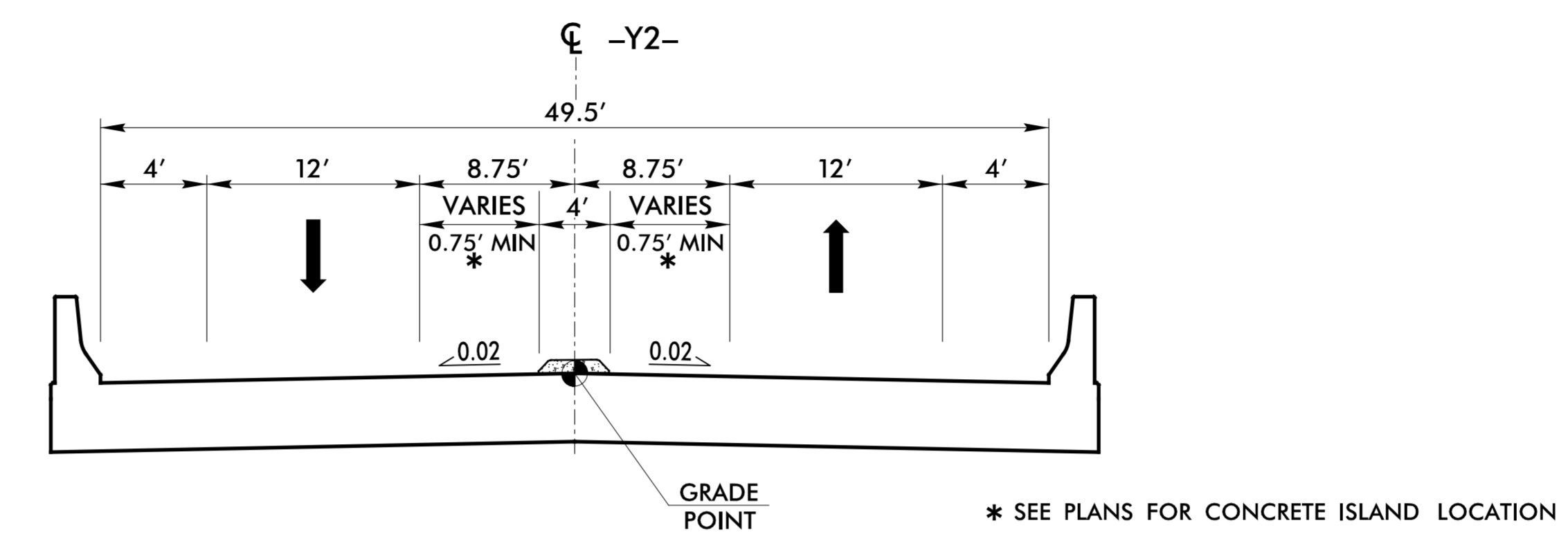
STRUCTURE TYPICAL SECTIONS

SITE 2 : -Y2- (NC 11 /OLD NC 11) STRUCTURE OVER
 -L- FUTURE FREEWAY NC 11 /SR 1212 (NC 11 /SHORT CUT RD.)

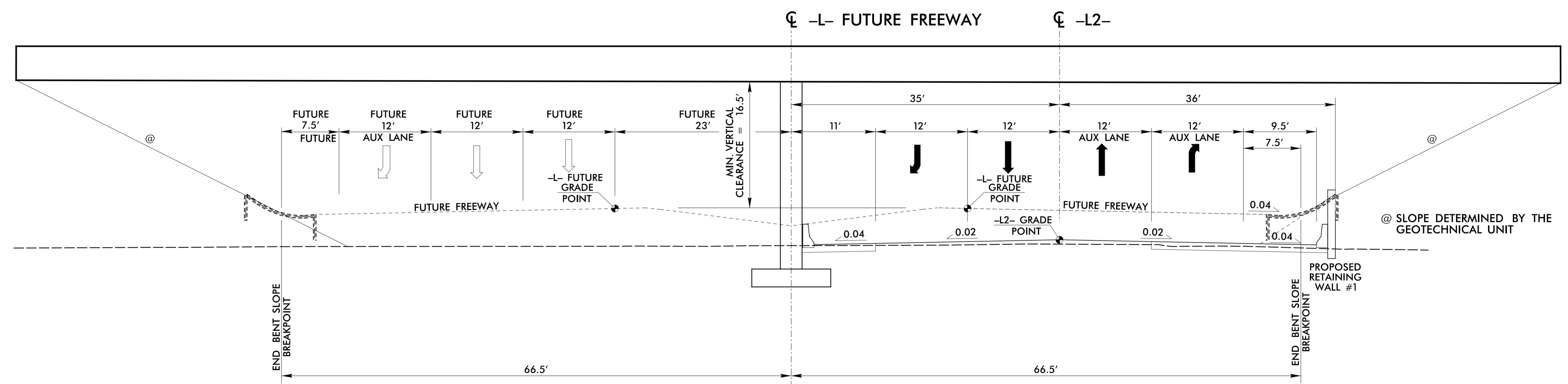


DocuSigned by:
 Dena C. Sneed
 2AB88B
**DOCUMENT NOT CONSIDERED FINAL
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FOR BRIDGE /PAVEMENT RELATIONSHIP SKETCH,
 SEE SHEET 2B-4



TYPICAL SECTION ON STRUCTURE
 (LOOKING STATIONS AHEAD)




TYPICAL SECTION ON ROADWAY UNDER STRUCTURE
 (LOOKING STATIONS AHEAD)

DESIGN DATA -Y2- (NC 11 /OLD NC 11)

ADT 2017 = 8400
 ADT 2037 = 11070
 K = 10%
 D = 55%
 T = 8%*
 V = 60 MPH
 *(TTST = 3% + DUAL = 5%)

FUNCT. CLASS : MAJOR COLLECTOR

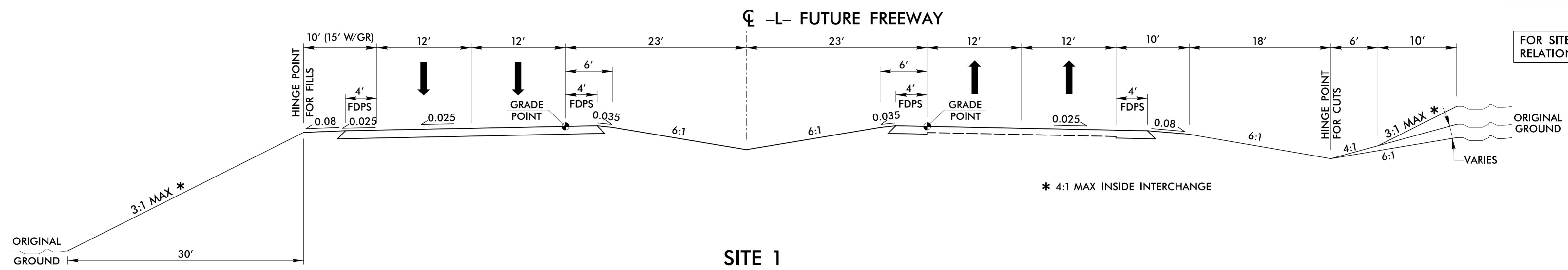
ROADWAY DESIGN ENGINEER



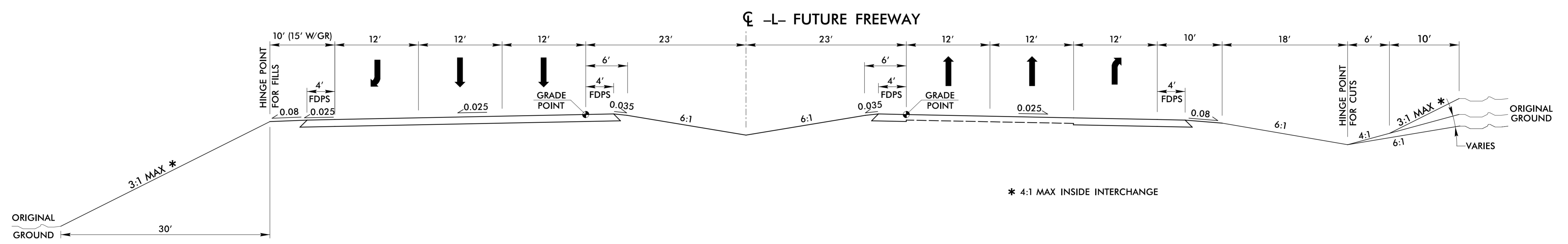
DocuSigned by:
Dena C. Sneed 5/1/2017

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FOR SITES 1 & 2 BRIDGE PAVEMENT RELATIONSHIP SKETCH, SEE SHEET 2B-4



SITE 1
 TYPICAL SECTION OF
 -L- FUTURE FREEWAY (NC 11/SR 1212) APPROACHING OVERHEAD
 STRUCTURE AT -Y1- (SR 1130 / MODLIN ROAD)
 (FOR REFERENCE ONLY)



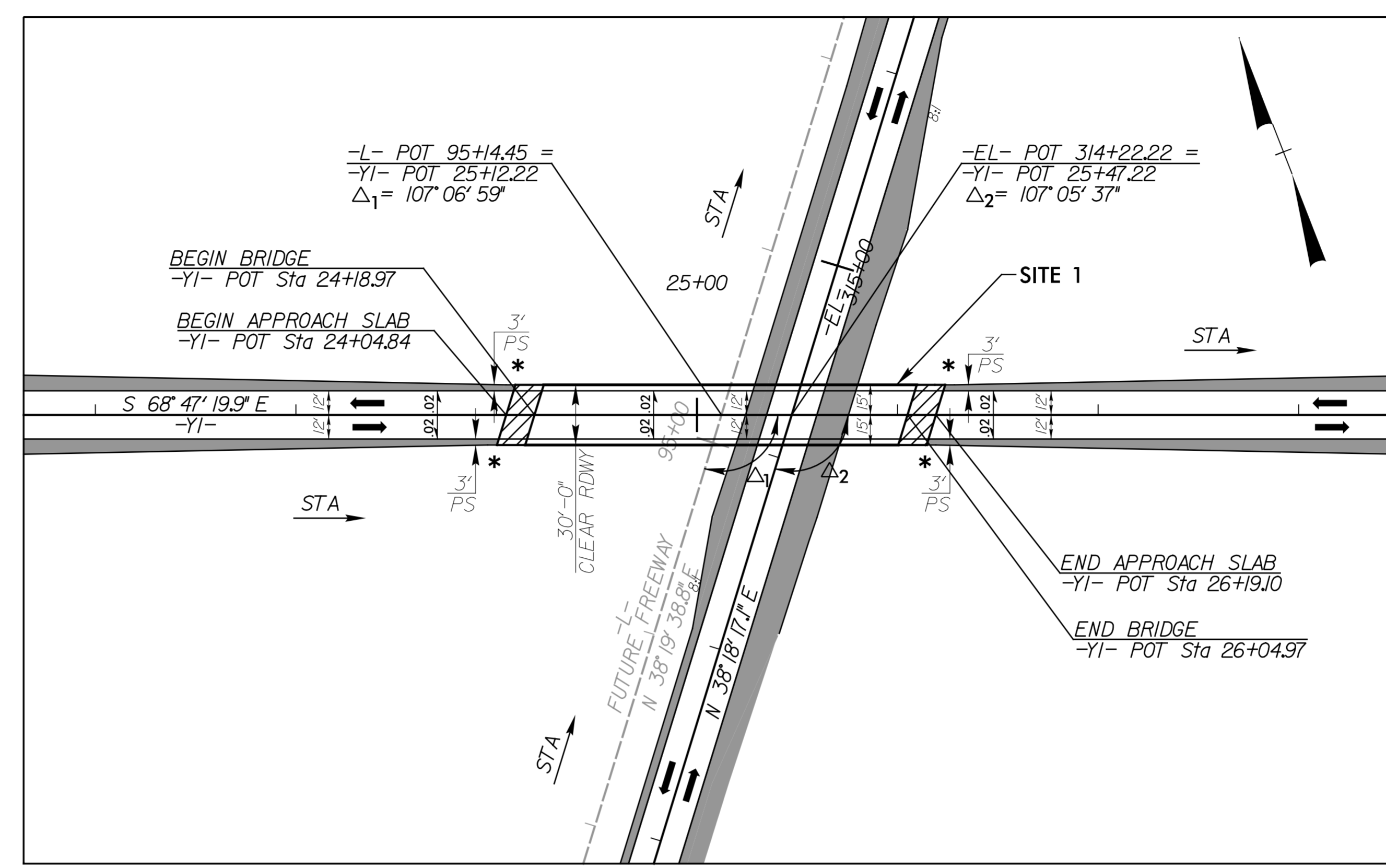
SITE 2
 TYPICAL SECTION OF
 -L- FUTURE FREEWAY (NC 11 / SR 1212) APPROACHING OVERHEAD
 STRUCTURE AT -Y2- (NC 11 / OLD NC 11)
 (FOR REFERENCE ONLY)

ROADWAY DESIGN ENGINEER
 NORTH CAROLINA PROFESSIONAL SEAL
 032074
 DENA C. SNEED
 ENGINEER
 DENA C. SNEED

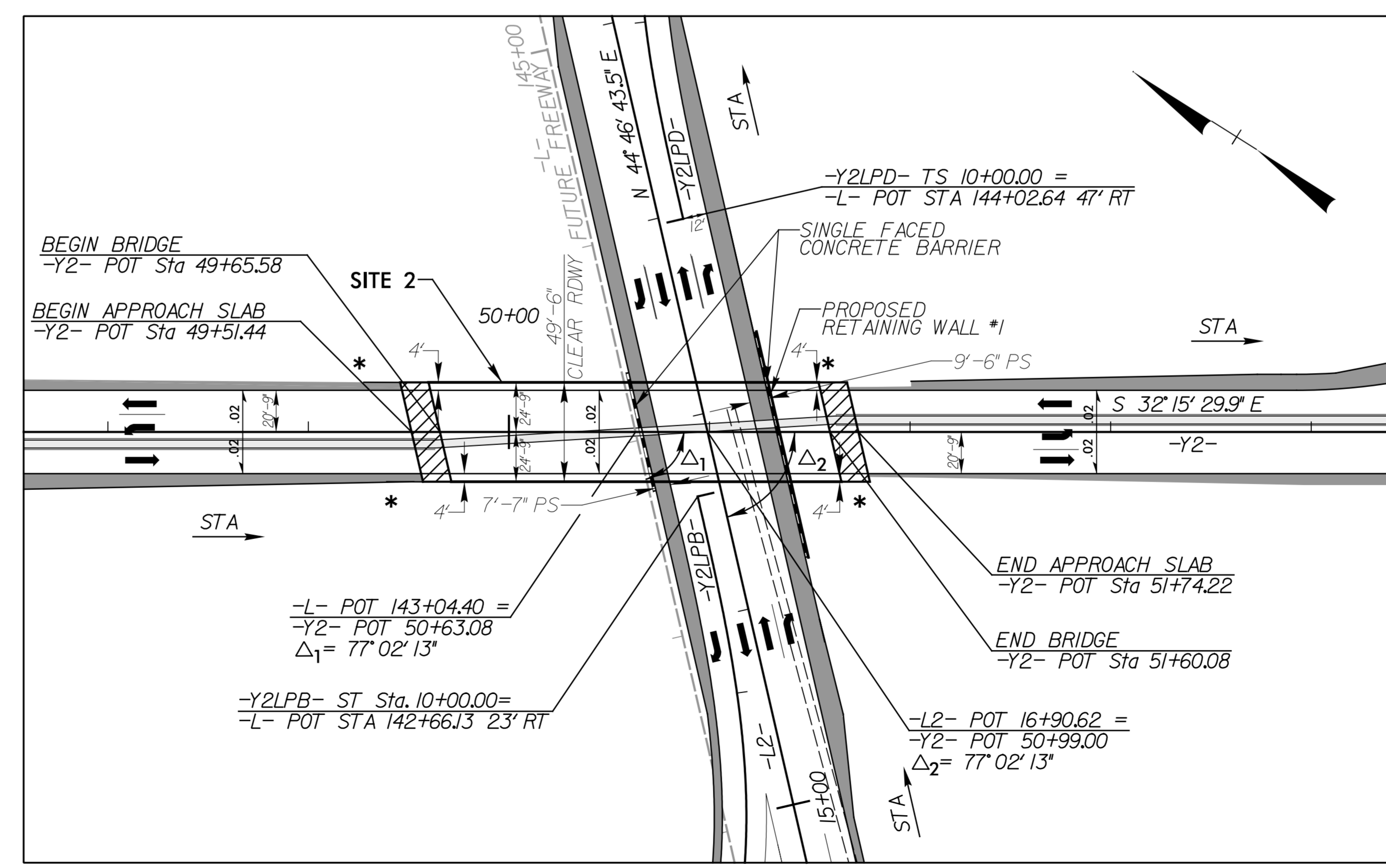
DocuSigned by:
 Dena C. Sneed
 5/1/2017

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

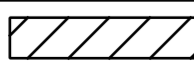
FOR TYPICAL SECTIONS OF SITES 1 & 2,
 SEE SHEET 2B-3
 FOR PLANS, SEE SHEETS 4 & 7

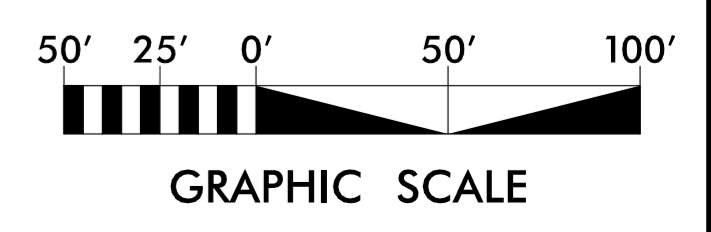


PAVEMENT-BRIDGE RELATIONSHIP SKETCH
 -Y1- (SR 1130 - MODLIN HATCHERY RD) OVER -EL- (NC 11 - SHORT CUT RD)



PAVEMENT-BRIDGE RELATIONSHIP SKETCH
 -Y2- (NC11/OLD NC11) OVER -L2- (NC 11 - SHORT CUT RD)

* GUARDRAIL ANCHOR UNIT REQUIRED
 BRIDGE APPROACH SLAB



5/28/17

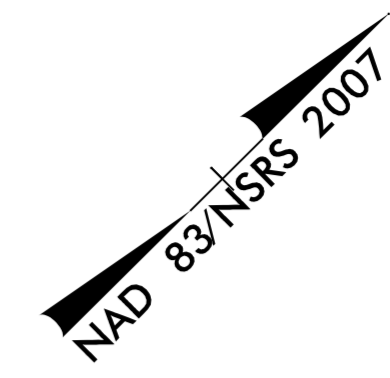
ICA
Engineering
5121 Kingdom Way,
Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO. R-5311A	SHEET NO. 2B-5
RW SHEET NO.	

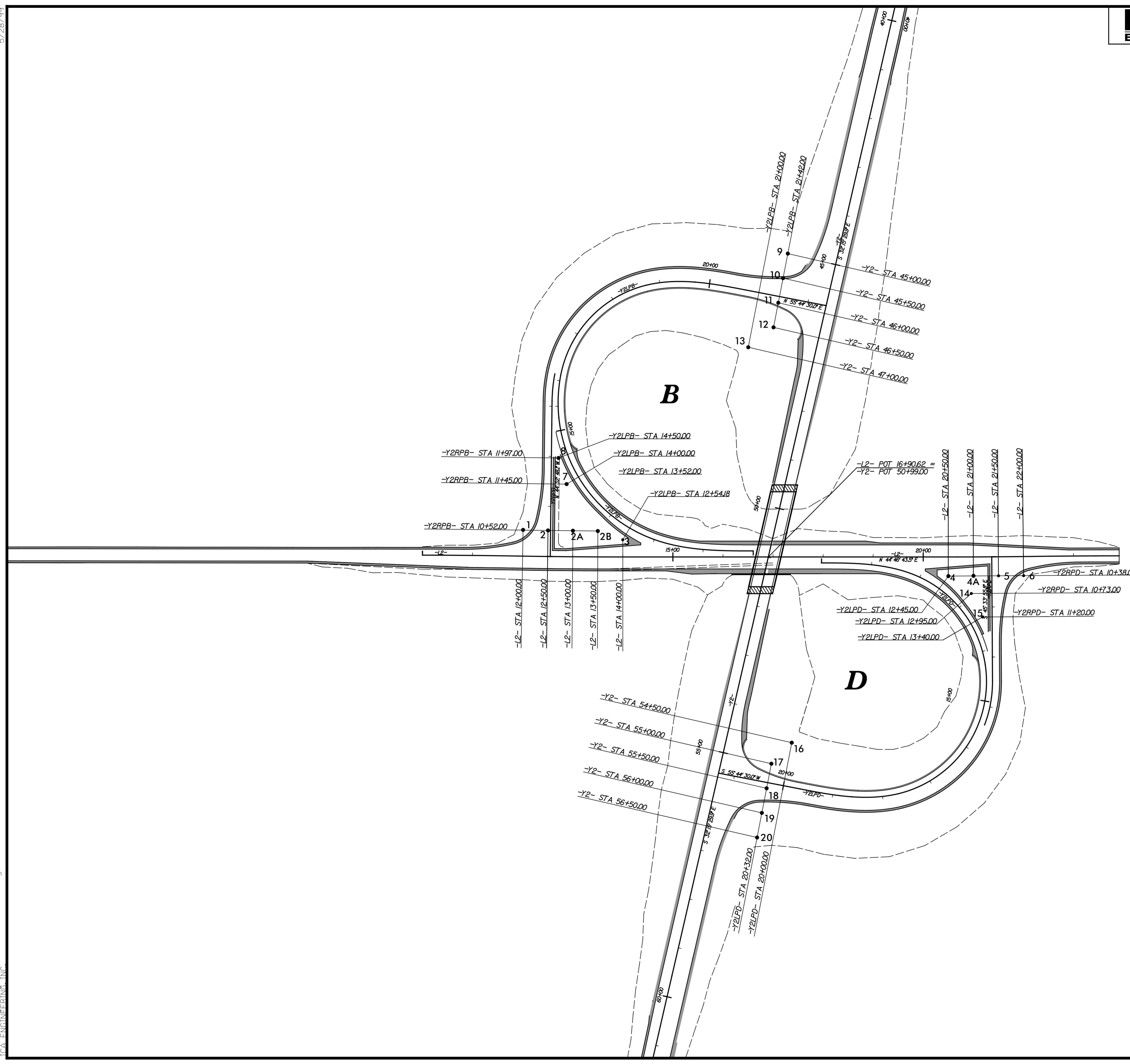


DocuSigned by:
Dena C. Snad 5/1/2017

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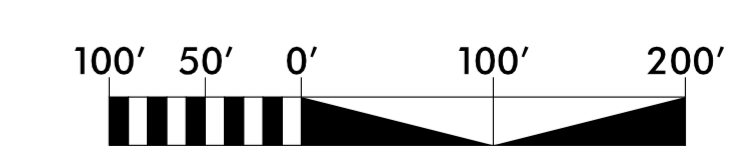


FOR PLAN, SEE SHEET 7



SHEAR POINT DIAGRAM

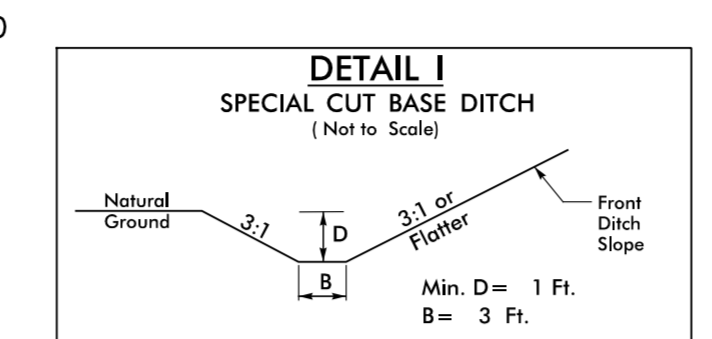
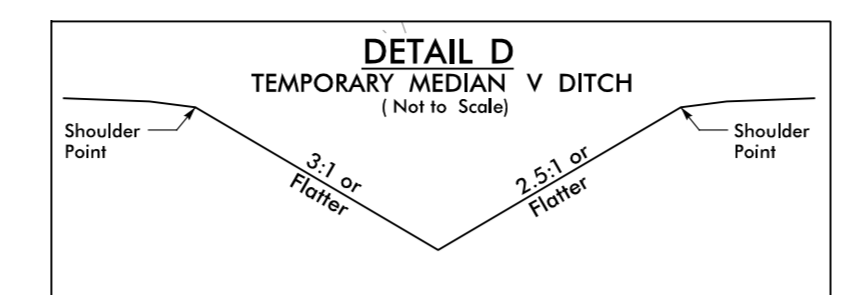
-L2- & -Y2- INTERSECTION



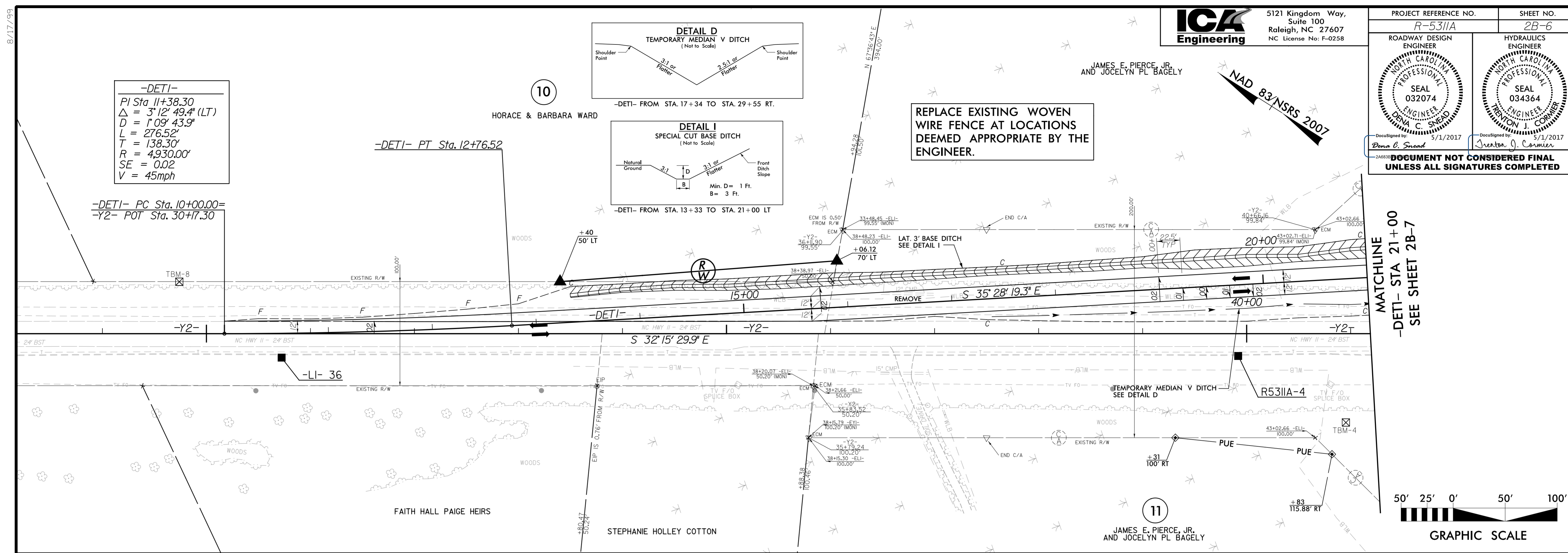
GRAPHIC SCALE

5/1/2017
P:\Projects\17\1705311A_RDY_DET_2B_05.dgn
ICA ENGINEERING, INC.

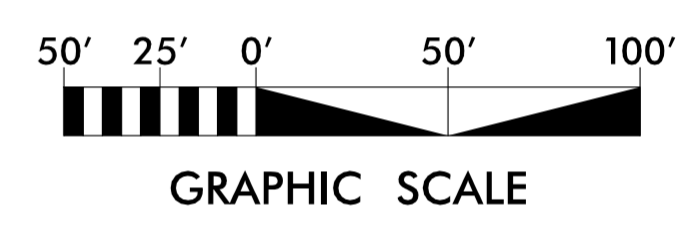
-DET1-
 PI Sta. 11+38.30
 $\Delta = 3^{\circ}12'49.4''$ (LT)
 $D = 1^{\circ}09'43.9''$
 $L = 276.52'$
 $T = 138.30'$
 $R = 4,930.00'$
 $SE = 0.02$
 $V = 45\text{mph}$



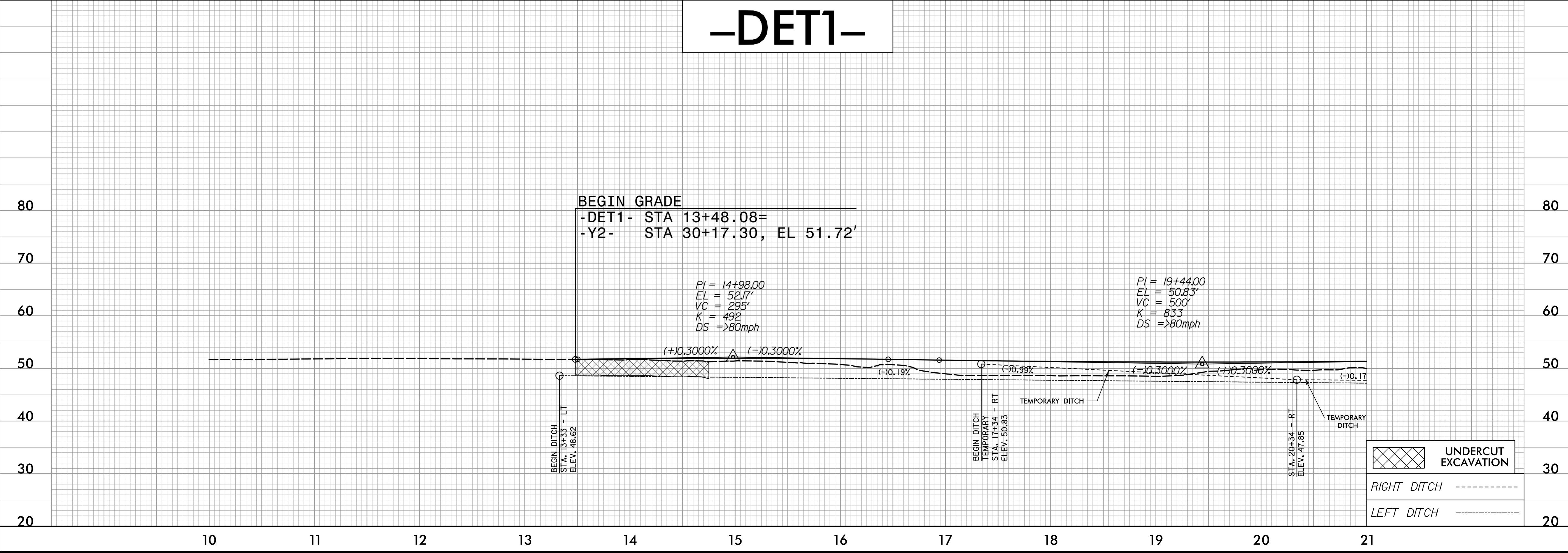
REPLACE EXISTING WOVEN WIRE FENCE AT LOCATIONS DEEMED APPROPRIATE BY THE ENGINEER.



