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See Sheet 1A For Index of Sheets  
See Sheet 1B For Standard Symbology Sheet

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

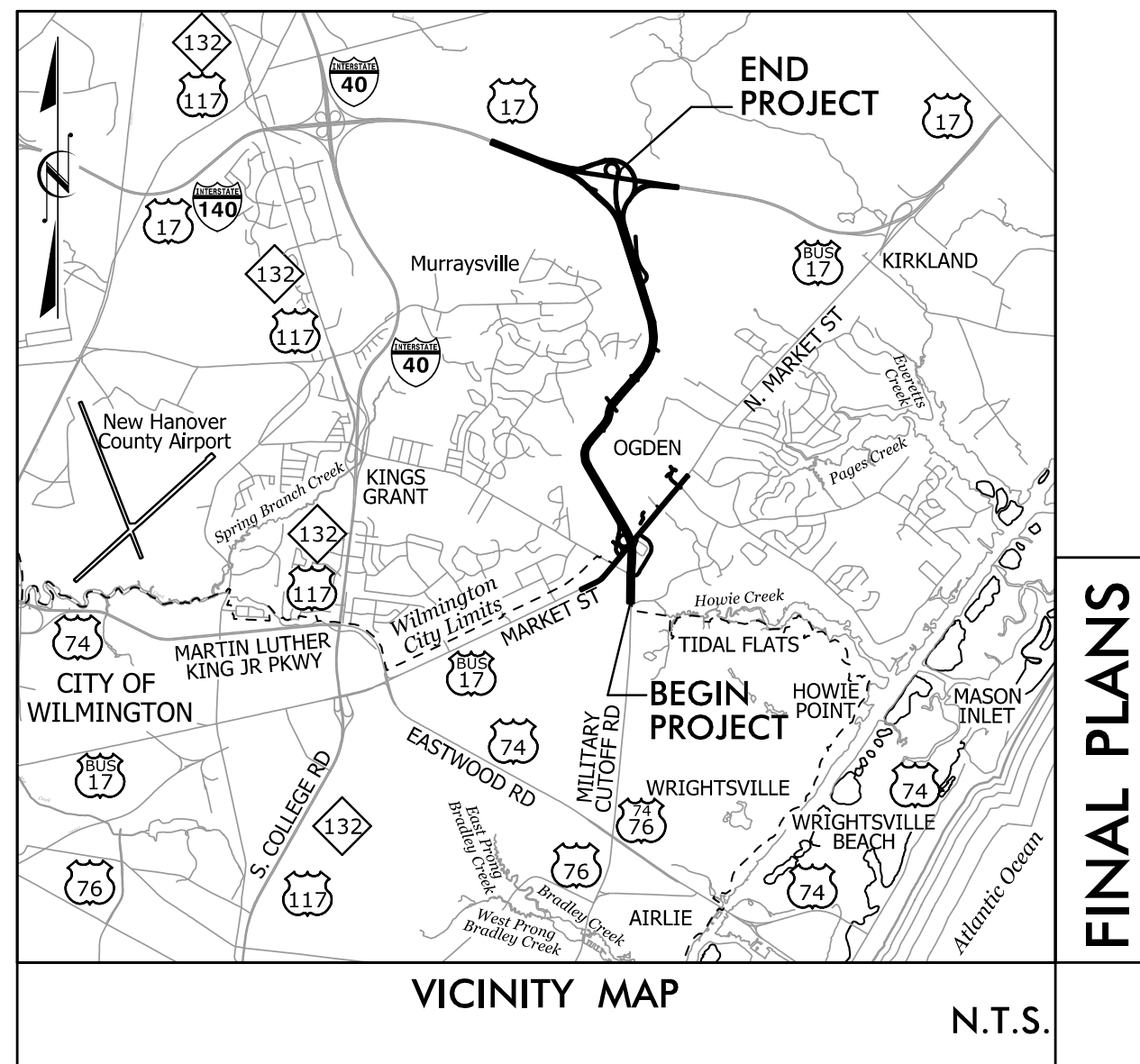
**NEW HANOVER COUNTY**

**LOCATION: SR 1409 (MILITARY CUTOFF ROAD EXTENSION) FROM SR 1409 (MILITARY CUTOFF ROAD) TO US 17 IN WILMINGTON**

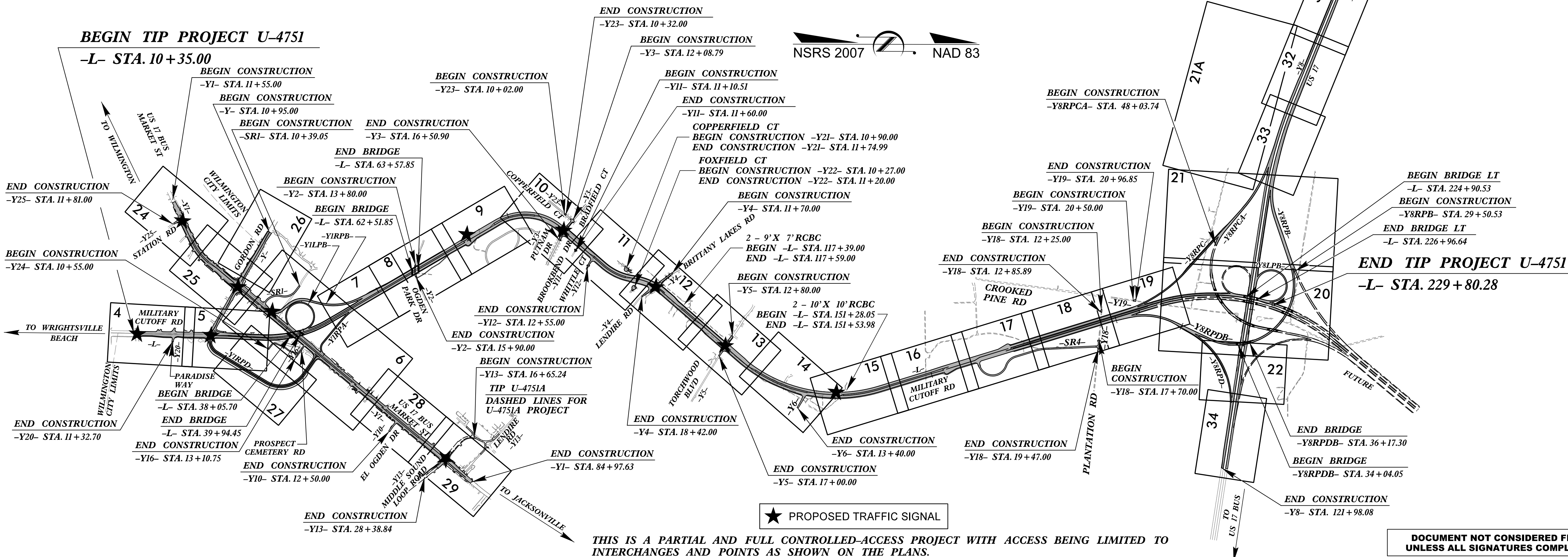
**TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, CULVERTS, RETAINING WALLS, SIGNALS, NOISE WALLS, AND SIGNING**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-4751	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
40191.1.2		PE	
40191.2.1		RW	
40191.3.2		CONSTRUCTION	
40191.2.3		UTIL	

**TIP PROJECT: U-4751**

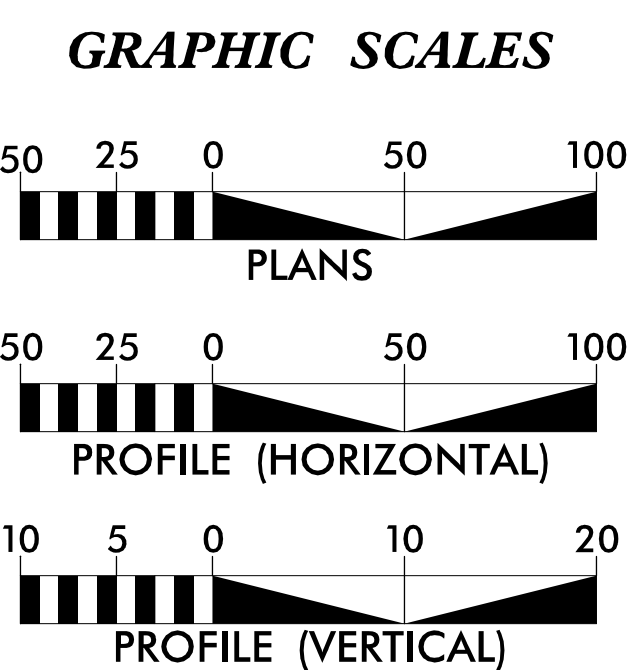


**FINAL PLANS**



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

**CONTRACT: C203980**



**DESIGN DATA**

ADT 2017 =	23,900
ADT 2037 =	49,100
K =	12%
D =	60%
T =	7%*
V =	50 MPH

\* (TTST = 3% + DUAL 4%)  
FUNC CLASS = ARTERIAL/FREEWAY  
STATEWIDE TIER

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJECT U-4751 =	4.053 MILES
LENGTH STRUCTURE TIP PROJECT U-4751 =	0.103 MILES
TOTAL LENGTH OF TIP PROJECT U-4751 =	4.156 MILES

PLANS PREPARED FOR THE NCDOT BY:

**STV** 100 Years  
STV Engineers, Inc.  
900 West Trade St., Suite 715  
Charlotte, NC 28202  
NC License Number F-0991

2012 STANDARD SPECIFICATIONS	<b>JOHN N. JOHNSON, PE</b> PROJECT ENGINEER
RIGHT OF WAY DATE: APRIL 17, 2015	<b>SEAN C. STEPHENS, PE</b> PROJECT DESIGN ENGINEER
LETTING DATE: NOVEMBER 21, 2017	<b>GARY LOVERING, PE</b> PROJECT ENGINEER NCDOT ROADWAY DESIGN

**HYDRAULICS ENGINEERS**

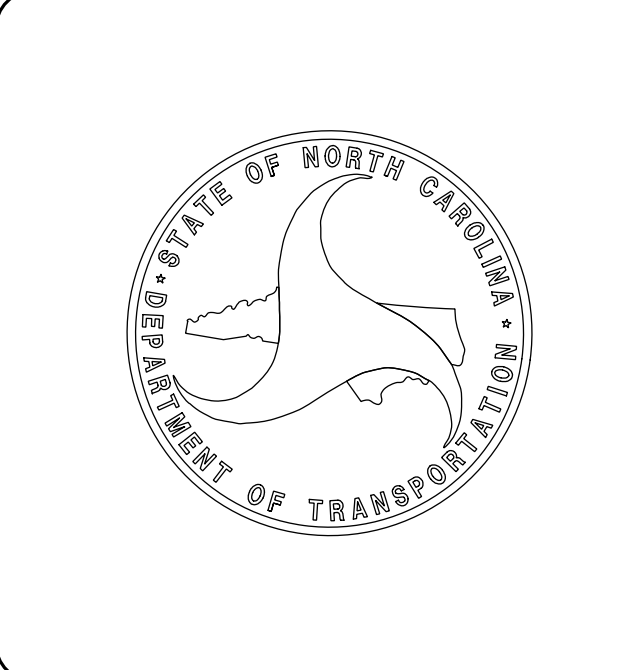
Seal of Edward Vainicek, P.E., License No. 26938, dated 9/22/2017.

Seal of Joshua G. Dalton, P.E., License No. 26971, dated 9/21/2017.

Signature: **Sean C. Stephens, PE**, dated 9/21/2017.

**ROADWAY DESIGN ENGINEER**

Seal of Sean C. Stephens, P.E., License No. 043891, dated 9/21/2017.



# INDEX OF SHEETS

SHEET NUMBER	SHEET
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2B-1 THRU 2B-4	STRUCTURE DETAILS
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2B-12	TEMPORARY PAVEMENT DETAIL
2C-1 THRU 2C-7	ROADWAY SPECIAL DETAILS
2C-8 THRU 2C-13	GUARDRAIL PLACEMENT DETAILS
2C-14 THRU 2C-17	GUARDRAIL INSTAALLATION DETAILS
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UD-1 THRU UD-34	UTILITIES BY OTHERS PLANS
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# GENERAL NOTES

GENERAL NOTES: 2012 SPECIFICATIONS  
EFFECTIVE: 01-17-2012  
REVISED: 01-24-2017

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 MODIFIED 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. 560.01

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.

DRIVEWAYS:  
WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER. DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 900 MM RADII OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES

STREET TURNOUT:  
STREET RETURNS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 848.04 USING THE RADII NOTED ON PLANS.

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 CAPE FEAR PUBLIC UTILITY AUTHORITY, DUKE ENERGY PROGRESS, AT&T, LEVEL 3, CHARTER COMMUNICATIONS, MCNC, SPIRIT COMMUNICATIONS, PIEDMONT NATURAL GAS, TIME WARNER CABLE, AND CENTURY LINK. 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.

CURB RAMPS  
CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. CONSTRUCT ALL CURB RAMPS ACCORDANCE WITH STD 848.05 and/or 848.06.

## STANDARD DRAWINGS

2012 ROADWAY ENGLISH STANDARD DRAWINGS      EFF. 01-17-2012  
REV. 05-24-2017

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	
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 Super-elevation - Two Lane Pavement
225.05	Method of Obtaining Super-elevation - Divided Highways
225.06	Method of Grading Sight Distance at Intersections
225.07	Grading for False Cut at Grade Separations
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 Super-elevated Curve - Method I
560.02	Method of Shoulder Construction - High Side of Super-elevated Curve - Method II (Sheet 2 of 3 is no longer applicable)
DIVISION 6 - ASPHALT BASES AND PAVEMENTS	
610.03	Guide for Paving Shoulders Under Bridges - Method III
654.01	Pavement Repairs
665.01	Asphalt Shoulders - Milled Rumble Strips
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
838.01	Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.11	Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew
838.21	Reinforced Concrete Endwall - for Single 54" Pipe 90 Skew
838.27	Reinforced Concrete Endwall - for Single 60" Pipe 90 Skew
838.45	Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40
838.51	Reinforced Brick Endwall - for Single 54" Pipe 90 Skew
838.57	Reinforced Brick Endwall - for Single 60" Pipe 90 Skew
838.75	Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70
838.80	Precast Endwalls - 12" thru 72" Pipe 90 Skew
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
840.04	Concrete Open Throat Catch Basin - 12" thru 48" Pipe
840.05	Brick Open Throat Catch Basin - 12" thru 48" Pipe
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
840.17	Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.18	Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe
840.20	Frames and Wide Slot Flat Grates
840.22	Frames and Wide Slot Sag Grates
840.24	Frames and Narrow Slot Sag Grates
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.26	Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe
840.27	Brick Grated Drop Inlet Type 'B' - 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
840.34	Traffic Bearing Junction Box - for Use with Pipes 42" and Under
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
840.51	Brick Manhole - 12" thru 36" Pipe
840.52	Precast Manhole - 4', 5' and 6' Diameter
840.53	Precast Manhole with Masonry Base - 12" thru 42" Pipe
840.54	Manhole Frame and Cover
840.66	Drainage Structure Steps
840.71	Concrete and Brick Pipe Plug
840.72	Pipe Collar
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
848.01	Concrete Sidewalk
848.02	Driveway Turnout - Radius Type
848.03	Driveway Turnout - Drop Curb Type
848.04	Street Turnout
848.05	Curb Ramp - Proposed Curb & Gutter
852.01	Concrete Islands
852.04	Method for Placement of Drop Inlets in Grassed Median - Using 1'-6" Curb and Gutter
852.05	Median Curb for Catch Basin - for Use with 1'-6" Curb and Gutter
852.06	Method for Placement of Drop Inlets in Concrete Islands
852.10	Median Construction - with Curb and Gutter
854.02	Double Faced Concrete Barrier - Types 'T', 'T1' and 'T2'
857.01	Precast Reinforced Concrete Barrier - 41" Single Faced
862.04	Anchoring End of Guardrail - B-77 and B-83 Anchor Units
865.01	Cable Guiderail
866.01	Chain Link Fence - 4', 5' and 6' High Fence
866.02	Woven Wire Fence - with Wood Post
876.01	Rip Rap in Channels
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

**STV** 100 Years  
STV Engineers, Inc.  
900 West Trade St., Suite 715  
Charlotte, NC 28202  
NC License Number F-0991

PROJECT REFERENCE NO. <i>U-4751</i>	SHEET NO. <i>/A</i>
	ROADWAY DESIGN ENGINEER
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

# STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS CONVENTIONAL PLAN SHEET SYMBOLS

## BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	○
Computed Property Corner	✕
Property Monument	◻
Parcel/Sequence Number	123
Existing Fence Line	-----
Proposed Woven Wire Fence	-----
Proposed Chain Link Fence	-----
Proposed Barbed Wire Fence	-----
Existing Wetland Boundary	-----
Proposed Wetland Boundary	-----
Existing Endangered Animal Boundary	-----
Existing Endangered Plant Boundary	-----
Existing Historic Property Boundary	-----
Known Contamination Area: Soil	☠ S ☠
Potential Contamination Area: Soil	?? S ??
Known Contamination Area: Water	☠ W ☠
Potential Contamination Area: Water	?? W ??
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 & PROJECT CONTROL:

Secondary Horiz and Vert Control Point	◆
Primary Horiz Control Point	○
Primary Horiz and Vert Control Point	●
Exist Permanent Easement Pin and Cap	◇
New Permanent Easement Pin and Cap	◆
Vertical Benchmark	⊠
Existing Right of Way Marker	△
Existing Right of Way Line	-----
New Right of Way Line	-----
New Right of Way Line with Pin and Cap	-----
New Right of Way Line with Concrete or Granite R/W Marker	-----
New Control of Access Line with Concrete CA Marker	-----
Existing Control of Access	-----
New Control of Access	-----
Existing Easement Line	-----
New Temporary Construction Easement	-----
New Temporary Drainage Easement	-----
New Permanent Drainage Easement	-----
New Permanent Drainage / Utility Easement	-----
New Permanent Utility Easement	-----
New Temporary Utility Easement	-----
New Aerial Utility Easement	-----

## ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	-----
Proposed Slope Stakes Fill	-----
Proposed Curb Ramp	-----
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equality Symbol	⊕
Pavement Removal	⊗

## VEGETATION:

Single Tree	☼
Single Shrub	☼

Note: Not to Scale

\*S.U.E. = Subsurface Utility Engineering

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.*)	-----
U/G Power Line LOS C (S.U.E.*)	-----
U/G Power Line LOS D (S.U.E.*)	-----

## 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.*)	-----
U/G Telephone Cable LOS C (S.U.E.*)	-----
U/G Telephone Cable LOS D (S.U.E.*)	-----
U/G Telephone Conduit LOS B (S.U.E.*)	-----
U/G Telephone Conduit LOS C (S.U.E.*)	-----
U/G Telephone Conduit LOS D (S.U.E.*)	-----
U/G Fiber Optics Cable LOS B (S.U.E.*)	-----
U/G Fiber Optics Cable LOS C (S.U.E.*)	-----
U/G Fiber Optics Cable LOS D (S.U.E.*)	-----

## WATER:

Water Manhole	⊕
Water Meter	○
Water Valve	⊗
Water Hydrant	⊕
U/G Water Line LOS B (S.U.E.*)	-----
U/G Water Line LOS C (S.U.E.*)	-----
U/G Water Line LOS D (S.U.E.*)	-----
Above Ground Water Line	-----

## TV:

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

## GAS:

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

## SANITARY SEWER:

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

## MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	⊠
Utility Located Object	○
Utility Traffic Signal Box	⊠
Utility Unknown U/G Line LOS B (S.U.E.*)	-----
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.