MATCHLINE
 -DET1- STA 21+00
 SEE SHEET 2B-7



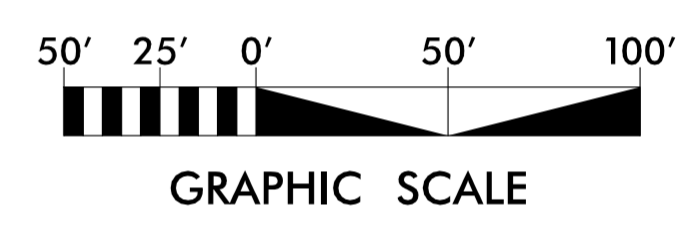
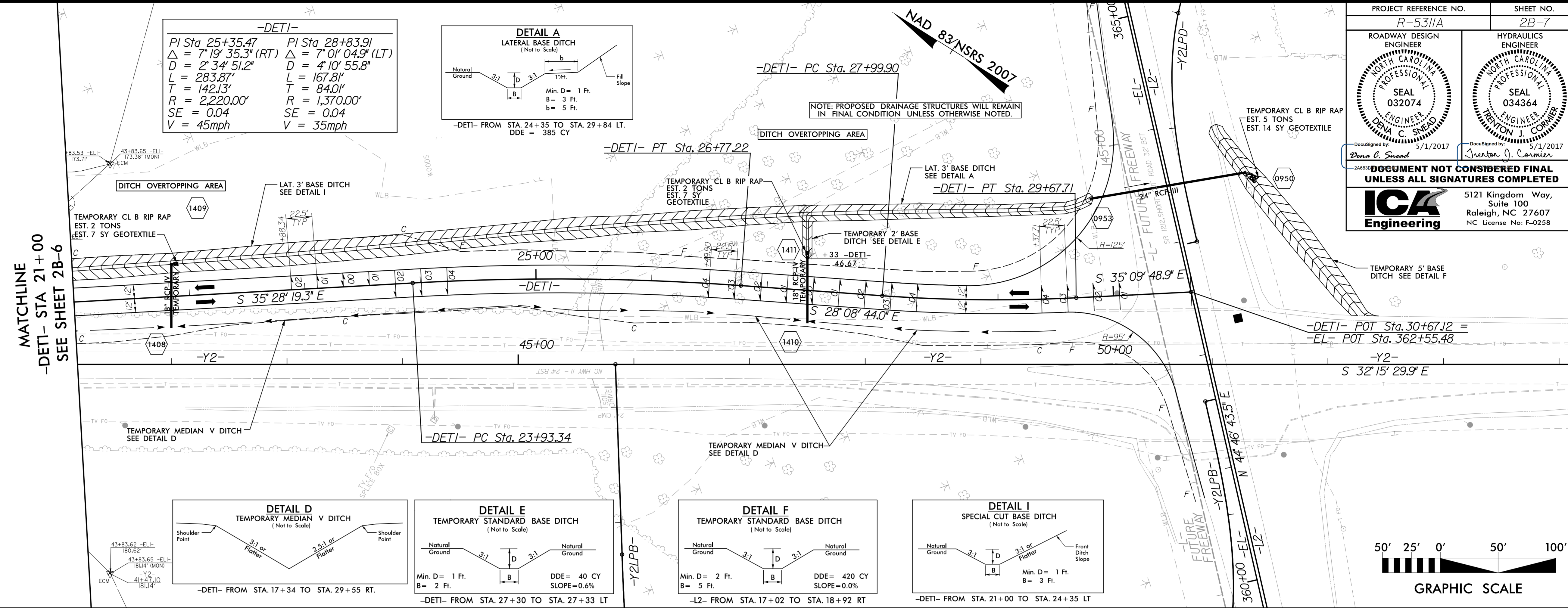
-DET1-



	UNDERCUT EXCAVATION
-----	RIGHT DITCH
-----	LEFT DITCH

5/1/2017
 P:\Projects\114-RD1-DET-2B-06.dgn
 DEBRA C. SNEAD
 ROADWAY DESIGN ENGINEER

PROJECT REFERENCE NO. R-5311A	SHEET NO. 2B-7
ROADWAY DESIGN ENGINEER SEAL 032074 DENNA C. SNEAD	HYDRAULICS ENGINEER SEAL 034364 JENNIFER J. COMBER
Documented by: <i>Denise L. Sneed</i> 5/1/2017 Documented by: <i>Jennifer J. Comber</i> 5/1/2017	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
ICA Engineering 5121 Kingdom Way, Suite 100 Raleigh, NC 27607 NC License No: F-0258	



-DET1-

PIPE HYDRAULIC DATA
TEMPORARY 18" RCP STA 21+84 -DET1-

DRAINAGE AREA	= 1	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 6	CFS
DESIGN HW ELEVATION	= 49.0	FT
100 YEAR DISCHARGE	= 6	CFS
100 YEAR HW ELEVATION	= 49.0	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 27	CFS
OVERTOPPING ELEVATION	= 50.3	FT

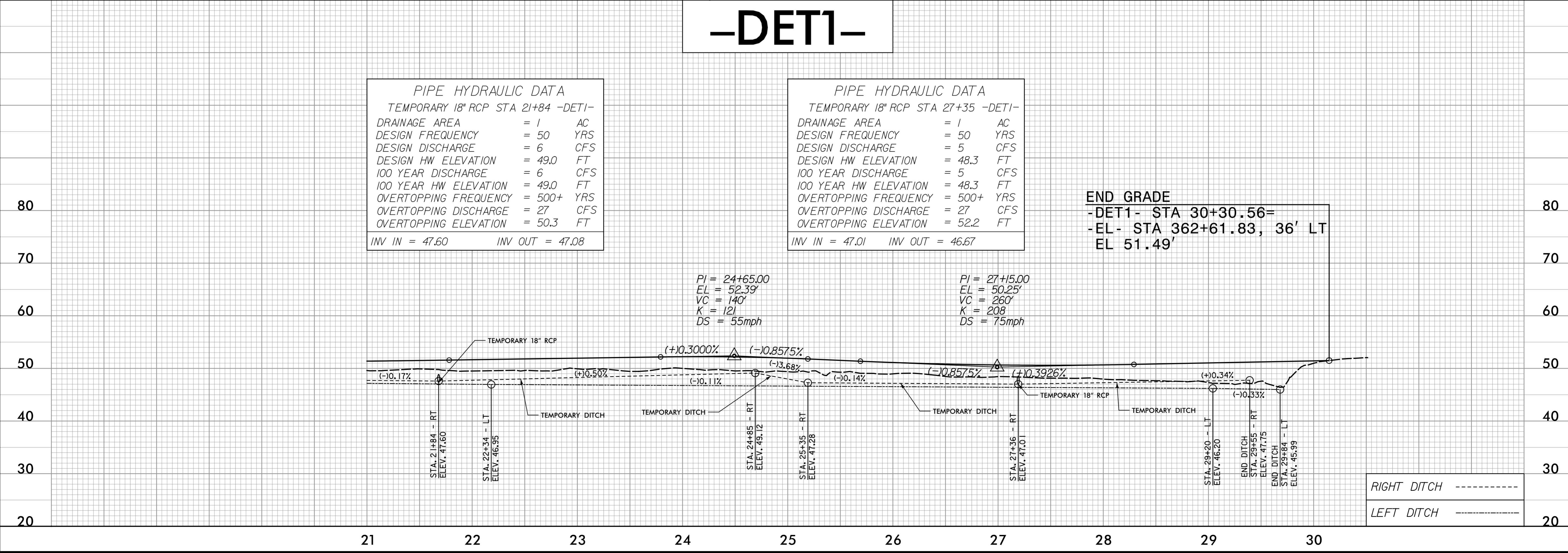
INV IN = 47.60 INV OUT = 47.08

PIPE HYDRAULIC DATA
TEMPORARY 18" RCP STA 27+35 -DET1-

DRAINAGE AREA	= 1	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 5	CFS
DESIGN HW ELEVATION	= 48.3	FT
100 YEAR DISCHARGE	= 5	CFS
100 YEAR HW ELEVATION	= 48.3	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 27	CFS
OVERTOPPING ELEVATION	= 52.2	FT

INV IN = 47.01 INV OUT = 46.67

END GRADE
-DET1- STA 30+30.56=
-EL- STA 362+61.83, 36' LT
EL 51.49'

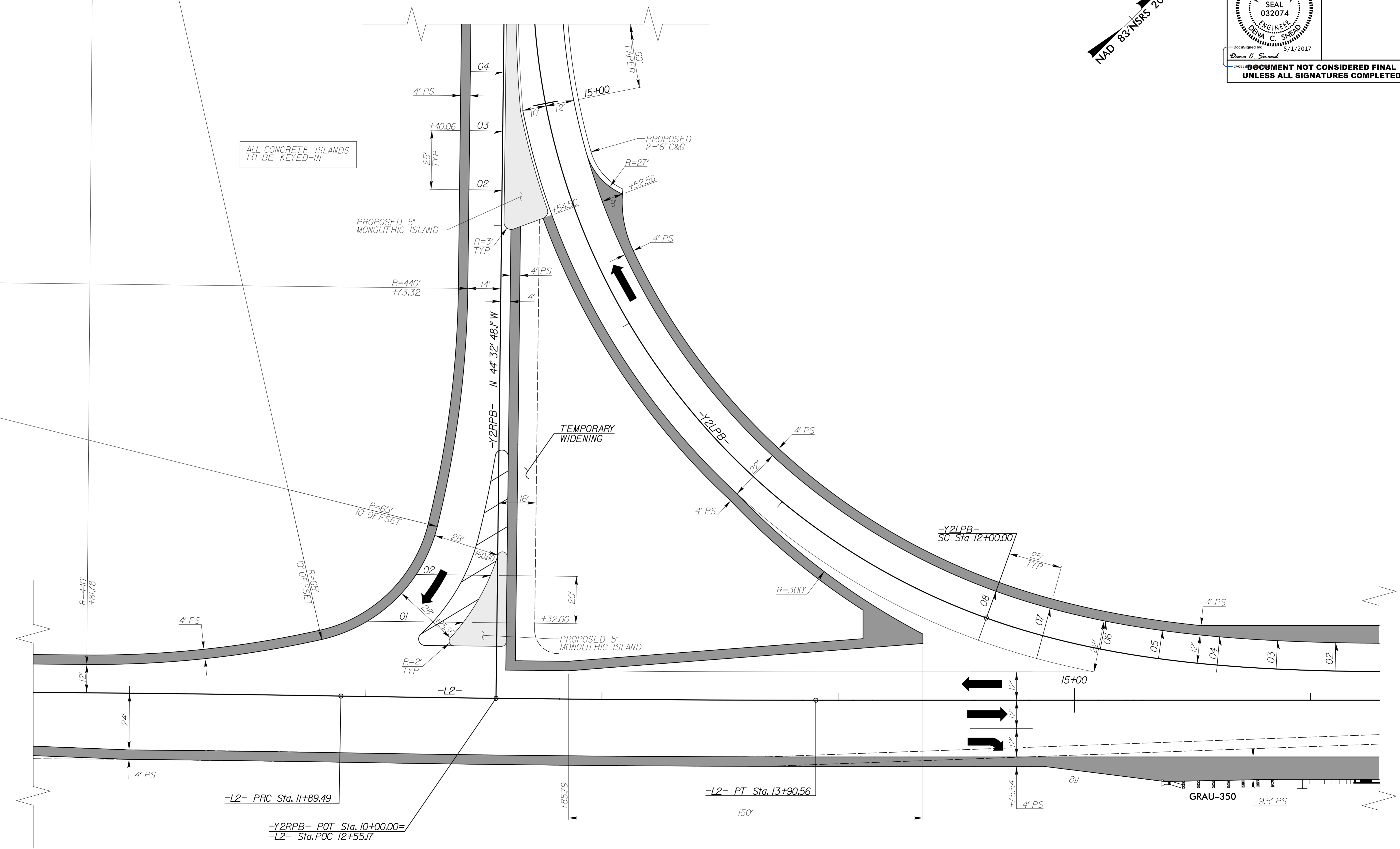


8/17/09
5/1/2017
P:\Projects\114-RDY_DET1-2B-07.dgn
DENNA C. SNEAD

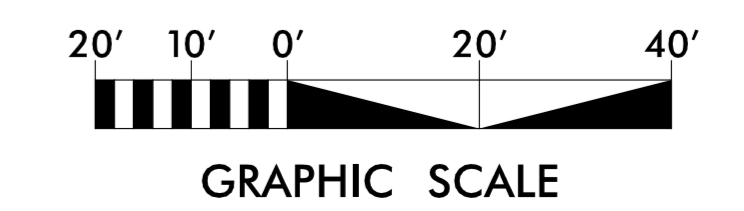
-L2- & -Y2RPB-

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 5121 Kingdom Way,
 Suite 100
 Raleigh, NC 27607
 NC License No: F-0258

PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. <i>2B-8</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 032074 DENA C. SNEED 5/1/2017 DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



5/1/2017
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 ICA ENGINEERING, INC.



FOR PLAN VIEW, SEE SHEET 7

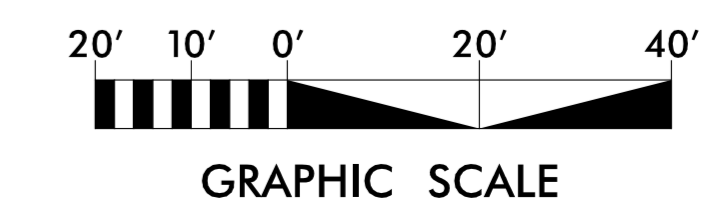
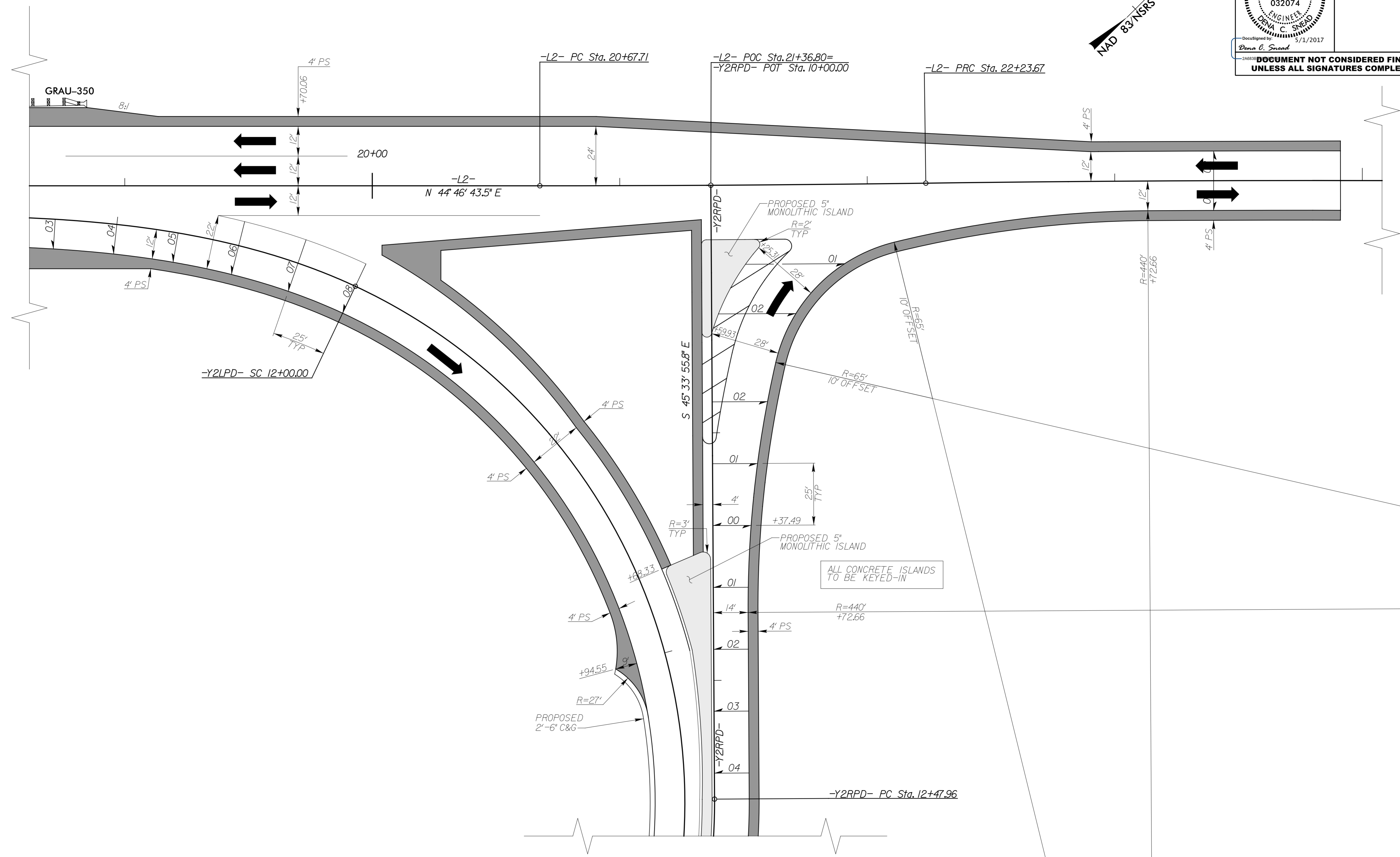
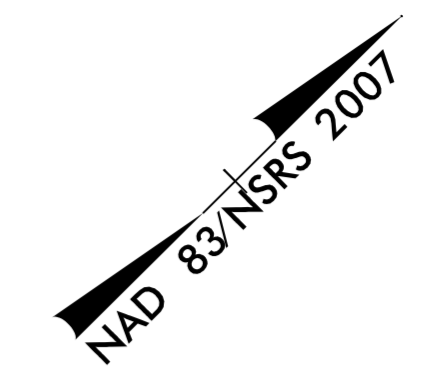
-L2- & -Y2RPD-

ICA Engineering
 5121 Kingdom Way,
 Suite 100
 Raleigh, NC 27607
 NC License No: F-0258

PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. <i>2B-9</i>
RW SHEET NO.	




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Dena C. Sneed 5/1/2017
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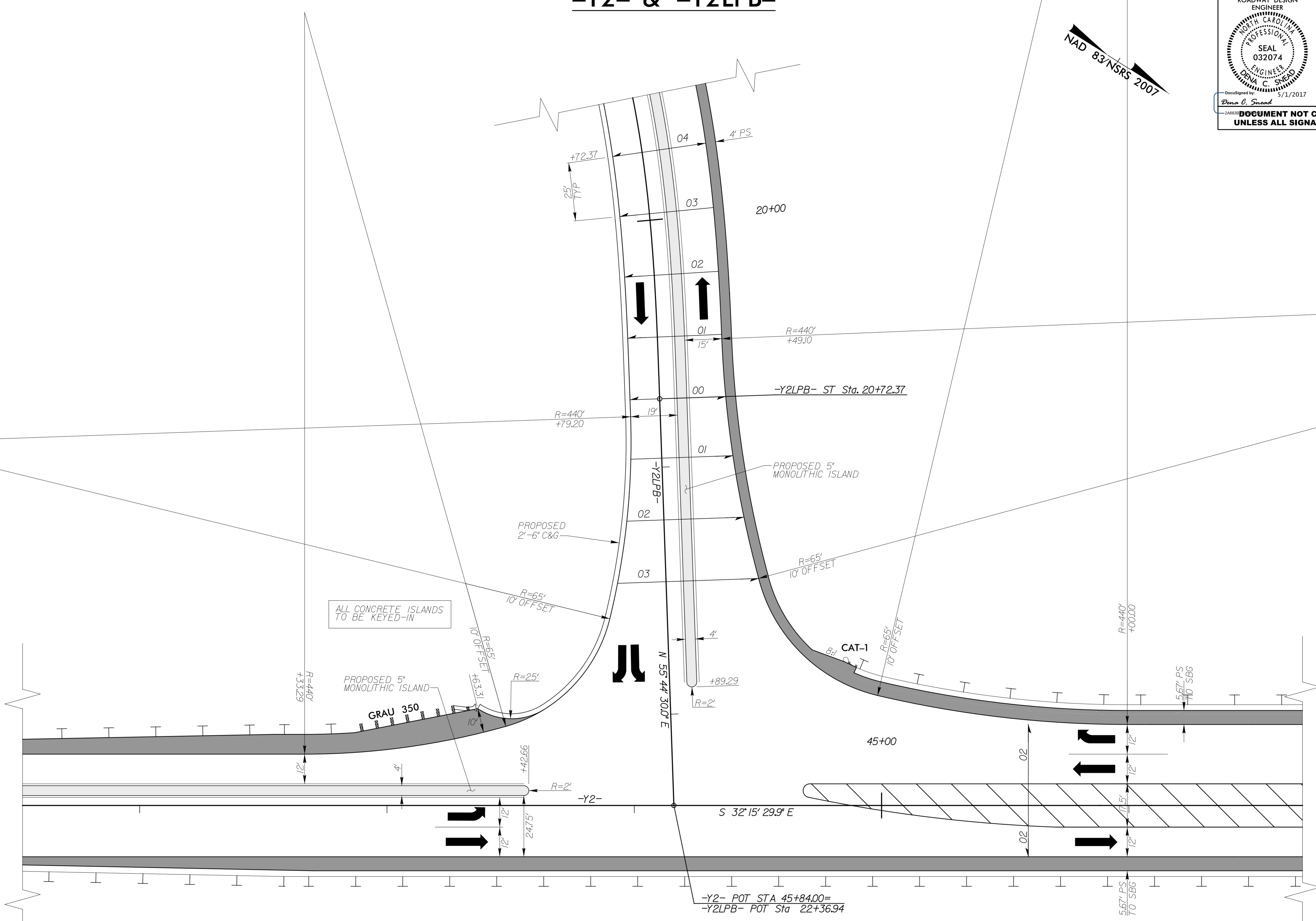
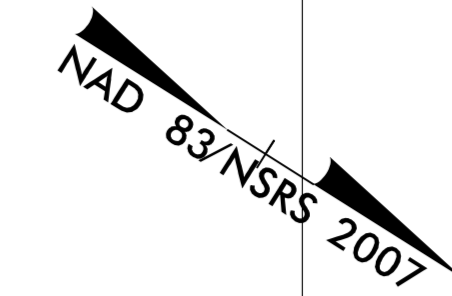


FOR PLAN VIEW, SEE SHEET 7

-Y2- & -Y2LPB-

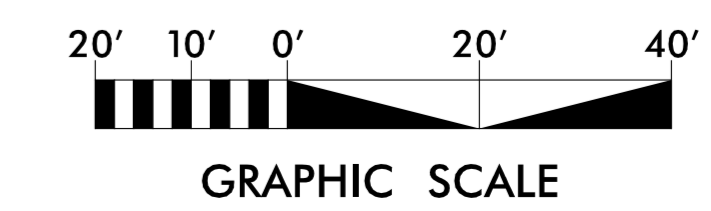
ICA Engineering
 5121 Kingdom Way,
 Suite 100
 Raleigh, NC 27607
 NC License No: F-0258

PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. <i>2B-10</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
	
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ALL CONCRETE ISLANDS TO BE KEYED-IN


-Y2- POT STA 45+84.00=
 -Y2LPB- POT Sta 22+36.94



FOR PLAN VIEW, SEE SHEET 7

8/17/17

-Y2- & -Y2LPD-



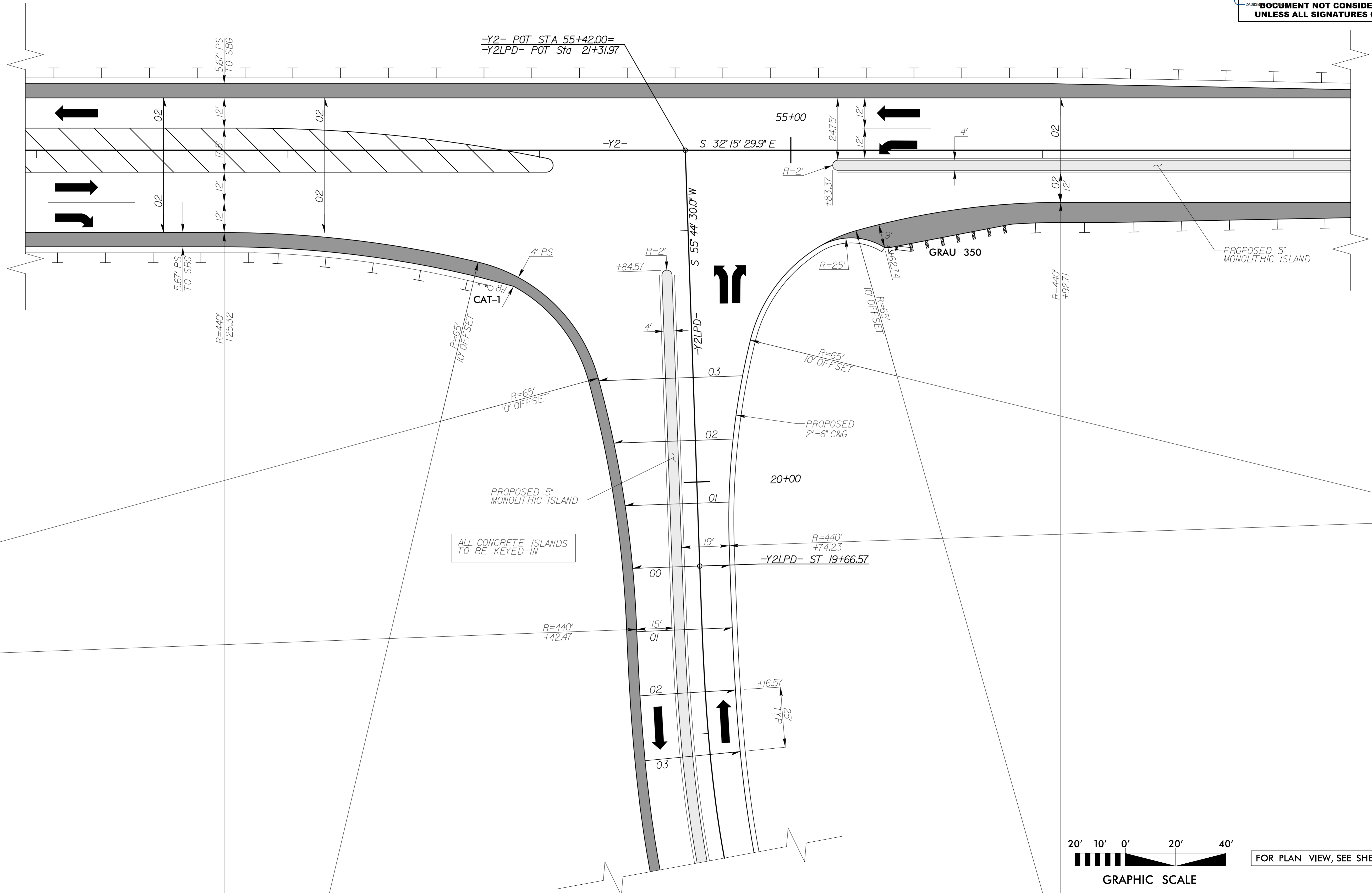
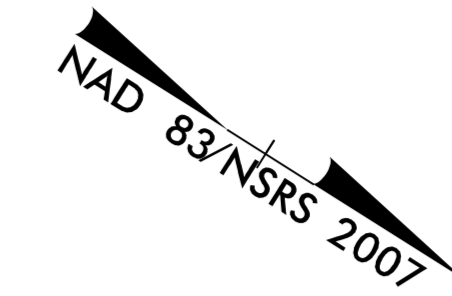
ICA Engineering
5121 Kingdom Way,
Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO.	SHEET NO.
R-5311A	2B-II
RW SHEET NO.	

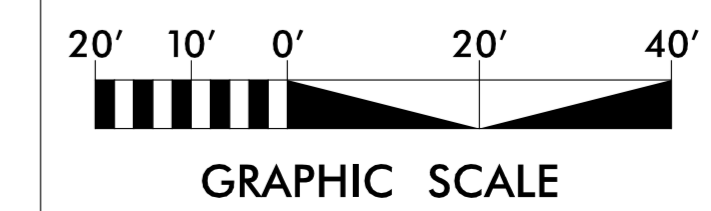
ROADWAY DESIGN
ENGINEER
NORTH CAROLINA
PROFESSIONAL
SEAL
032074
DENNA C. SNEED
ENGINEER

DocuSigned by:
Denna C. Sneed 5/1/2017

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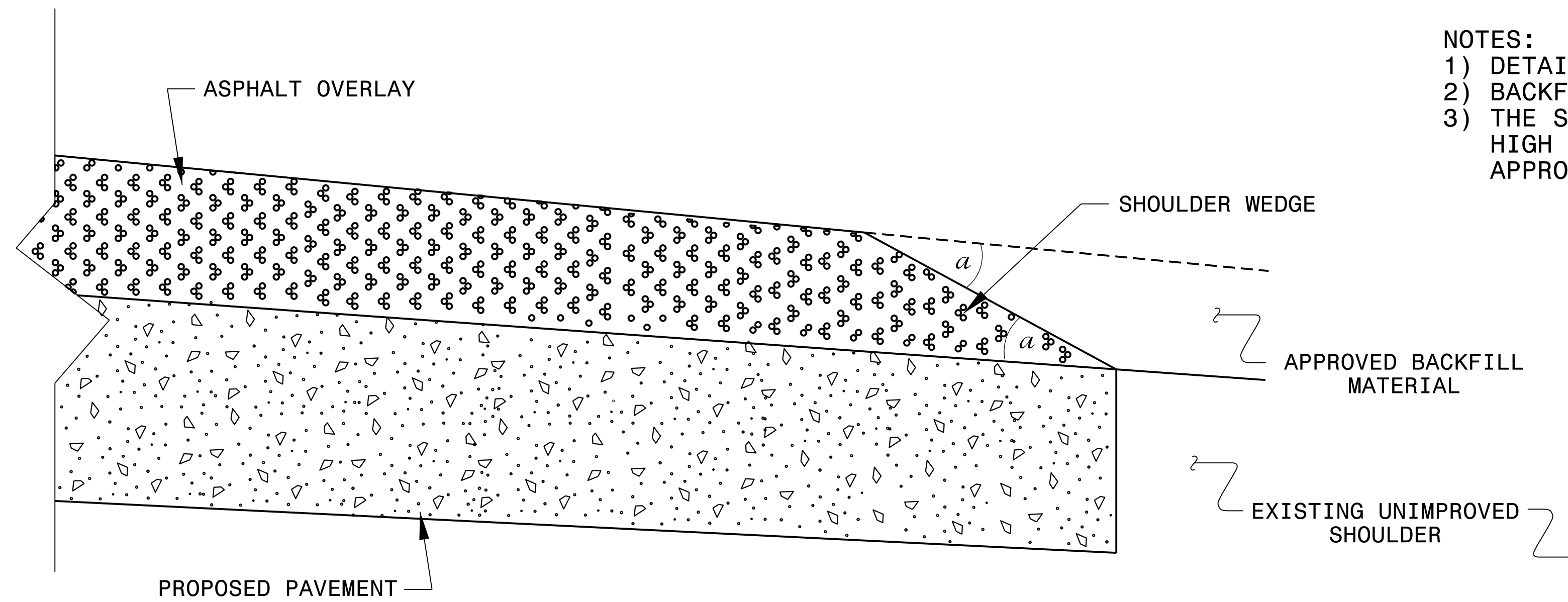
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TO BE KEYED-IN



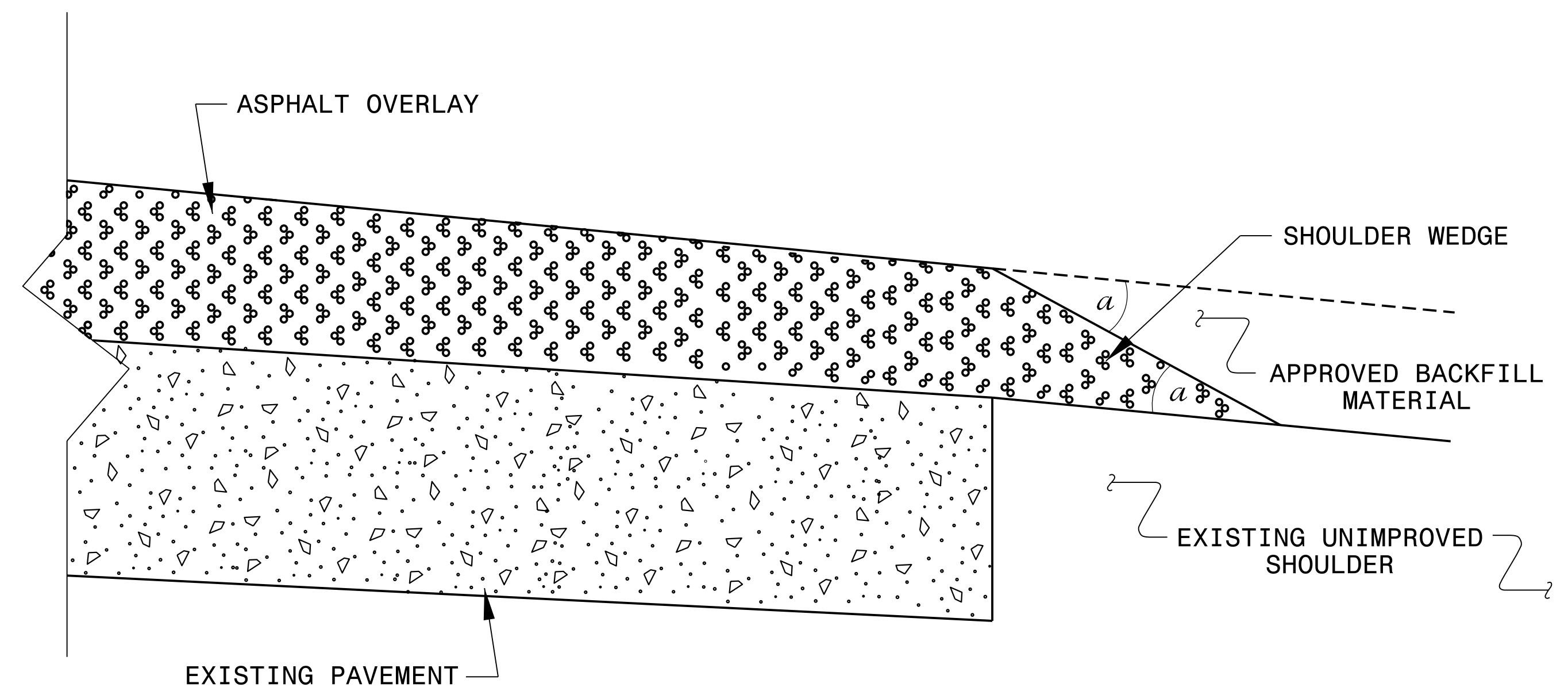
FOR PLAN VIEW, SEE SHEET 7

5/1/2017 10:45:11 AM P:\03\RES311A_RDY_DET_2B-11.dgn
ICA ENGINEERING, INC.

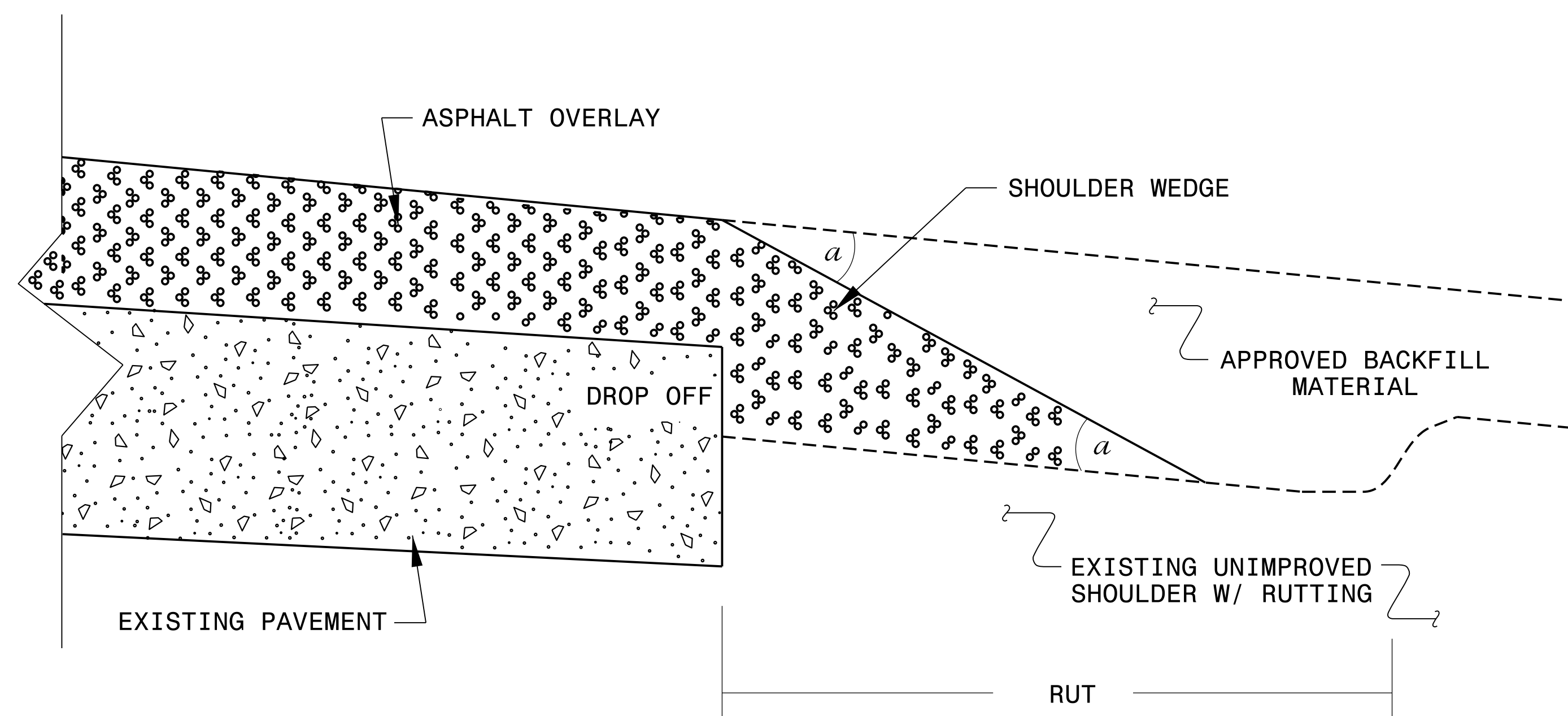
- NOTES:
- 1) DETAIL DOES NOT APPLY TO OGAFB AND ULTRA-THIN BONDED WEARING COURSE.
 - 2) BACKFILL SHOULDER WITH APPROVED MATERIAL.
 - 3) THE SHOULDER WEDGE DEVICE MAY BE DISENGAGED AT PAVED DRIVEWAYS, SIDE STREETS, HIGH SHOULDERS, AND OTHER LOCATIONS NOT FEASIBLE TO CONSTRUCT AS APPROVED BY THE ENGINEER.



SHOULDER WEDGE DETAIL
 (Resurfacing Projects w/ Widening or
 with Existing Paved Shoulder having no dropoffs)

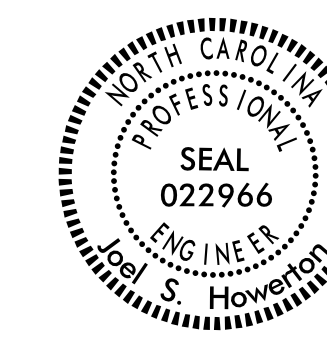


SHOULDER WEDGE DETAIL
 (Resurfacing Projects w/ NO Widening)



SHOULDER WEDGE DETAIL
 (Resurfacing Adjacent to
 Rutted Shoulder)

- SHOULDER WEDGE ANGLE = 30°



DocuSigned by:
 Joel S. Howerton
 873F3017DCDC46F...
 5/11/2017

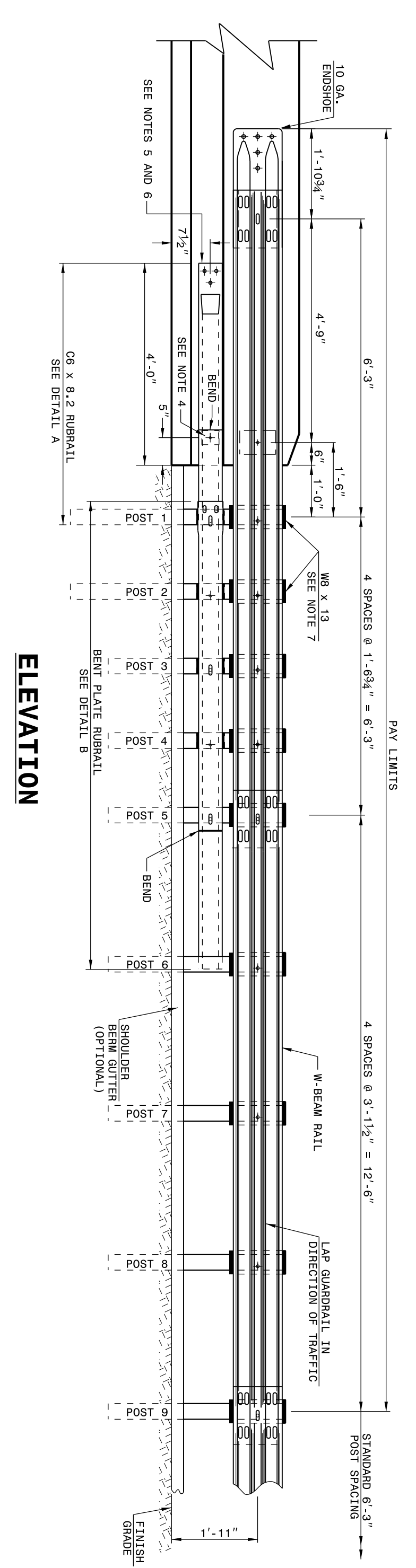
**CONTRACT STANDARDS
 AND DEVELOPMENT UNIT**
 Office 919-707-6950 FAX 919-250-4119

**SHOULDER WEDGE
 DETAILS**

ORIGINAL BY: T. SPELL	DATE: 7-19-11
MODIFIED BY:	DATE: 2/2/16
CHECKED BY:	DATE:
FILE SPEC.: s:\usr\details\stand\shoulderwedgedetail.dgn	

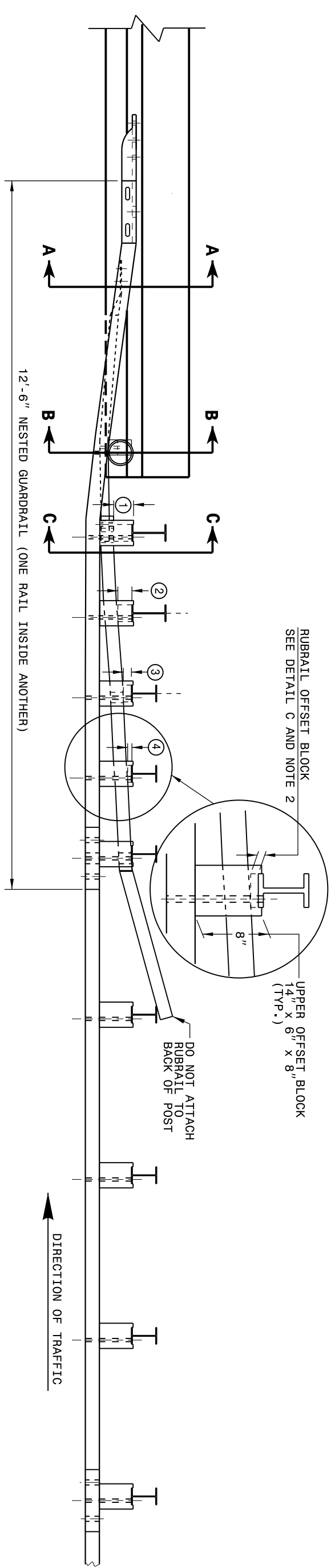
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STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
RALEIGH, N.C.



ELEVATION

- GENERAL NOTES:**
- POSTS 1 THROUGH 5 REQUIRE AN ADDITIONAL HOLE TO ATTACH LOWER BLOCKS AND/OR RUBRAIL.
 - RUBRAIL BLOCKS LOCATED ON POSTS 1 THROUGH 4 ARE OFFSET FROM THE W-BEAM RAIL.
 - WITH A 5/8" x 4 1/2" BUTTOMHEAD BOLT RUBRAIL IS FLARED TO BACK OF POST 6 AND NOT SECURED TO POST 5.
 - STEEL SPACER TUBE IS A SCHEDULE 40 GALVANIZED PIPE 6" INSIDE DIAMETER x 9' LONG. ATTACH TUBE TO GUARDRAIL ONLY WITH 5/8" x 1 1/2" LONG BUTTOMHEAD BOLT AND RECTANGULAR PLATE WASHER.
 - SEE DETAIL D FOR SLOPED RUBRAIL BLOCKOUT. BLOCKOUT IS ATTACHED TO RAIL ELEMENT ONLY. USE 3/8" x 3" LAG BOLT WITH FLAT WASHER. TYPE OF FINISH GRADER OR SHALOPE RAIL.
 - ANCHORAGE: (a) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, ANCHOR RUBRAIL USING THREE 5/8" x 6" CHEMICALLY ANCHORED BOLTS WITH WASHERS. MAXIMUM PROJECTION FOR BOLTS IS 1/2". (b) AT EXISTING BRIDGE RAIL AND NEW OR EXISTING BARRIERS, ANCHOR THE W-BEAM END SIDE USING A 4 BOLT HOLD DOWN PLATE (SEE STD. DWG. 862.04). INSTALL THE W-BEAM END SHOE BEHIND THE NESTED W-BEAM ELEMENTS (SEE STD. DWG. 857.07).
 - (c) AT NEW BRIDGE RAIL, ANCHOR THE W-BEAM END SHOE AND RUBRAIL AS DETAILED ON THE STRUCTURE PLANS.

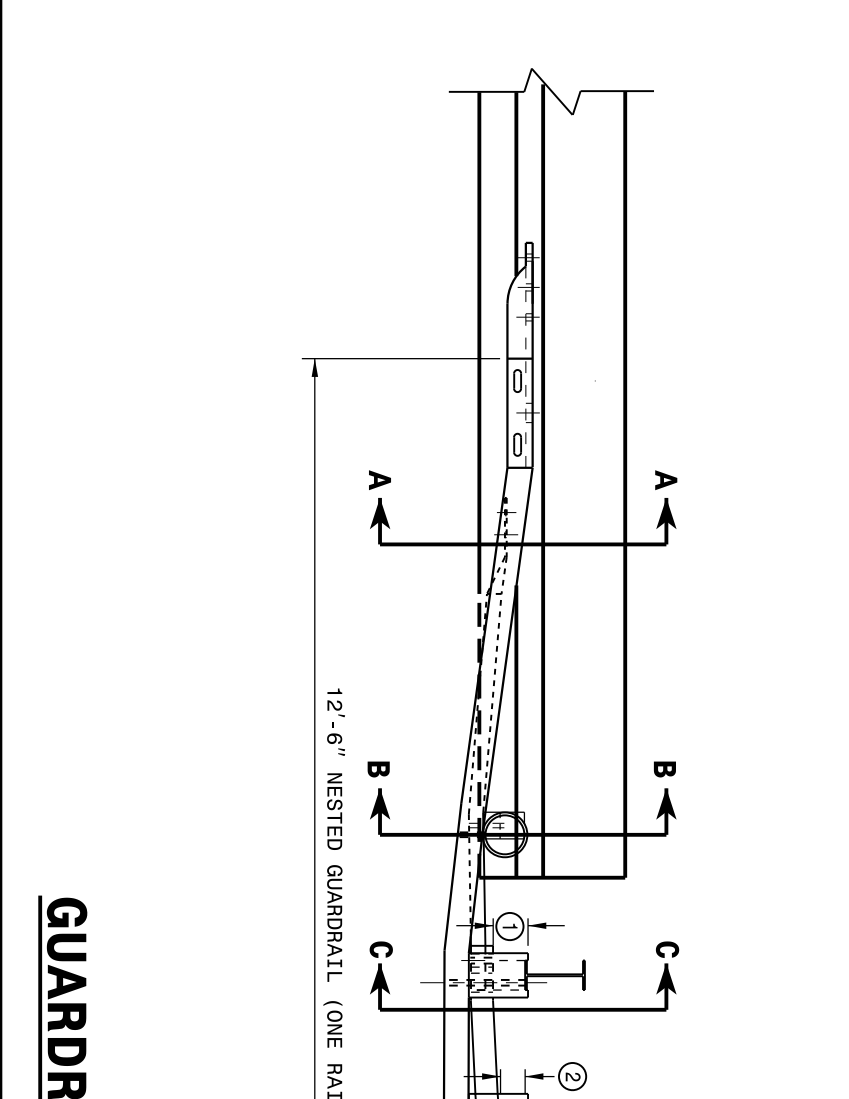


PLAN

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER

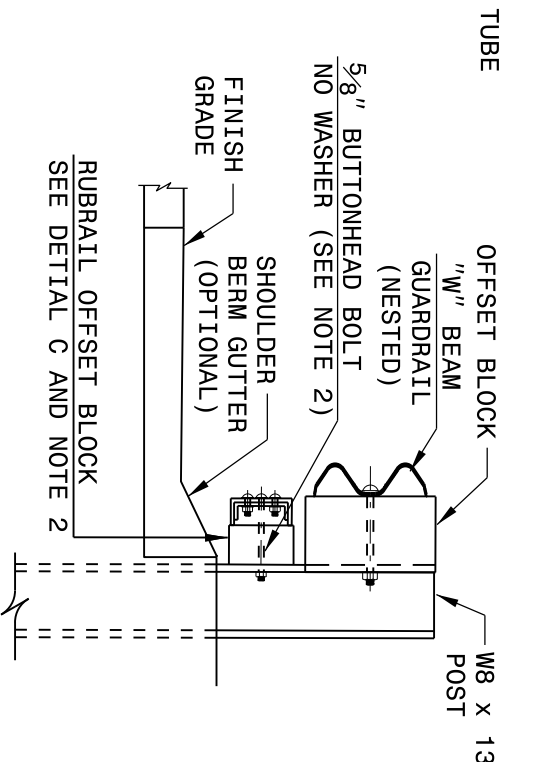
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
RALEIGH, N.C.

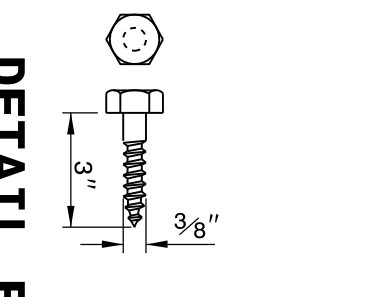


SECTION A-A

SECTION B-B



SECTION C-C



DETAIL E
LAG BOLT

RUBRAIL BLOCKS 7" HIGH x 4" WIDE

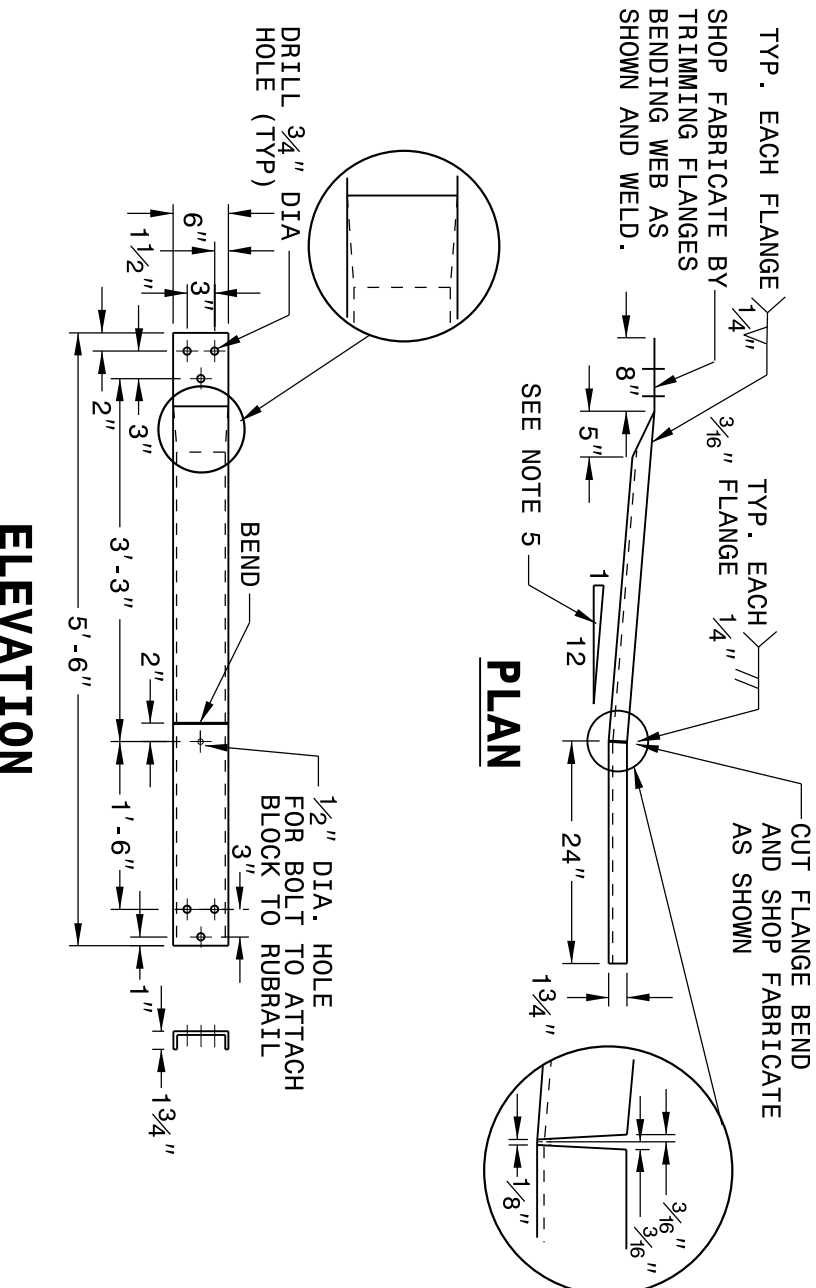
POST	THICKNESS	BOLT LENGTH
(1)	4 1/4"	9"
(2)	3 1/4"	5"
(3)	2"	6"
(4)	1"	3"

* BOLTS FOR POSTS 2 AND 4 ARE USED TO ATTACHED TO BLOCK.

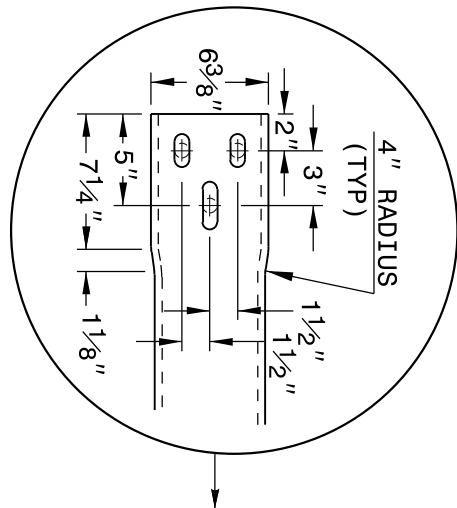
DETAIL C
RUBRAIL BLOCKOUT

DETAIL D
SLOPED RUBRAIL BLOCKOUT

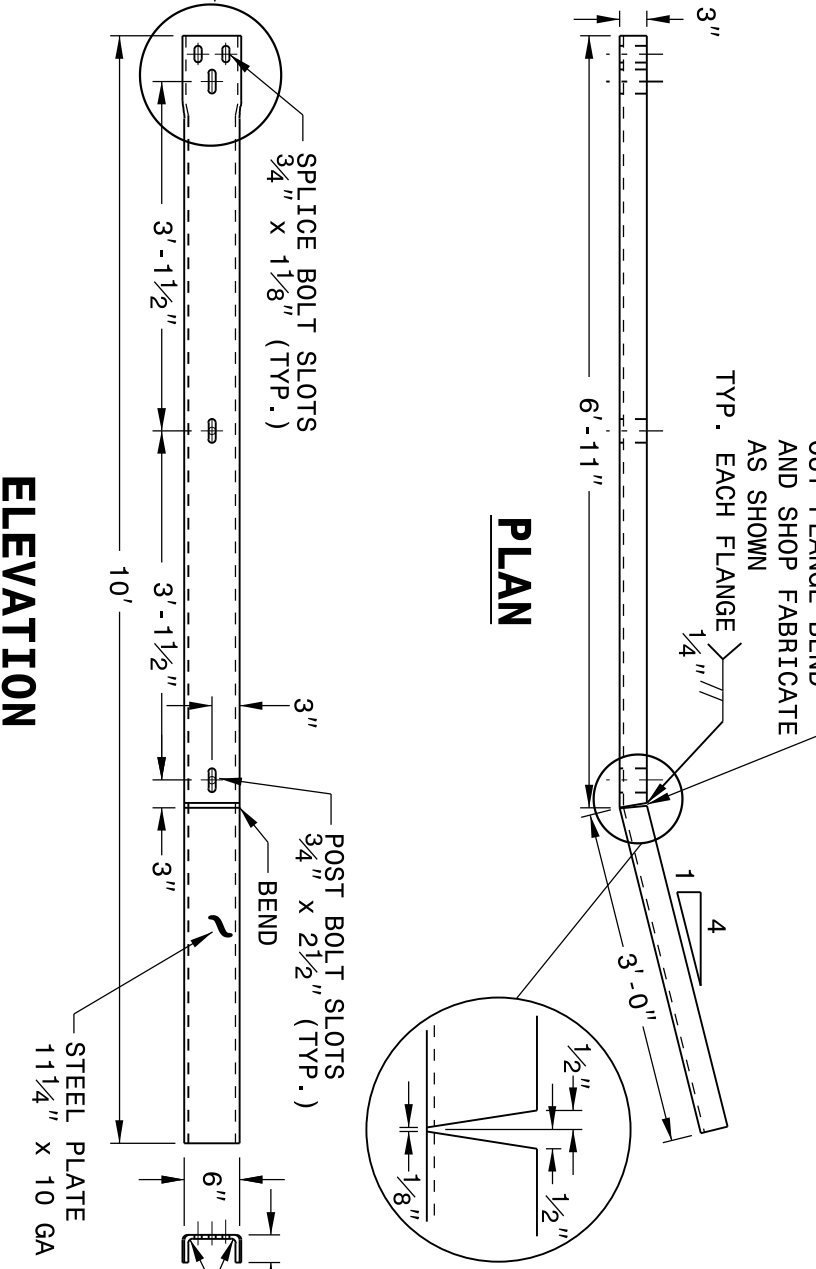
DETAIL F
W8 X 13 X 7'-6"



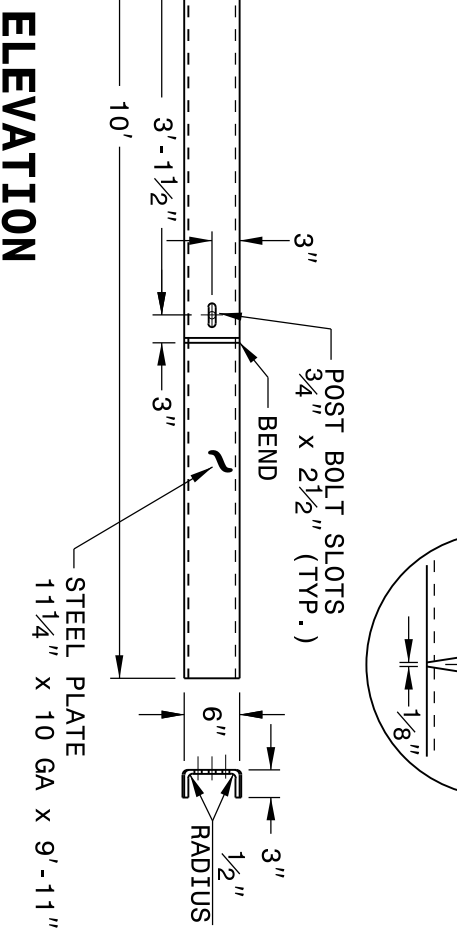
PLAN



ELEVATION

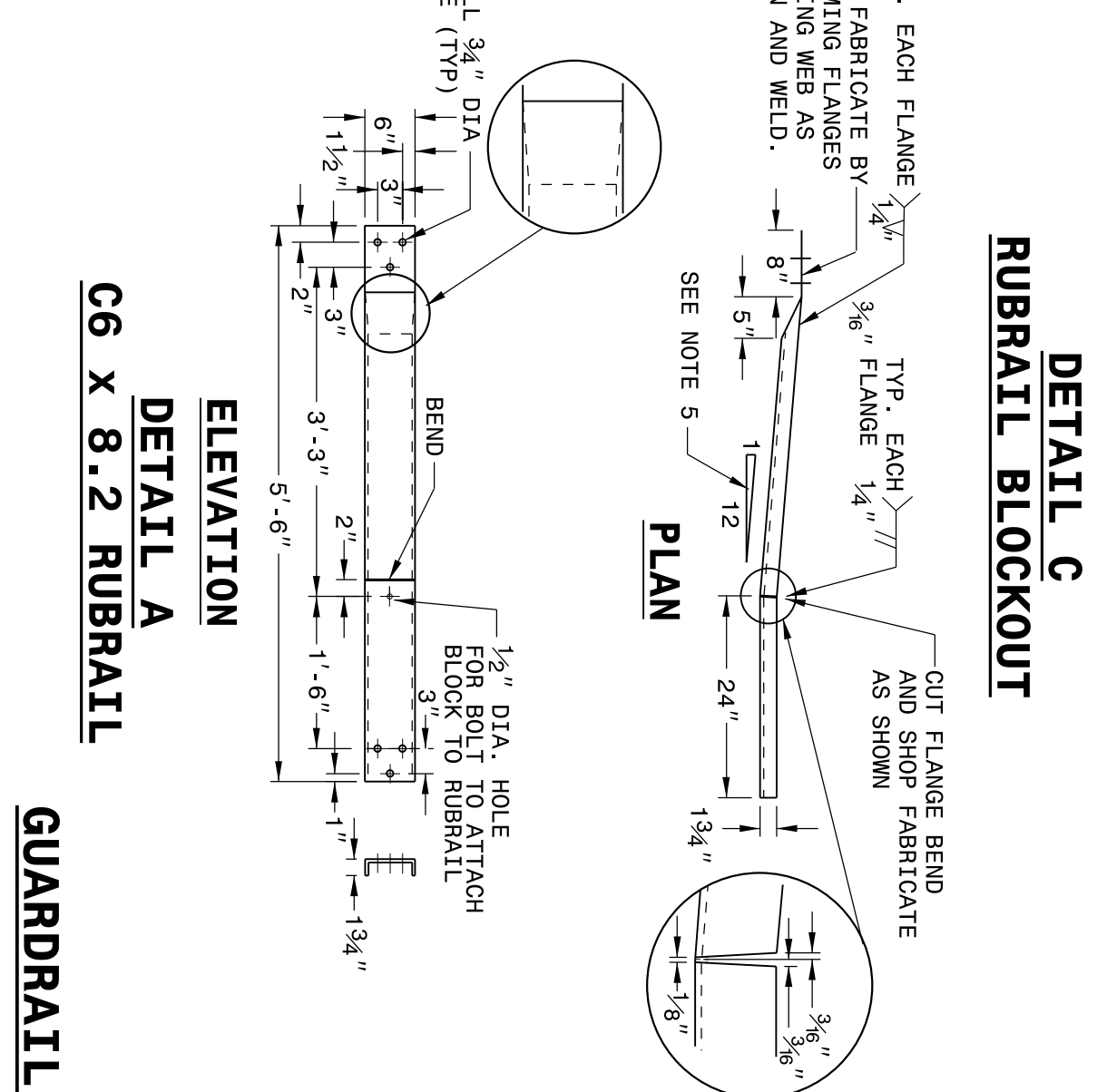


PLAN



ELEVATION

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER



DETAIL A
C6 X 8.2 RUBRAIL

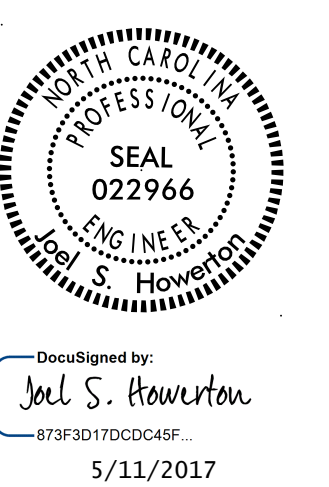
DETAIL B
GUARDRAIL ANCHOR UNIT TYPE B-77
BENT PLATE RUBRAIL

DETAIL C
W8 X 13 X 7'-6"

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER

STATE OF
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DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
STRUCTURE ANCHOR UNIT
GUARDRAIL ANCHOR UNIT TYPE B-77
FOR F-SHAPE BARRIER



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SEE TITLE BLOCK

ORIGINAL BY: J. HOWERTON DATE: 06-22-12
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FILE SPEC.: DATE:

STATE OF
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DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

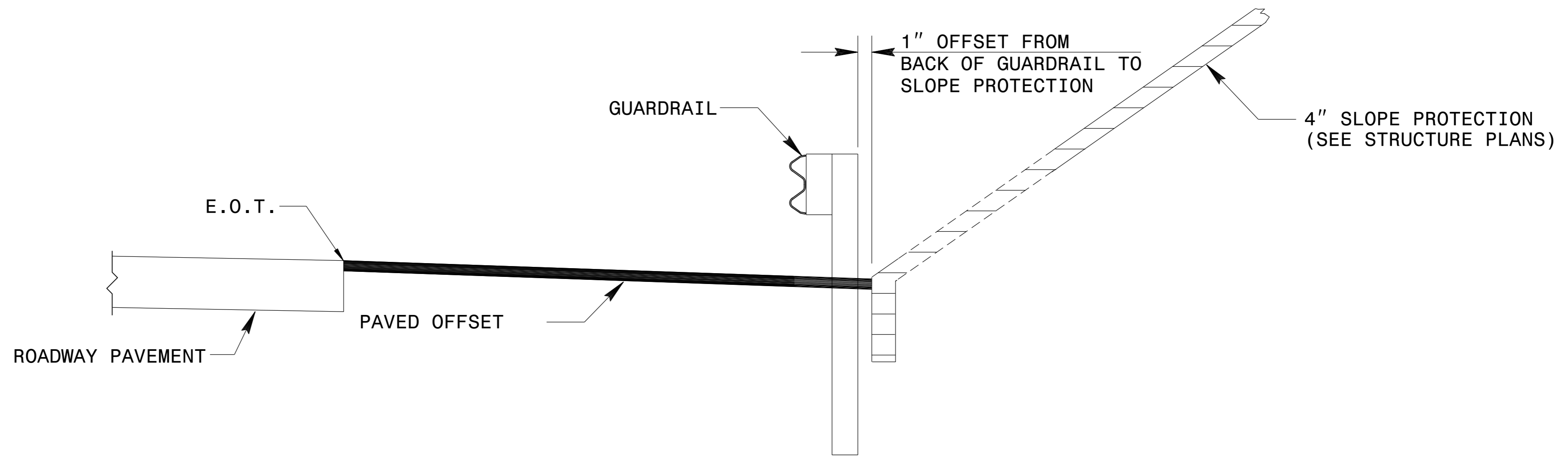
ENGLISH DETAIL DRAWING FOR
**GUIDE FOR PAVING
SHOULDERS UNDER BRIDGES**
METHOD II

SHEET 1 OF 1
610D02

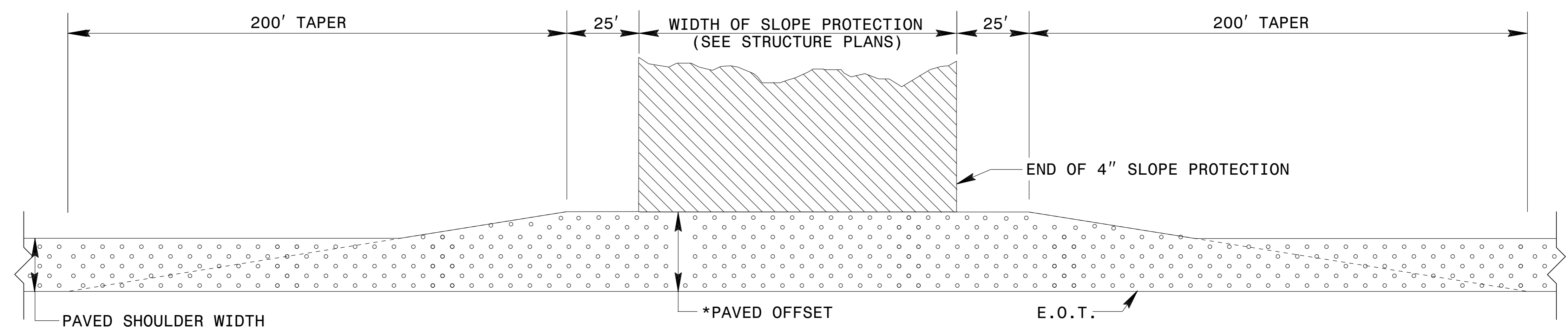
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RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
**GUIDE FOR PAVING
SHOULDERS UNDER BRIDGES**
METHOD II

SHEET 1 OF 1
610D02

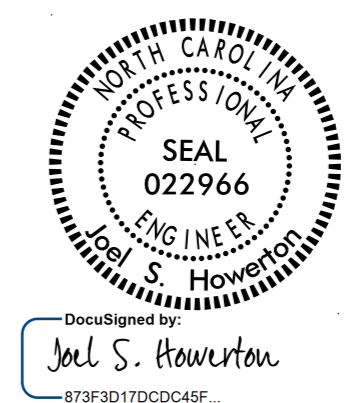


ELEVATION



PLAN

NOTES:
PAVE THE FULL WIDTH OF THE SHOULDER AND OFFSET AS SHOWN WITH SHOULDER PAVEMENT MATERIAL AS SHOWN ON PLANS.
*PAVED OFFSET BASED ON BRIDGE POLICY (SEE STRUCTURE PLANS).
PROTECT SLOPE WITH REINFORCED CONCRETE PAVING. CONCRETE BLOCK PAVING WILL NOT BE PERMITTED.