# SURVEY CONTROL SHEET U-4751

PROJECT REFERENCE NO.	SHEET NO.
U-4751	1C-1
Location and Surveys	

BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
U47512		185670.6250	2354666.1300	28.84	OUTSIDE PROJECT LIMITS	
U47513		185720.2880	2354690.6880	30.82	10+31.46	56.87 RT
BL1		187368.2157	2354700.3728	33.09	16+79.45	95.07 RT
BL2		188076.0920	2354702.5180	36.60	23+87.26	44.58 RT
BL3		188863.8340	2354723.2560	40.77	31+76.68	29.95 RT
ABY13		189719.0268	2354837.7075	46.02	39+79.99	214.01 RT
ABY14		190004.1370	2355082.0440	44.61	41+46.44	534.75 RT
BL4		190197.8670	2354195.2600	44.88	46+68.97	173.27 LT
BL5		190658.8150	2353526.4540	44.64	54+05.64	515.46 LT
BL6		191213.6800	2353227.7610	43.95	60+35.32	491.11 LT
U47516		191826.6110	2352989.1930	46.18	66+84.51	385.47 LT
BL7		191673.1000	2353556.8350	44.99	62+64.07	25.64 RT
BL8		192002.9430	2353583.8980	43.25	65+34.51	216.41 RT
BL9		192372.1230	2353104.9560	43.29	70+95.92	9.14 LT
BL10		193203.3512	2352702.3338	43.51	80+18.26	65.92 RT
BL11		193698.5720	2352608.2141	42.80	85+71.09	80.68 RT
BL12		194319.9492	2352785.5298	42.71	92+47.19	15.41 LT
BL13		195088.0139	2353453.0698	41.90	102+65.72	11.74 LT
BL14		195848.7730	2353849.1470	41.54	111+41.47	98.04 RT
BL15		196498.7580	2354447.9770	40.82	120+48.37	147.69 RT
U47518		197144.4430	2354839.7150	40.85	127+92.94	21.22 RT
BL16		197952.4010	2355553.2100	41.24	138+46.03	125.62 RT
BL17		198645.5100	2355872.0044	41.92	145+59.49	215.40 RT
BL18		199312.7890	2355774.9500	42.18	151+86.31	79.18 RT
BL19		200129.6790	2355919.9140	42.77	160+23.53	0.53 LT
BL20		200723.6200	2355336.0840	43.06	166+51.00	0.39 RT
BL21		201346.6660	2355144.3300	42.03	173+02.89	0.53 RT
BL22		201909.7830	2354968.7400	42.24	178+92.74	1.52 LT
BL23		202452.6200	2354933.3970	42.48	184+21.93	124.50 RT
BL24		203241.3750	2354887.2550	40.82	191+89.32	312.58 RT
BL25		203767.2700	2354942.9650	42.67	196+75.52	520.63 RT
BL26		203815.9640	2354406.1480	43.10	198+80.07	21.93 RT
BL27		203845.0210	2353954.4990	41.70	200+40.79	401.15 LT
BL28		204624.9430	2354047.1670	41.31	207+58.88	83.01 LT
BL29		205398.4960	2354160.3450	41.46	215+04.08	199.97 RT
U475111		206409.6660	2354287.0720	43.41	226+02.37	283.96 RT

BY3 POINT	DESC.	NORTH	EAST	ELEVATION	Y3 STATION	OFFSET
BY31		194803.2630	2351735.5830	41.79	OUTSIDE PROJECT LIMITS	
BY32		194822.4590	2352067.0730	41.59	OUTSIDE PROJECT LIMITS	
BY33		194701.4940	2352361.4180	41.10	OUTSIDE PROJECT LIMITS	
ABL12		194319.9492	2352785.5298	42.71	14+50.43	19.74 RT
BY34		193979.3620	2353483.7890	41.89	OUTSIDE PROJECT LIMITS	

BY4 POINT	DESC.	NORTH	EAST	ELEVATION	Y4 STATION	OFFSET
BY41		196501.2300	2353422.9890	40.90	OUTSIDE PROJECT LIMITS	
BY42		196227.2780	2353538.2890	41.31	11+66.70	20.26 RT
ABL14		195848.7733	2353849.1471	41.54	16+54.91	1.43 RT
BY43		195336.9480	2354133.6670	41.70	20+77.57	19.98 RT
BY44		195284.4890	2354458.1880	42.52	24+88.63	23.22 RT
BY45		195092.0500	2354783.3920	43.03	28+64.45	16.13 LT

BY5 POINT	DESC.	NORTH	EAST	ELEVATION	Y5 STATION	OFFSET
BY51		197692.9850	2354101.2480	39.39	OUTSIDE PROJECT LIMITS	
AU47518		197144.4430	2354839.7150	40.85	15+13.71	24.09 RT
U47519		196634.5660	2355729.1570	42.35	25+37.96	0.00

BY POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
BY1		189467.6860	2352119.2580	42.97	OUTSIDE PROJECT LIMITS	
BY2		189200.4480	2352620.4420	45.40	OUTSIDE PROJECT LIMITS	
BY3		188978.8430	2353185.2690	45.31	14+62.46	53.27 LT
ABY11		188467.2374	2353794.5222	48.39	22+45.94	85.43 RT
BY4		188327.7470	2354285.9570	42.88	27+40.74	39.08 LT
ABL2		188076.0918	2354702.5178	36.60	OUTSIDE PROJECT LIMITS	

BY6 POINT	DESC.	NORTH	EAST	ELEVATION	Y6 STATION	OFFSET
BY61		208041.4630	2348493.6310	46.05	OUTSIDE PROJECT LIMITS	
BY62		207591.3770	2349568.9650	42.07	OUTSIDE PROJECT LIMITS	
BY63		207132.7560	2350667.3230	45.56	OUTSIDE PROJECT LIMITS	
BY64		206797.0690	2351813.5210	43.52	OUTSIDE PROJECT LIMITS	
U475110		206605.7440	2353002.2310	46.98	OUTSIDE PROJECT LIMITS	
AU475111		206409.6660	2354287.0720	43.41	OUTSIDE PROJECT LIMITS	
U475112		206222.4440	2355117.4580	45.61	OUTSIDE PROJECT LIMITS	
BY65		206040.8310	2356705.9480	45.54	OUTSIDE PROJECT LIMITS	
BY66		205859.9510	2357891.6880	46.01	OUTSIDE PROJECT LIMITS	
BY67		205678.7900	2359077.5560	46.83	OUTSIDE PROJECT LIMITS	

BY1 POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
U47511		187374.7110	2352288.2380	42.72	11+56.71	34.46 RT
PATROL1		187751.0960	2353073.6490	49.21	20+26.63	34.37 RT
BY11		188467.2370	2353794.5220	48.39	30+35.36	49.52 RT
BY12		188994.4950	2354215.9780	45.87	37+10.25	37.44 RT
BY13		189719.0270	2354837.7080	46.02	46+64.84	53.64 RT
BY14		190004.1370	2355082.0440	44.62	50+40.27	59.77 RT
BY15		190610.7310	2355459.1950	43.22	57+47.96	37.05 LT
BY16		191110.8380	2355975.4100	43.85	64+62.43	41.16 RT
BY17		191652.6180	2356425.1760	40.44	71+66.57	41.61 RT
U47514		192245.8550	2356912.9870	46.11	79+34.89	38.11 RT
U47515		193151.3140	2357658.7640	43.89	OUTSIDE PROJECT LIMITS	

BY2 POINT	DESC.	NORTH	EAST	ELEVATION	Y2 STATION	OFFSET
U47517		192038.1840	2351884.2770	44.88	OUTSIDE PROJECT LIMITS	
AU47516		191826.6110	2352989.1930	46.18	OUTSIDE PROJECT LIMITS	
ABL7		191673.0995	2353556.8345	44.99	15+17.59	20.26 RT
BY21		191832.5750	2353882.7740	46.27	18+76.75	15.54 LT
BY22		191988.5150	2354513.0930	46.15	OUTSIDE PROJECT LIMITS	

.....  
 BM1 ELEVATION = 39.61  
 N 187449 E 2354486  
 L STATION 17+56.00 161 LEFT  
 RRSPIKE IN 18' PINE  
 .....

.....  
 BM13 ELEVATION = 46.46  
 N 189498 E 2354950  
 L STATION 37+56.00 277 RIGHT  
 RRSPIKE IN 24' PINE  
 .....

.....  
 BM17 ELEVATION = 45.01  
 N 198704 E 2355985  
 L STATION 146+29.00 317 RIGHT  
 RRSPIKE IN 18' PINE  
 .....

.....  
 BM20 ELEVATION = 45.48  
 N 200741 E 2355491  
 L STATION 166+22.00 153 RIGHT  
 RRSPIKE IN 16' PINE  
 .....

.....  
 BM23 ELEVATION = 44.94  
 N 202953 E 2354957  
 L STATION 185+21.00 180 RIGHT  
 RRSPIKE IN 8' PINE  
 .....

.....  
 BM27 ELEVATION = 45.66  
 N 203843 E 2354093  
 L STATION 199+98.00 269 LEFT  
 RRSPIKE IN 12' PINE  
 .....

**DATUM DESCRIPTION**  
 THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY OTHERS FOR MONUMENT "P-122"  
 WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF NORTHING: 205424.53(±) EASTING: 2360493.54(±) ELEVATION: 52.97(±)  
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.000012368  
 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "P-122" TO -L- L STATION 10+00.00 IS S 17° 22' 12" W 19.629.87  
 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NAVD 88

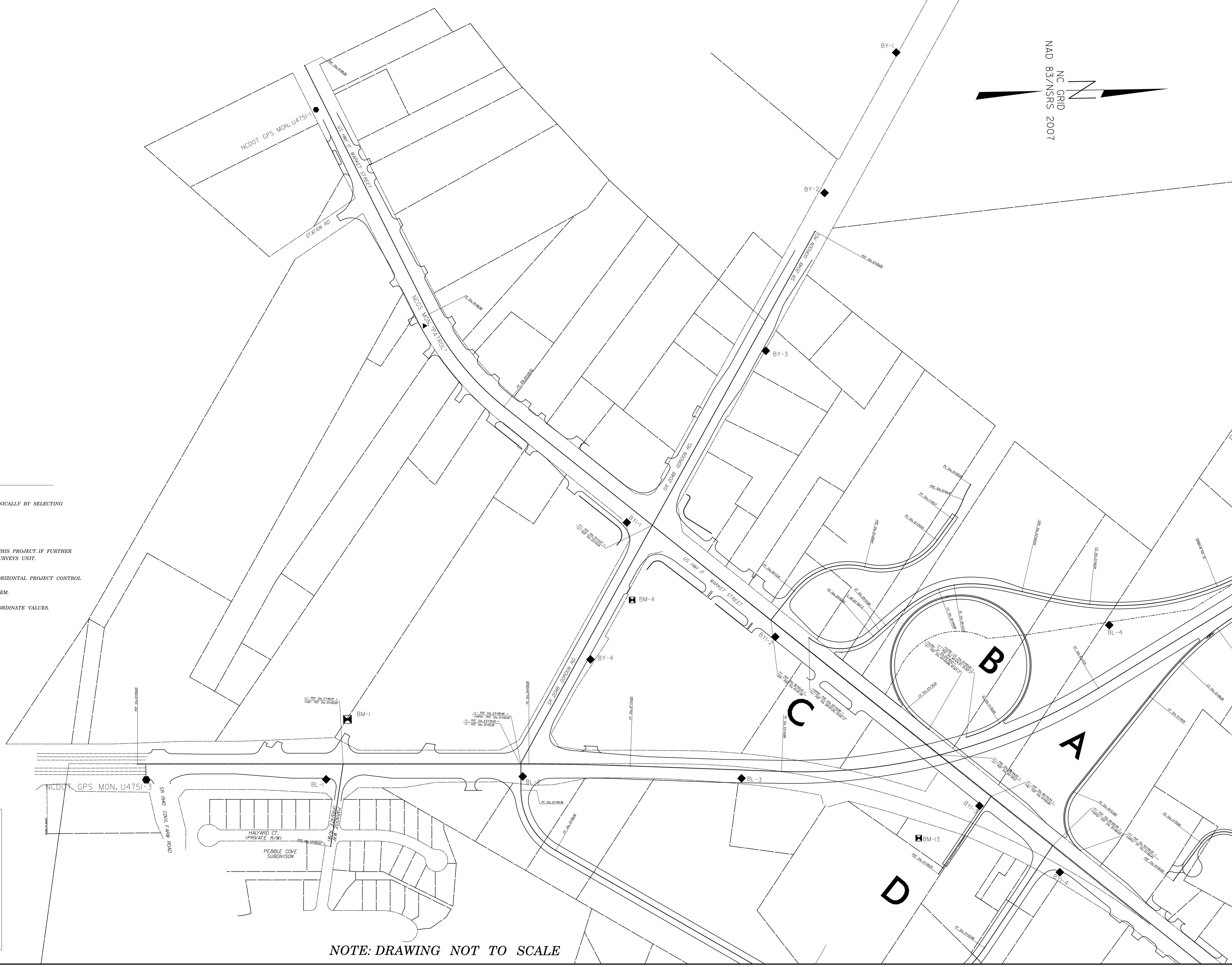
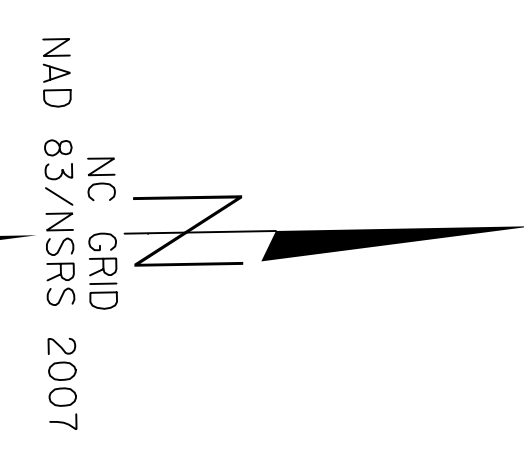
**NOTES:**

- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT: [HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION](https://connect.ncdot.gov/resources/location)  
 THE FILES TO BE FOUND ARE AS FOLLOWS:  
 U4751\_IS\_CONTROL\_H000.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.  
 NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION  
 SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

**NOTE: DRAWING NOT TO SCALE**

PROJECT REFERENCE NO.	SHEET NO.
U-4751	1C-2
Location and Surveys	

# SURVEY CONTROL SHEET U-4751



### NOTES:

- THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION](https://connect.ncdot.gov/resources/location)  
THE FILES TO BE FOUND ARE AS FOLLOWS:  
U4751\_IS\_CONTROL\_141010.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.  
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION.  
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NCDOT GPS MON. U4751-2

**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY OTHERS FOR MONUMENT "P-122"

WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF  
NORTHING: 205424.531(FT) EASTING: 2360493.541(FT)  
ELEVATION: 52.97(FT)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.000012368  
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "P-122" TO -L- L STATION 10+00.00 IS  
S 17° 22' 12" W 19.629.87

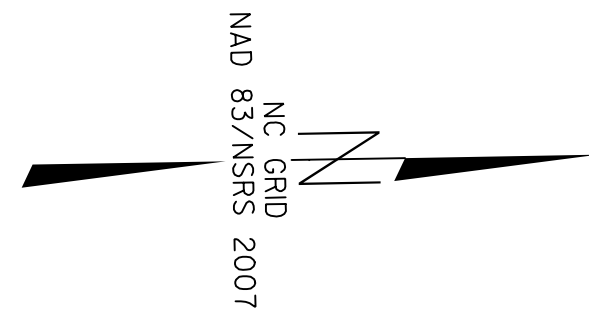
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES  
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