DocuSigned by:
J. S. Howerton
873F3D17DCDCAF
5/11/2017

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AND DEVELOPMENT UNIT**
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SEE TITLE PLATE

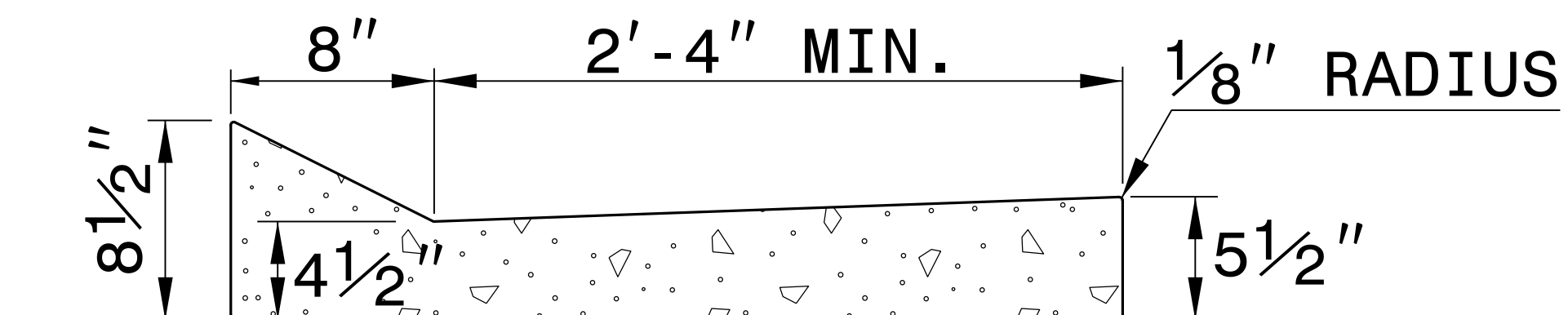
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MODIFIED BY: J. Howerton	DATE: 12/02/15
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5/14/99
C:\TIME\DESIGN\DESIGN\PROJECTS\610D02\610D02.DWG
\$\$\$\$\$USERNAME\$\$\$\$\$

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

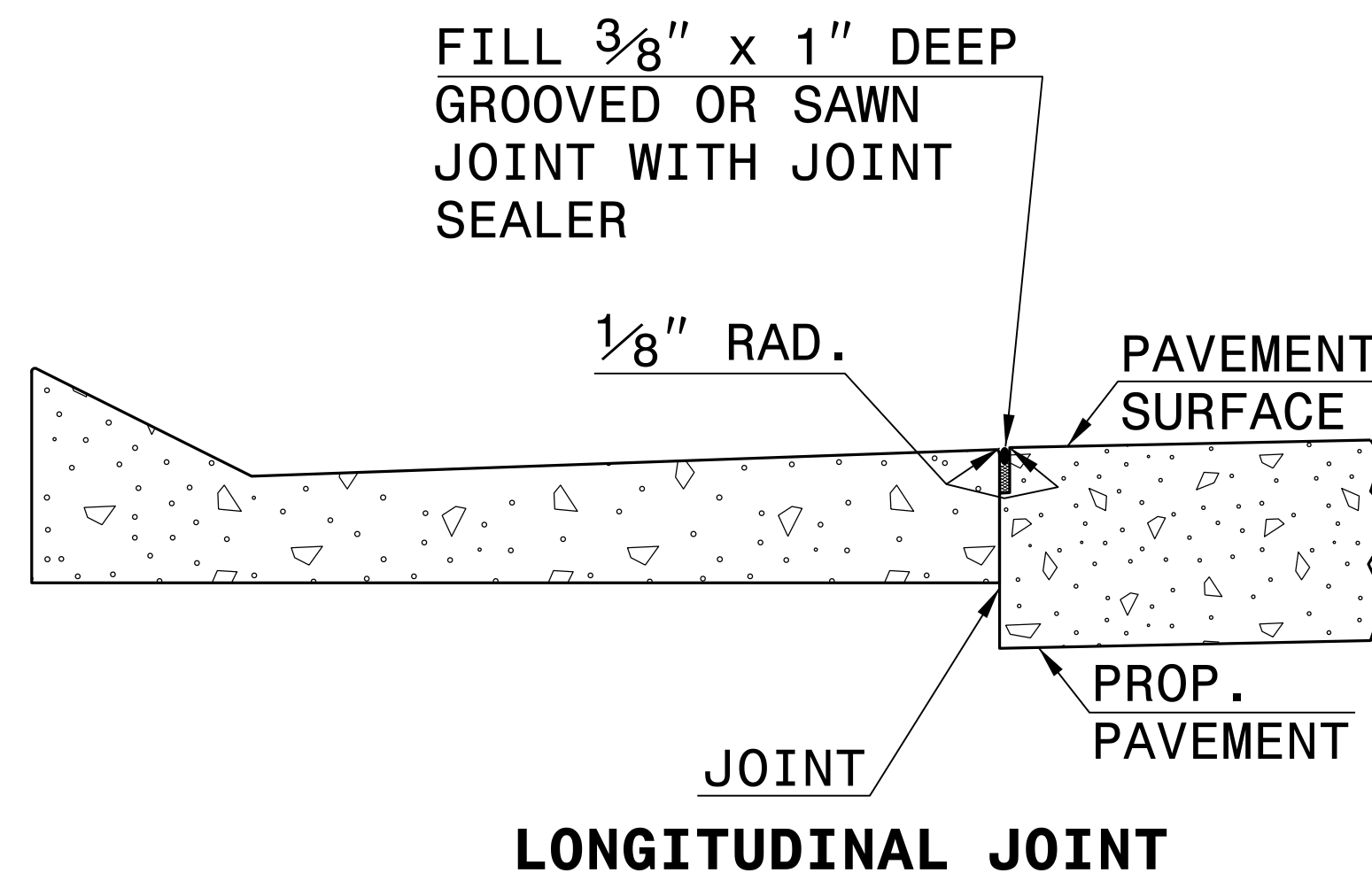
ENGLISH DETAIL DRAWING FOR MODIFIED SHOULDER BERM GUTTER

SHEET OF 846D01

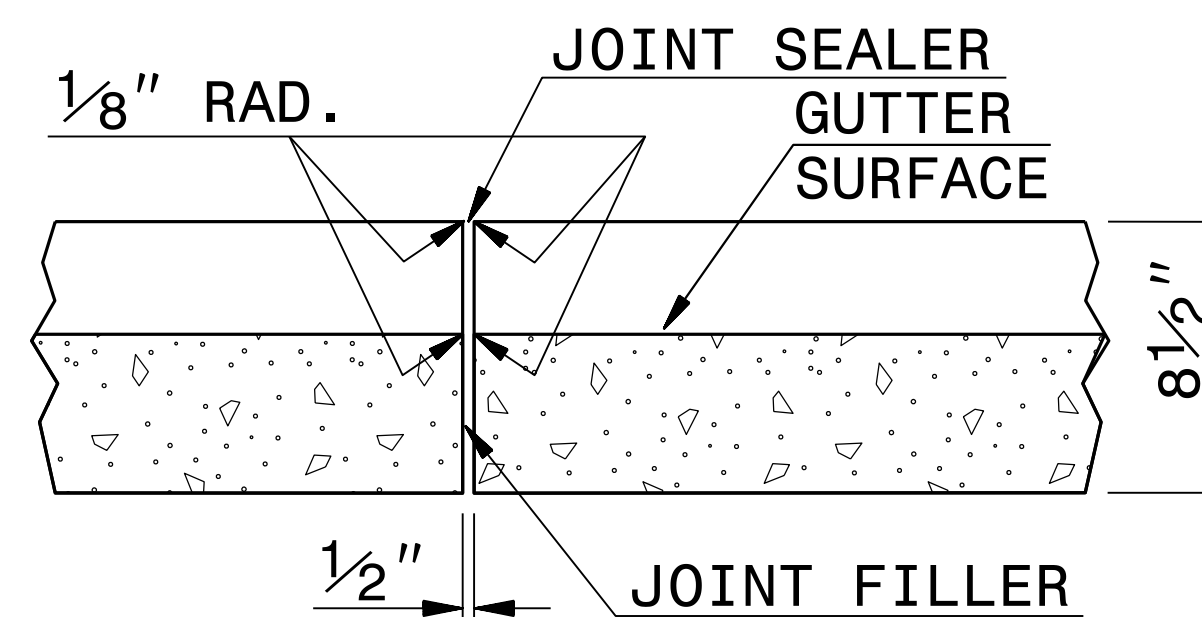


MODIFIED SHOULDER BERM GUTTER

- GENERAL NOTES:
- PLACE CONTRACTION JOINTS AT 10' INTERVALS, EXCEPT THAT A 15' SPACING MAY BE USED WHEN A MACHINE IS USED OR WHEN SATISFACTORY SUPPORT FOR THE FACE FORM CAN BE OBTAINED WITHOUT THE USE OF TEMPLATES AT 10' INTERVALS.
 - JOINT SPACING MAY BE ALTERED IF REQUIRED BY THE ENGINEER.
 - CONTRACTION JOINTS MAY BE INSTALLED WITH THE USE OF TEMPLATES OR FORMED BY OTHER APPROVED METHODS. CONSTRUCT NON-TEMPLATE FORMED JOINTS A MIN. OF 1 1/2" DEEP.
 - FILL ALL CONSTRUCTION JOINTS WITH JOINT FILLER AND SEALER.
 - SPACE EXPANSION JOINTS AT 90' INTERVALS AND ADJACENT TO ALL RIGID OBJECTS.



LONGITUDINAL JOINT



TRANSVERSE EXPANSION JOINT IN CURB AND GUTTER

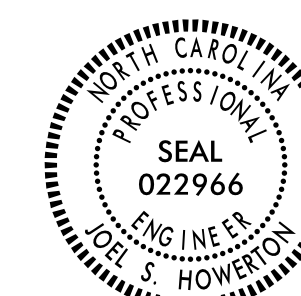
SECTION VIEW OF JOINTS

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR MODIFIED SHOULDER BERM GUTTER

SHEET OF 846D01

29-MAR-2017 07:20 S:\Contracts\Contract\846D01\Details\Howerton\846D01 Modified SBC.dgn Howerton AI CS0-272995



DocuSigned by: Joel S. Howerton 873F3D17DCDC45F 5/11/2017

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SEE TITLE BLOCK

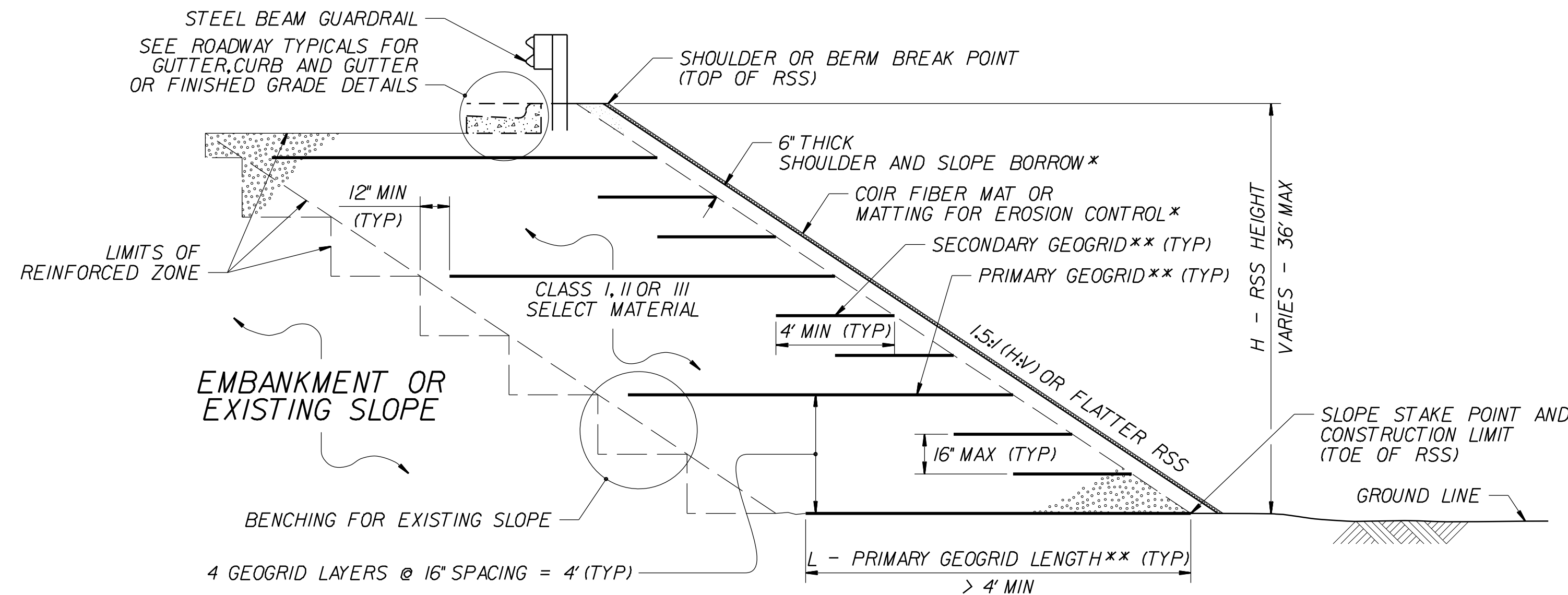
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DocuSigned by:
 Brian D Keany 10/28/2016

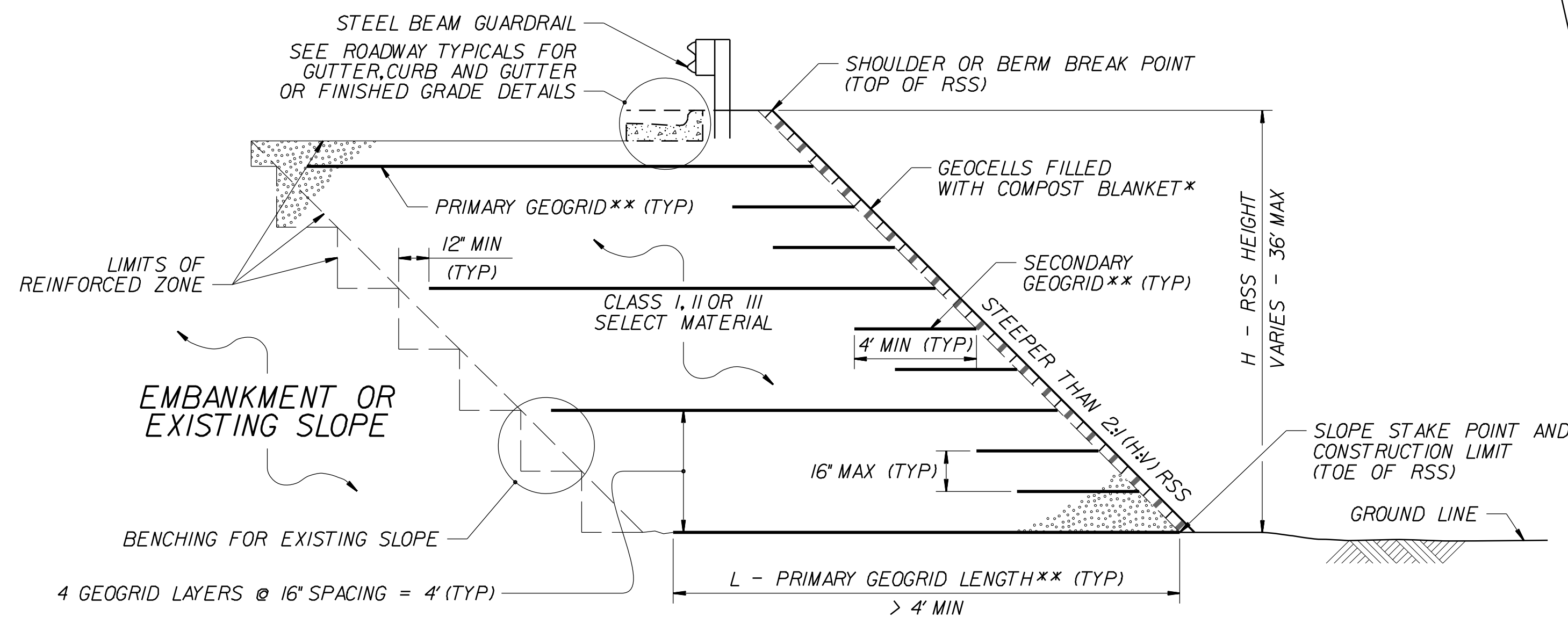
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MATTING WITH SHOULDER AND SLOPE BORROW

*SEE NOTES 3 AND 11 ON SHEET 2.

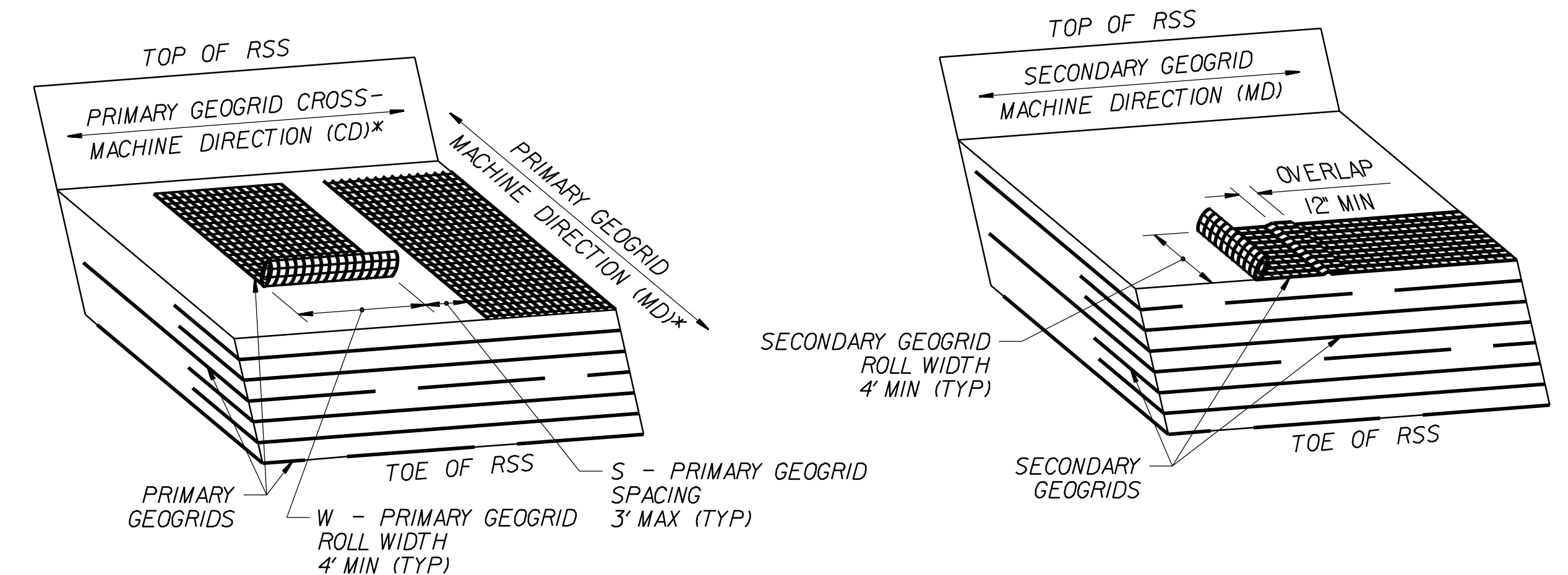


GEOCELLS WITH COMPOST BLANKET

*SEE NOTES 3 AND 11 ON SHEET 2.

STANDARD REINFORCED SOIL SLOPE (RSS)

**SEE TABLES ON SHEET 2 AND GEOGRID PLACEMENT DETAILS.

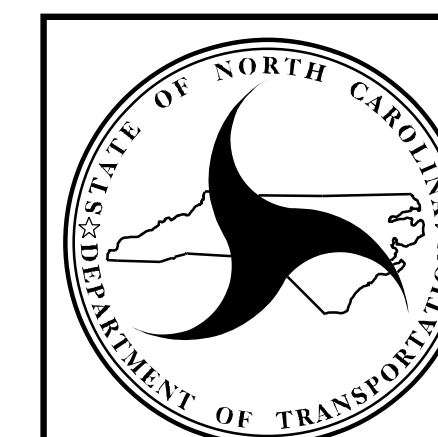


GEOGRID PLACEMENT DETAILS

$$(\% \text{ COVERAGE} = \frac{W}{W+S} \times 100 \geq 75\%)$$

*SEE NOTES 8 AND 9 ON SHEET 2.

REVISIONS TO STANDARD:
 ON SITE OR APPROVED BORROW IS ACCEPTABLE FOR RSS CONSTRUCTION. USE ONLY SECONDARY GEOGRID (NO PRIMARY GEOGRID IS REQUIRED) TO LIMIT SURFACE EROSION AT SLOPE TRANSITIONS FROM BRIDGE END SLOPES TO ROADWAY SIDE SLOPES AT -Y1- AND -Y2-. USE SECONDARY GEOGRID PAST THE CONCRETE SLOPE PROTECTION AT 2:1 UNTIL THE SIDE SLOPE TRANSITIONS TO 2.75:1




NORTH CAROLINA
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 DIVISION OF HIGHWAYS

**GEOTECHNICAL
 ENGINEERING UNIT**

STANDARD DETAIL NO. 1803.02

STANDARD
 REINFORCED SOIL SLOPE (RSS)
 WITH LOW GROUNDWATER
 SHEET 1 OF 2

PROJECT REFERENCE NO. R-5311A	SHEET NO. 2G-2
	ENGINEER
DocuSigned by: Brian D Keany 10/28/2016	SIGNATURE DATE
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GEOGRID TYPE, DIRECTION	H (FT)	0 - < 12		12 - 24		> 24 - 36	
	SELECT MATERIAL CLASS	I	II OR III	I	II OR III	I	II OR III
PRIMARY GEOGRID, MD (SUBSTITUTE SECONDARY GEOGRID FOR PRIMARY GEOGRID FOR 2:1 (H:V) OR FLATTER RSS)	1:1 TO < 1.5:1 (H:V) RSS	900	500	1200	900	1800	1200
	1.5:1 TO 1.75:1 (H:V) RSS	500	500	900	500	1400	1000
	> 1.75:1 TO < 2:1 (H:V) RSS	500	500	600	500	1000	800
SECONDARY GEOGRID, CD	1:1 (H:V) OR FLATTER RSS	185					

LTDS – MINIMUM REQUIRED LONG-TERM DESIGN STRENGTH (LB/FT)
(LTDS IS BASED ON 100% COVERAGE FOR PRIMARY GEOGRID.
SEE NOTE 9 FOR LESS THAN 100% COVERAGE.)

NOTES:

- SEE EROSION CONTROL AND ROADWAY PLANS AND SUMMARY SHEETS FOR REINFORCED SOIL SLOPE (RSS) AND SLOPE EROSION CONTROL LOCATIONS.
- FOR STANDARD REINFORCED SOIL SLOPES, SEE REINFORCED SOIL SLOPES PROVISION. FOR STEEL BEAM GUARDRAIL, SEE SECTION 862 OF THE STANDARD SPECIFICATIONS.
- FOR SHOULDER AND SLOPE BORROW, SEE ARTICLE 1019-2 OF THE STANDARD SPECIFICATIONS. FOR GEOCELLS, SEE CELLULAR CONFINEMENT SYSTEMS PROVISION. FOR COIR FIBER MAT, MATTING FOR EROSION CONTROL AND COMPOST BLANKET, SEE EROSION CONTROL PROVISIONS, SECTION 1631 OF THE STANDARD SPECIFICATIONS AND ROADWAY STANDARD DRAWING NO. 1633.01.
- STANDARD RSS ARE BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:
UNIT WEIGHT, $\gamma = 120$ LB/CF
FRICTION ANGLE, $\phi = 30$ DEGREES
COHESION, $c = 0$ LB/SF
- DO NOT USE STANDARD RSS IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE OR DEPTH TO GROUNDWATER IS LESS THAN 7 FT.
- DO NOT USE STANDARD RSS WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS BELOW RSS.
- GEOGRIDS ARE TYPICALLY APPROVED FOR ULTIMATE TENSILE STRENGTHS IN THE MACHINE DIRECTION (MD) AND CROSS-MACHINE DIRECTION (CD) OR LONG-TERM DESIGN STRENGTHS FOR A 75-YEAR DESIGN LIFE IN THE MD BASED ON MATERIAL TYPE. THE LIST OF APPROVED GEOGRIDS WITH DESIGN STRENGTHS IS AVAILABLE FROM:
connect.ncdot.gov/resources/Materials/Pages/SoilsLaboratory.aspx
DEFINE MATERIAL TYPE FROM THE WEBSITE ABOVE FOR SELECT MATERIAL AS FOLLOWS:

MATERIAL TYPE	SELECT MATERIAL
BORROW	CLASS I SELECT MATERIAL
FINE AGGREGATE	CLASS II OR III SELECT MATERIAL

IF THE WEBSITE DOES NOT LIST A LONG-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID IN THE MD, DO NOT USE THE GEOGRID FOR PRIMARY GEOGRID. IF THE WEBSITE DOES NOT LIST A LONG-TERM DESIGN STRENGTH FOR AN APPROVED GEOGRID IN THE CD, USE A LONG-TERM DESIGN STRENGTH EQUAL TO THE ULTIMATE TENSILE STRENGTH DIVIDED BY 7 FOR THE SECONDARY GEOGRID.

- DO NOT OVERLAP PRIMARY GEOGRIDS IN THE MD SO OVERLAPS ARE PARALLEL TO THE TOE OF RSS. POLYOLEFIN (e.g., HDPE OR PP) GEOGRIDS MAY BE SPLICED ONCE PER PRIMARY GEOGRID LENGTH IN ACCORDANCE WITH THE GEOGRID MANUFACTURER'S INSTRUCTIONS. USE POLYOLEFIN GEOGRID PIECES AT LEAST 4' LONG. DO NOT SPLICE POLYESTER TYPE (PET) GEOGRIDS.
- FOR PRIMARY GEOGRIDS WITH 100% COVERAGE, PLACE PRIMARY GEOGRIDS SO GEOGRIDS ARE ADJACENT TO EACH OTHER IN THE CD. FOR PRIMARY GEOGRIDS WITH 75% TO LESS THAN 100% COVERAGE,

MINIMUM REQUIRED LONG-TERM DESIGN STRENGTH = LTDS BASED ON 100% COVERAGE $\times (W + S) / W$

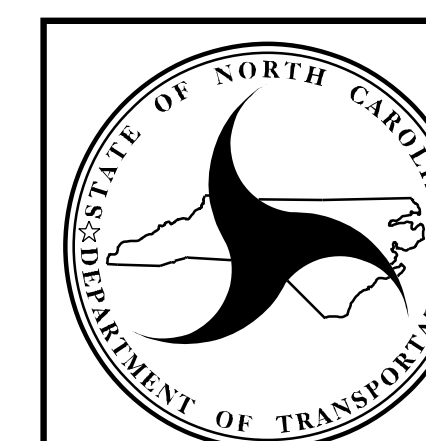
SEE TABLE FOR LTDS BASED ON 100% COVERAGE AND GEOGRID PLACEMENT DETAILS FOR PRIMARY GEOGRID ROLL WIDTH (W) AND SPACING (S). FOR PRIMARY GEOGRIDS WITH LESS THAN 100% COVERAGE, STAGGER PRIMARY GEOGRIDS SO GEOGRIDS ARE CENTERED OVER GAPS IN THE PRIMARY GEOGRID LAYER BELOW. DO NOT USE LESS THAN 75% COVERAGE FOR PRIMARY GEOGRIDS.
- DO NOT PLACE ANY GEOGRIDS UNTIL EXCAVATION DIMENSIONS AND IN-SITU MATERIAL ARE APPROVED.
- FOR SLOPE EROSION CONTROL, USE GEOCELLS OR MATTING ON SLOPE FACES OF RSS AS FOLLOWS:

RSS ANGLE	SLOPE EROSION CONTROL
1:1 TO < 1.5:1 (H:V)	GEOCELLS WITH COMPOST BLANKET
1.5:1 TO < 2:1 (H:V)	GEOCELLS WITH COMPOST BLANKET OR COIR FIBER MAT WITH SHOULDER AND SLOPE BORROW*
2:1 (H:V) OR FLATTER	MATTING FOR EROSION CONTROL WITH SHOULDER AND SLOPE BORROW

*SEE REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL SUMMARY TABLE IN THE ROADWAY SUMMARY SHEETS FOR SLOPE EROSION CONTROL ON SLOPE FACES OF RSS 1.5:1 (H:V) TO STEEPER THAN 2:1.

H (FT)	0 - < 12		12 - 24		> 24 - 36	
SELECT MATERIAL CLASS	I	II OR III	I	II OR III	I	II OR III
1:1 TO < 1.5:1 (H:V) RSS	1.00	1.00	0.90	0.85	0.85	0.80
1.5:1 TO 1.75:1 (H:V) RSS	0.90	0.80	0.75	0.70	0.75	0.70
> 1.75:1 TO < 2:1 (H:V) RSS	0.75	0.70	0.65	0.60	0.65	0.60

L/H RATIO (L > 4' MIN)
(IF $L \leq 4'$, USE SECONDARY GEOGRID
INSTEAD OF PRIMARY GEOGRID.)




NORTH CAROLINA
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DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

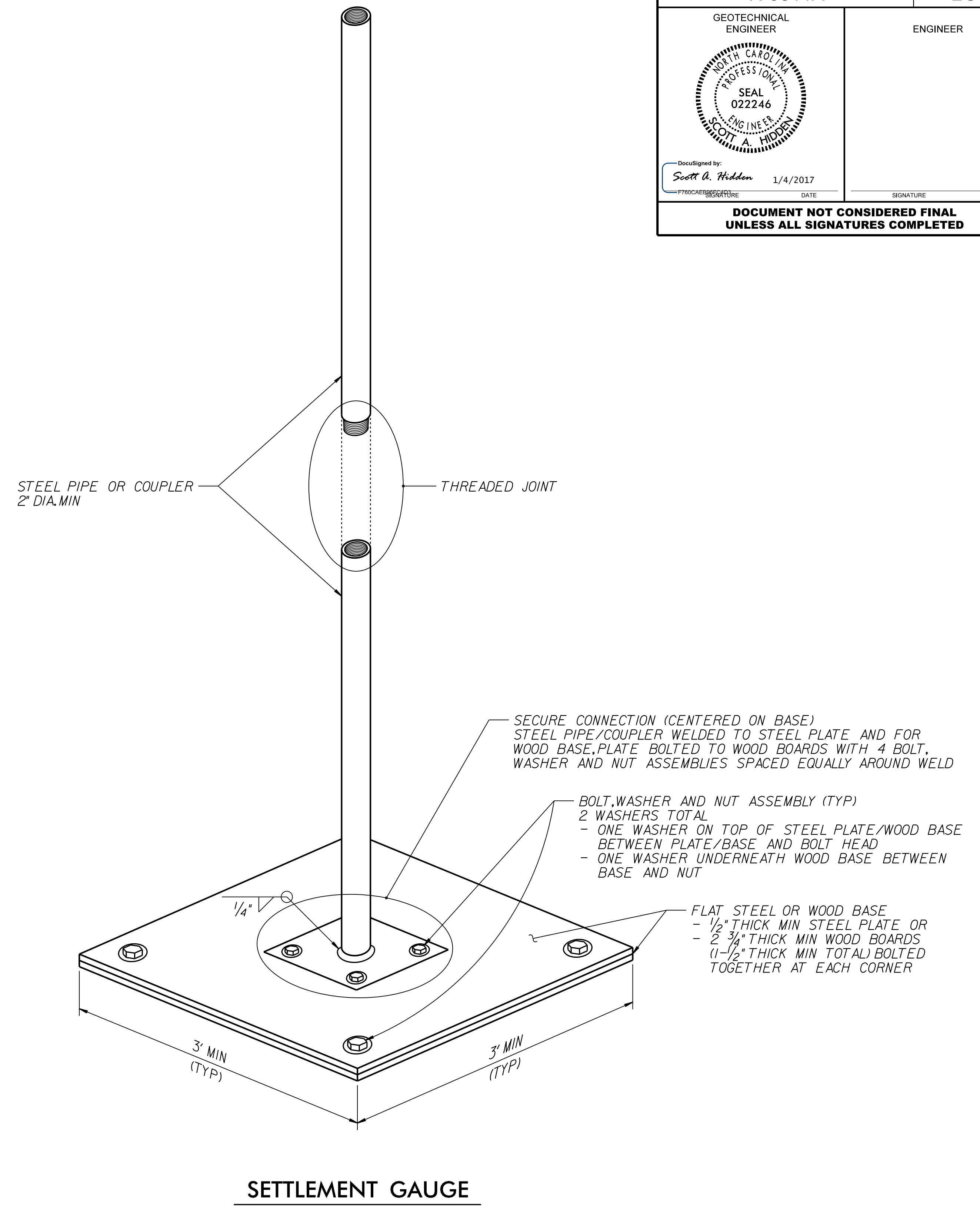
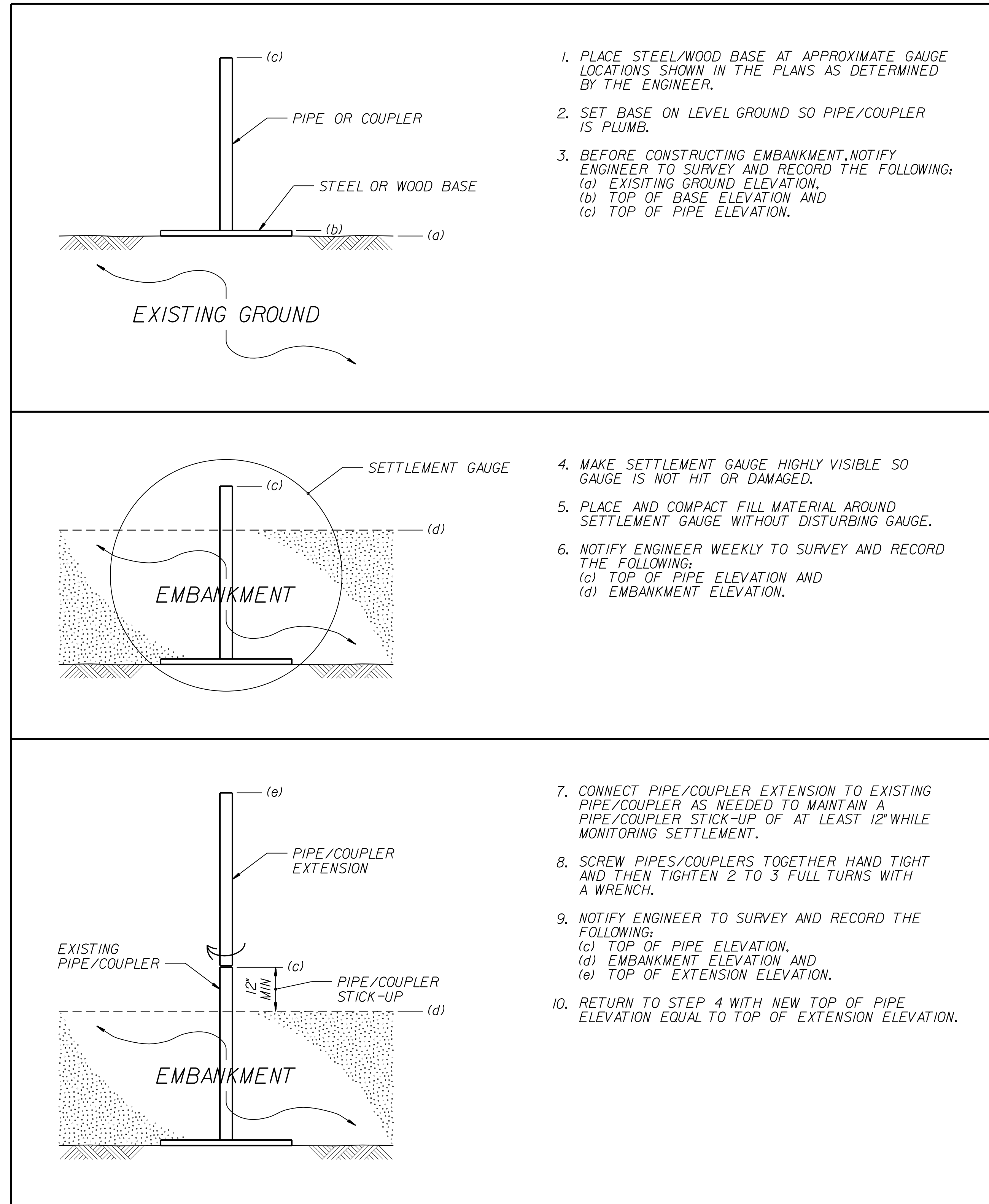
STANDARD DETAIL NO. 1803.02

STANDARD
REINFORCED SOIL SLOPE (RSS)
WITH LOW GROUNDWATER
SHEET 2 OF 2

DATE: 4-19-16

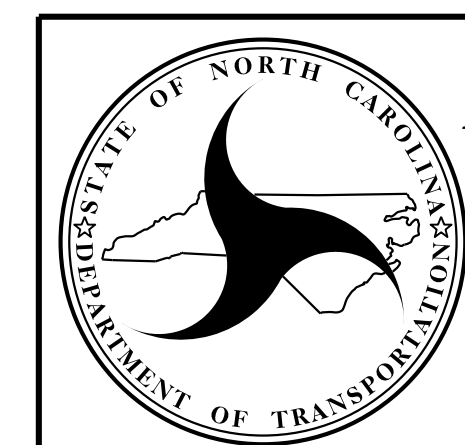
PROJECT REFERENCE NO. R-5311A	SHEET NO. 2G-3
GEOTECHNICAL ENGINEER  Designd by: <i>Scott A. Hidden</i> 1/4/2017 <small>PROFESSIONAL ENGINEER SIGNATURE DATE</small>	ENGINEER <small>SIGNATURE DATE</small>
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

EMBANKMENT MONITORING SEQUENCE



NOTES:

1. SEE ROADWAY SUMMARY SHEETS FOR APPROXIMATE SETTLEMENT GAUGE LOCATIONS.
2. FOR STANDARD EMBANKMENT MONITORING, SEE EMBANKMENT SETTLEMENT GAUGES PROVISION.
3. INSTALL SETTLEMENT GAUGES AFTER CLEARING AND GRUBBING GAUGE LOCATIONS AND BEFORE CONSTRUCTING EMBANKMENTS WITH EMBANKMENT MONITORING.



NORTH CAROLINA
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DIVISION OF HIGHWAYS

**GEOTECHNICAL
ENGINEERING UNIT**

STANDARD DETAIL NO. 1804.01

STANDARD
EMBANKMENT MONITORING

COMPUTED BY: ADS DATE: 9/16/16
 CHECKED BY: JCB DATE: 03/27/17

PROJECT NO. R-5311A SHEET NO. 3B-3

**STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS**

**PAVEMENT REMOVAL SUMMARY
 IN SQUARE YARDS**

SURVEY LINE	Station	Station	LOCATION LT/RT/CL	ASPHALT REMOVAL	ASPHALT BREAKUP	CONCRETE REMOVAL	CONCRETE BREAKUP
EL	310+00	318+18	LT	1281.99			
EL	310+00	315+55	RT	56.44			
Y1	15+25	21+00	CL		1261.79		
Y1	21+00	24+48	CL		1324.56		
Y1	24+48	24+53	CL	6.94			
Y1	25+75	25+79	CL	15.37			
Y1	25+79	30+00	CL		1903.95		
Y1	30+00	35+00	CL		1230.26		
Y2	38+50	47+36	CL		2362.67		
Y2	47+36	49+91	CL		1008.63		
Y2	50+02	50+60	CL	434.67			
Y2	54+15	62+50	CL		2226.67		
L2	15+83	23+91	LT	1100.01			
L2	17+00	23+91	RT	137.67			
DET1	10+00	17+34	CL	1049.8			
DET1	17+34	24+35	LT	1234.27			
DET1	20+33	29+18	RT		2047.83		
Y2RPB	10+19	12+03	RT	170.71			
EL	352+70	L2- 11+00	RT	63.38			
TOTAL:				5551.25	13366.36		
SAY:				5,600	13,370		

SHOULDER BERM GUTTER SUMMARY

LINE	SIDE	Station	Station	LENGTH LF
Y1	LT*	23+84.00	24+09.66	25.7
Y1	RT*	23+84.00	24+01.15	17.2
Y1	LT*	26+23.92	26+41.00	17.1
Y1	RT*	26+14.28	26+41.00	26.7
Y2	RT	41+25.00	45+11.00	386.0
Y2	LT*	41+25.00	49+45.74	820.7
Y2	RT*	49+14.00	49+57.14	43.1
Y2	LT*	51+68.52	52+00.00	31.5
Y2	RT*	51+79.92	60+45.00	865.1
Y2	LT	56+24.00	60+85.00	461.0
*SHOULDER BERM GUTTER TIES TO BRIDGE APPROACH SLAB				
TOTAL:				2694.1
SAY:				2700.0

RAL-50648300L

COMPUTED BY: KYLE STOFFER DATE: 9/15/2016
CHECKED BY: ALEX SNIDER, PE DATE: 10/04/2016

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO. R-5311A SHEET NO. 3D-1

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

Table with columns for Line & Station, Offset, Structure Number, Drainage Pipe (RCP, CAAP, HDPE, or PVC), C. S. PIPE, R. C. PIPE CLASS III, R. C. PIPE CLASS IV, Quantities for Drainage Structures, Frame, Grates, and Hood, Concrete Transitional Section, and Pipe Removal. Includes a 'SHEET TOTALS' row at the bottom.

ABBREVIATIONS table listing codes like C.A.A., C.B., C.S., D.I., G.D.I., H.D.P.E., J.B., M.H., N.S., P.V.C., R.C., T.B.D.I., T.B.J.B., W.S. and their corresponding descriptions.

REMARKS

Remarks column containing notes such as 'REMOVE EX. 15" RCP', 'REMOVE EX. 24" RCP', 'ROD & LUG WSLEEVES', etc.

RAI-50648300L

COMPUTED BY: KYLE STOFFER DATE: 9/15/2016
CHECKED BY: ALEX SNIDER, PE DATE: 10/04/2016

NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

PROJECT NO. SHEET NO.
R-5311A 3D-2

Note: Invert Elevations indicated are for Bid Purposes only and shall not be used for project construction stakeout. See "Standard Specifications For Roads and Structures, Section 300-5".

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 48 INCHES & UNDER)

Main data table with columns for Line & Station, Offset, Structure Number, Invert Elevation, Minimum Required Slope, Drainage Pipe, C.S. Pipe, R.C. Pipe Class III, R.C. Pipe Class IV, Quantities for Drainage Structures, Frame, Grates, and Hood, Concrete Transitional Section, and Pipe Removal. Includes sub-totals for SHEET TOTALS and PROJECT TOTALS.

ABBREVIATIONS table listing various materials and components like C.A.A. CORRUGATED ALUMINIUM ALLOY, C.B. CATCH BASIN, C.S. CORRUGATED STEEL, D.I. DROP INLET, G.D.I. GRATED DROP INLET, H.D.P.E. HIGH DENSITY POLYETHYLENE, J.B. JUNCTION BOX, M.H. MANHOLE, N.S. NARROW SLOT, P.V.C. POLYVINYL CHLORIDE, R.C. REINFORCED CONCRETE, T.B.D.I. TRAFFIC BEARING DROP INLET, T.B.J.B. TRAFFIC BEARING JUNCTION BOX, W.S. WIDE SLOT.

REMARKS

SHEET TOTALS
PROJECT TOTALS

Summary table for SHEET TOTALS and PROJECT TOTALS with columns for various pipe sizes and quantities.

COMPUTED BY: CBJ DATE: 8/29/2016
 CHECKED BY: BDK DATE: 8/29/2016

(8-29-16)

PROJECT NO. R-5311A SHEET NO. 3G-1

STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

SUMMARY OF SUBSURFACE DRAINAGE

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	1000
				TOTAL LF:	1000

*UD = Underdrain
 *BD = Blind Drain
 *SD = Subsurface Drain

SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION

LINE	Station	Station	Aggregate Type* ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			AST	3					500
CONTINGENCY			ASU	12	1000	1950	3000		
TOTAL CY/TONS/SY:					1000	1950	3000**	0	500

*ASU = Aggregate Subgrade
 *AST = Aggregate Stabilization
 **Total square yards of "Geotextile for Soil Stabilization" is only the estimated quantity for ASU/AST and may only represent a portion of the geotextile quantity shown in the Item Sheets of the Proposal.

SUMMARY OF REINFORCED SOIL SLOPES AND SLOPE EROSION CONTROL

LINE	Beginning Slope/ RSS (H:V)	Approx. Station	Ending Slope/ RSS (H:V)	Approx. Station	Location LT/RT	Reinforced Soil Slope (RSS) SY	Geocells SY	Coir Fiber Mat SY	Matting for Erosion Control SY
-Y1-	2.75:1	23+42.48	2:1	24+17.48	LT	275	0	0	275
-Y1-	2.75:1	23+29.29	2:1	24+04.29	RT	275	0	0	275
-Y1-	2:1	26+19.65	2.75:1	26+94.65	LT	275	0	0	275
-Y1-	2:1	26+06.46	2.75:1	26+81.46	RT	275	0	0	275
-Y2-	2.75:1	48+75.08	2:1	49+50.08	LT	300	0	0	300
-Y2-	2.75:1	48+89.09	2:1	49+64.09	RT	300	0	0	300
-Y2-	2:1	51+61.55	2.75:1	52+36.55	LT	300	0	0	300
-Y2-	2:1	51+75.74	2.75:1	52+50.74	RT	300	0	0	300
TOTAL SY:						2300	0	0*	2,300**

*Total square yards of "Coir Fiber Mat" is only the estimated quantity for slopes steeper than 2:1 (H:V) and may only represent a portion of the coir fiber mat quantity shown in the Item Sheets of the Proposal.

**Total square yards of "Matting for Erosion Control" is only the estimated quantity for RSS and may only represent a portion of the matting quantity shown in the Item Sheets of the Proposal.

SUMMARY OF SETTLEMENT GAUGES

Gauge No.	LINE and Station	Offset	
		Distance FT	Direction LT/RT
1	-Y1- 24+08	15	RT
2	-Y1- 24+18	15	LT
3	-Y1- 26+08	15	RT
4	-Y1- 26+17	15	LT
5	-Y2- 49+64	25	RT
6	-Y2- 49+53	25	LT
7	-Y2- 51+73	25	RT
8	-Y2- 51+61	25	LT
TOTAL GAUGES (EACH):		8	

SUMMARY OF BRIDGE WAITING PERIODS

Bridge Description	End Bent/ Bent No.	MONTHS
Bridge on SR 1130 (-Y1-) over NC11 (-EL-)	EB1	1
Bridge on SR 1130 (-Y1-) over NC11 (-EL-)	EB2	3
Bridge on SR 1213 (-Y2-) over NC11 (-L2-)	EB1	1
Bridge on SR 1213 (-Y2-) over NC11 (-L2-)	EB2	3

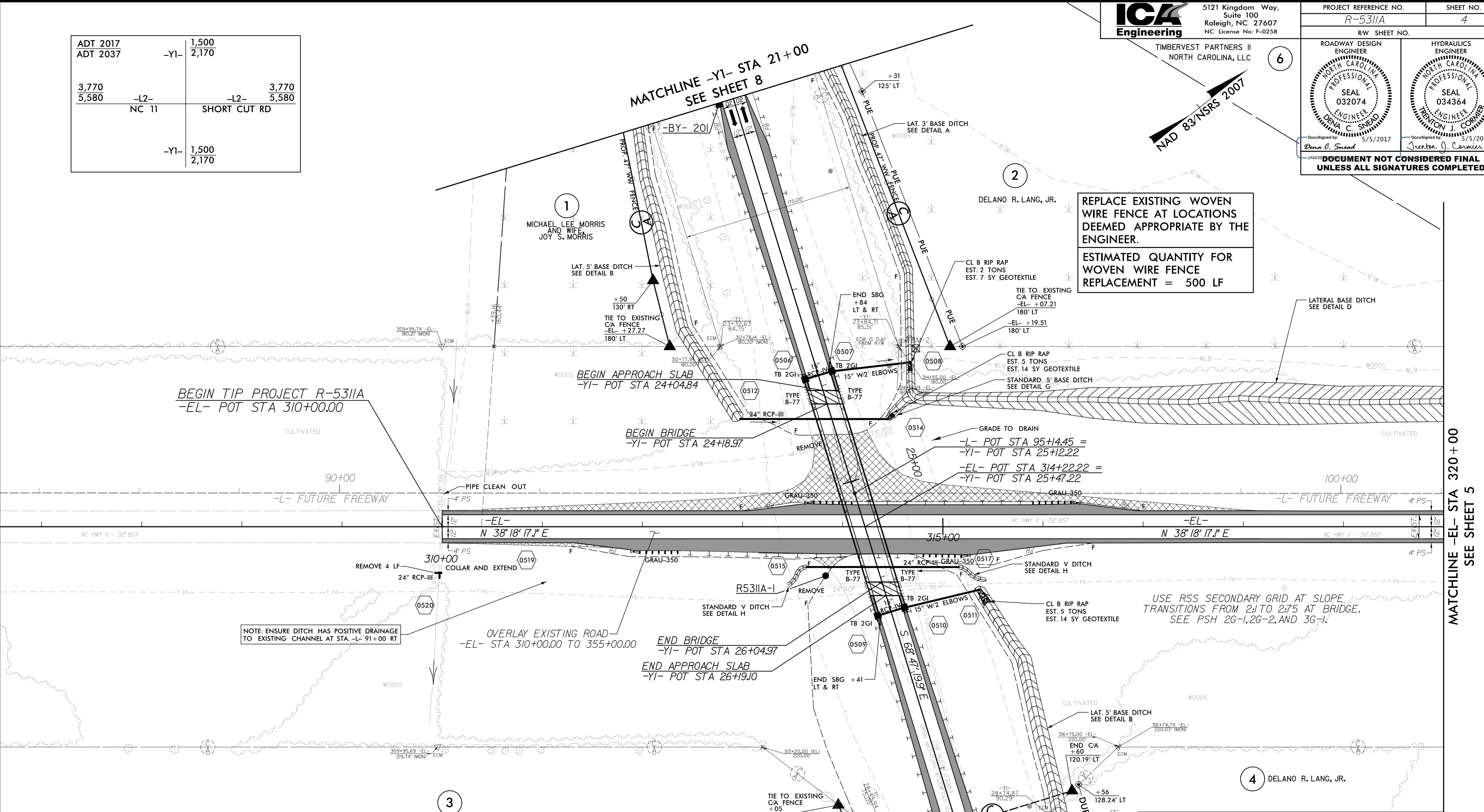
8/17/19

ADT 2017	-Y1-	1,500	
ADT 2037		2,170	
3,770	-L2-		3,770
5,580	NC 11		5,580
		SHORT CUT RD	
	-Y1-	1,500	
		2,170	

ICA Engineering
 5121 Kingdom Way,
 Suite 100
 Raleigh, NC 27607
 NC License No: F-0258

PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. 4
RW SHEET NO. 6	
ROADWAY DESIGN ENGINEER DENVA C. SNEYD SEAL 032074 5/5/2017	HYDRAULICS ENGINEER BREYTON J. CORRIER SEAL 034364 5/5/2017
<p>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</p>	

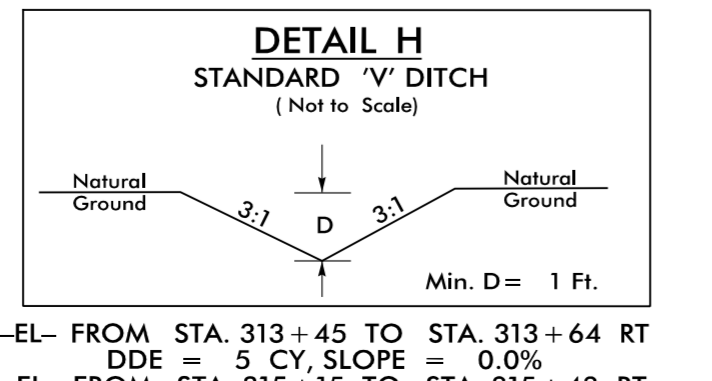
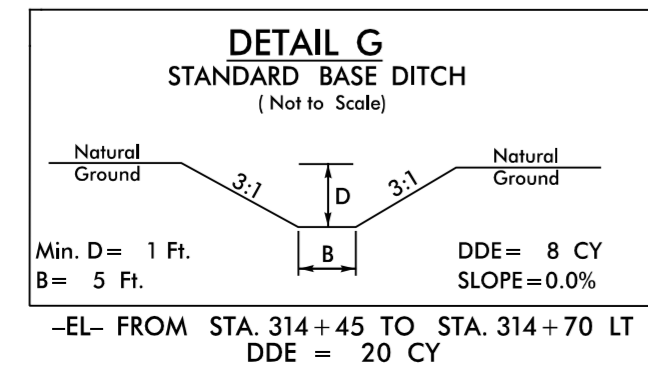
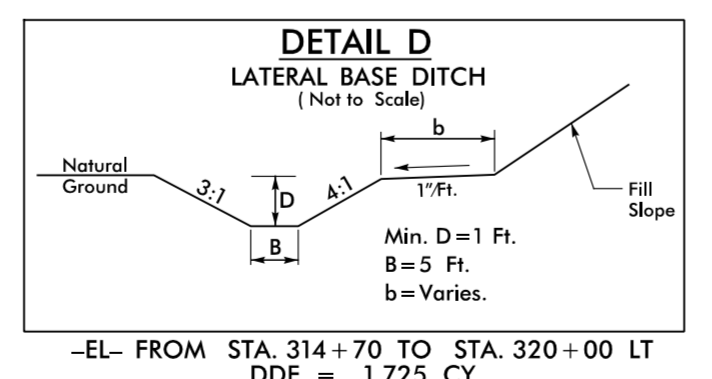
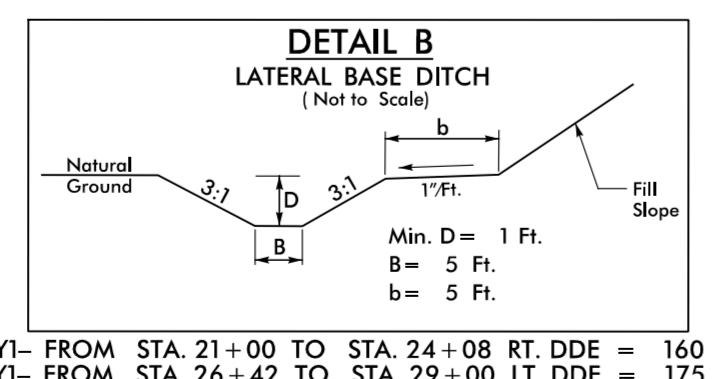
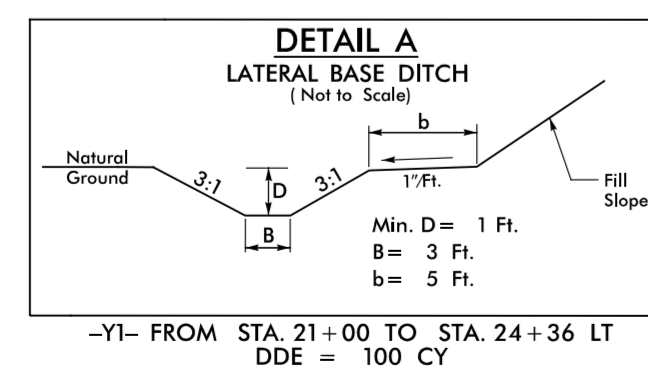
TIMBERVEST PARTNERS II
 NORTH CAROLINA, LLC
 NAD 83/NSRS 2007



REPLACE EXISTING WOVEN WIRE FENCE AT LOCATIONS DEEMED APPROPRIATE BY THE ENGINEER.
 ESTIMATED QUANTITY FOR WOVEN WIRE FENCE REPLACEMENT = 500 LF

USE RSS SECONDARY GRID AT SLOPE TRANSITIONS FROM 2:1 TO 2:75 AT BRIDGE. SEE PSH 2G-1, 2G-2, AND 3G-1.

NOTE: ENSURE DITCH HAS POSITIVE DRAINAGE TO EXISTING CHANNEL AT STA. -L- 91+00 RT



PAVEMENT REMOVAL

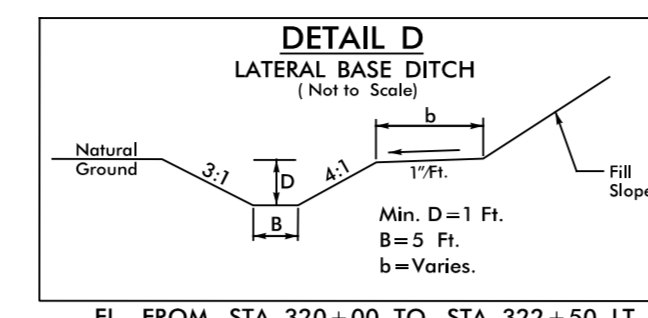
FOR -EL- PROFILE, SEE SHEET 12 & 13
 FOR -Y1- PROFILE, SEE SHEET 14 & 15
 FOR BRIDGE, SEE SHEET S01-1 TO S01-30
 FOR BRIDGE / PAVEMENT RELATIONSHIP SKETCH, SEE SHEET 2B-4

5/5/19 (R5311A) Roadway\Projects\Proo\NRS5311A-RDY_PSH_04.dgn
 TIA ENGINEERING INC.

8/17/19

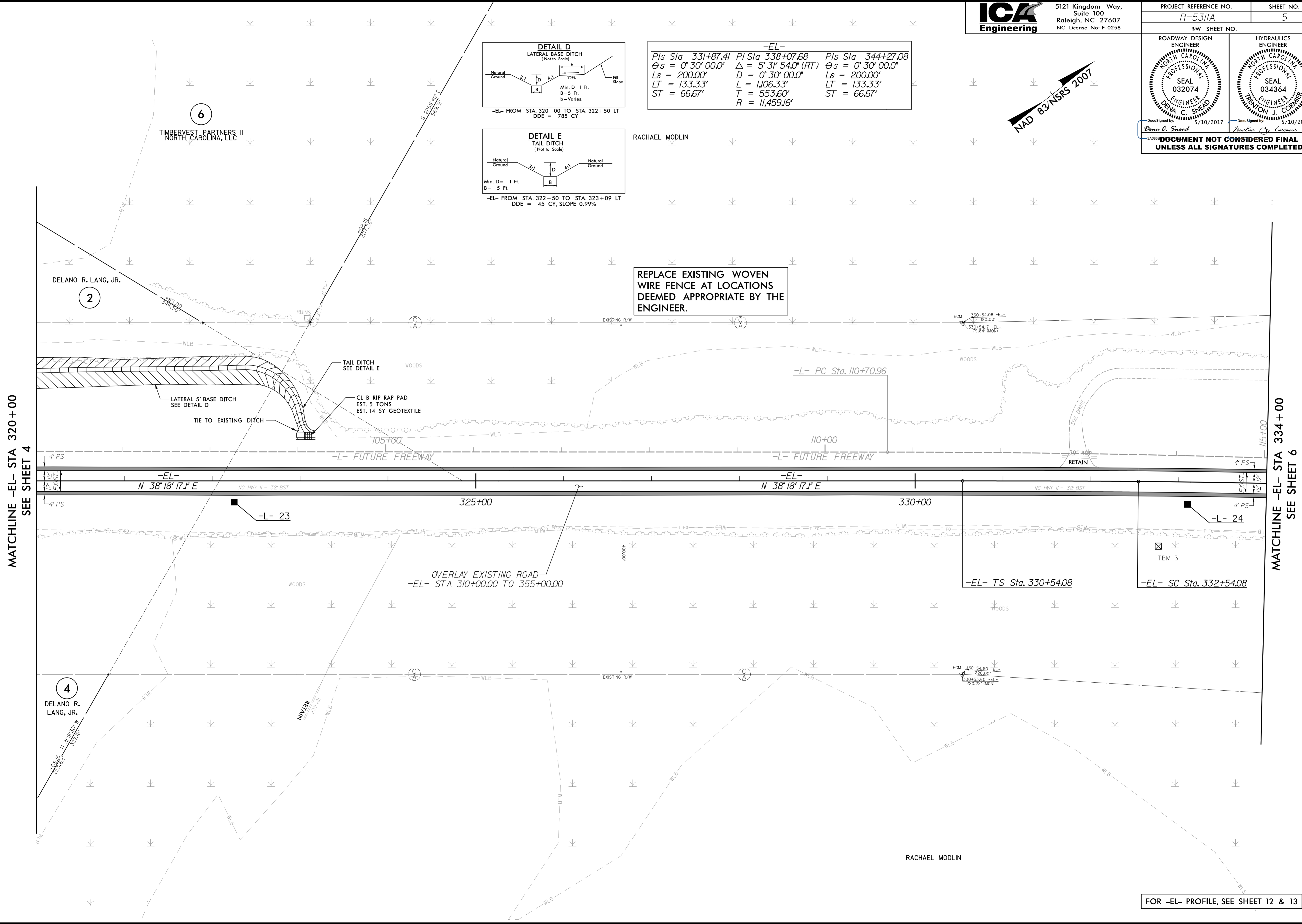
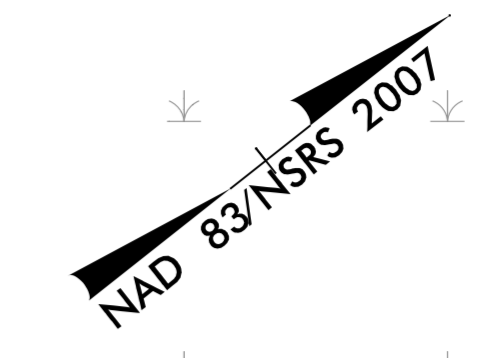
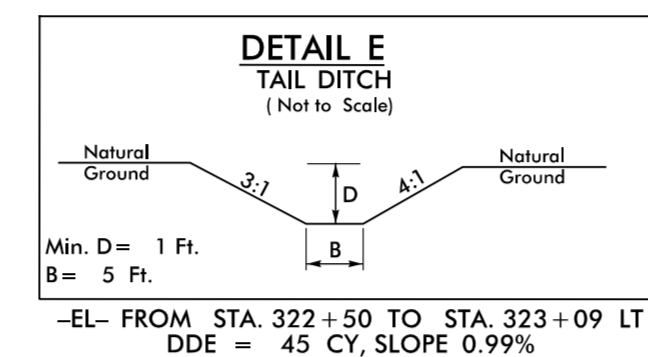
ICA Engineering
5121 Kingdom Way,
Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. 5
RW SHEET NO.	
ROADWAY DESIGN ENGINEER SEAL 032074 DENVA C. SNEED	HYDRAULICS ENGINEER SEAL 034364 DEVON J. CORNER
DocuSigned by: <i>Dena C. Sneed</i> 5/10/2017	DocuSigned by: <i>Devon J. Corner</i> 5/10/2017
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



-EL-

Pls Sta 331+87.41	PI Sta 338+07.68	Pls Sta 344+27.08
$\theta_s = 0^\circ 30' 00.0''$	$\Delta = 5^\circ 31' 54.0'' (RT)$	$\theta_s = 0^\circ 30' 00.0''$
$L_s = 200.00'$	$D = 0^\circ 30' 00.0''$	$L_s = 200.00'$
$LT = 133.33'$	$L = 1,106.33'$	$LT = 133.33'$
$ST = 66.67'$	$T = 553.60'$	$ST = 66.67'$
	$R = 11,459.16'$	



REPLACE EXISTING WOVEN WIRE FENCE AT LOCATIONS DEEMED APPROPRIATE BY THE ENGINEER.