6/2/99  
6/30/2017  
6/30/2017

PROJECT REFERENCE NO.	SHEET NO.
U-4751	1C-3
◆ Location and Surveys	

# SURVEY CONTROL SHEET U-4751

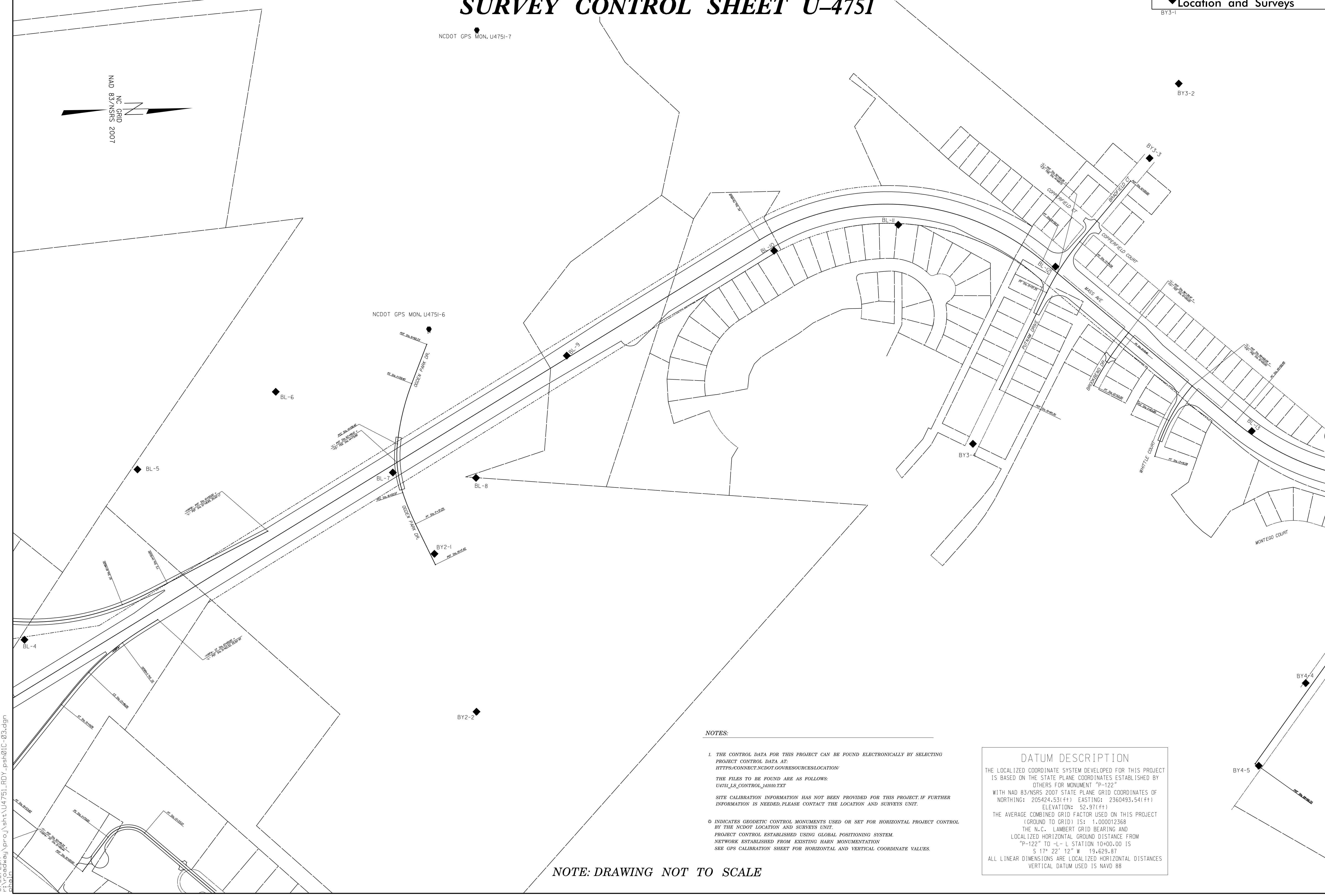


6/2/99

6/30/2017 \\sawaf\proj\sh01\U4751.RDY-psht01C-03.dgn

NCDOT GPS MON. U4751-7

NCDOT GPS MON. U4751-6



- NOTES:**
1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/](https://connect.ncdot.gov/resources/location/)  
THE FILES TO BE FOUND ARE AS FOLLOWS:  
U4751\_IS\_CONTROL\_14000.TXT  
SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
  2. ◆ 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.  
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION  
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

**DATUM DESCRIPTION**  
 THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY OTHERS FOR MONUMENT "P-122"  
 WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF  
 NORTHING: 205424.531(FT) EASTING: 2360493.541(FT)  
 ELEVATION: 52.971(FT)  
 THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.000012368  
 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "P-122" TO -L- L STATION 10+00.00 IS  
 S 17° 22' 12" W 19,629.87  
 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES  
 VERTICAL DATUM USED IS NAVD 88

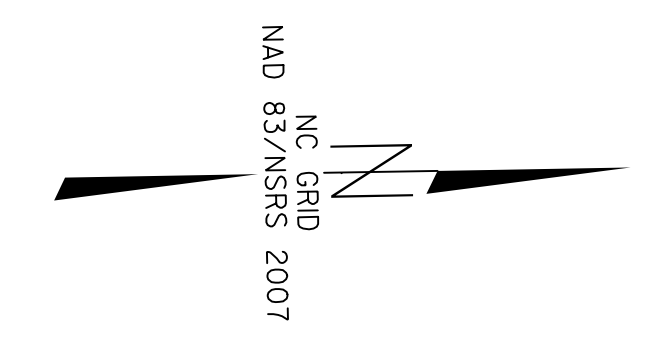
**NOTE: DRAWING NOT TO SCALE**





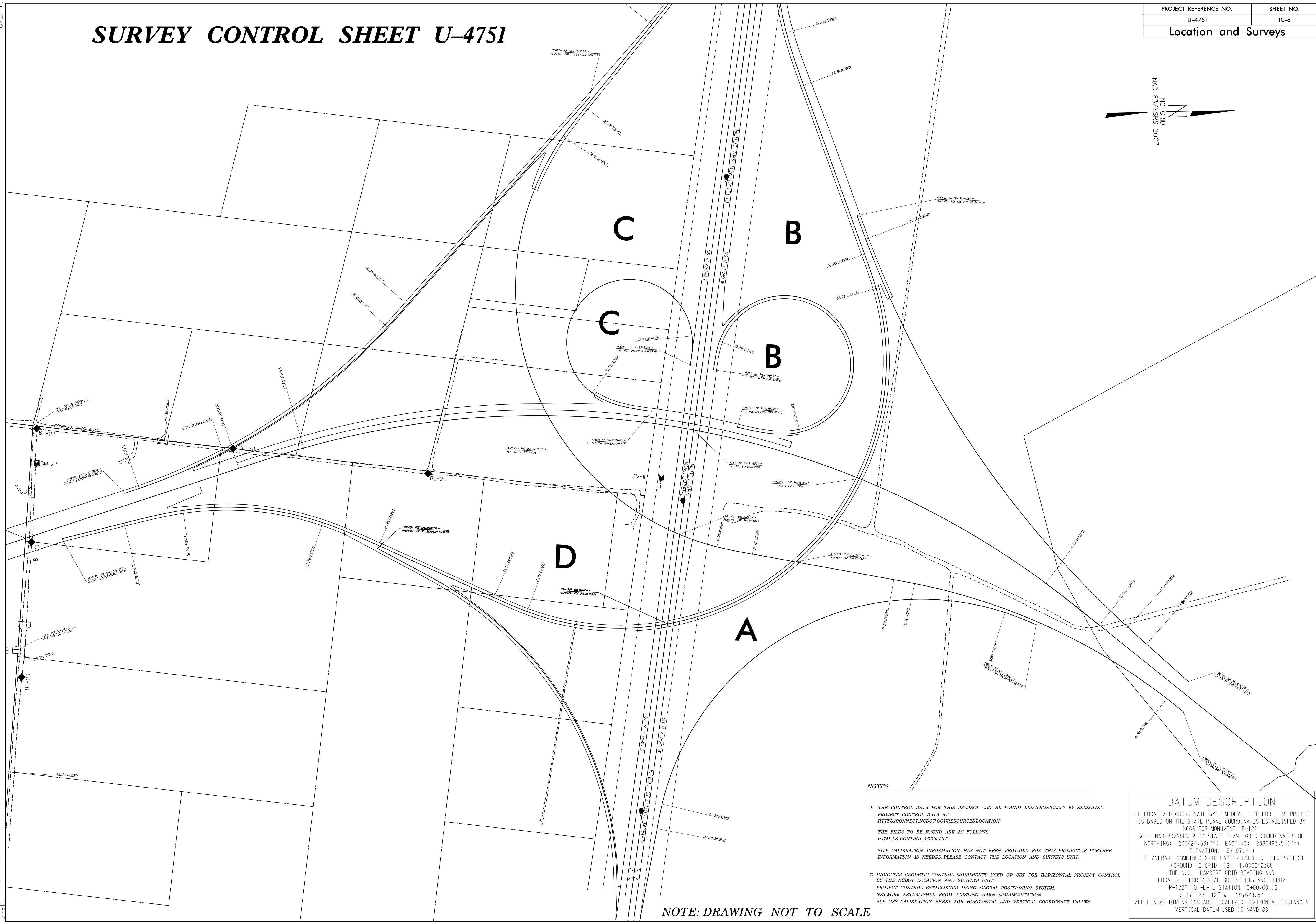


# SURVEY CONTROL SHEET U-4751



6/2/99

6/30/2017  
6:\adaw\proj\sh01\U4751.RD1-psht01C-06.dgn  
D:\01



**NOTES:**

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION](https://connect.ncdot.gov/resources/location)  
 THE FILES TO BE FOUND ARE AS FOLLOWS:  
 U4751\_LS\_CONTROL\_141010.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.  
 NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION  
 SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "P-122"

WITH NAD 83/NSRS 2007 STATE PLANE GRID COORDINATES OF  
 NORTHING: 205424.53(±1) EASTING: 2360493.54(±1)  
 ELEVATION: 52.97(±1)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT  
 (GROUND TO GRID) IS: 1.000012368

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "P-122" TO -L- L STATION 10+00.00 IS  
 S 17° 22' 12" W 19,629.87

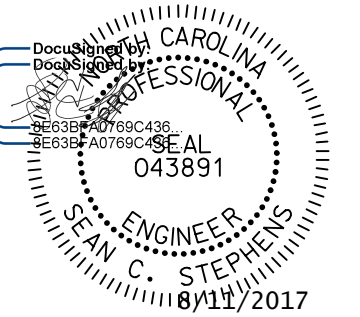

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES  
 VERTICAL DATUM USED IS NAVD 88



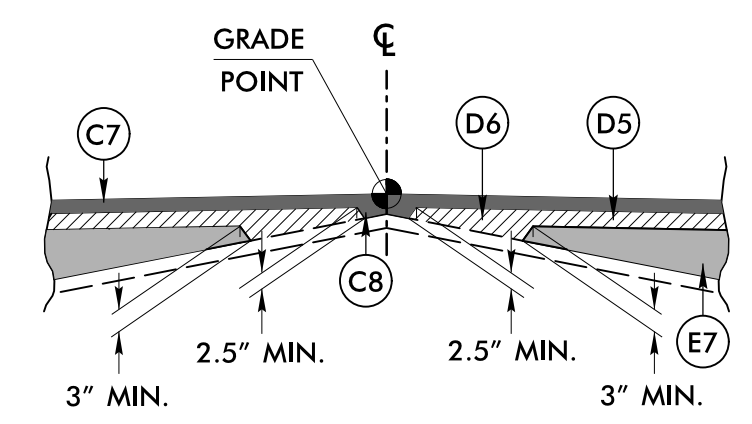




6/2/2017

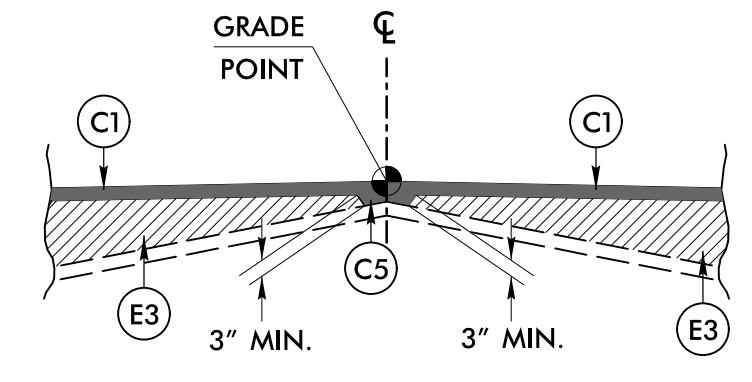
PROJECT REFERENCE NO. U-4751	SHEET NO. 2A-1
ROADWAY DESIGN ENGINEER 	PAVEMENT DESIGN ENGINEER 

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



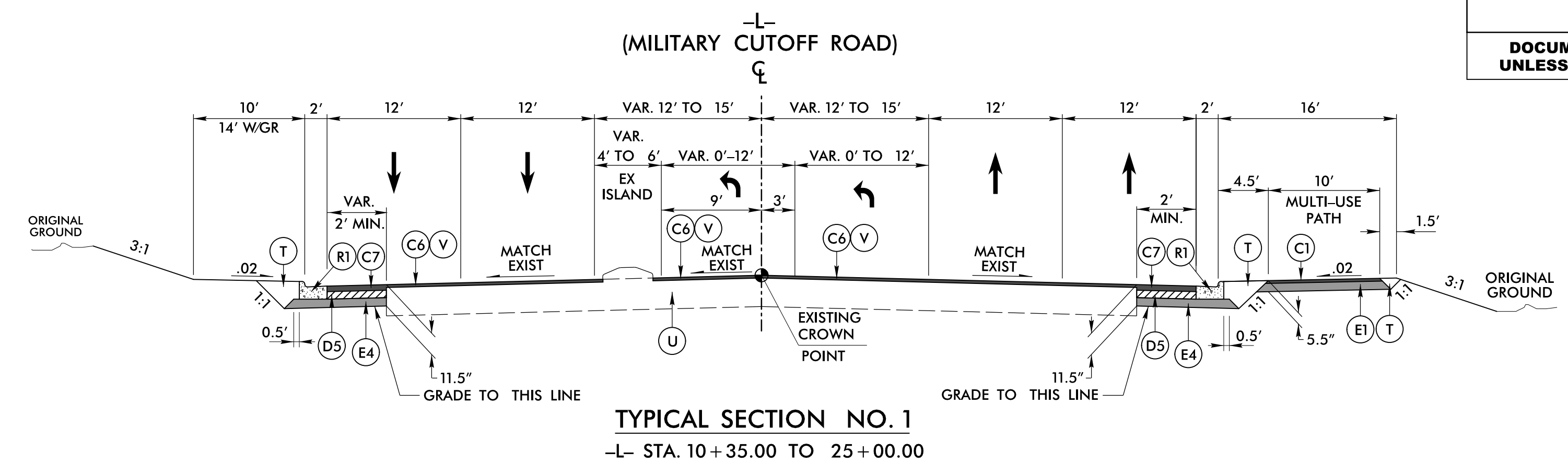
**WEDGING DETAIL NO. 1**

USE FOR TYPICAL SECTIONS 2, 8, 8A, 8B, & 8C



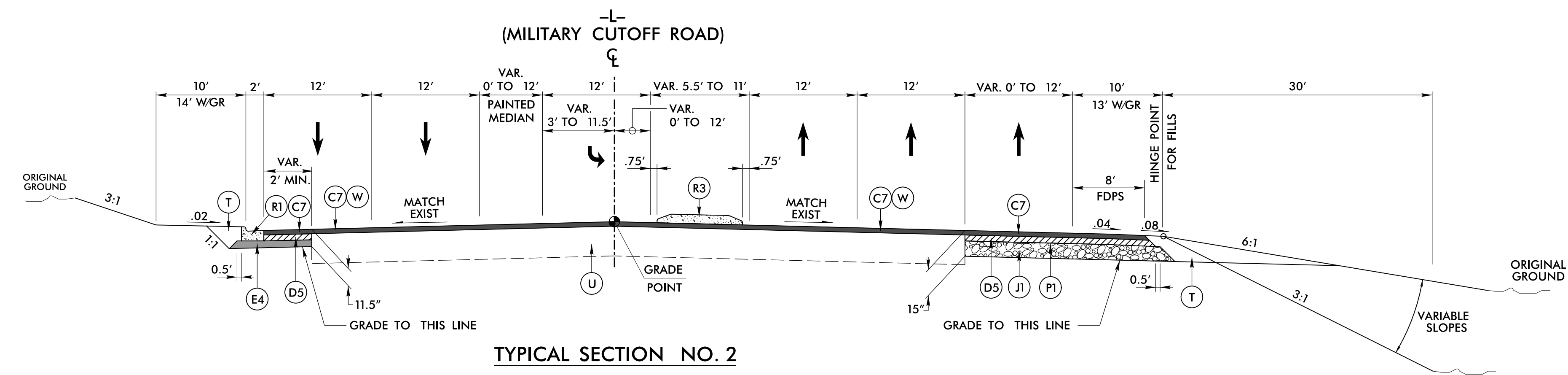
**WEDGING DETAIL NO. 2**

USE FOR TYPICAL SECTIONS 15, 17, 18, 30 & CUL-DE-SACS



**TYPICAL SECTION NO. 1**

-L- STA. 10+35.00 TO 25+00.00



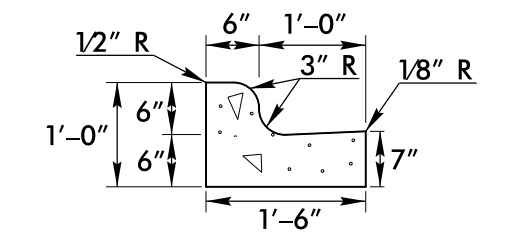
**TYPICAL SECTION NO. 2**

-L- STA. 25+00.00 TO 27+00.00

**PAVEMENT SCHEDULE**  
 (FINAL PAVEMENT DESIGN)

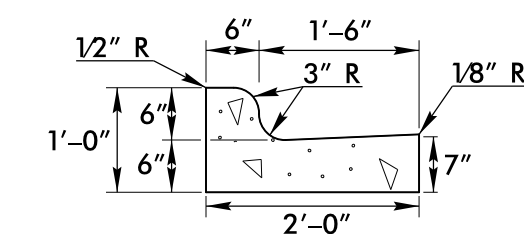
<b>C1</b>	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ.YD.	<b>D6</b>	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ.YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 2.5" IN DEPTH OR GREATER THAN 4" IN DEPTH.	<b>R2</b>	1'-6" CONCRETE CURB AND GUTTER
<b>C2</b>	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ.YD.	<b>E1</b>	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ.YD.	<b>R3</b>	5" MONOLITHIC CONCRETE ISLAND (KEYED-IN)
<b>C3</b>	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5B, AT AN AVERAGE RATE OF 280 LBS. PER SQ.YD.	<b>E2</b>	PROP. APPROX. 4.5" ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ.YD.	<b>R4</b>	SHOULDER BERM GUTTER
<b>C4</b>	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.	<b>E3</b>	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 5.5" IN DEPTH.	<b>R5</b>	2'-0" VALLEY GUTTER
<b>C5</b>	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 LESS THAN 1.5" IN DEPTH OR GREATER THAN 2" IN DEPTH.	<b>E4</b>	PROP. APPROX. 4.5" ASPHALT CONCRETE BASE COURSE TYPE B25.0C, AT AN AVERAGE RATE OF 513 LBS. PER SQ.YD.	<b>R6</b>	DOUBLE FACED CONCRETE BARRIER, TYPE T
<b>C6</b>	PROP. APPROX. 1.5" ASPHALT CONCRETE SURFACE COURSE TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ.YD.	<b>E5</b>	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE TYPE B25.0C, AT AN AVERAGE RATE OF 627 LBS. PER SQ.YD.	<b>R7</b>	SINGLE FACED CONCRETE BARRIER
<b>C7</b>	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.	<b>E6</b>	PROP. APPROX. 7" ASPHALT CONCRETE BASE COURSE TYPE B25.0C, AT AN AVERAGE RATE OF 399 LBS. PER SQ.YD. IN EACH OF TWO LAYERS.	<b>R8</b>	2'-9" CONCRETE CURB AND GUTTER (SEE DETAIL 2C-1)
<b>C8</b>	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 LESS THAN 1.5" IN DEPTH OR GREATER THAN 2" IN DEPTH.	<b>E7</b>	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 5.5" IN DEPTH.	<b>S</b>	CONCRETE SIDEWALK
<b>D1</b>	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ.YD.	<b>J1</b>	PROP. 8" AGGREGATE BASE COURSE	<b>T</b>	EARTH MATERIAL
<b>D2</b>	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ.YD.	<b>J2</b>	PROP. 6" AGGREGATE BASE COURSE	<b>U</b>	EXISTING PAVEMENT
<b>D3</b>	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ.YD.	<b>J3</b>	PROP. VAR. DEPTH AGGREGATE BASE COURSE	<b>V</b>	MILLING ASPHALT PAVEMENT, 1.5" DEPTH
<b>D4</b>	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 2.5" IN DEPTH OR GREATER THAN 4" IN DEPTH.	<b>P1</b>	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YARD	<b>W</b>	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAILS THIS SHEET)
<b>D5</b>	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE I19.0C, AT AN AVERAGE RATE OF 456 LBS. PER SQ.YD.	<b>R1</b>	2'-6" CONCRETE CURB AND GUTTER	<b>Y</b>	MILLED RUMBLE STRIPS