MATCHLINE -EL- STA 320+00
SEE SHEET 4

MATCHLINE -EL- STA 334+00
SEE SHEET 6

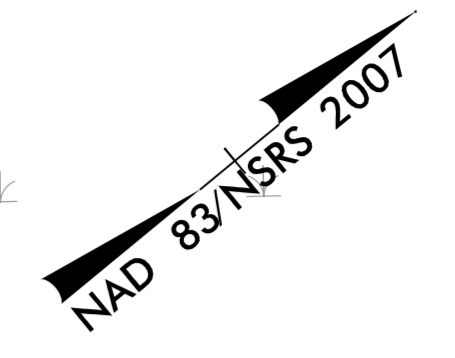
5/1/2017
P:\Projects\195311A_RDY_PSH_05.dgn
ICA ENGINEERING, INC.

FOR -EL- PROFILE, SEE SHEET 12 & 13

**DOCUMENT NOT CONSIDERED FINAL
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ROADWAY DESIGN ENGINEER
 DENA C. SNEAD
 SEAL 032074
 5/10/2017

HYDRAULICS ENGINEER
 JACOB J. CORNELL
 SEAL 034364
 5/10/2017



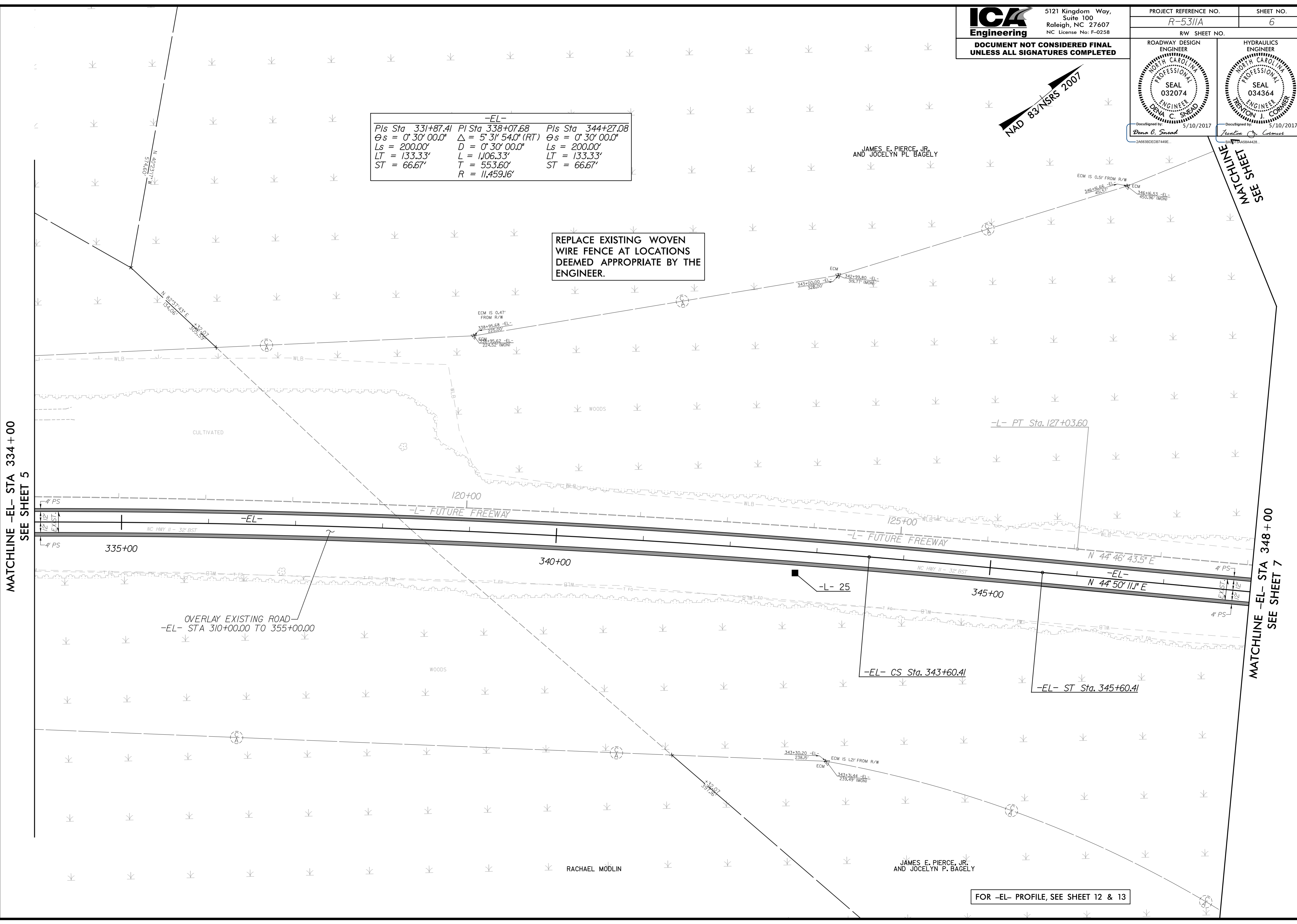
-EL-
 PIs Sta 331+87.41 PI Sta 338+07.68 PIs Sta 344+27.08
 $\theta_s = 0^\circ 30' 00.0''$ $\Delta = 5^\circ 31' 54.0''$ (RT) $\theta_s = 0^\circ 30' 00.0''$
 $L_s = 200.00'$ $D = 0^\circ 30' 00.0''$ $L_s = 200.00'$
 $LT = 133.33'$ $L = 1,106.33'$ $LT = 133.33'$
 $ST = 66.67'$ $T = 553.60'$ $ST = 66.67'$
 $R = 11,459.16'$

JAMES E. PIERCE, JR.
AND JOCELYN PL BAGELY

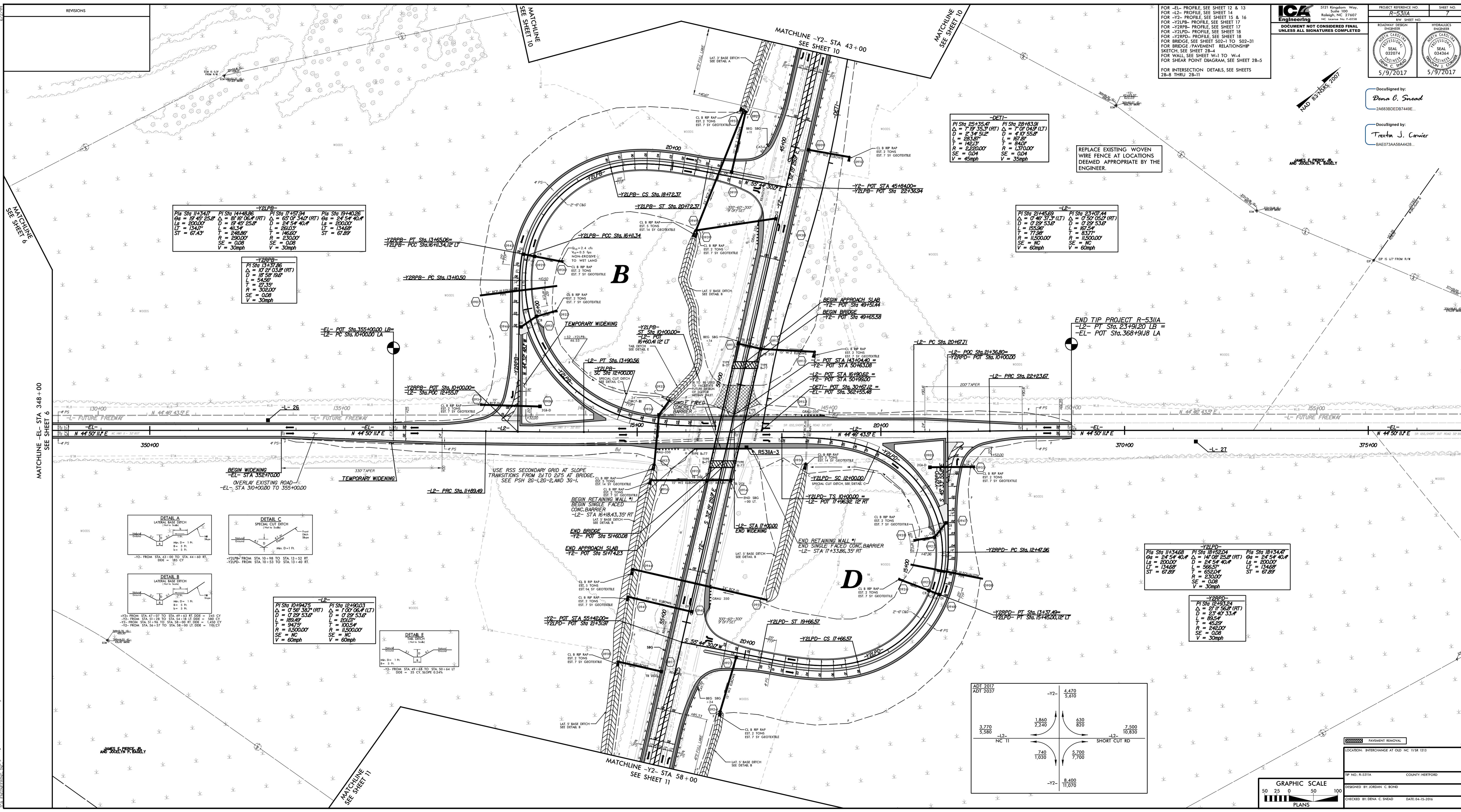
REPLACE EXISTING WOVEN
 WIRE FENCE AT LOCATIONS
 DEEMED APPROPRIATE BY THE
 ENGINEER.

MATCHLINE -EL- STA 334+00
SEE SHEET 5

MATCHLINE -EL- STA 348+00
SEE SHEET 7



FOR -EL- PROFILE, SEE SHEET 12 & 13



ICM Engineering
 3701 Kingsway, Weymouth, MA 01978
 (508) 853-2000
 www.icm-engineering.com

PROJECT REFERENCE NO: R-531A
 SHEET NO: 7

FOR -EL- PROFILE SEE SHEET 12 & 13
 FOR -L2- PROFILE SEE SHEET 14
 FOR -Y2- PROFILE SEE SHEET 15 & 16
 FOR -Y2PB- PROFILE SEE SHEET 17
 FOR -Y2LPD- PROFILE SEE SHEET 18
 FOR BRIDGE SEE SHEET 502-1 TO 502-31
 FOR BRIDGE PAVEMENT RELATIONSHIP SKETCH SEE SHEET 28-4
 FOR WALL SEE SHEET W-1 TO W-4
 FOR SHEAR POINT DIAGRAM SEE SHEET 28-5
 FOR INTERSECTION DETAILS SEE SHEETS 28-8 THRU 28-11

PROFESSIONAL ENGINEER
 SEAL 032074
 5/9/2017

PROFESSIONAL ENGINEER
 SEAL 034364
 5/9/2017

DocuSigned by:
Dena C. Sneed
 2A8A3BDE8744E

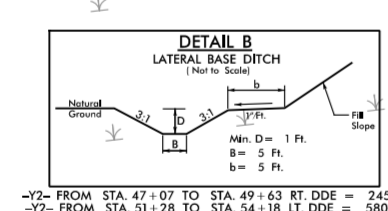
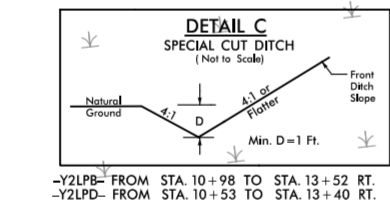
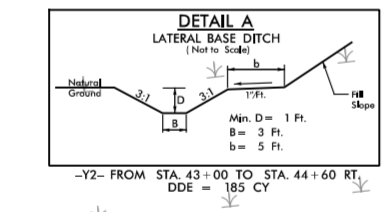
DocuSigned by:
Trenton J. Corvair
 BA6073AAS8A4426

PI Sta 11+34.17	PI Sta 14+48.29	PI Sta 17+52.34	PI Sta 19+40.25
Δ = 27° 45' 25.8"	Δ = 19° 45' 25.8"	Δ = 63° 0' 34.0" (RT)	Δ = 24° 54' 40.4"
D = 200.00'	D = 283.8'	D = 283.8'	D = 200.00'
L = 134.08'	L = 142.1'	L = 283.8'	L = 134.08'
T = 67.43'	T = 77.98'	T = 142.1'	T = 67.89'
R = 230.00'	R = 1,370.00'	R = 1,370.00'	R = 230.00'
SE = 0.04	SE = 0.04	SE = 0.04	SE = 0.04
V = 30mph	V = 30mph	V = 30mph	V = 30mph

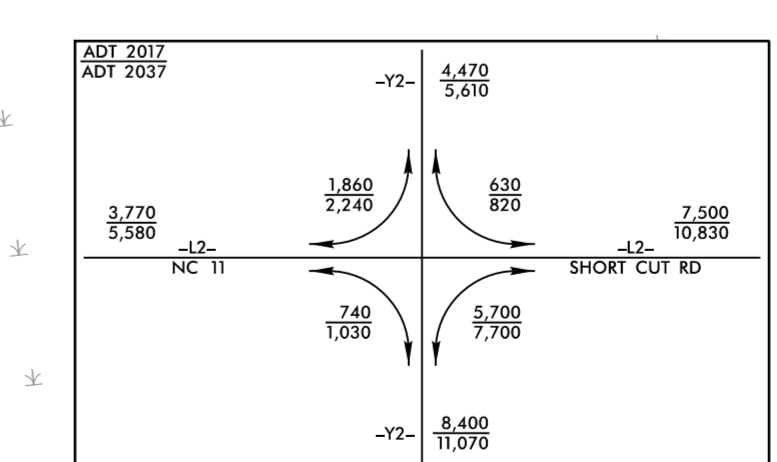
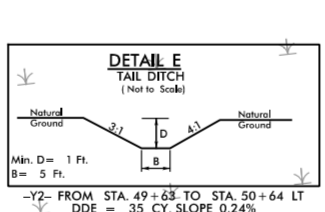
PI Sta 13+17.86	PI Sta 17+52.34
Δ = 17° 01' 03.8" (RT)	Δ = 63° 0' 34.0" (RT)
D = 165.8'	D = 283.8'
L = 83.5'	L = 142.1'
T = 41.75'	T = 77.98'
R = 302.00'	R = 1,370.00'
SE = 0.04	SE = 0.04
V = 30mph	V = 30mph

PI Sta 25+35.47	PI Sta 28+63.31
Δ = 7° 19' 35.3" (RT)	Δ = 7° 0' 04.9" (LT)
D = 283.8'	D = 167.8'
L = 142.1'	L = 84.0'
T = 77.98'	T = 42.00'
R = 2,220.00'	R = 1,370.00'
SE = 0.04	SE = 0.04
V = 45mph	V = 35mph

PI Sta 21+45.69	PI Sta 23+01.44
Δ = 0° 42' 31.3" (LT)	Δ = 0° 52' 53.6" (RT)
D = 0° 52' 53.6"	D = 0° 52' 53.6"
L = 65.56'	L = 67.54'
T = 32.78'	T = 33.77'
R = 11,500.00'	R = 11,500.00'
SE = NC	SE = NC
V = 60mph	V = 60mph



PI Sta 10+94.75	PI Sta 12+80.03
Δ = 0° 58' 30.7" (RT)	Δ = 1° 00' 06.4" (LT)
D = 0° 58' 30.7"	D = 0° 58' 30.7"
L = 189.49'	L = 201.0'
T = 94.75'	T = 100.5'
R = 11,500.00'	R = 11,500.00'
SE = NC	SE = NC
V = 60mph	V = 60mph





GRAPHIC SCALE
 50 25 0 50 100
 PLANS

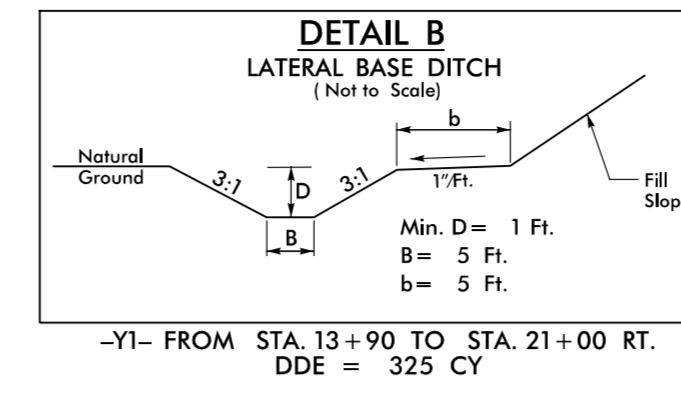
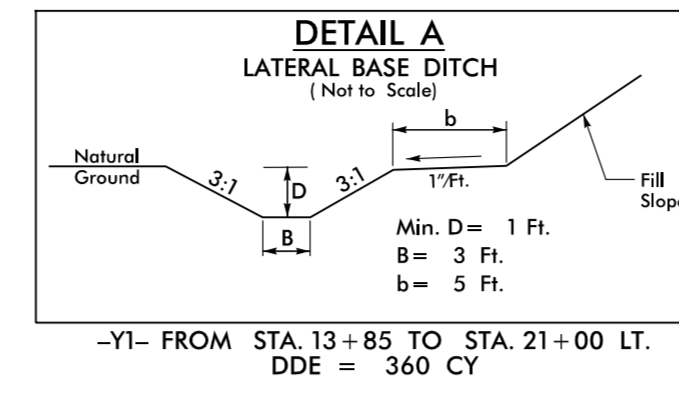
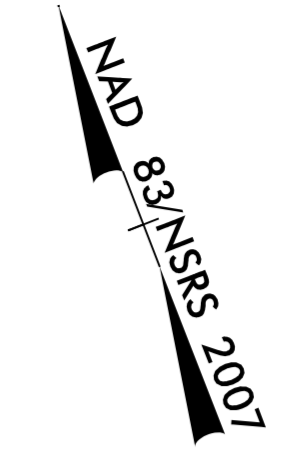
LOCATION: INTERCHANGE AT OLD NC 1918 1913

PROJECT NO: R-531A COUNTY: HERTFORD

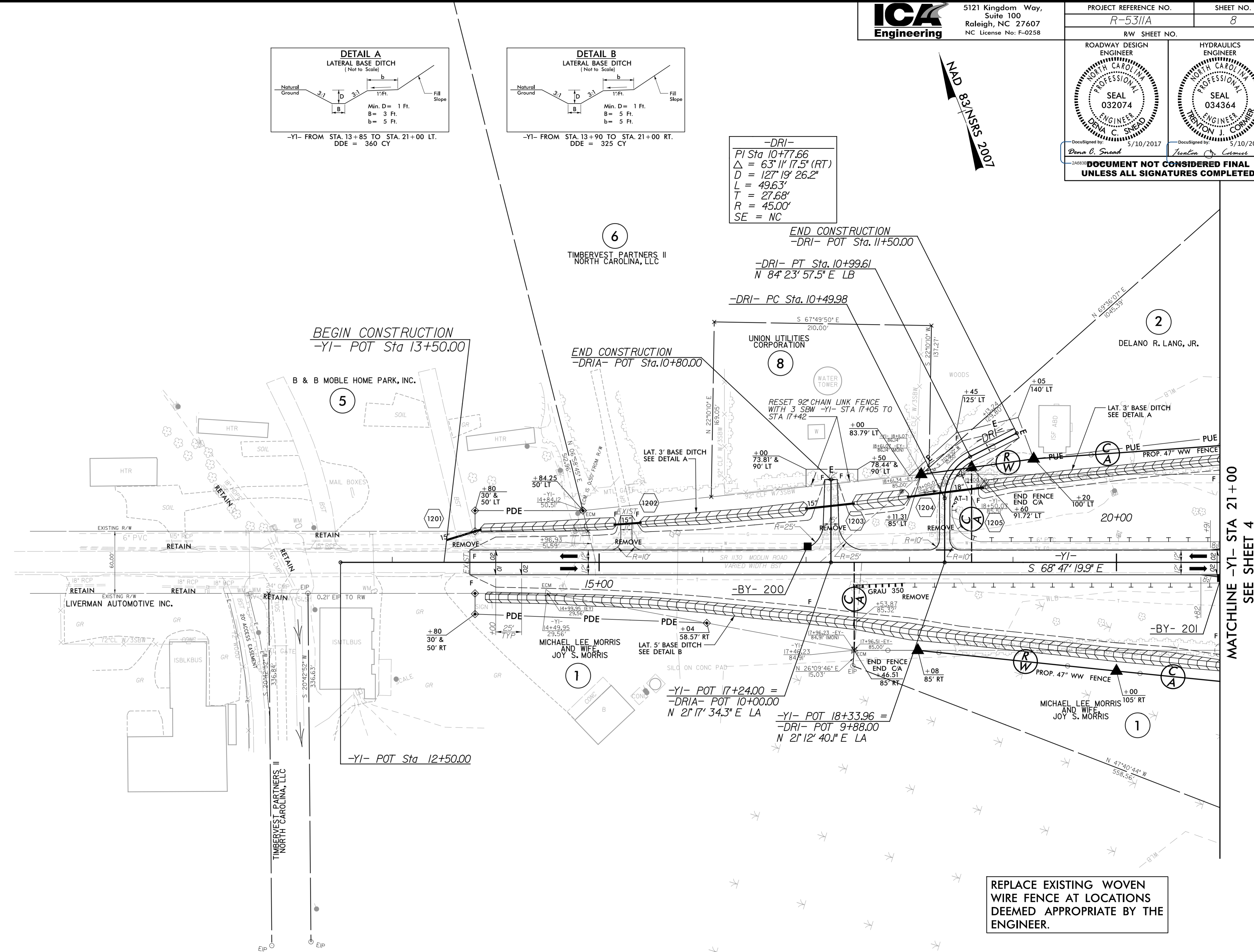
DESIGNED BY: JORDAN C. BOND

CHECKED BY: DENA C. SNEAD DATE: 04.15.2016

PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. 8
RW SHEET NO.	
ROADWAY DESIGN ENGINEER  Dena C. Sneed 5/10/2017	HYDRAULICS ENGINEER  Brenton J. Cormier 5/10/2017
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



-DRI-
 PI Sta 10+77.66
 $\Delta = 63^\circ 11' 17.5''$ (RT)
 D = 127' 19" 26.2"
 L = 49.63'
 T = 27.68'
 R = 45.00'
 SE = NC



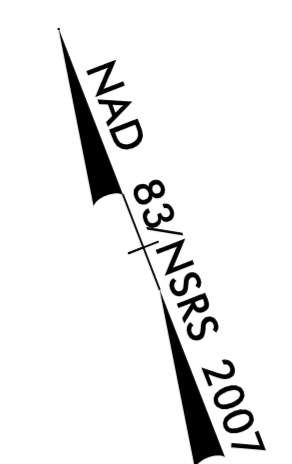
REVISIONS

MATCHLINE -YI- STA 21+00
SEE SHEET 4

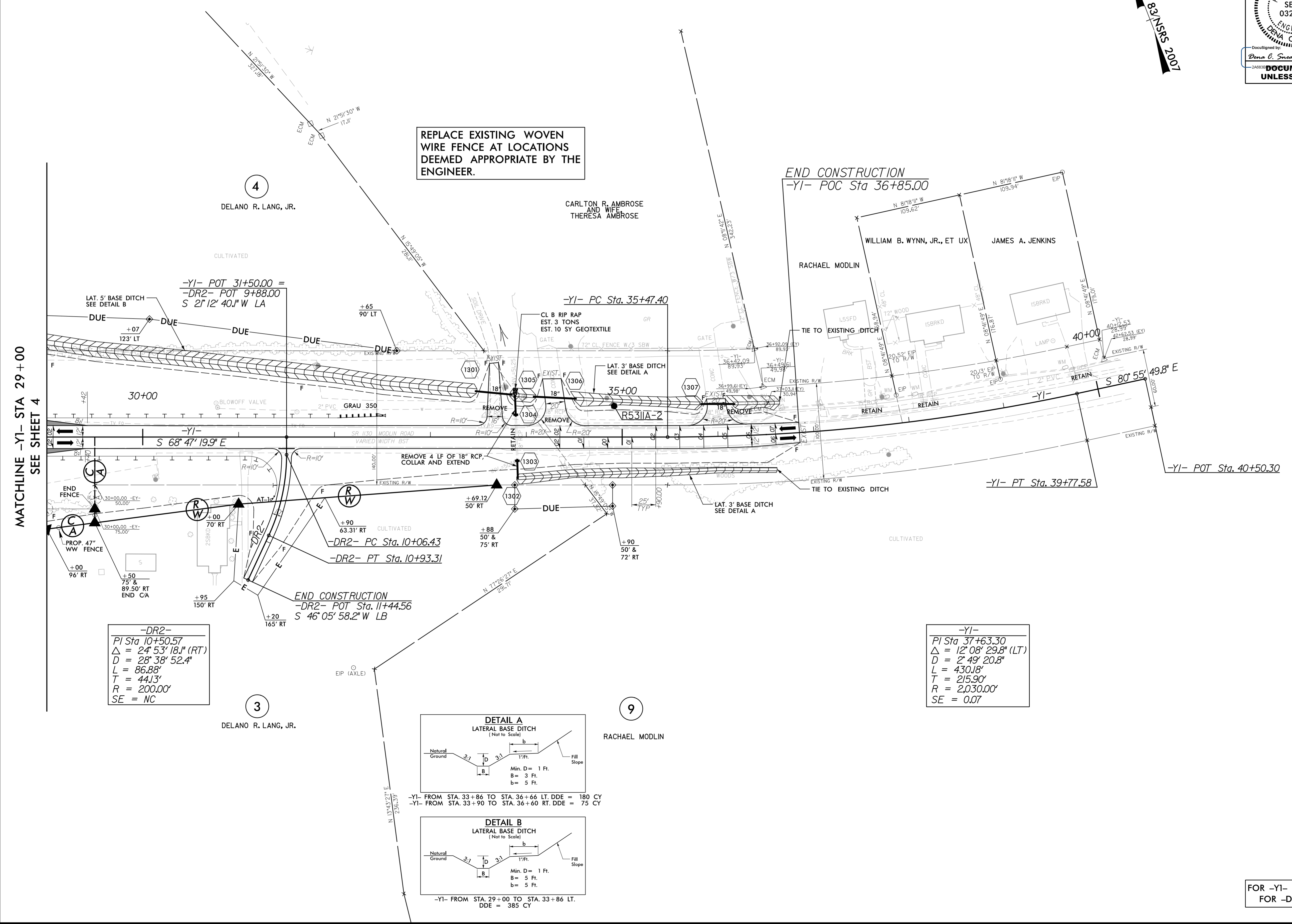
REPLACE EXISTING WOVEN WIRE FENCE AT LOCATIONS DEEMED APPROPRIATE BY THE ENGINEER.

FOR -YI- PROFILE, SEE SHEETS 14 & 15
 FOR -DRI- PROFILE, SEE SHEET 19
 FOR -DRIA- PROFILE, SEE SHEET 18

PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. 9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER DENNA C. SNEED SEAL 032074 NORTH CAROLINA PROFESSIONAL ENGINEER	HYDRAULICS ENGINEER BREYTON J. CORNER SEAL 034364 NORTH CAROLINA PROFESSIONAL ENGINEER
DocuSigned by: <i>Denne C. Sneed</i> 5/10/2017	DocuSigned by: <i>Breyton J. Corner</i> 5/10/2017
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



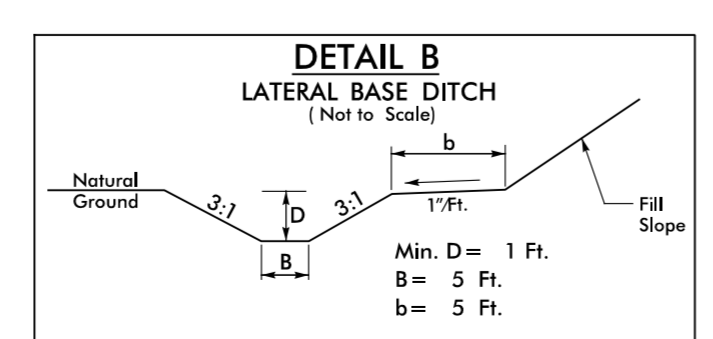
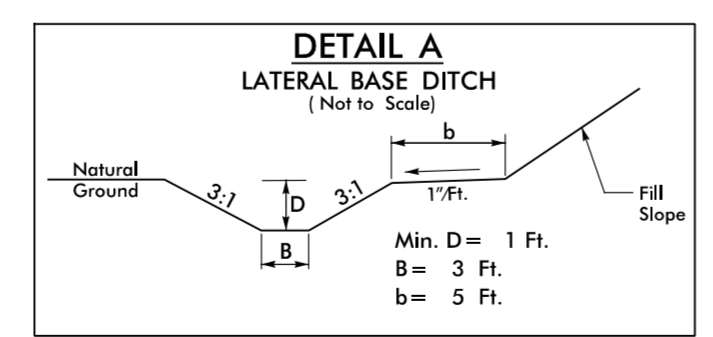
REPLACE EXISTING WOVEN WIRE FENCE AT LOCATIONS DEEMED APPROPRIATE BY THE ENGINEER.



MATCHLINE -Y1- STA 29+00
SEE SHEET 4

-DR2-
PI Sta 10+50.57
 $\Delta = 24' 53'' 18.1''$ (RT)
D = 28' 38'' 52.4"
L = 86.88'
T = 44.13'
R = 200.00'
SE = NC

-Y1-
PI Sta 37+63.30
 $\Delta = 12' 08'' 29.8''$ (LT)
D = 2' 49'' 20.8"
L = 430.18'
T = 215.90'
R = 2,030.00'
SE = 0.07



-Y1- FROM STA. 33+86 TO STA. 36+66 LT. DDE = 180 CY
-Y1- FROM STA. 33+90 TO STA. 36+60 RT. DDE = 75 CY

-Y1- FROM STA. 29+00 TO STA. 33+86 LT.
DDE = 385 CY

8/17/09

5/1/2017
P:\Projects\11A\11A-RDY_PSH_09.dgn

FOR -Y1- PROFILE, SEE SHEETS 14 & 15
FOR -DR2- PROFILE, SEE SHEET 19

RW SHEET NO.