**SPECIAL CURB DETAILS FOR CHANNELIZATION**



**1'-6" CURB AND GUTTER (NON-STANDARD)**

- Y1- STA. 58+17.54 TO 59+05.96 RT
- Y1- STA. 58+31.84 TO 58+97.96 RT
- Y1- STA. 63+52.06 TO 64+64.59 RT
- Y1- STA. 65+81.70 TO 66+06.30 RT
- Y1- STA. 66+35.00 TO 66+81.66 RT
- Y1- STA. 67+10.36 TO 67+30.18 RT
- Y1- STA. 79+19.00 TO 80+81.11 RT



**2'-0" CURB AND GUTTER**

- L- STA. 30+92.00 TO 31+59.00 LT
- Y1- STA. 24+54.00 TO 25+77.00 RT
- Y1- STA. 28+65.48 RT TO -Y- STA. 23+38.18 RT
- Y1- STA. 27+76.88 LT TO -Y- STA. 20+70.93 RT
- Y- STA. 20+53.67 LT TO -Y1- STA. 32+98.97 LT
- Y- STA. 23+58.91 LT TO -Y1- STA. 32+26.75 RT
- Y1- STA. 32+32.66 TO STA. 32+97.25 RT
- Y1- STA. 33+19.20 TO STA. 33+93.02 RT
- Y1- STA. 34+67.09 TO STA. 36+01.92 RT
- Y1- STA. 36+65.07 TO STA. 37+08.78 RT
- Y1- STA. 37+70.91 TO STA. 38+26.67 RT

SEE STD. 846.01 FOR ALL APPLICABLE NOTES AND SECTION VIEW OF JOINTS.

6/2/2017  
 C:\Users\jacob\Documents\Projects\U4751\RDY\_psh\02A\_TYP.dgn  
 Jacob

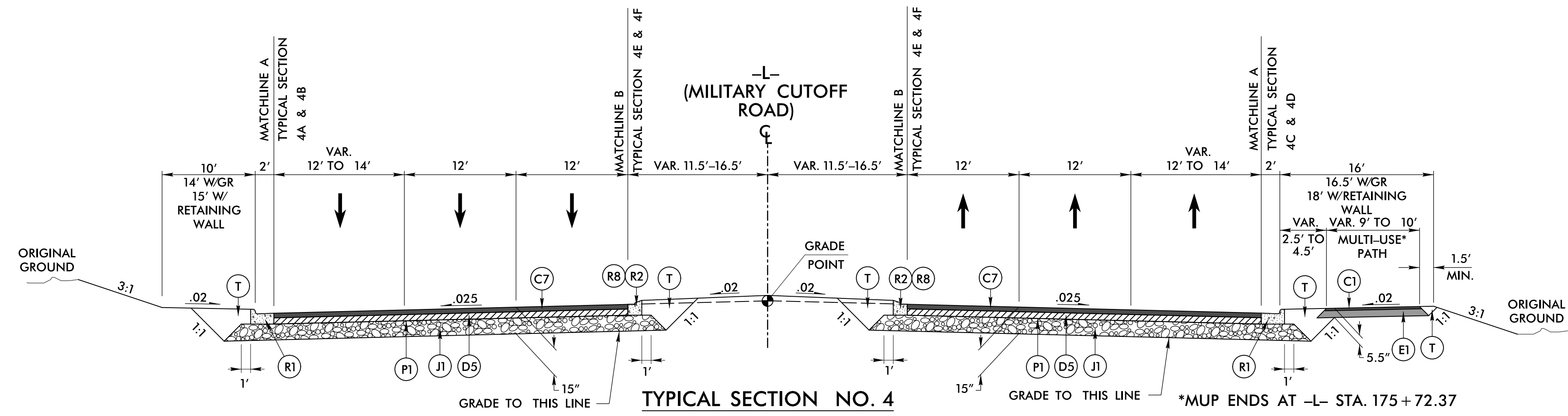


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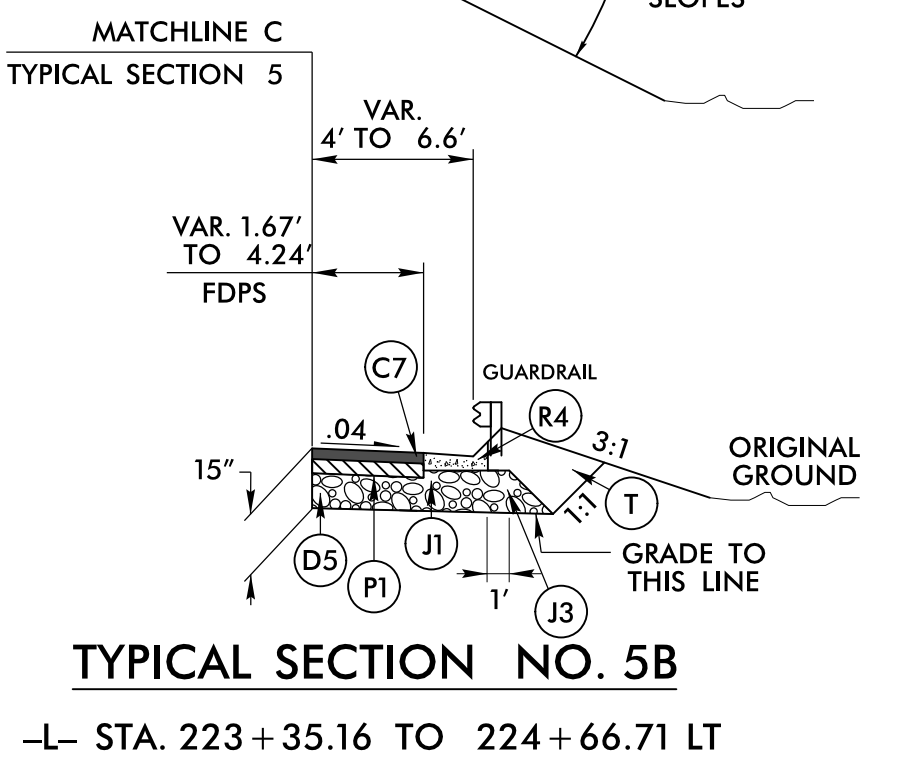
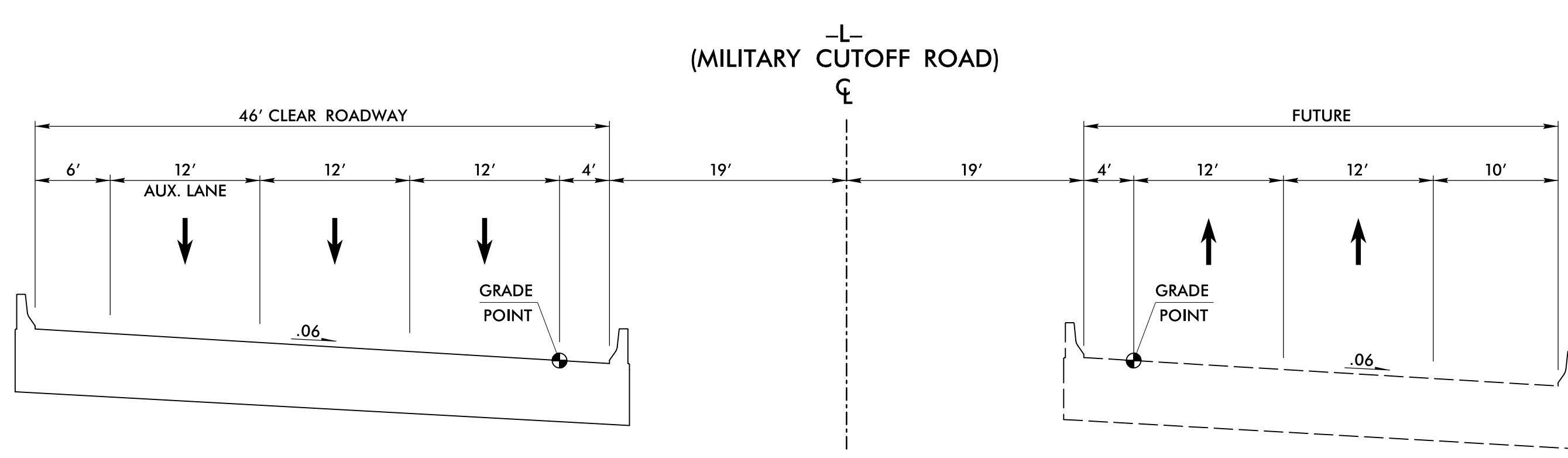
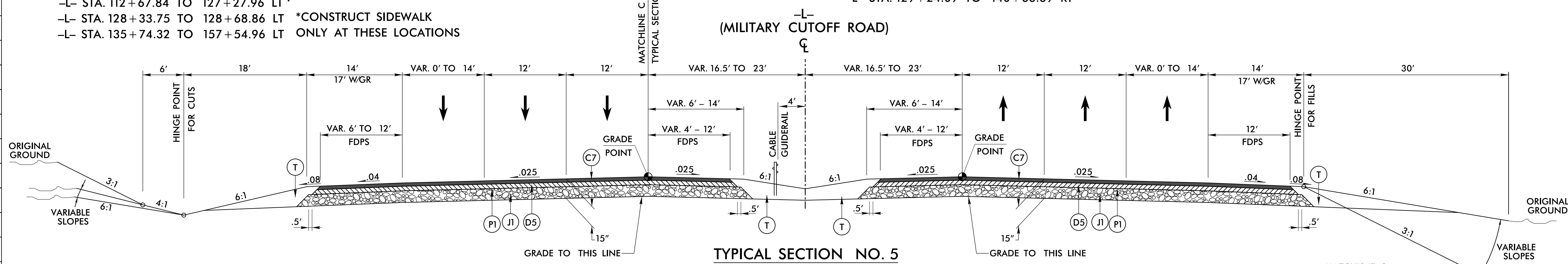
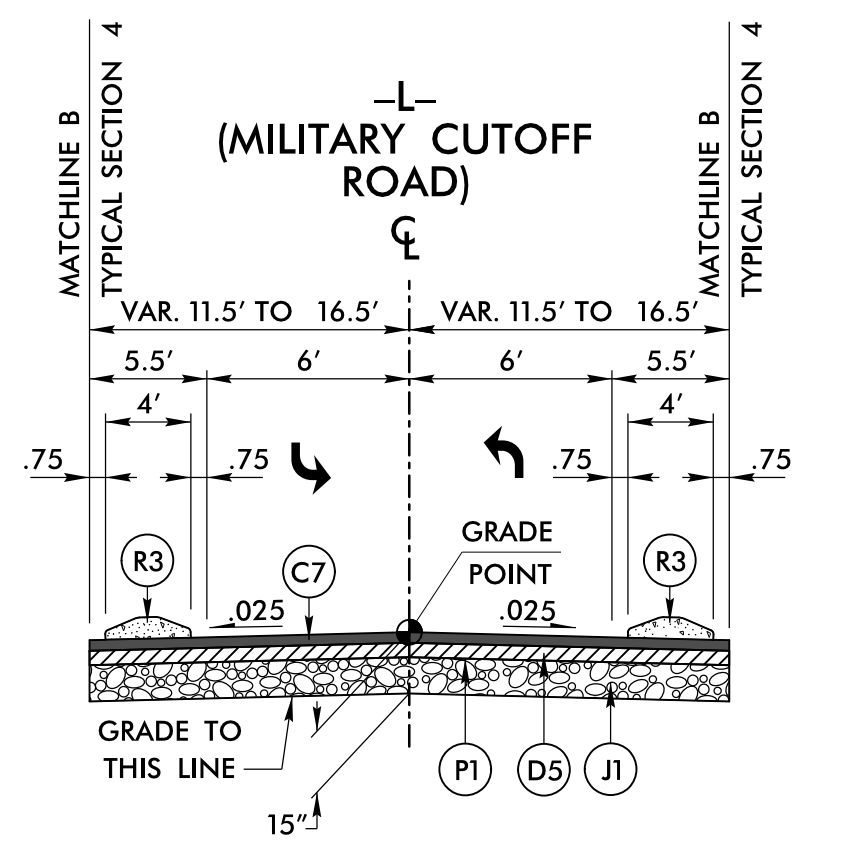
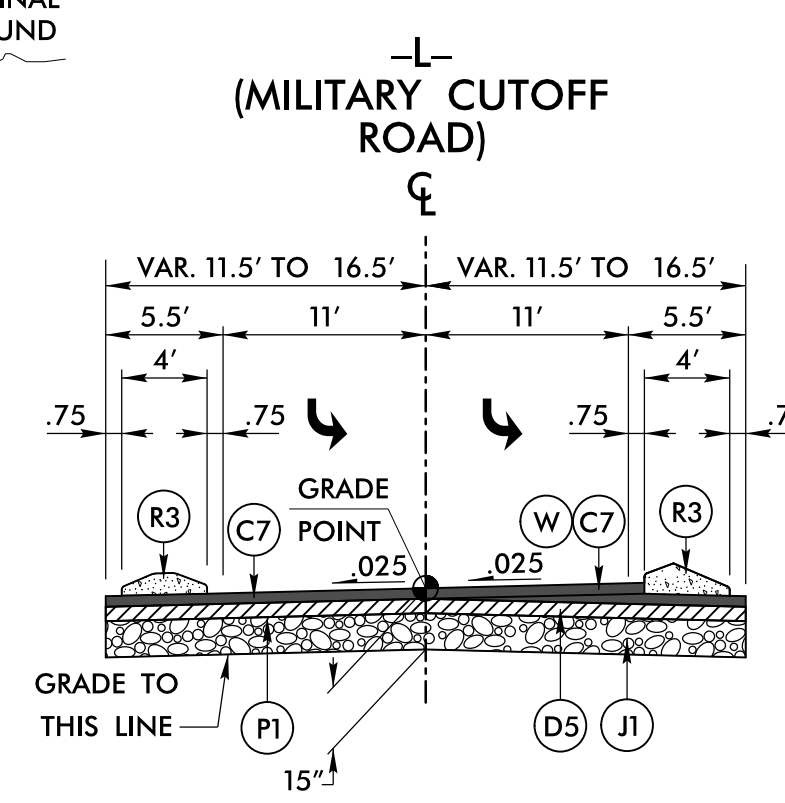
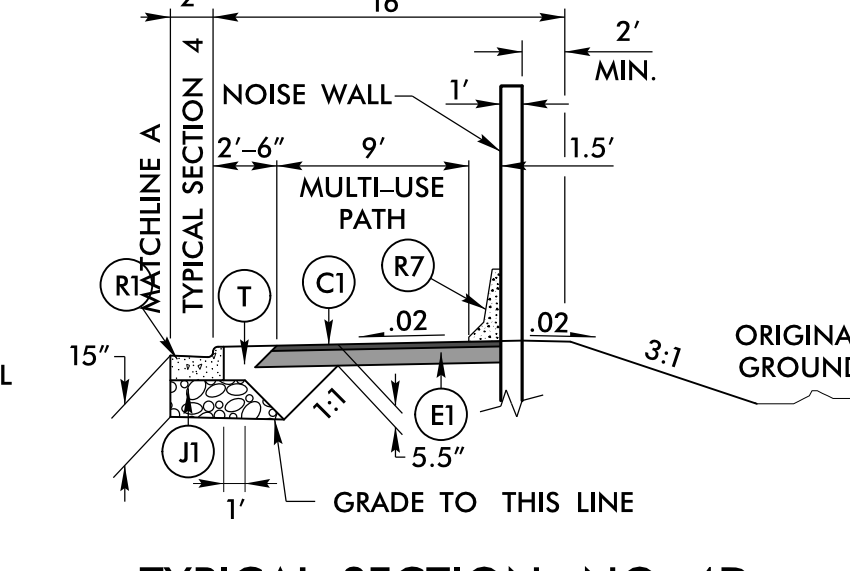
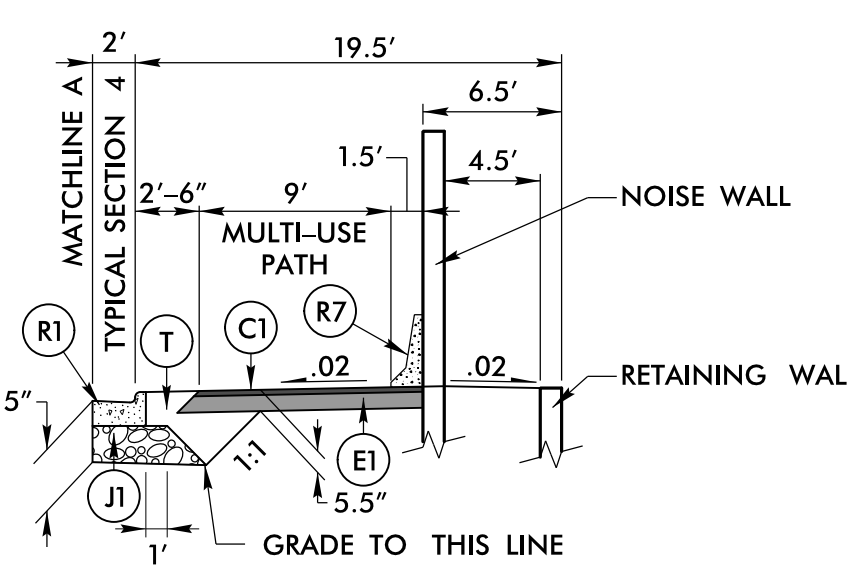
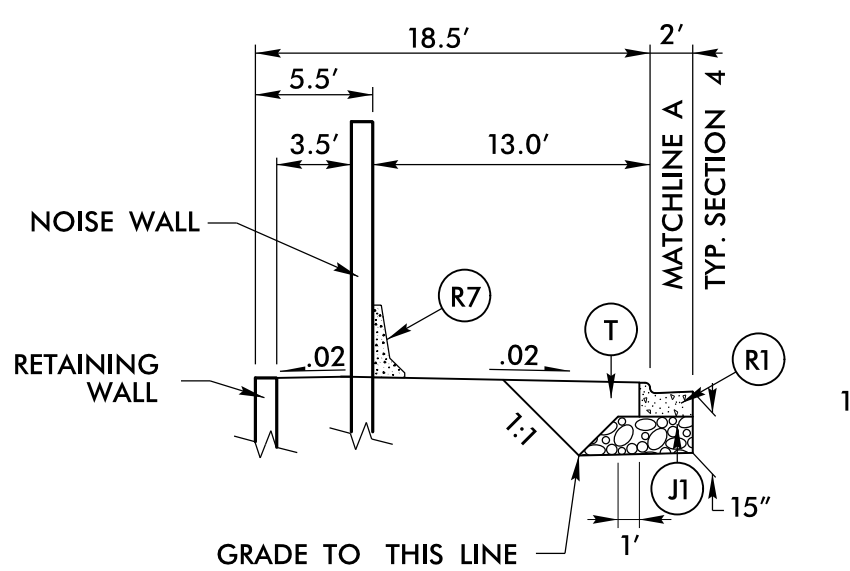
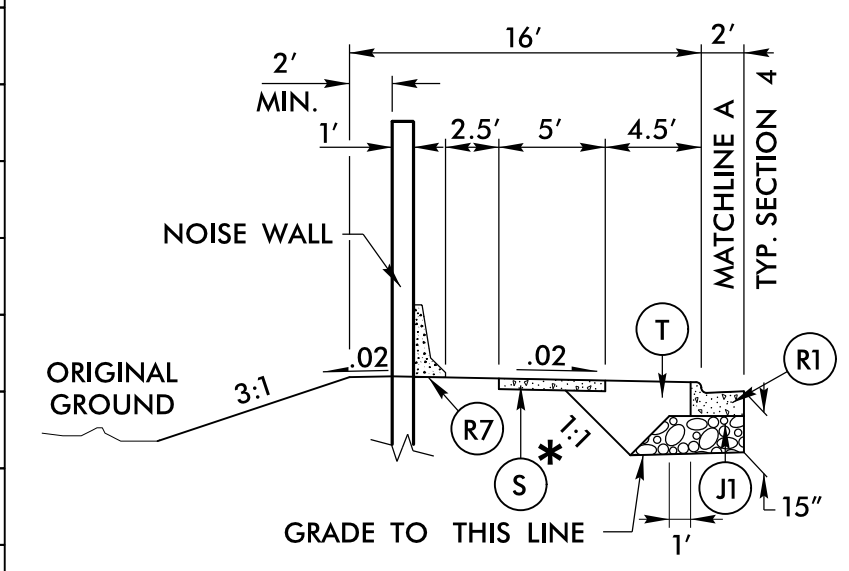
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 Charlotte, NC 28202  
 NC License Number F-0991

PROJECT REFERENCE NO. U-4751	SHEET NO. 2A-3
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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



C1	1.5" S9.5B
C2	2.0" S9.5B
C3	2.5" S9.5B
C4	3.0" S9.5B
C5	VAR. S9.5B
C6	1.5" S9.5C
C7	3.0" S9.5C
C8	VAR. S9.5C
D1	2.5" I19.0B
D2	3.0" I19.0B
D3	4.0" I19.0B
D4	VAR. I19.0B
D5	4.0" I19.0C
D6	VAR. I19.0C
E1	4.0" B25.0B
E2	4.5" B25.0B
E3	VAR. B25.0B
E4	4.5" B25.0C
E5	5.5" B25.0C
E6	7.0" B25.0C
E7	VAR. B25.0C
J1	8.0" ABC
J2	6.0" ABC
J3	VAR. DEPTH ABC
P1	PRIME COAT
R1	2' - 6" C&G
R2	1' - 6" C&G
R3	5" MONO. ISLAND
R4	SHOULDER BERM GUTTER
R5	2.0' VALLEY GUTTER
R6	CONC. BARRIER, TYPE T
R7	CONC. BARRIER, SINGLE
R8	2' - 9" C&G
S	CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W	WEDGING
Y	MILLED RUMBLE STRIPS



7/27/2017  
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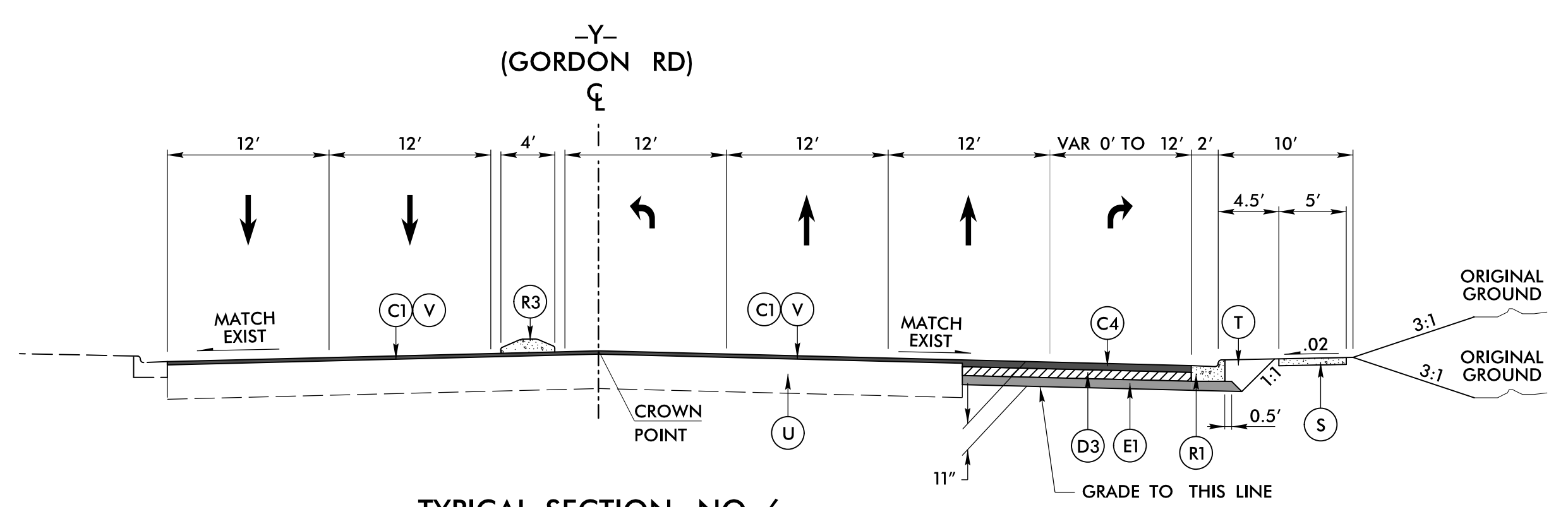


6/2/2017

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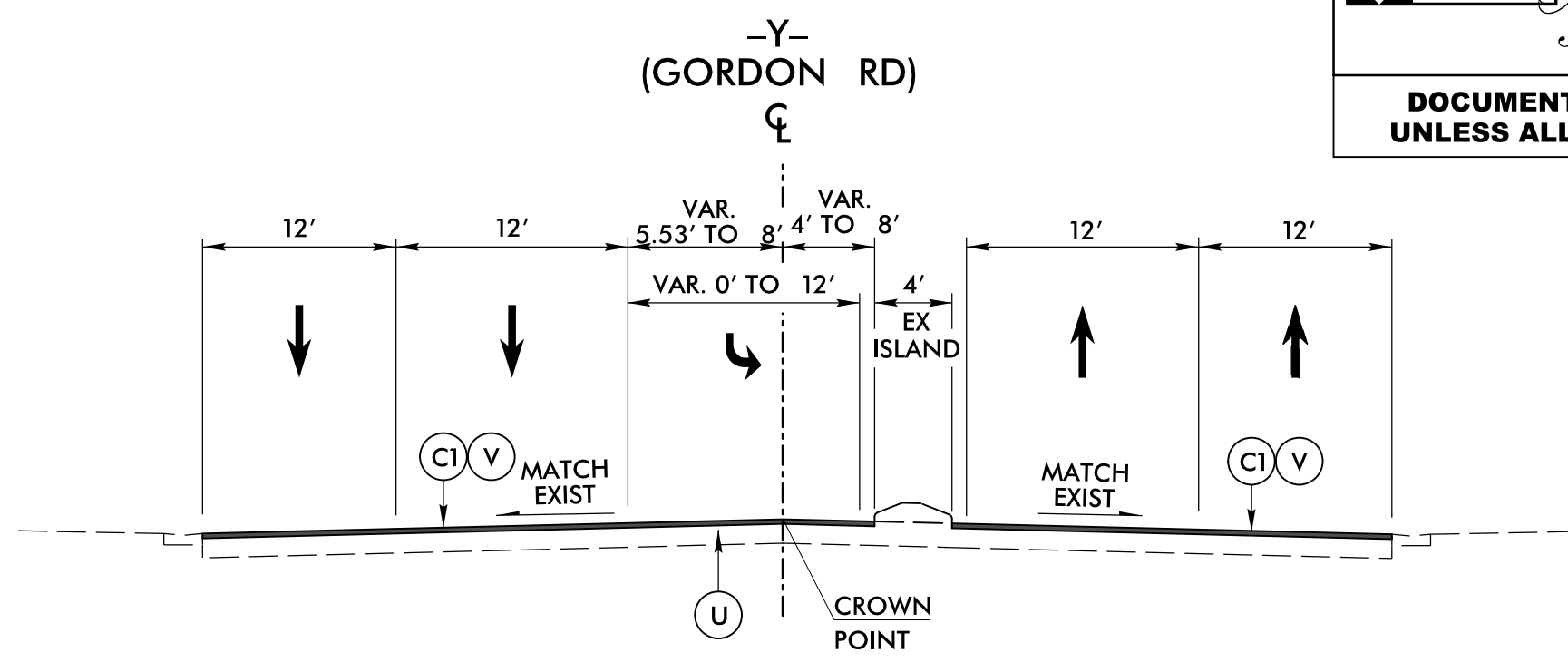
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PROJECT REFERENCE NO. U-4751	SHEET NO. 2A-4
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER



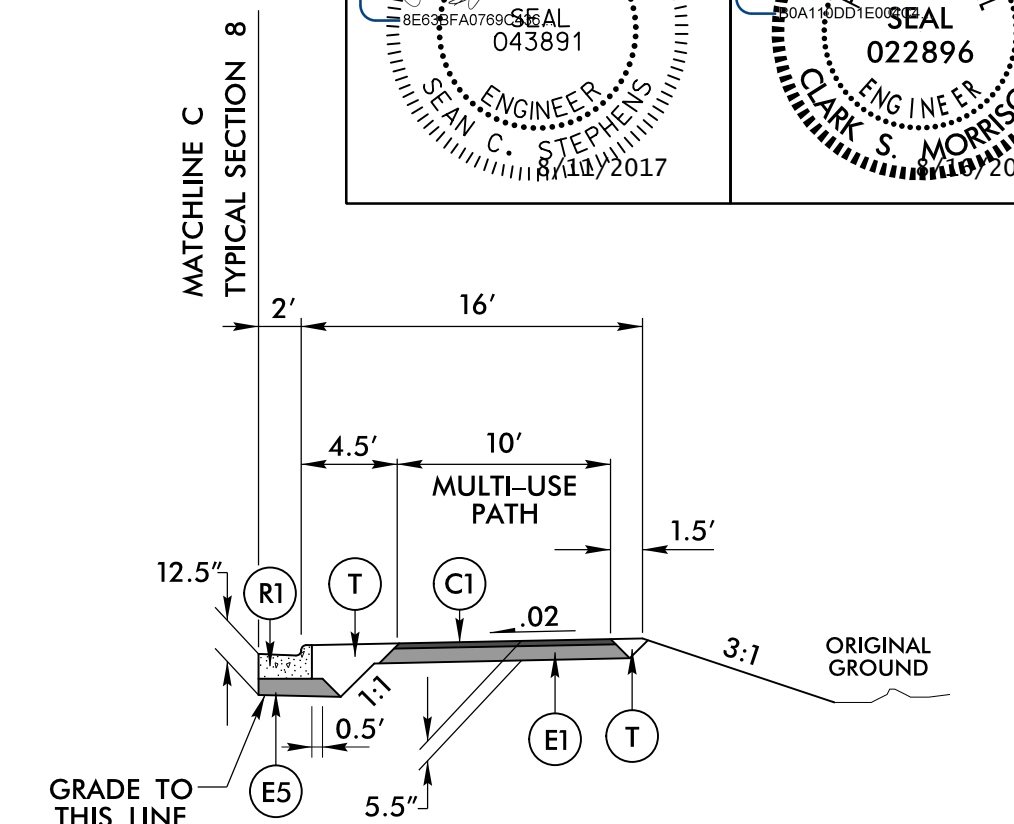
**TYPICAL SECTION NO. 6**

-Y- STA. 10+95.00 TO 21+58.45  
 NOTE: RETAIN EXISTING ISLAND  
 STA. 18+80.00 TO 20+93.00



**TYPICAL SECTION NO. 7**

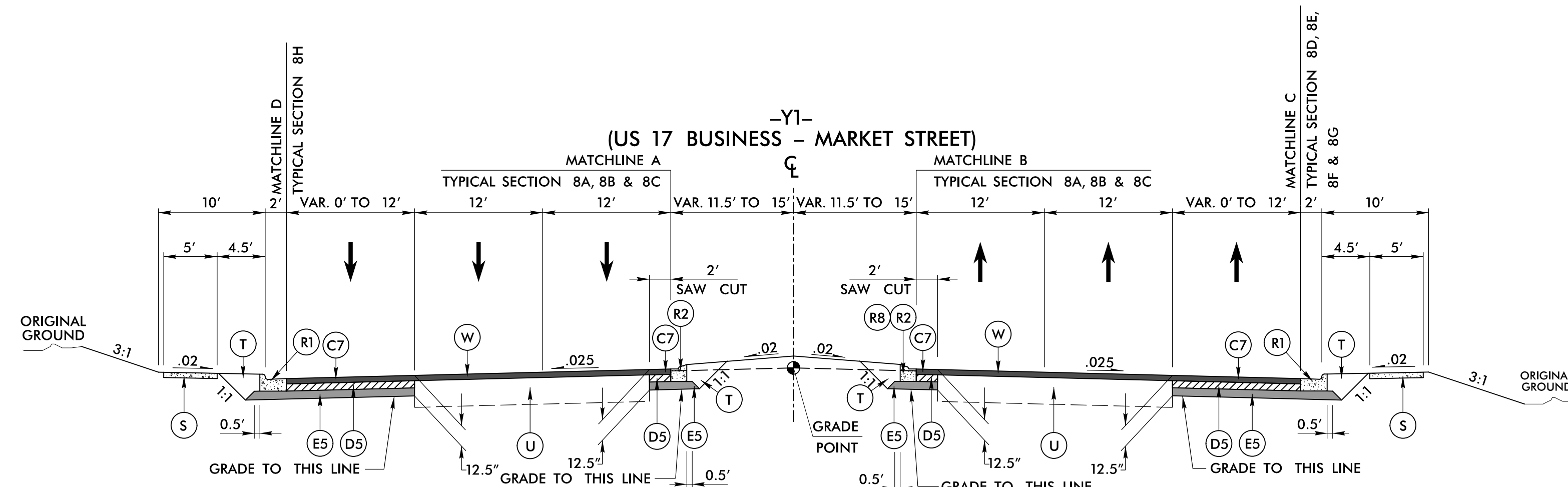
-Y- STA. 22+61.92 TO 31+48.60  
 SEE PLAN SHEETS FOR C&G REPLACEMENT LOCATIONS



**TYPICAL SECTION NO. 8D**

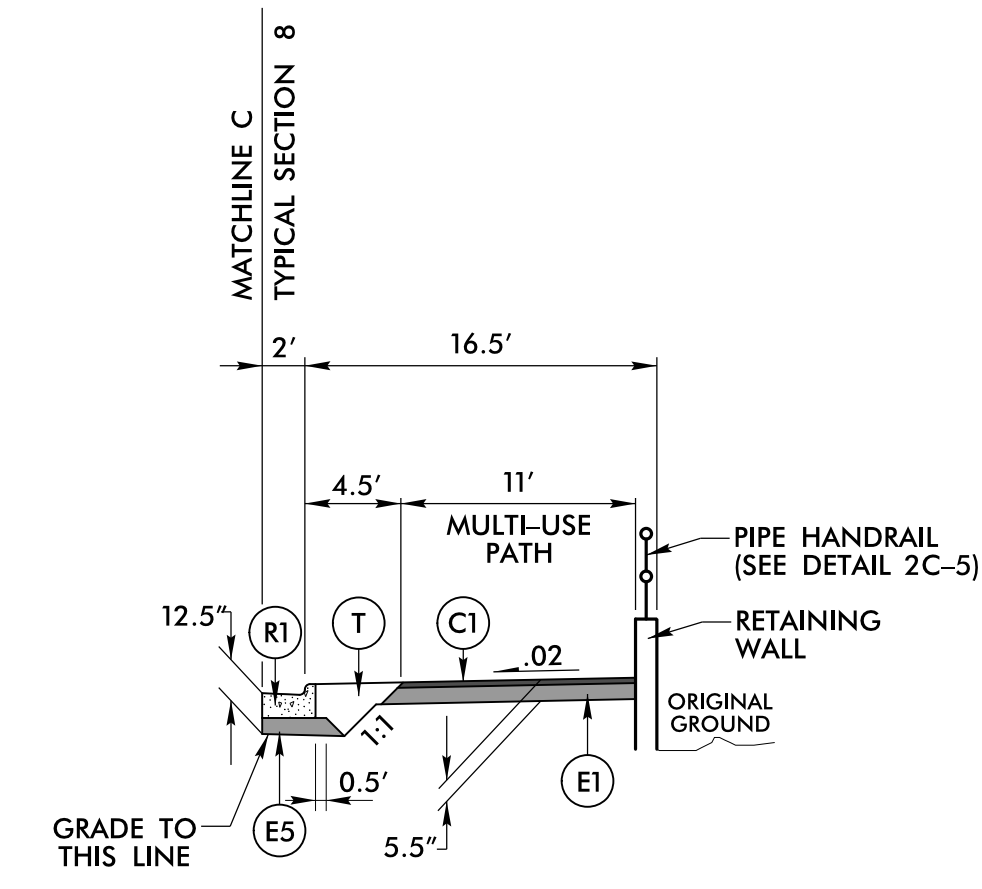
-Y1- STA. 50+94.00 TO 68+40.00  
 -Y1- STA. 69+42.00 TO 78+20.00

C1	1.5" S9.5B
C2	2.0" S9.5B
C3	2.5" S9.5B
C4	3.0" S9.5B
C5	VAR. S9.5B
C6	1.5" S9.5C
C7	3.0" S9.5C
C8	VAR. S9.5C
D1	2.5" I19.0B
D2	3.0" I19.0B
D3	4.0" I19.0B
D4	VAR. I19.0B
D5	4.0" I19.0C
D6	VAR. I19.0C
E1	4.0" B25.0B
E2	4.5" B25.0B
E3	VAR. B25.0B
E4	4.5" B25.0C
E5	5.5" B25.0C
E6	7.0" B25.0C
E7	VAR. B25.0C
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R5	2.0' VALLEY GUTTER
R6	CONC. BARRIER, TYPE T
R7	CONC. BARRIER, SINGLE
R8	2' - 9" C&G
S	CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W	WEDGING
Y	MILLED RUMBLE STRIPS



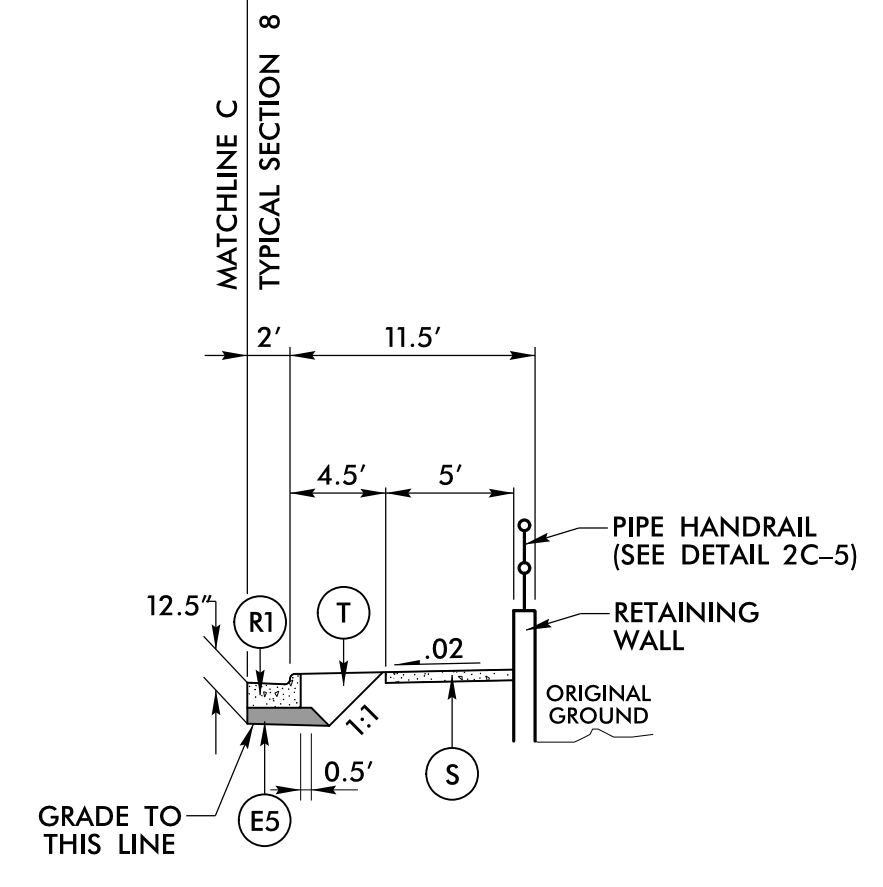
**TYPICAL SECTION NO. 8**

-Y1- STA. 12+00.00 TO 84+95.00  
 SEE PLAN SHEETS FOR SIDEWALK AND 2'-9" C&G (DETAIL ON SHEET 2C-1) LOCATIONS



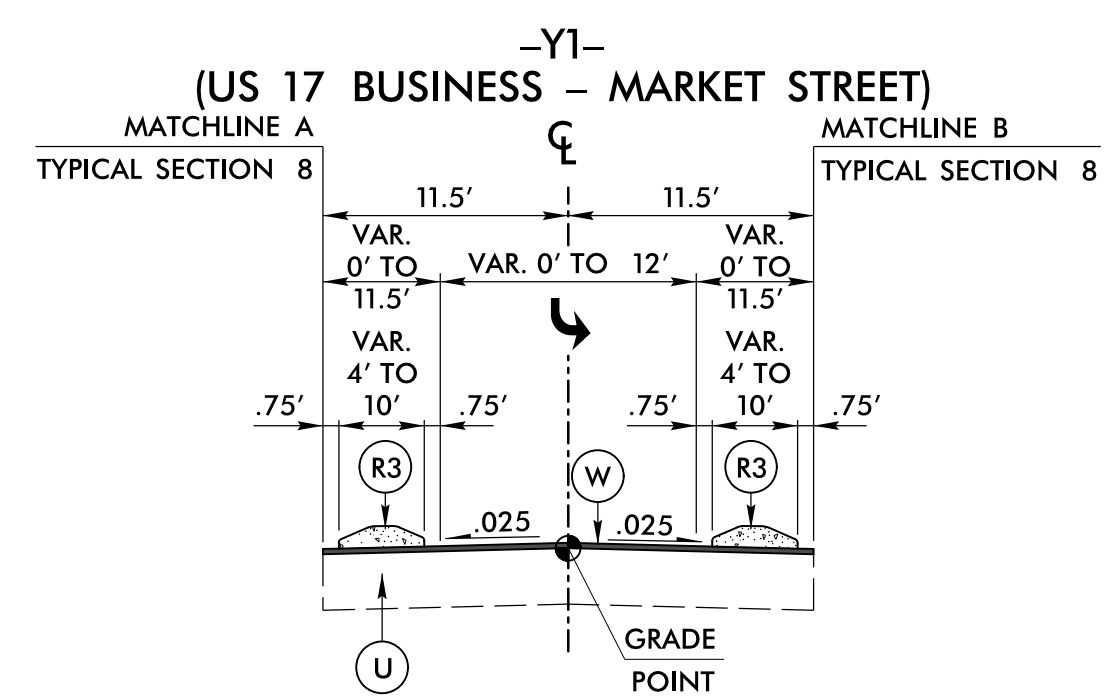
**TYPICAL SECTION NO. 8E**

-Y1- STA. 68+40.00 TO 69+40.78



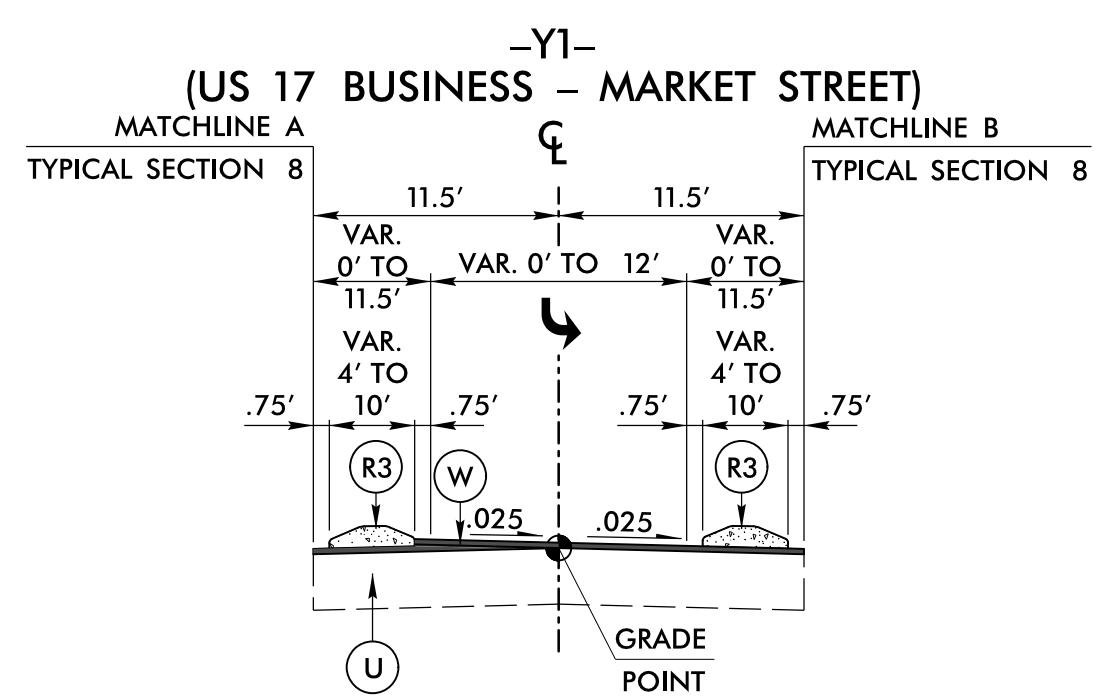
**TYPICAL SECTION NO. 8F**

-Y1- STA. 32+32.00 TO 33+94.00



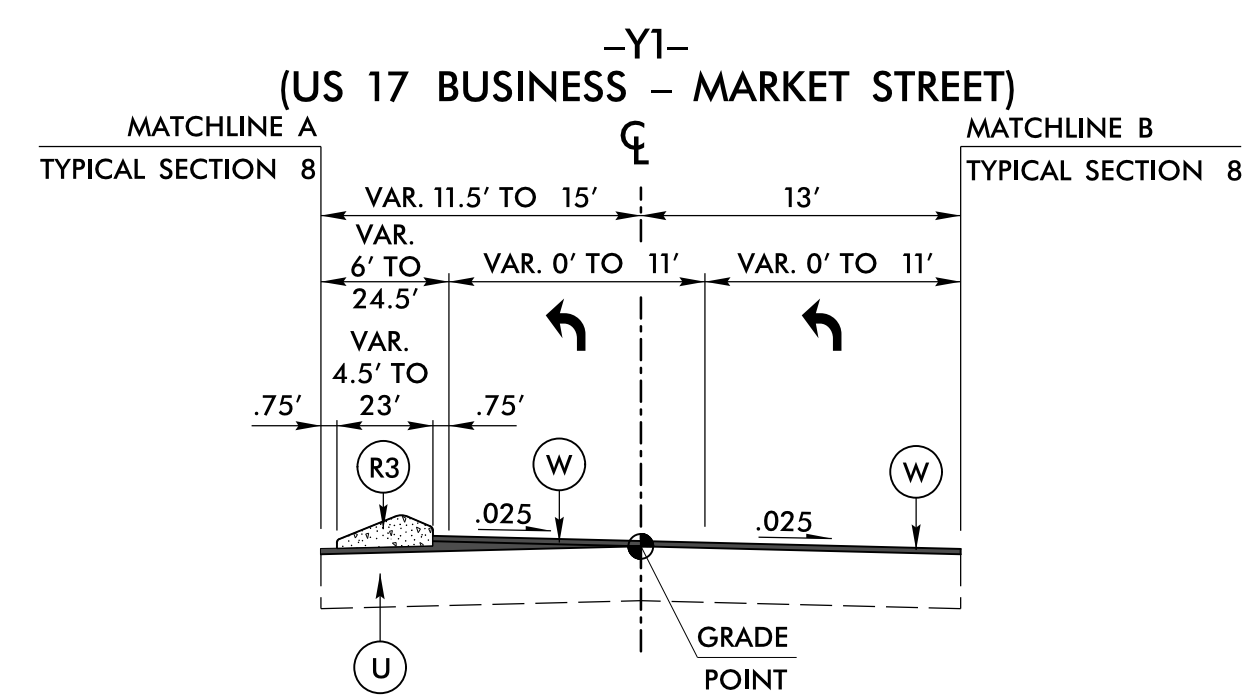
**TYPICAL SECTION NO. 8A**

-Y1- STA. 14+50.00 TO 19+47.00  
 -Y1- STA. 35+84.32 TO 40+59.45  
 -Y1- STA. 57+31.84 TO 65+25.84



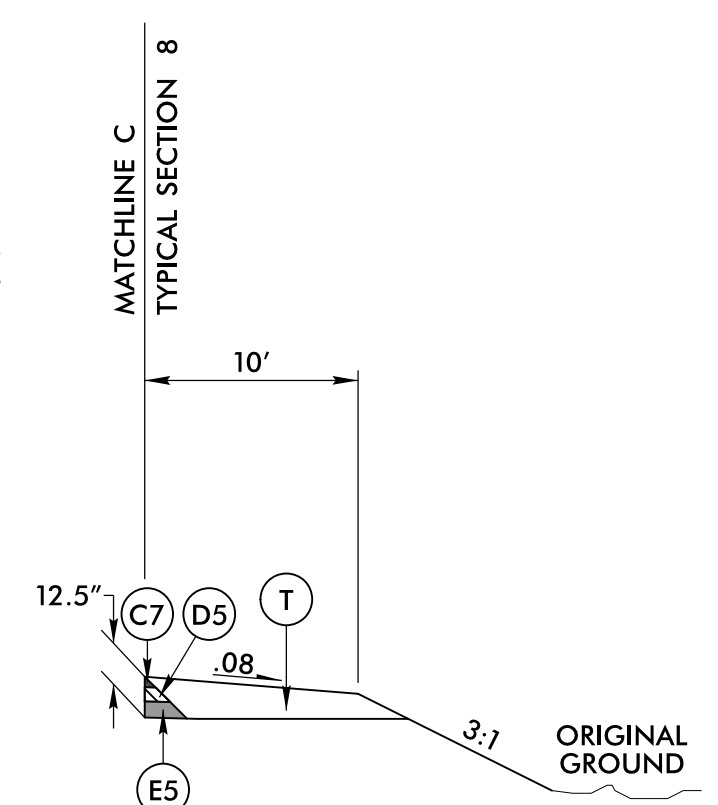
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-Y1- STA. 73+66 TO 78+05  
 -Y1- STA. 79+15 TO 83+58 (MIRROR)