ROADWAY DESIGN ENGINEER
DENNA C. SNEED
SEAL 032074
NORTH CAROLINA PROFESSIONAL ENGINEER

HYDRAULICS ENGINEER
BREYTON J. CORNER
SEAL 034364
NORTH CAROLINA PROFESSIONAL ENGINEER

DocuSigned by:
Denna C. Sneed 5/10/2017

DocuSigned by:
Breyton J. Corner 5/10/2017

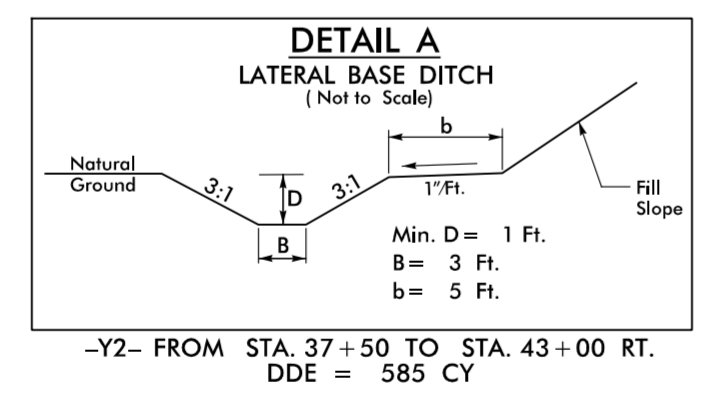
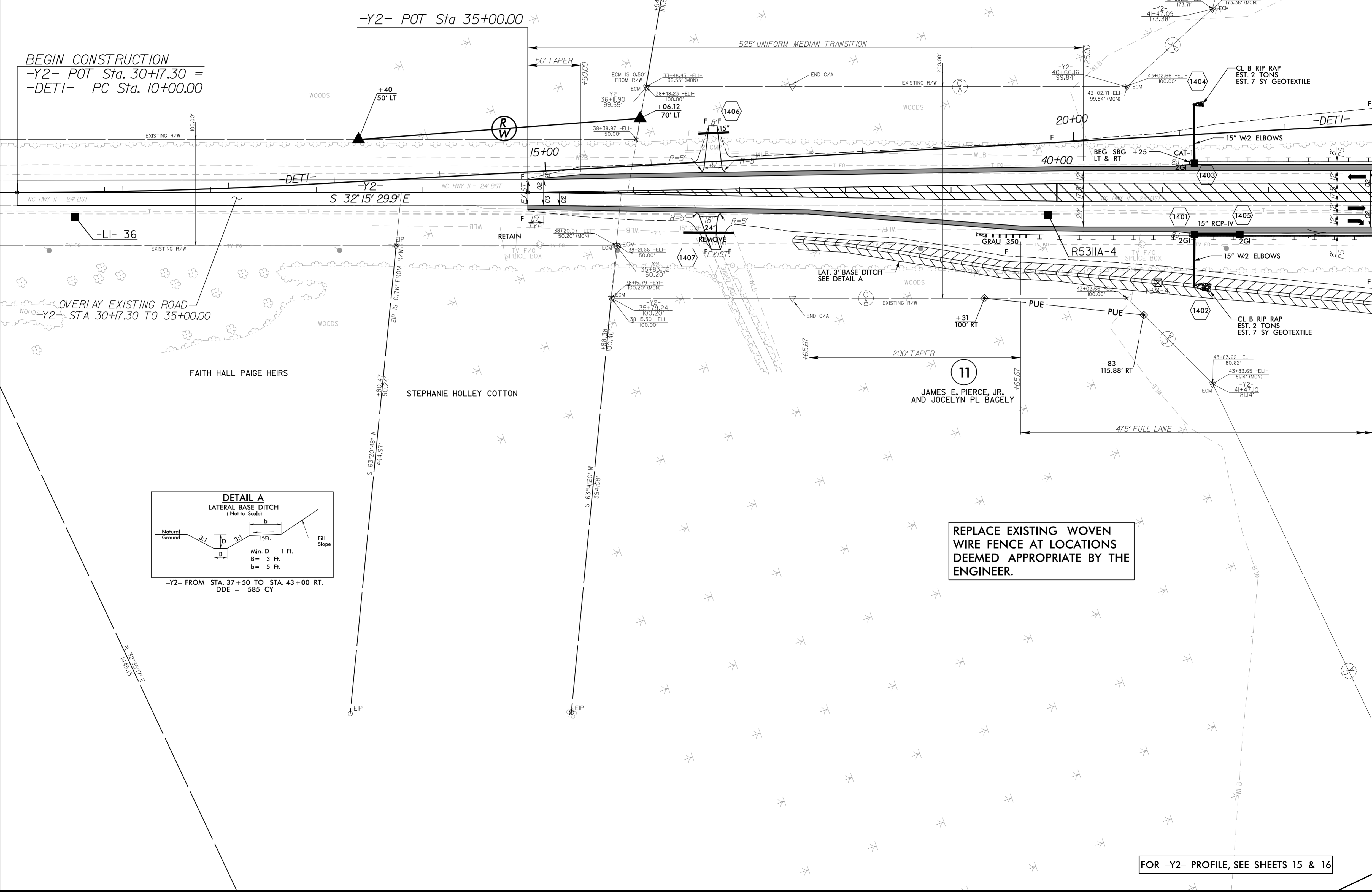
-DETI-
 PI Sta 11+38.30
 $\Delta = 3^{\circ}12'49.4"$ (LT)
 $D = 1^{\circ}09'43.9"$
 $L = 276.52'$
 $T = 138.30'$
 $R = 4,930.00'$
 $SE = 0.02$
 $V = 45\text{mph}$

10
 HORACE & BARBARA WARD

JAMES E. PIERCE, JR.
 AND JOCELYN PL BAGELY

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 UNLESS ALL SIGNATURES COMPLETED**

NAD 83/NSRS 2007



REPLACE EXISTING WOVEN WIRE FENCE AT LOCATIONS DEEMED APPROPRIATE BY THE ENGINEER.

FOR -Y2- PROFILE, SEE SHEETS 15 & 16

MATCHLINE -Y2- STA 43+00
 SEE SHEET 7

MATCHLINE
 SEE SHEET 7

MATCHLINE
 SEE SHEET 7

8/17/19

5/10/2017
 P:\Projects\19\1905311A_RDY_PSH_10.dgn
 ICA ENGINEERING, INC.

8/17/19

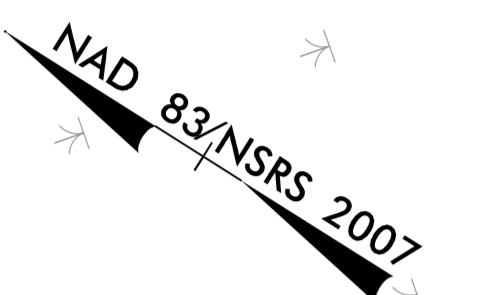
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D:\ENGINEERING\IN

PRESTON WOOD
MANUFACTURED HOMES, INC.

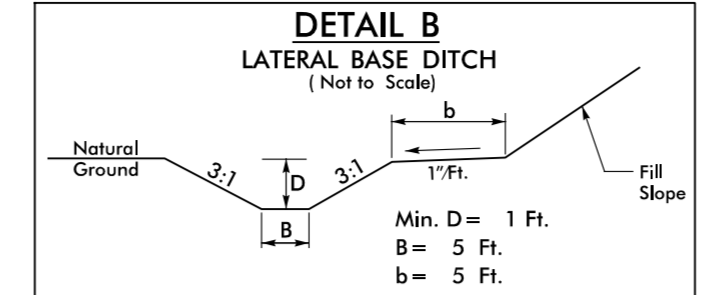
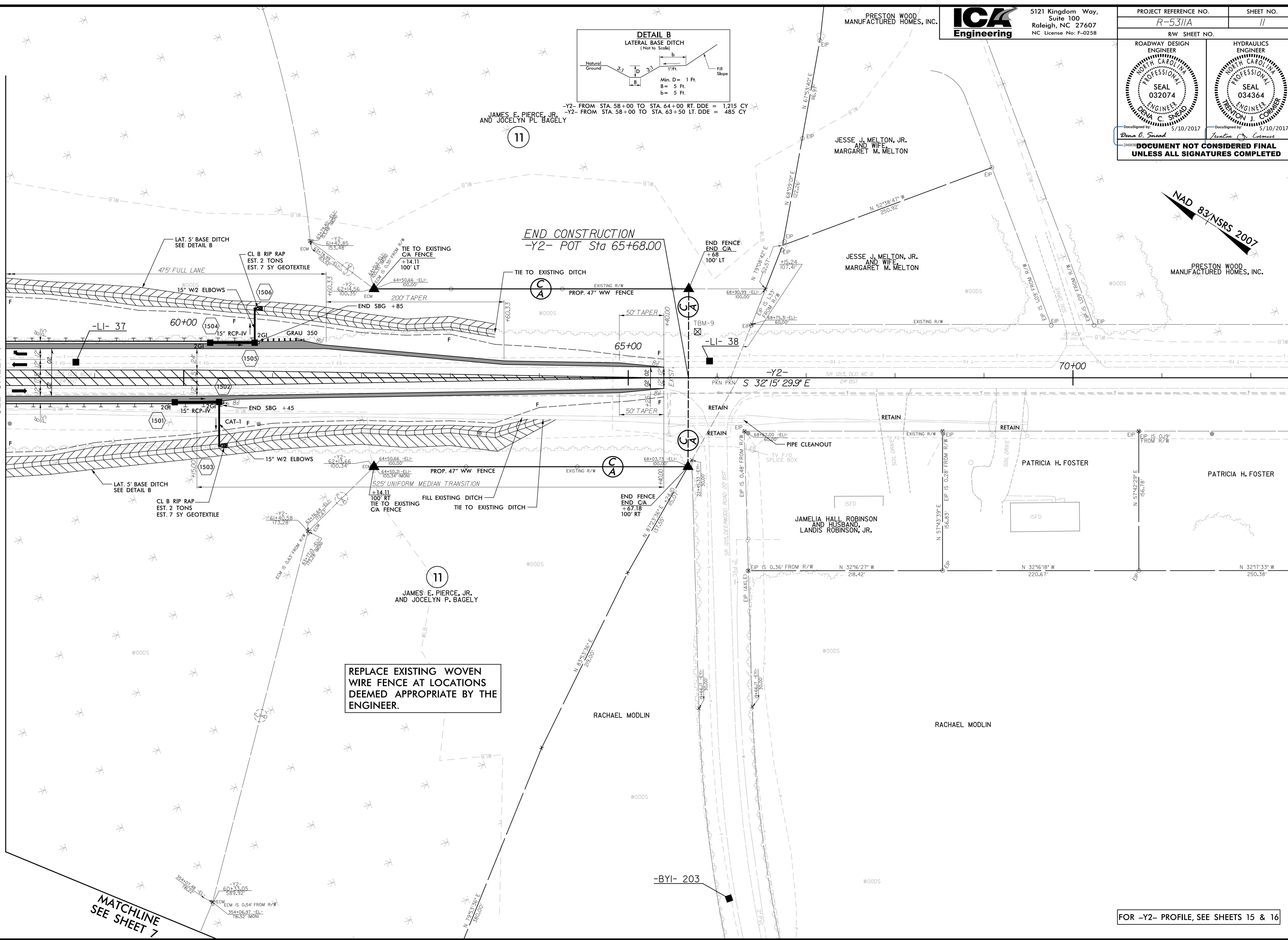


5121 Kingdom Way,
Suite 100
Raleigh, NC 27607
NC License No: F-0258

PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. <i>11</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER
DocuSigned by: <i>Denia C. Sneed</i> 5/10/2017	DocuSigned by: <i>Brenton J. Corrier</i> 5/10/2017
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



MATCHLINE -Y2- STA 58+00
SEE SHEET 7



JAMES E. PIERCE, JR.
AND JOCELYN P. BAGELY

-Y2- FROM STA. 58+00 TO STA. 64+00 RT. DDE = 1,215 CY
-Y2- FROM STA. 58+00 TO STA. 63+50 LT. DDE = 485 CY

END CONSTRUCTION
-Y2- POT Sta 65+68.00

REPLACE EXISTING WOVEN
WIRE FENCE AT LOCATIONS
DEEMED APPROPRIATE BY THE
ENGINEER.

MATCHLINE
SEE SHEET 7

FOR -Y2- PROFILE, SEE SHEETS 15 & 16

5/28/17

-EL-

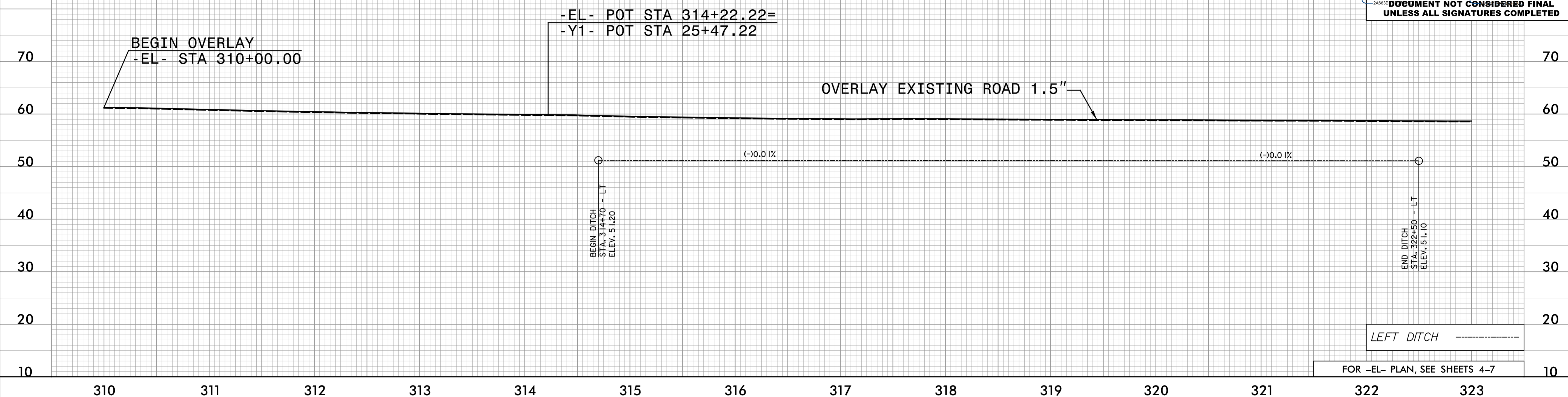


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Suite 100
Raleigh, NC 27607
NC License No: F-0258

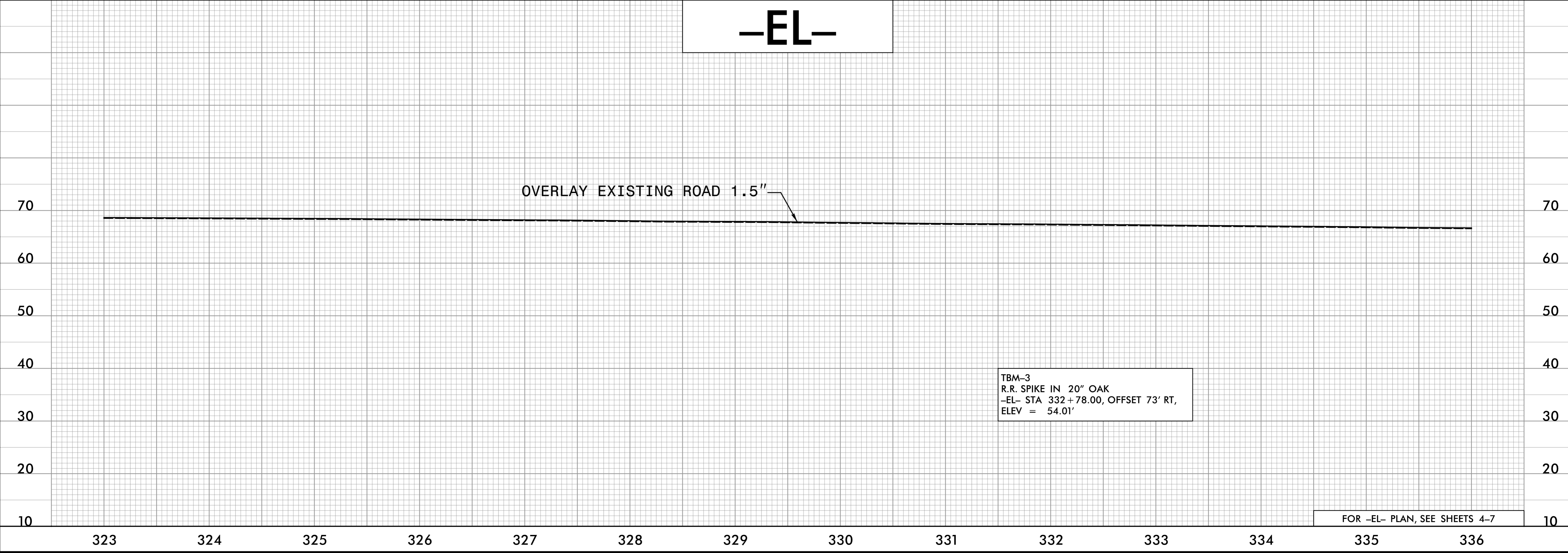
PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. <i>12</i>
ROADWAY DESIGN ENGINEER <i>DENA C. SNEAD</i>	HYDRAULICS ENGINEER <i>TRACON O. COMBES</i>
PROFESSIONAL SEAL 032074 DENY C. SNEAD	PROFESSIONAL SEAL 034364 TRACON O. COMBES
DocuSigned by: <i>Dena C. Snoad</i> 5/10/2017	DocuSigned by: <i>Tracoon O. Combes</i> 5/10/2017

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

TBM-2
R.R. SPIKE IN 14" PINE
-EL- STA 314+73.00, OFFSET 178' LT,
ELEV = 55.41'



-EL-



TBM-3
R.R. SPIKE IN 20" OAK
-EL- STA 332+78.00, OFFSET 73' RT,
ELEV = 54.01'

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FOR -EL- PLAN, SEE SHEETS 4-7

FOR -EL- PLAN, SEE SHEETS 4-7

5/28/17

-EL-



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PROJECT REFERENCE NO. <i>R-5311A</i>		SHEET NO. <i>13</i>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
DocuSigned by: <i>Dena C. Sneed</i> 5/10/2017	DocuSigned by: <i>Devon J. Corbett</i> 5/10/2017	
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FOR -EL- PLAN, SEE SHEETS 4-7

-EL-



END OVERLAY
 -EL- STA 355+00.00 =
 -L2- STA 10+00.00

FOR -EL- PLAN, SEE SHEETS 4-7

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5/28/17

-L2-



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PROJECT REFERENCE NO. R-5311A	SHEET NO. 14
ROADWAY DESIGN ENGINEER SEAL 032074 DENA C. SMOAD	HYDRAULICS ENGINEER SEAL 034364 DEVON C. CORNER
DocuSigned by: Dena C. Smoad 5/10/2017	DocuSigned by: Devon C. Corner 5/10/2017

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PIPE HYDRAULIC DATA
24" RCP STA 15+41 -L2-

DRAINAGE AREA	= 10	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 16	CFS
DESIGN HW ELEVATION	= 47.8	FT
100 YEAR DISCHARGE	= 19	CFS
100 YEAR HW ELEVATION	= 48.3	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 23	CFS
OVERTOPPING ELEVATION	= 51.3	FT

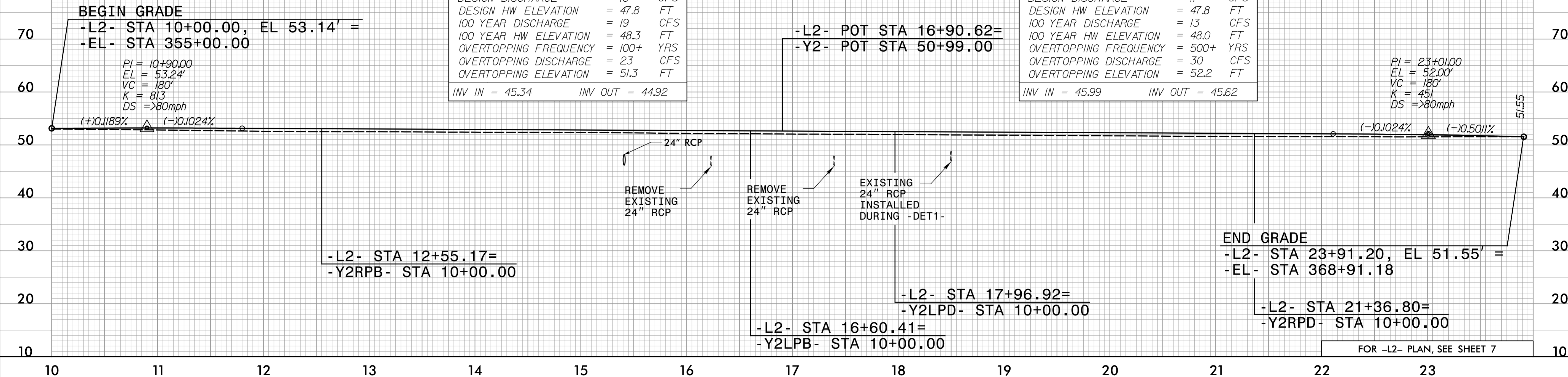
INV IN = 45.34 INV OUT = 44.92

PIPE HYDRAULIC DATA
EXISTING 24" RCP STA 18+50 -L2-

DRAINAGE AREA	= 10	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 11	CFS
DESIGN HW ELEVATION	= 47.8	FT
100 YEAR DISCHARGE	= 13	CFS
100 YEAR HW ELEVATION	= 48.0	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 30	CFS
OVERTOPPING ELEVATION	= 52.2	FT

INV IN = 45.99 INV OUT = 45.62

PI	= 23+01.00
EL	= 52.00'
VC	= 180'
K	= 45'
DS	= >80mph



FOR -L2- PLAN, SEE SHEET 7

-Y1-

PIPE HYDRAULIC DATA
24" RCP STA 24+35 -Y1-

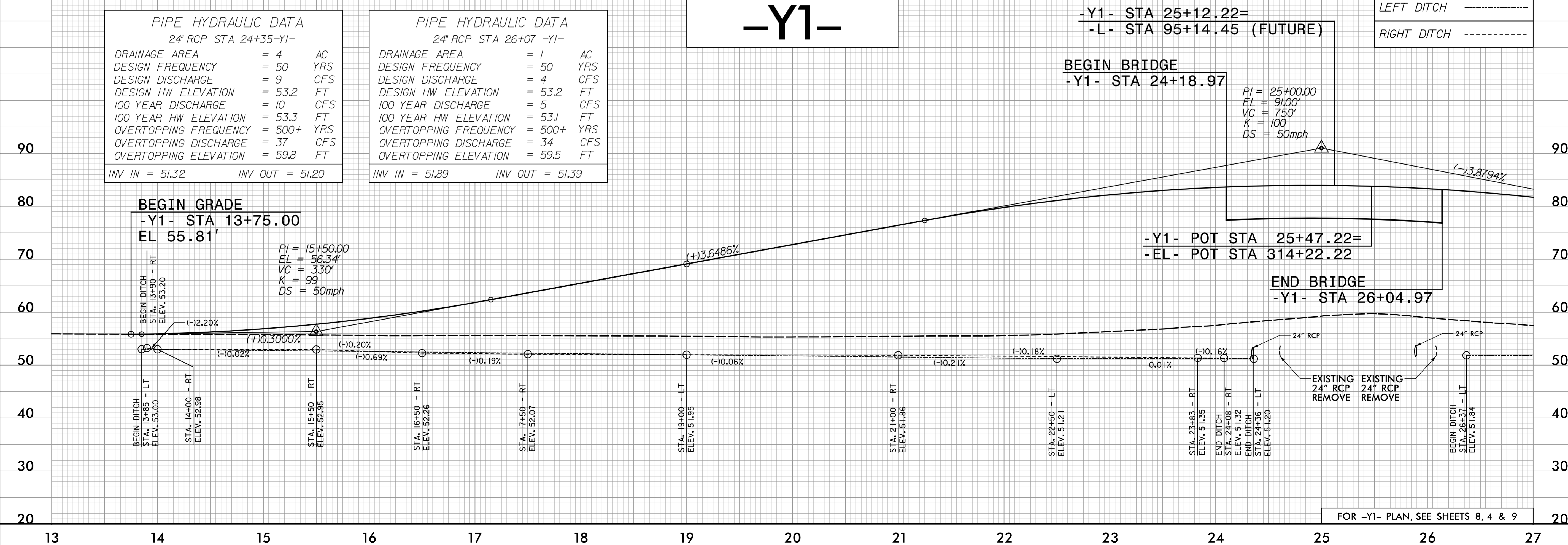
DRAINAGE AREA	= 4	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 9	CFS
DESIGN HW ELEVATION	= 53.2	FT
100 YEAR DISCHARGE	= 10	CFS
100 YEAR HW ELEVATION	= 53.3	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 37	CFS
OVERTOPPING ELEVATION	= 59.8	FT

INV IN = 51.32 INV OUT = 51.20

PIPE HYDRAULIC DATA
24" RCP STA 26+07 -Y1-

DRAINAGE AREA	= 1	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 4	CFS
DESIGN HW ELEVATION	= 53.2	FT
100 YEAR DISCHARGE	= 5	CFS
100 YEAR HW ELEVATION	= 53.1	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 34	CFS
OVERTOPPING ELEVATION	= 59.5	FT

INV IN = 51.89 INV OUT = 51.39




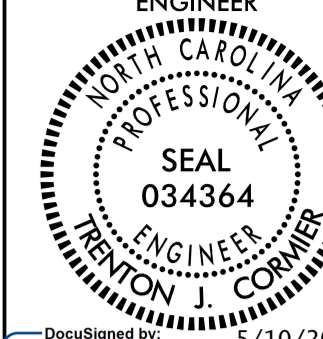
FOR -Y1- PLAN, SEE SHEETS 8, 4 & 9

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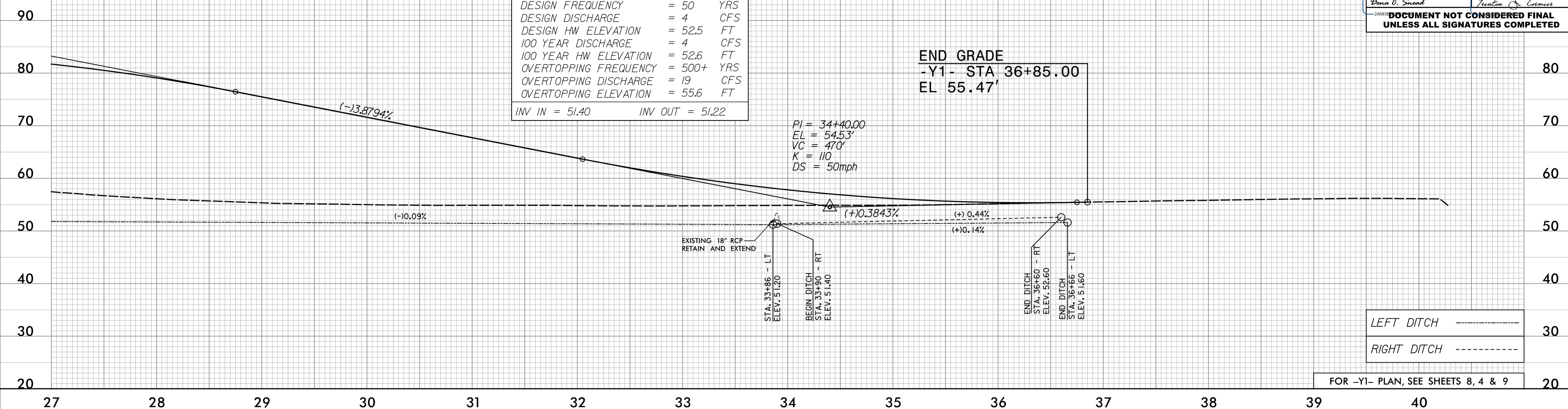
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-Y1-

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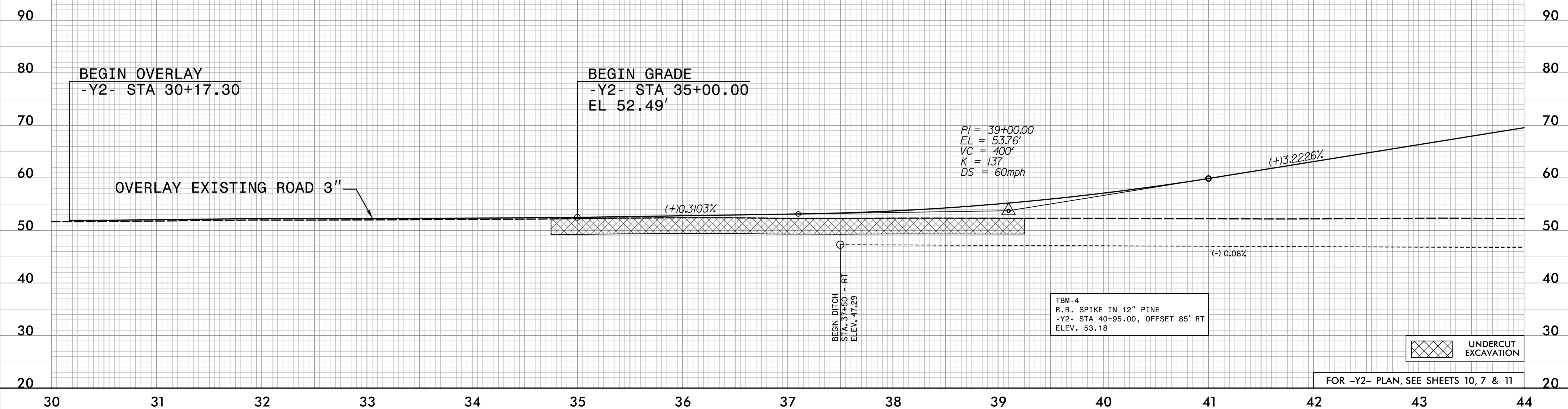
PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. <i>15</i>
ROADWAY DESIGN ENGINEER <i>Dena C. Sneed</i>	HYDRAULICS ENGINEER <i>Jonathan O. Colwell</i>
 Dena C. Sneed 5/10/2017	 Jonathan O. Colwell 5/10/2017
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PIPE HYDRAULIC DATA	
18" RCP STA 33+90 -Y1-	
DRAINAGE AREA	= 1 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 4 CFS
DESIGN HW ELEVATION	= 52.5 FT
100 YEAR DISCHARGE	= 4 CFS
100 YEAR HW ELEVATION	= 52.6 FT
OVERTOPPING FREQUENCY	= 500+ YRS
OVERTOPPING DISCHARGE	= 19 CFS
OVERTOPPING ELEVATION	= 55.6 FT
INV IN	= 51.40
INV OUT	= 51.22



FOR -Y1- PLAN, SEE SHEETS 8, 4 & 9

-Y2-



FOR -Y2- PLAN, SEE SHEETS 10, 7 & 11

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5/28/17

-Y2-

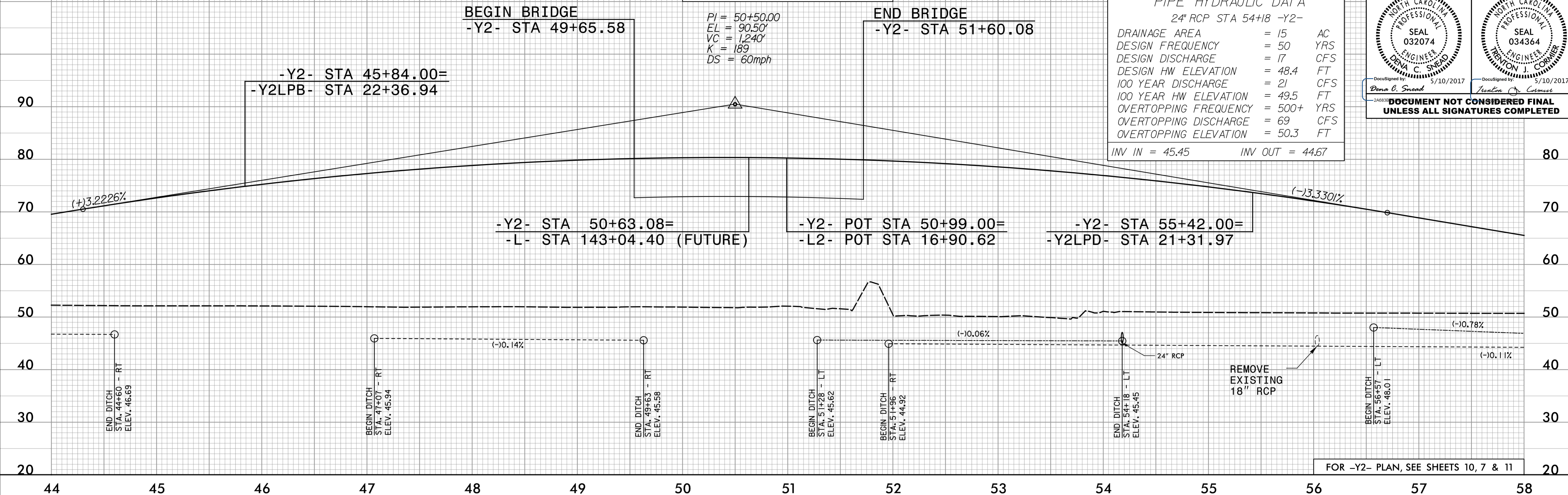
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PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. <i>16</i>
ROADWAY DESIGN ENGINEER <i>Dena C. Sneed</i>	HYDRAULICS ENGINEER <i>Jonathan O. Colmest</i>
SEAL 032074 NORTH CAROLINA PROFESSIONAL ENGINEER DENA C. SNEED	SEAL 034364 NORTH CAROLINA PROFESSIONAL ENGINEER JONATHAN O. COLMEST
DocuSigned by: <i>Dena C. Sneed</i> 5/10/2017	DocuSigned by: <i>Jonathan O. Colmest</i> 5/10/2017