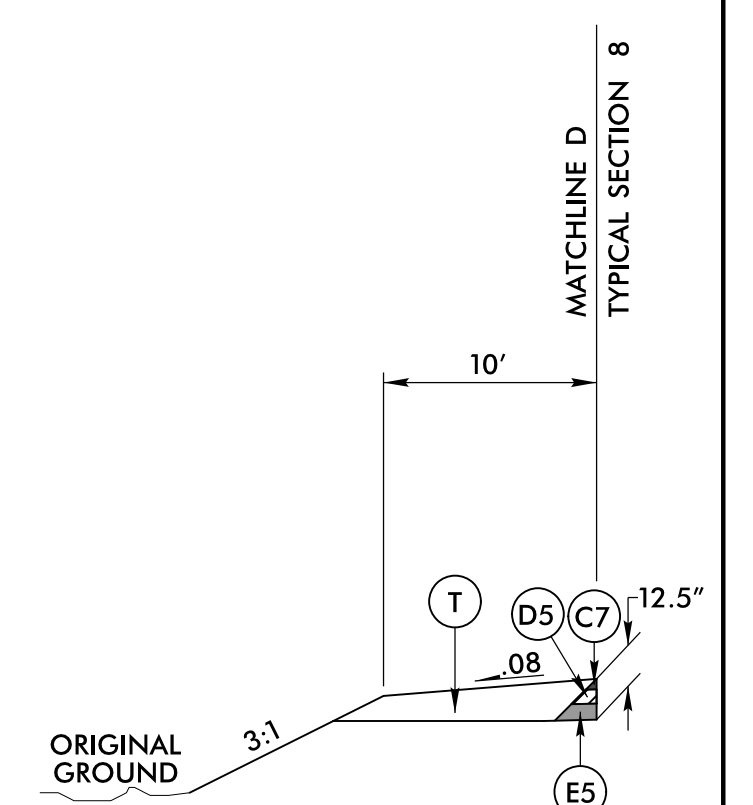
**TYPICAL SECTION NO. 8C**

-Y1- STA. 24+29.30 TO 30+36.00



**TYPICAL SECTION NO. 8G**

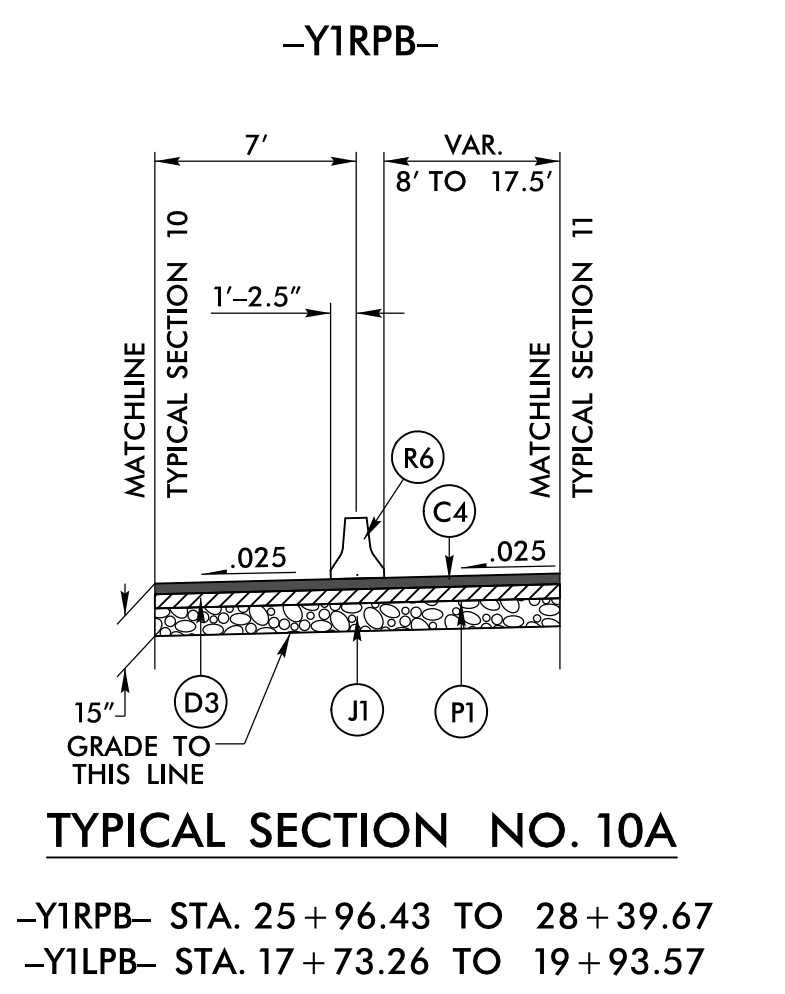
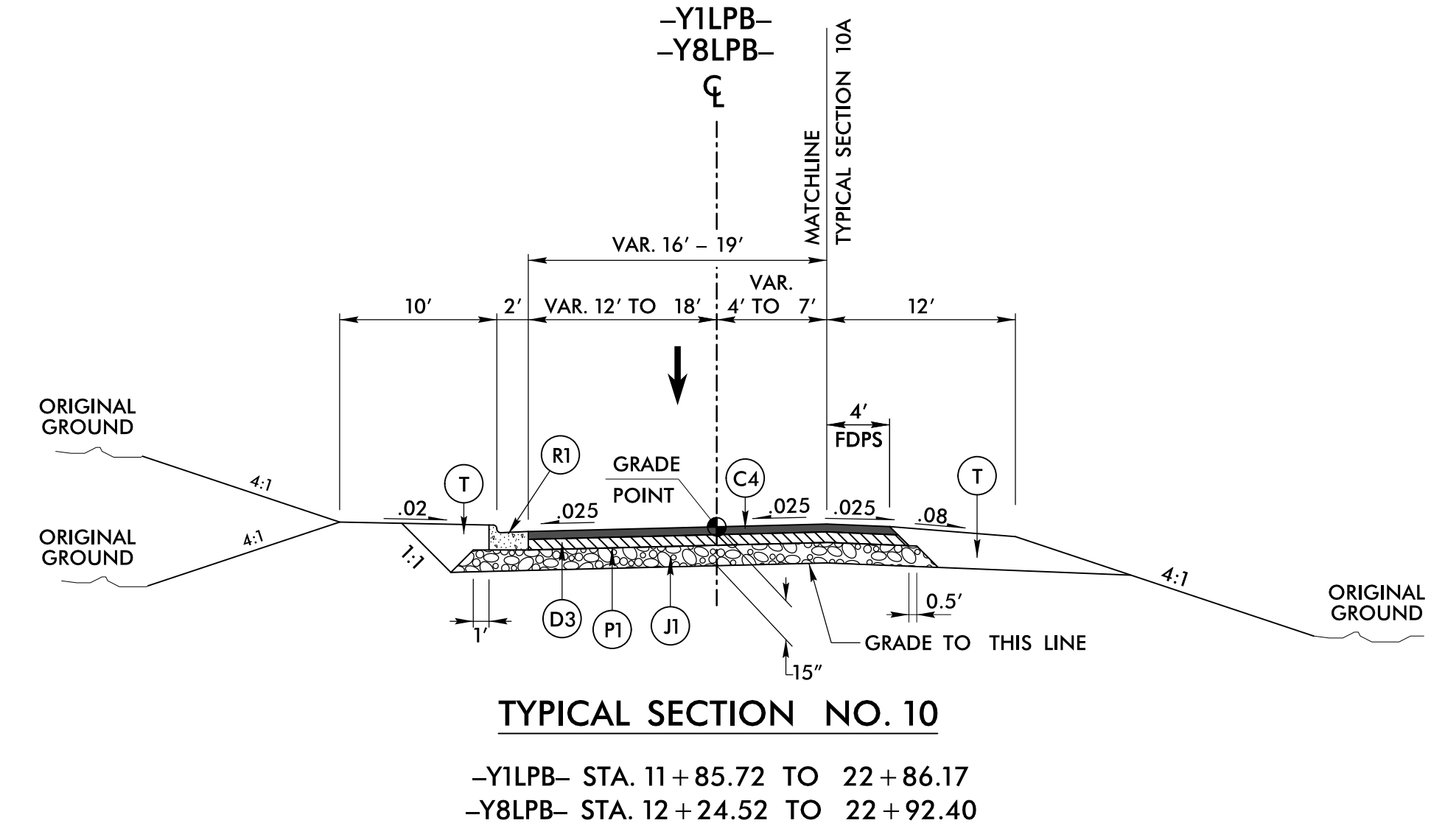
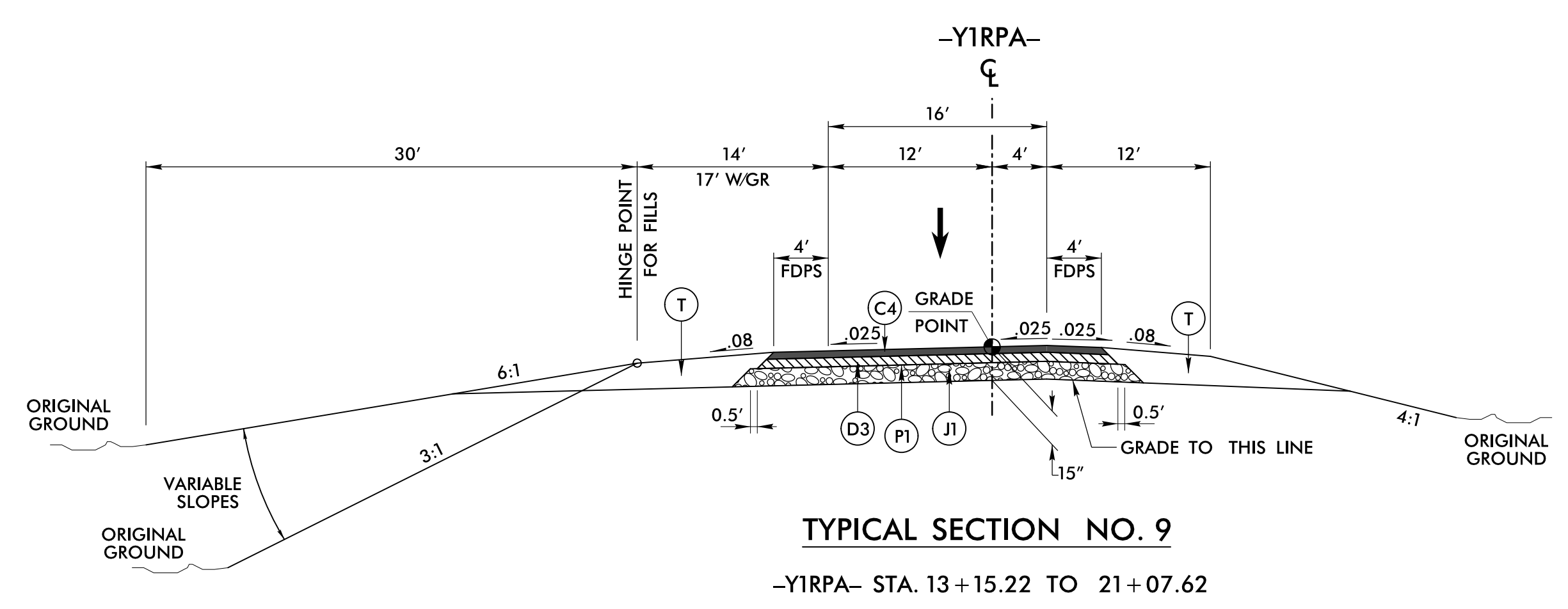
-Y1- STA. 81+16.09 TO 84+95.00



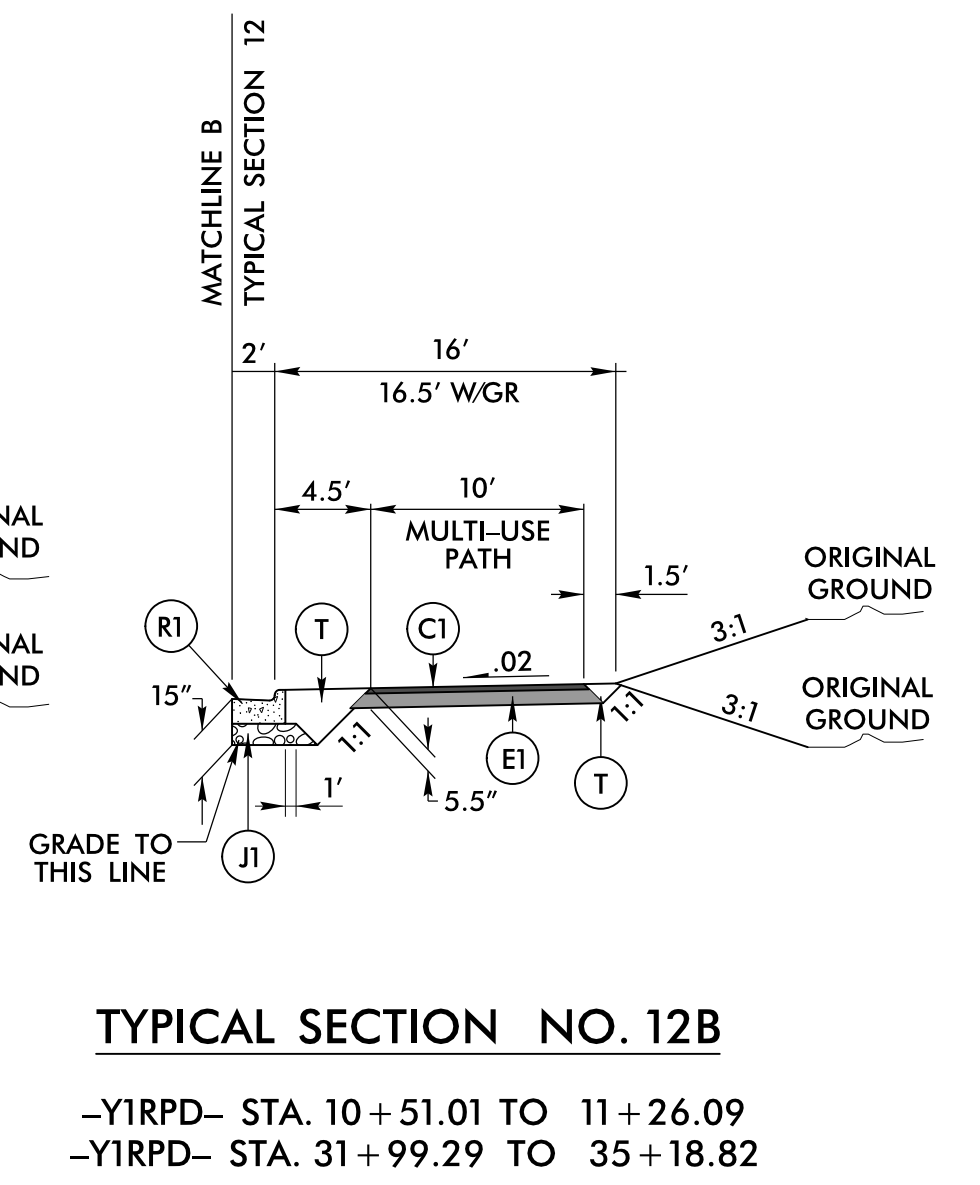
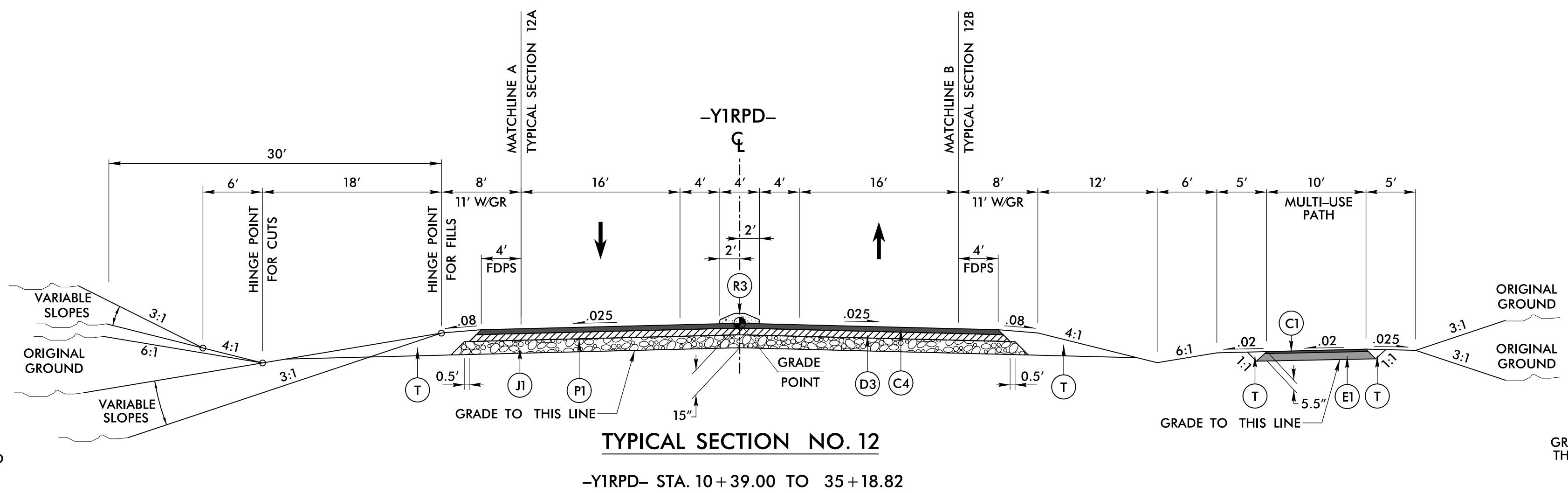
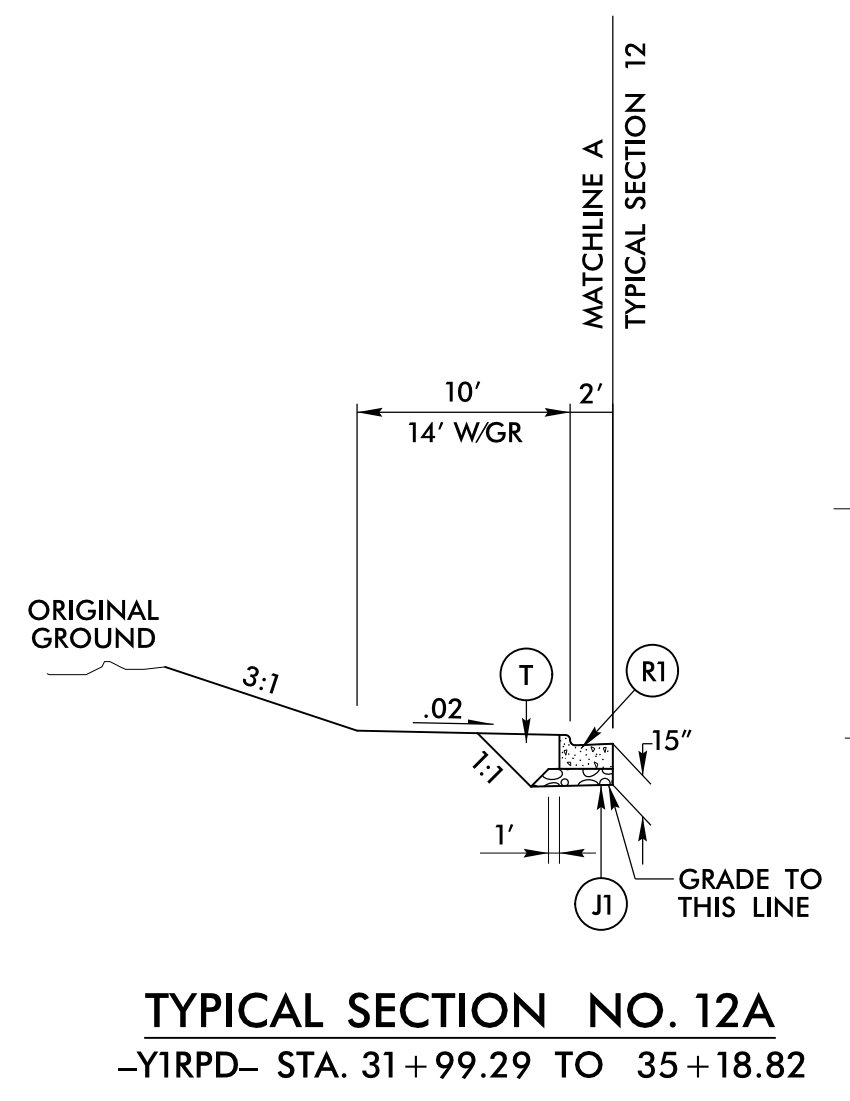
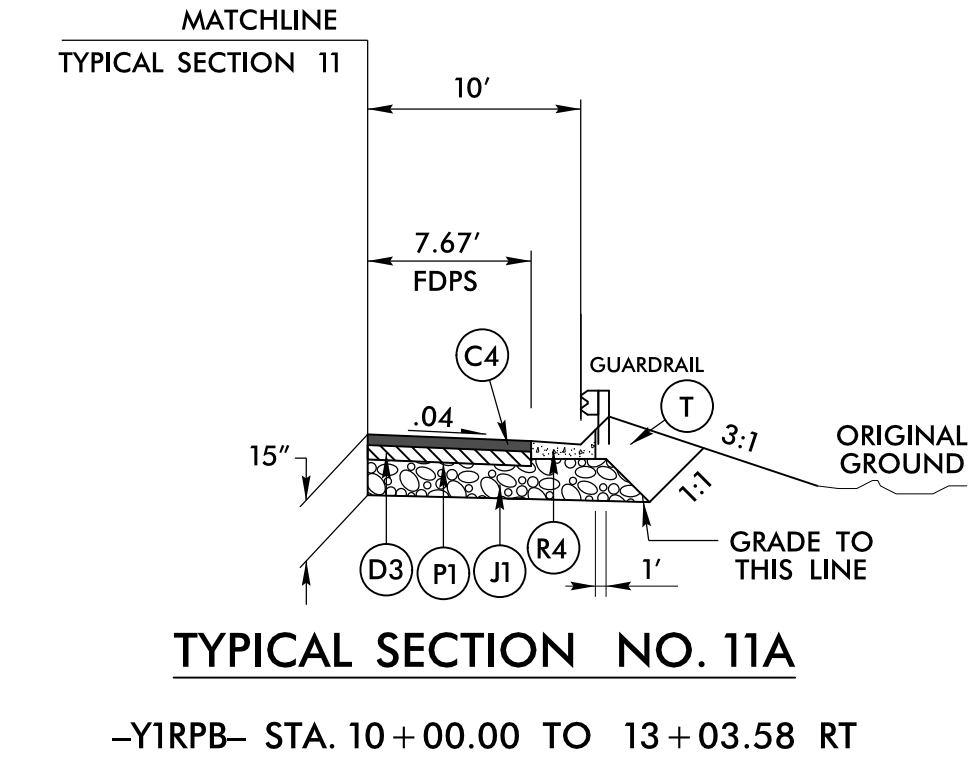
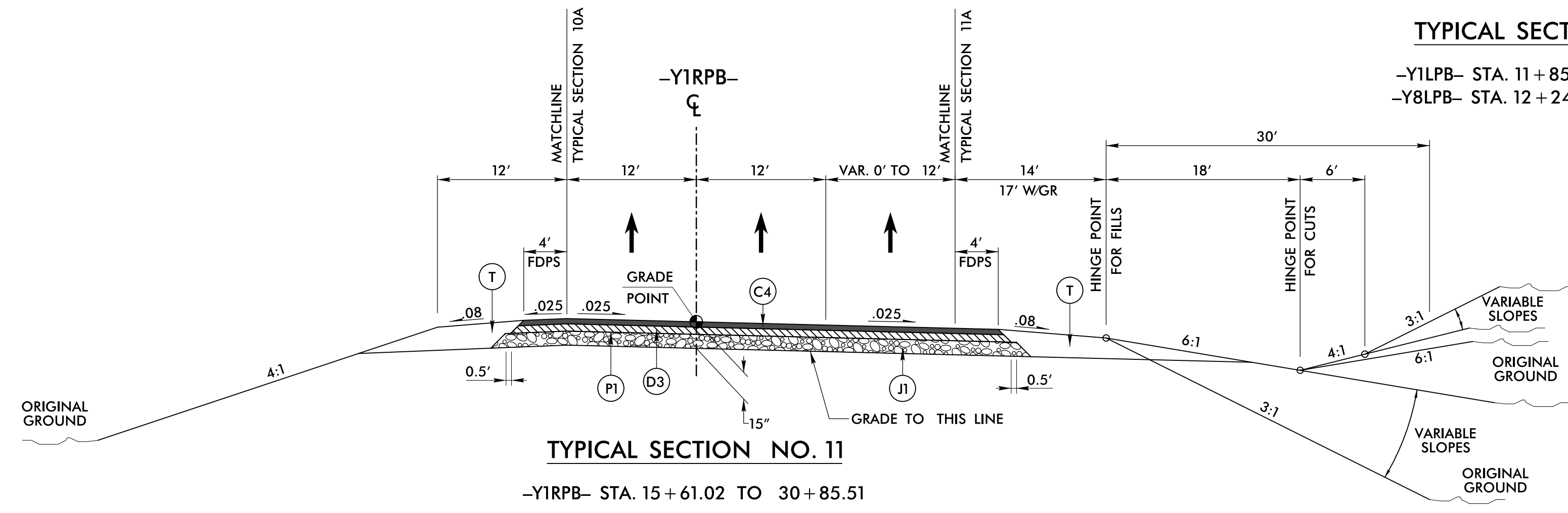
**TYPICAL SECTION NO. 8H**