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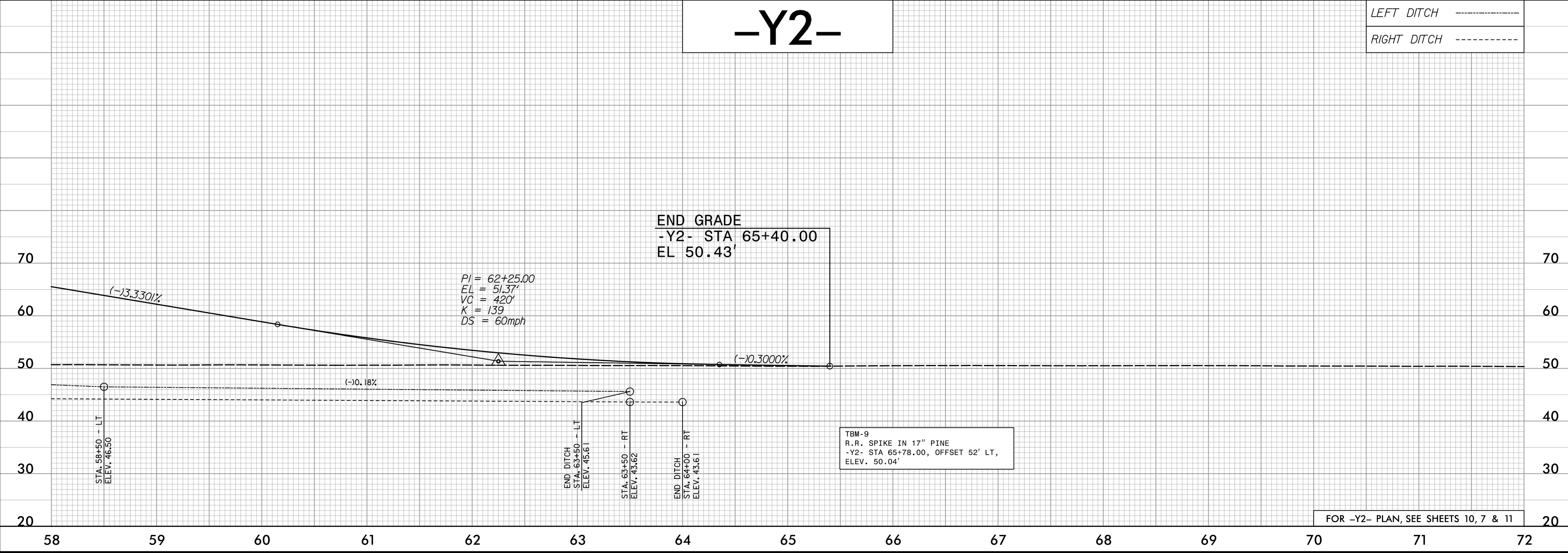
PIPE HYDRAULIC DATA
 24" RCP STA 54+18 -Y2-

DRAINAGE AREA	= 15	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 17	CFS
DESIGN HW ELEVATION	= 48.4	FT
100 YEAR DISCHARGE	= 21	CFS
100 YEAR HW ELEVATION	= 49.5	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 69	CFS
OVERTOPPING ELEVATION	= 50.3	FT
INV IN	= 45.45	
INV OUT	= 44.67	



-Y2-

LEFT DITCH -----
 RIGHT DITCH -----



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-Y2LPB-



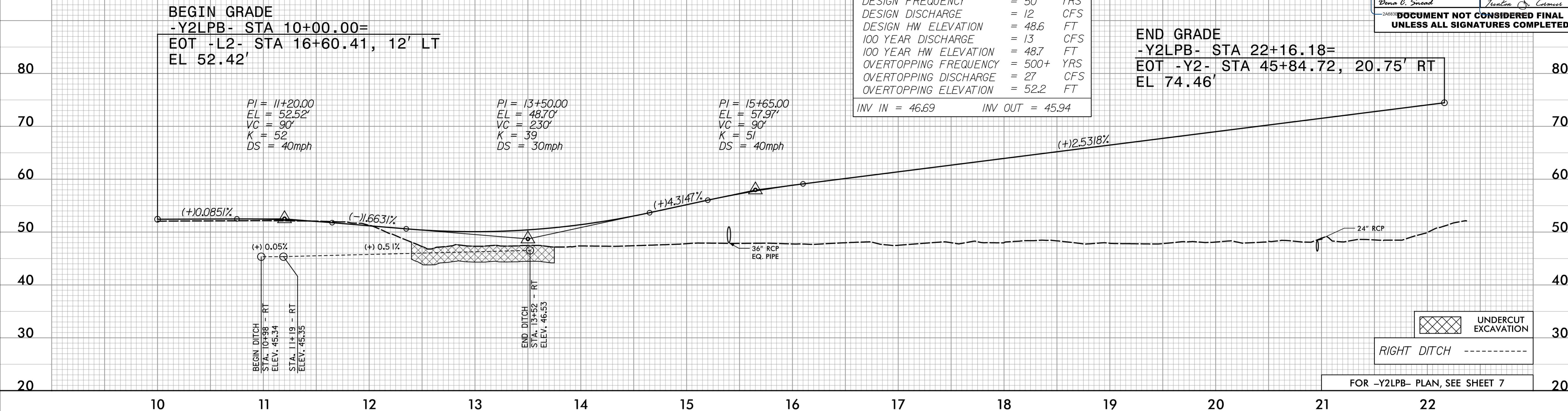
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PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. <i>17</i>
ROADWAY DESIGN ENGINEER <i>Dena C. Sneed</i> SEAL 032074	HYDRAULICS ENGINEER <i>Jonathan J. Colmest</i> SEAL 034364
DocuSigned by: <i>Dena C. Sneed</i> 5/10/2017	DocuSigned by: <i>Jonathan J. Colmest</i> 5/10/2017

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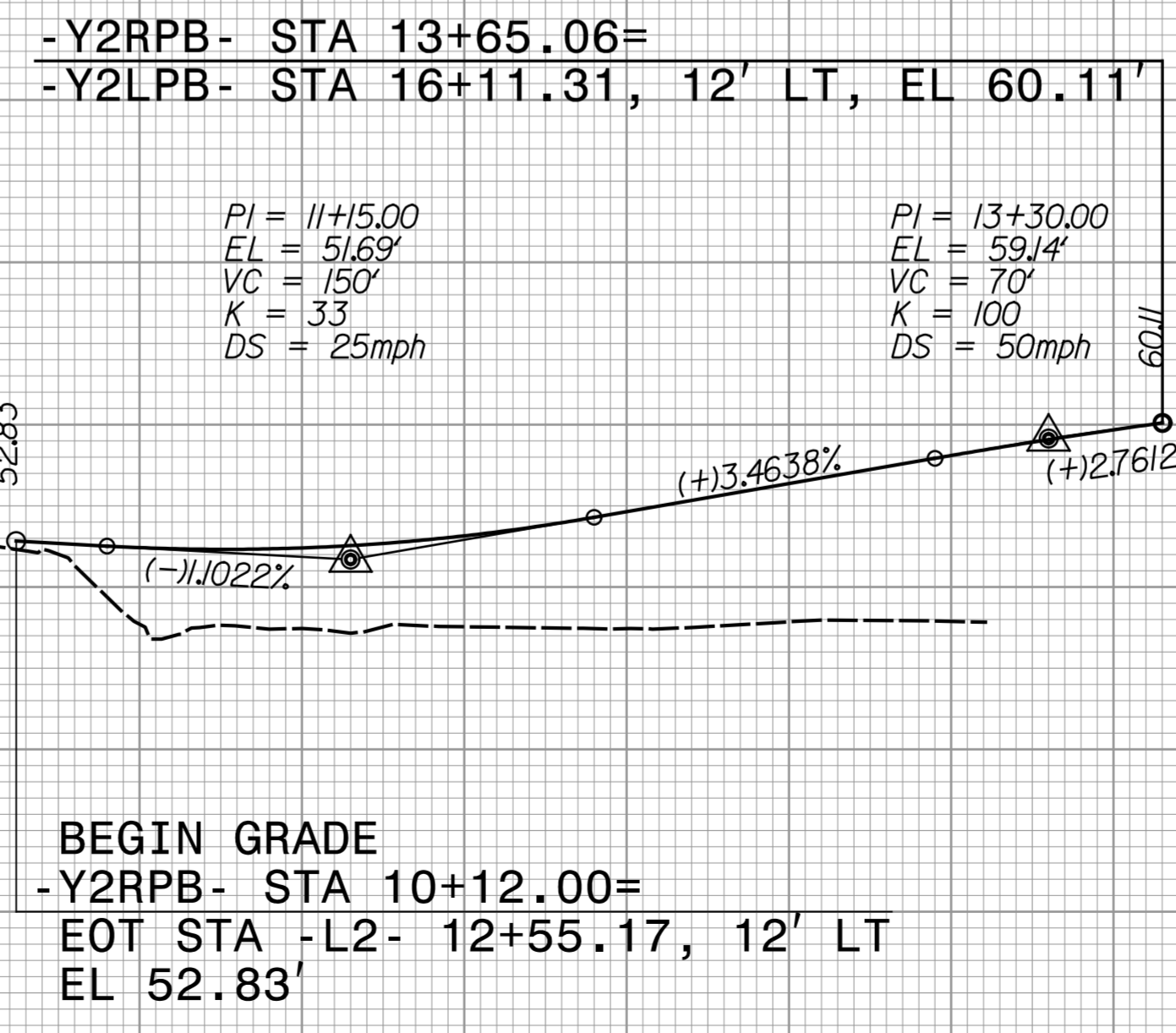
PIPE HYDRAULIC DATA
24" RCP STA 20+96 -Y2LPB-

DRAINAGE AREA	= 6	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 12	CFS
DESIGN HW ELEVATION	= 48.6	FT
100 YEAR DISCHARGE	= 13	CFS
100 YEAR HW ELEVATION	= 48.7	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 27	CFS
OVERTOPPING ELEVATION	= 52.2	FT
INV IN	= 46.69	
INV OUT	= 45.94	



FOR -Y2LPB- PLAN, SEE SHEET 7

-Y2RPB-



FOR -Y2RPB- PLAN, SEE SHEET 7

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-Y2LPD-

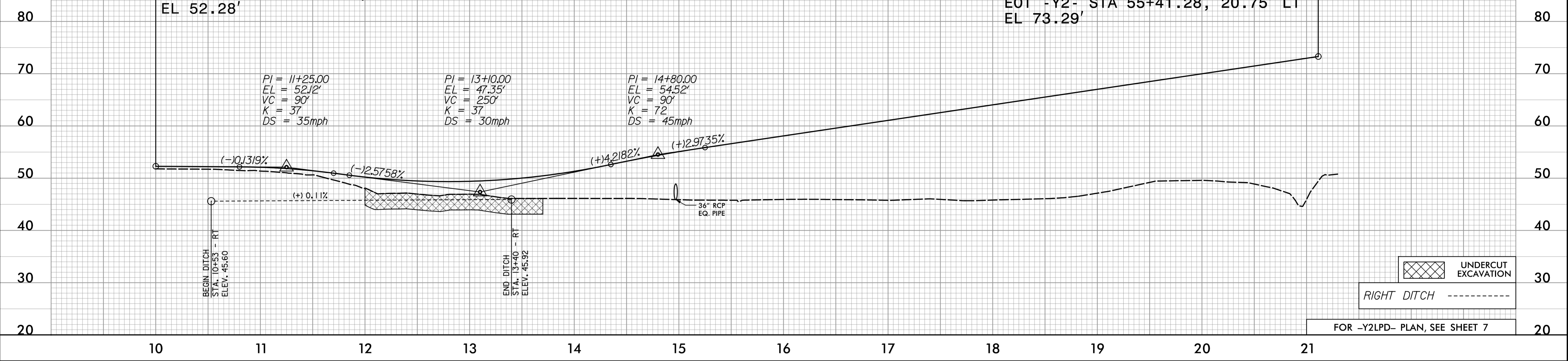
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PROJECT REFERENCE NO. R-5311A	SHEET NO. 18
ROADWAY DESIGN ENGINEER SEAL 032074 DENVA C. SNEAD	HYDRAULICS ENGINEER SEAL 034364 JENYON J. COMBER
DocuSigned by: Denna C. Snood 5/10/2017	DocuSigned by: Jenyon J. Comber 5/10/2017

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BEGIN GRADE
 -Y2LPD- STA 10+00.00=
 EOT -L2- STA 17+96.92, 12' RT
 EL 52.28'

END GRADE
 -Y2LPD- STA 21+11.21=
 EOT -Y2- STA 55+41.28, 20.75' LT
 EL 73.29'



FOR -Y2LPD- PLAN, SEE SHEET 7

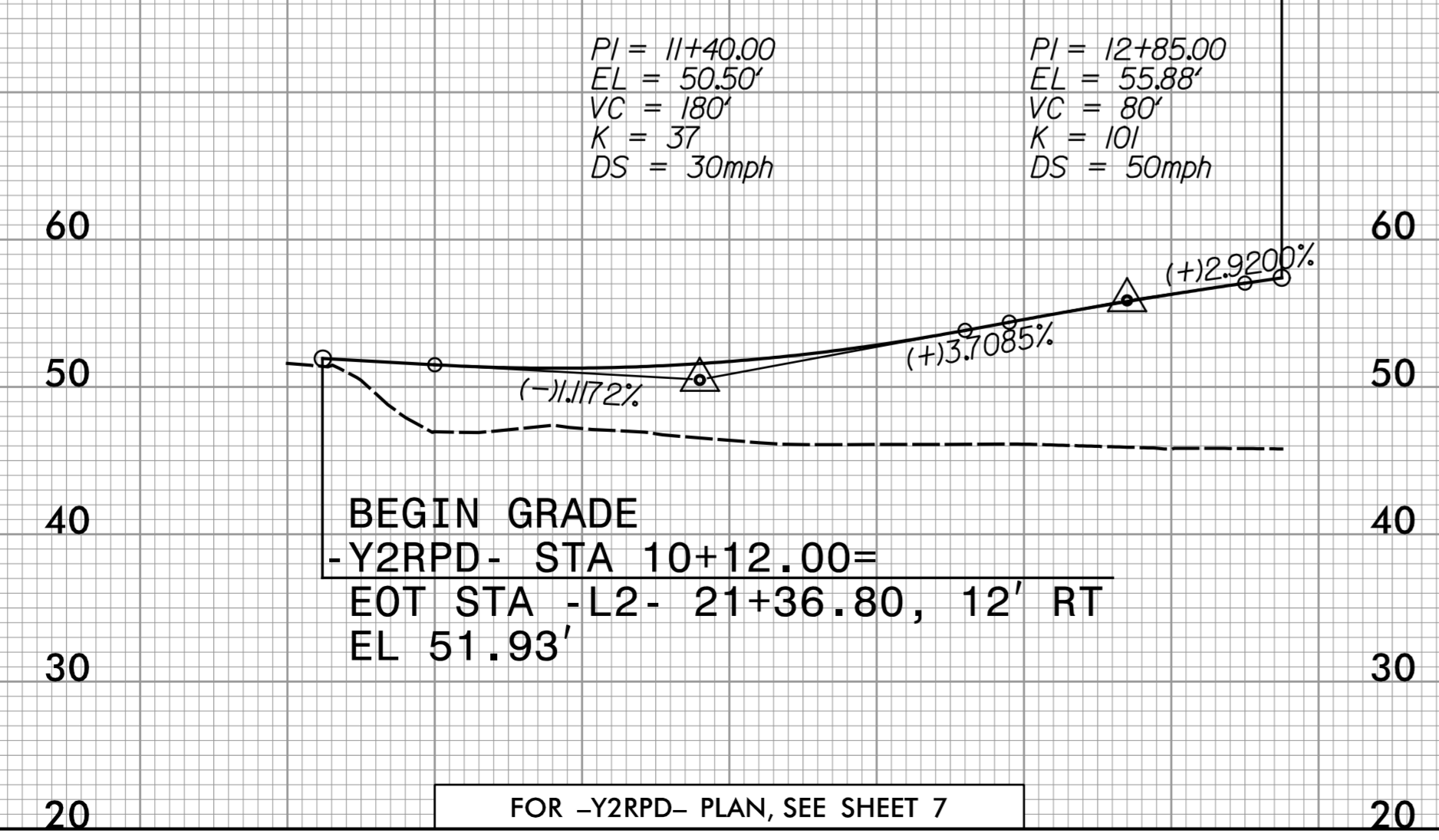
-Y2RPD-

-DR1A-

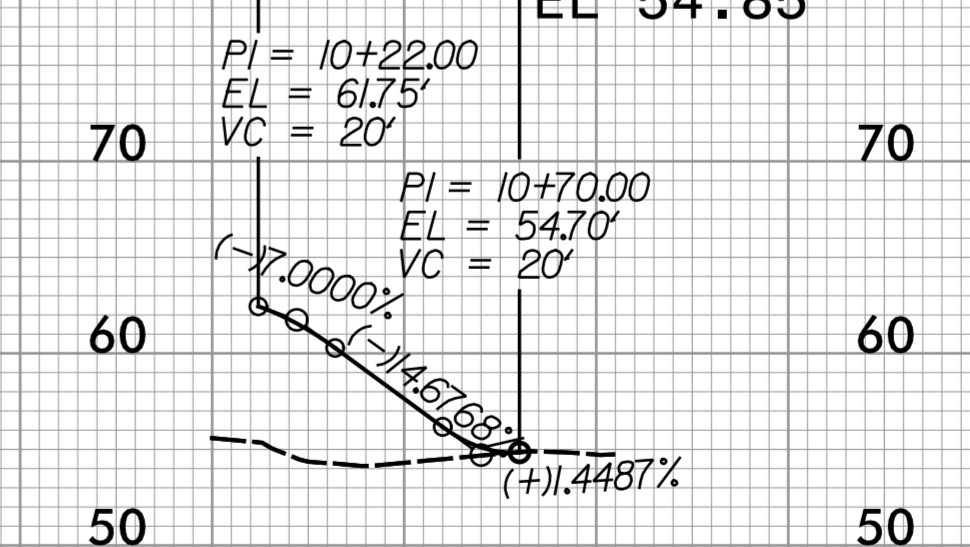
END GRADE
 -Y2RPD- STA 13+37.49 =
 -Y2LPD- STA 15+45.00,
 12' LT EL = 57.41'

BEGIN GRADE
 -DR1A- STA 10+12.00=
 EOT -Y1- STA 17+24.01, 12' LT
 EL 62.45'

END GRADE
 -DR1A- STA 10+80.00=
 EL 54.85'



FOR -Y2RPD- PLAN, SEE SHEET 7



FOR -DR1A- PLAN, SEE SHEET 8

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PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. <i>19</i>
ROADWAY DESIGN ENGINEER <i>Dena C. Sneed</i>	HYDRAULICS ENGINEER <i>Leon C. Colwell</i>
DocuSigned by: <i>Dena C. Sneed</i> 5/10/2017	DocuSigned by: <i>Leon C. Colwell</i> 5/10/2017

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-DR1-

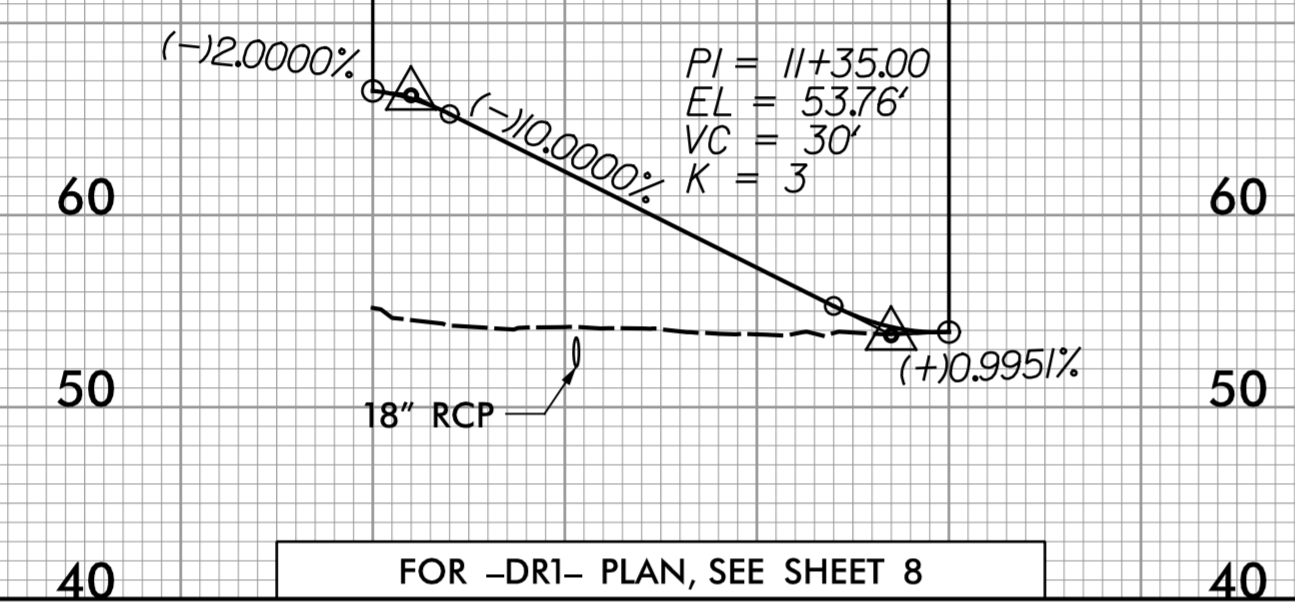
BEGIN GRADE
-DR1- STA 10+00.00=
EOT -Y1- STA 18+33.96, 12' LT
EL 66.46'

END GRADE
-DR1- STA 11+50.00=
EL 53.91'

PI = 10+10.00
EL = 66.26'
VC = 20'
K = 3

PI = 11+35.00
EL = 53.76'
VC = 30'
K = 3

PIPE HYDRAULIC DATA	
18" RCP STA 10+53 -DR1-	
DRAINAGE AREA	= 1 AC
DESIGN FREQUENCY	= 10 YRS
DESIGN DISCHARGE	= 4 CFS
DESIGN HW ELEVATION	= 53.4 FT
100 YEAR DISCHARGE	= 5 CFS
100 YEAR HW ELEVATION	= 53.8 FT
OVERTOPPING FREQUENCY	= 100+ YRS
OVERTOPPING DISCHARGE	= 6 CFS
OVERTOPPING ELEVATION	= 53.9 FT
INV IN	= 52.18
INV OUT	= 52.03



FOR -DR1- PLAN, SEE SHEET 8

10 11

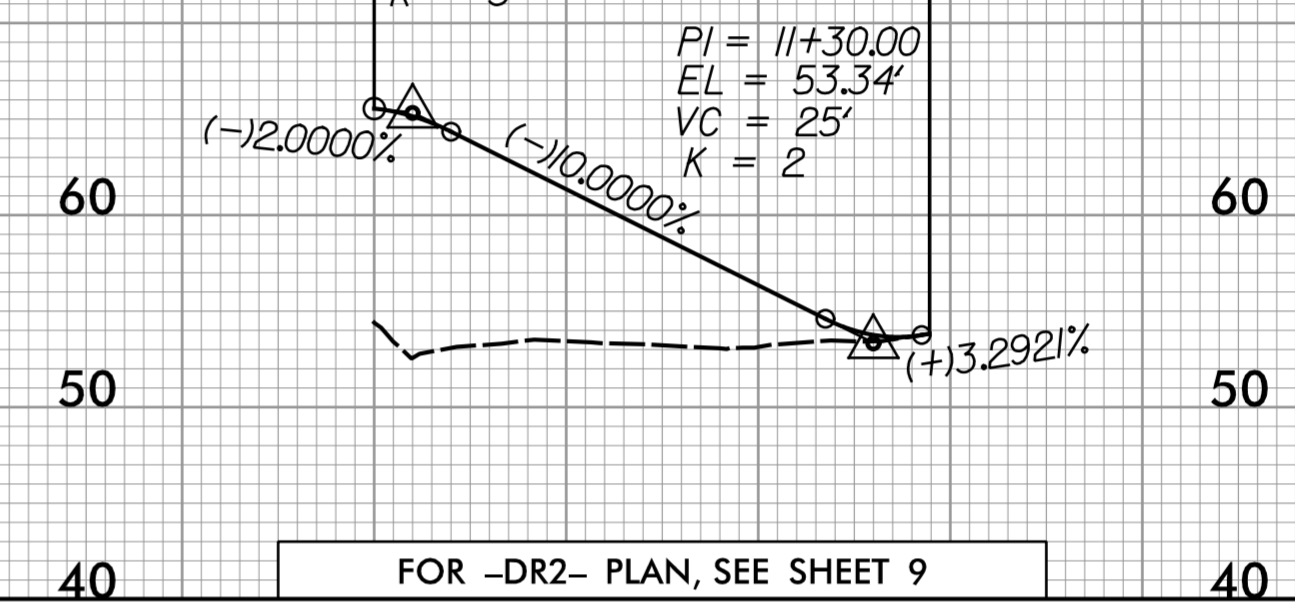
-DR2-

BEGIN GRADE
-DR2- STA 10+00.00=
EOT -Y1- STA 31+50.00, 12' RT
EL 65.54'

END GRADE
-DR2- STA 11+44.56=
EL 53.82'

PI = 10+10.00
EL = 65.34'
VC = 20'
K = 3

PI = 11+30.00
EL = 53.34'
VC = 25'
K = 2



FOR -DR2- PLAN, SEE SHEET 9

10 11

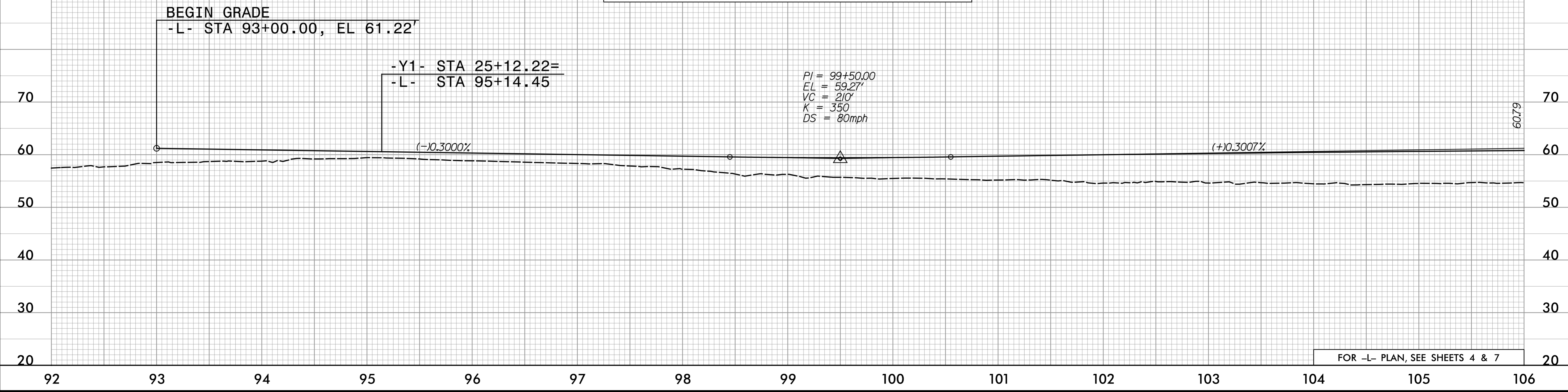
-L-

FUTURE CONSTRUCTION FOR REFERENCE ONLY

BEGIN GRADE
-L- STA 93+00.00, EL 61.22'

-Y1- STA 25+12.22=
-L- STA 95+14.45

PI = 99+50.00
EL = 59.27'
VC = 210'
K = 350
DS = 80mph



FOR -L- PLAN, SEE SHEETS 4 & 7

60.79

92 93 94 95 96 97 98 99 100 101 102 103 104 105 106

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-L-



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PROJECT REFERENCE NO. <i>R-5311A</i>	SHEET NO. <i>20</i>
ROADWAY DESIGN ENGINEER SEAL 032074 DENNA C. SNEAD	HYDRAULICS ENGINEER SEAL 034364 DEVON J. CORNER
DocuSigned by: <i>Denne C. Snood</i> 5/10/2017	DocuSigned by: <i>Devon J. Corner</i> 5/10/2017

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FUTURE CONSTRUCTION
FOR REFERENCE ONLY

PI = 110+82.50
EL = 62.67'
VC = 2,055'
K = 3421
DS = 80mph



FOR -L- PLAN, SEE SHEETS 4-7

-L-

FUTURE CONSTRUCTION
FOR REFERENCE ONLY

-Y2RPB- STA 10+00.00=
-L- STA 126+50.56, 47' LT

PI = 132+00.00
EL = 56.32'
VC = 400'
K = 660
DS = 80mph




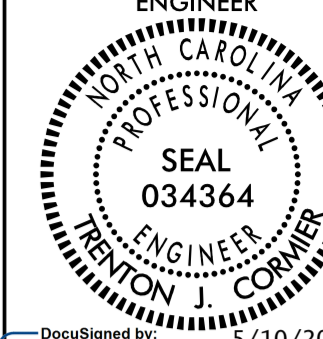
FOR -L- PLAN, SEE SHEETS 4-7

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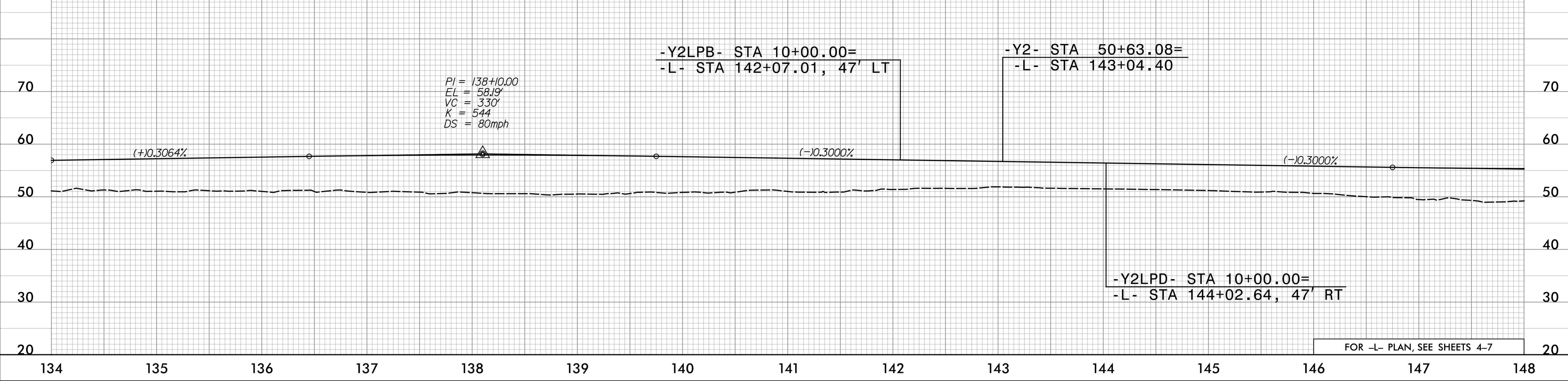
-L-

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ROADWAY DESIGN ENGINEER 	HYDRAULICS ENGINEER 
DocuSigned by: <i>Debra C. Sneed</i> 5/10/2017	DocuSigned by: <i>Trevon J. Colman</i> 5/10/2017

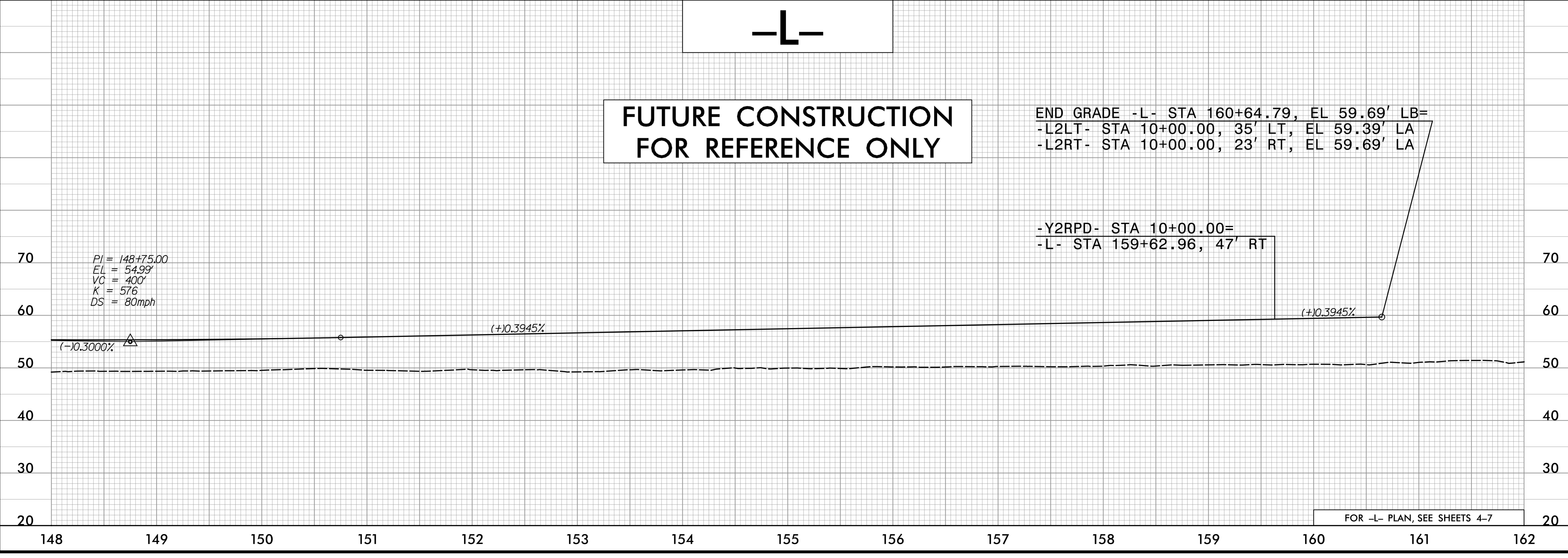
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**FUTURE CONSTRUCTION
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**FUTURE CONSTRUCTION
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