-Y1- STA. 81+00.00 TO 84+95.00

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 6/2/2017 10:54:00 AM  
 John C. Stepien



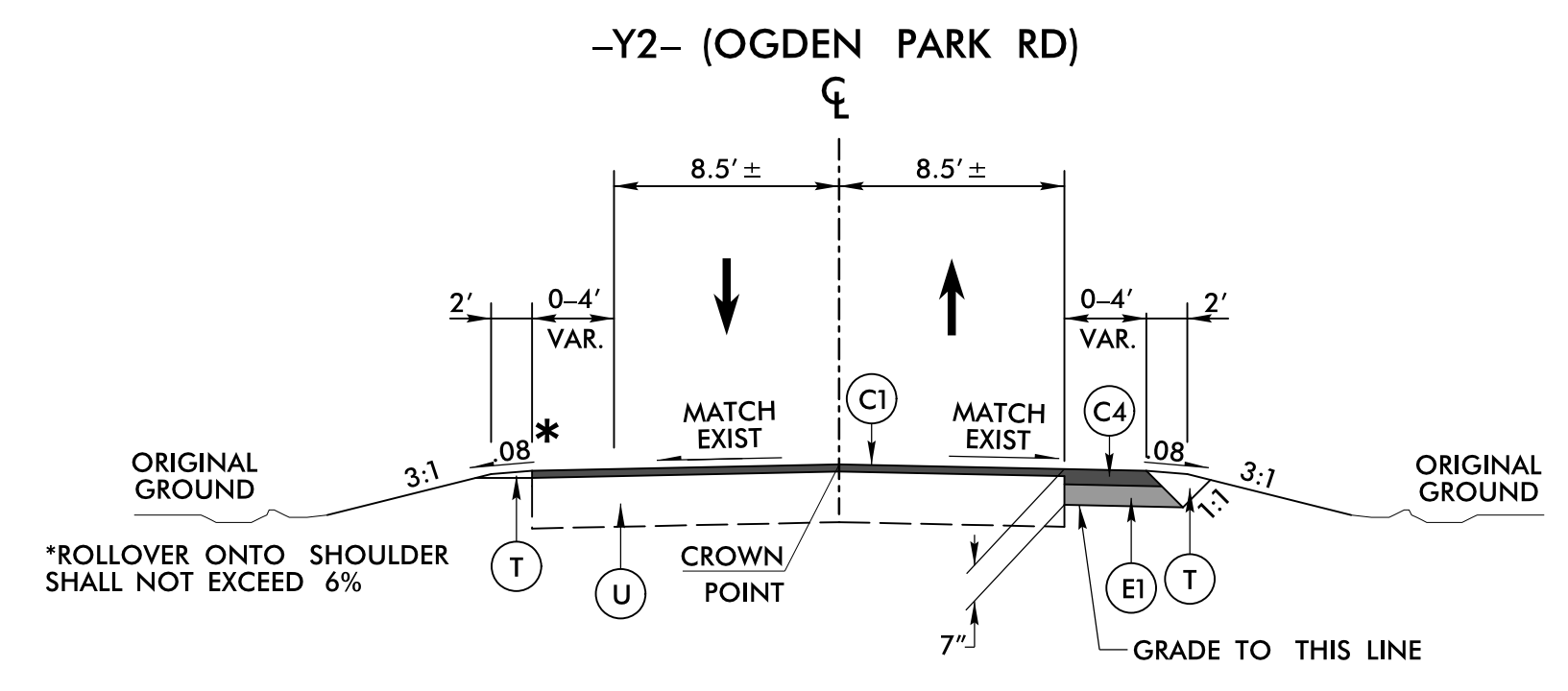
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C2	2.0" S9.5B
C3	2.5" S9.5B
C4	3.0" S9.5B
C5	VAR. S9.5B
C6	1.5" S9.5C
C7	3.0" S9.5C
C8	VAR. S9.5C
D1	2.5" I19.0B
D2	3.0" I19.0B
D3	4.0" I19.0B
D4	VAR. I19.0B
D5	4.0" I19.0C
D6	VAR. I19.0C
E1	4.0" B25.0B
E2	4.5" B25.0B
E3	VAR. B25.0B
E4	4.5" B25.0C
E5	5.5" B25.0C
E6	7.0" B25.0C
E7	VAR. B25.0C
J1	8.0" ABC
J2	6.0" ABC
J3	VAR. DEPTH ABC
P1	PRIME COAT
R1	2' - 6" C&G
R2	1' - 6" C&G
R3	5" MONO. ISLAND
R4	SHOULDER BERM GUTTER
R5	2.0' VALLEY GUTTER
R6	CONC. BARRIER, TYPE T
R7	CONC. BARRIER, SINGLE
R8	2' - 9" C&G
S	CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W	WEDGING
Y	MILLED RUMBLE STRIPS



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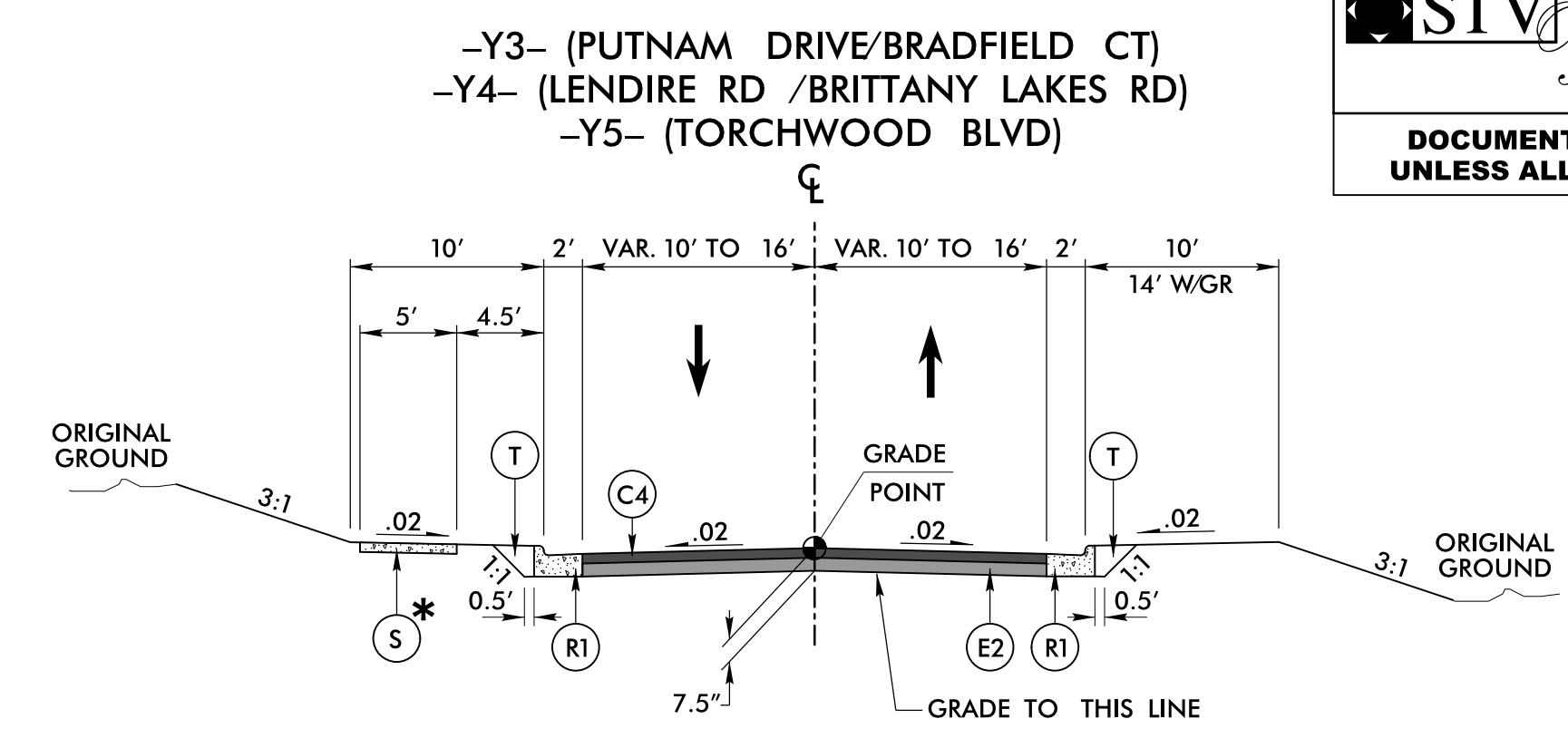
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PROJECT REFERENCE NO. U-4751	SHEET NO. 2A-6
ROADWAY DESIGN ENGINEER <i>[Signature]</i>	PAVEMENT DESIGN ENGINEER <i>[Signature]</i>



**TYPICAL SECTION NO. 13**

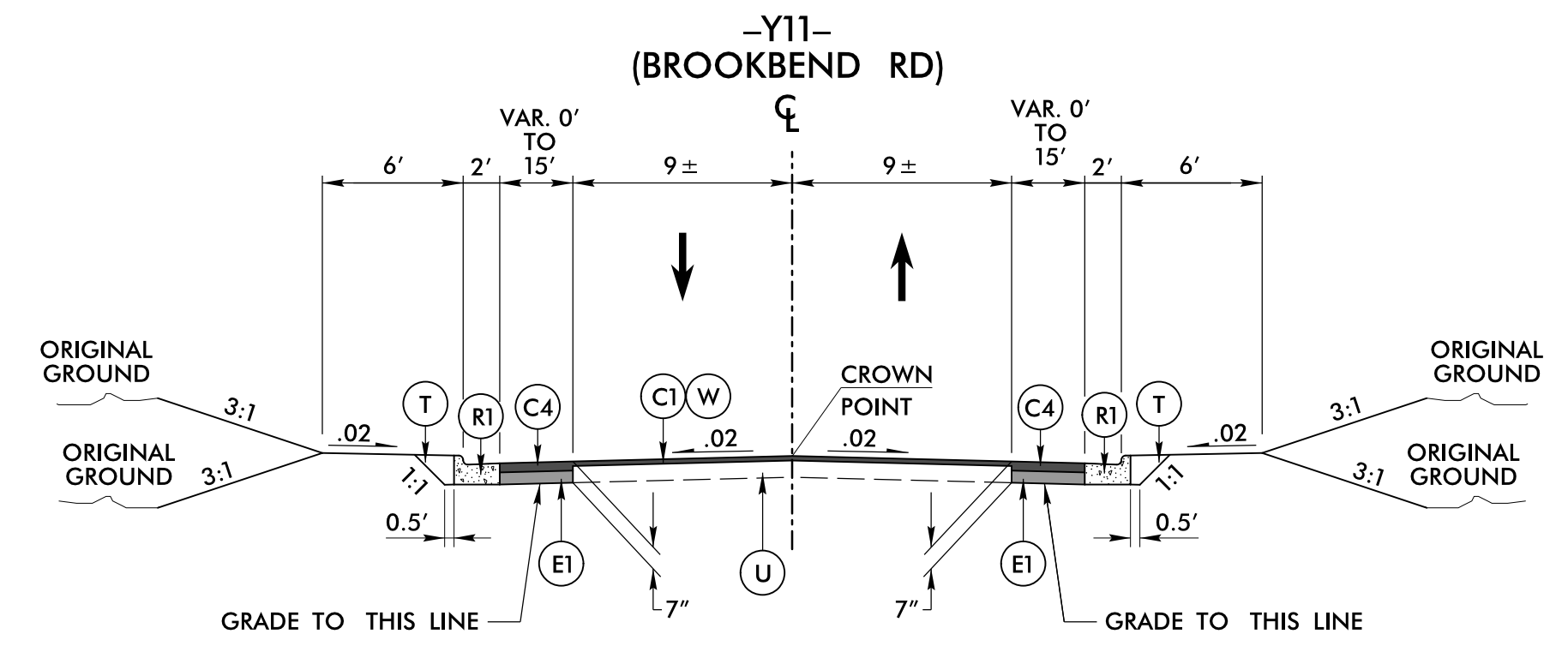
-Y2- STA. 13+80.00 TO 15+90.00



**TYPICAL SECTION NO. 14**

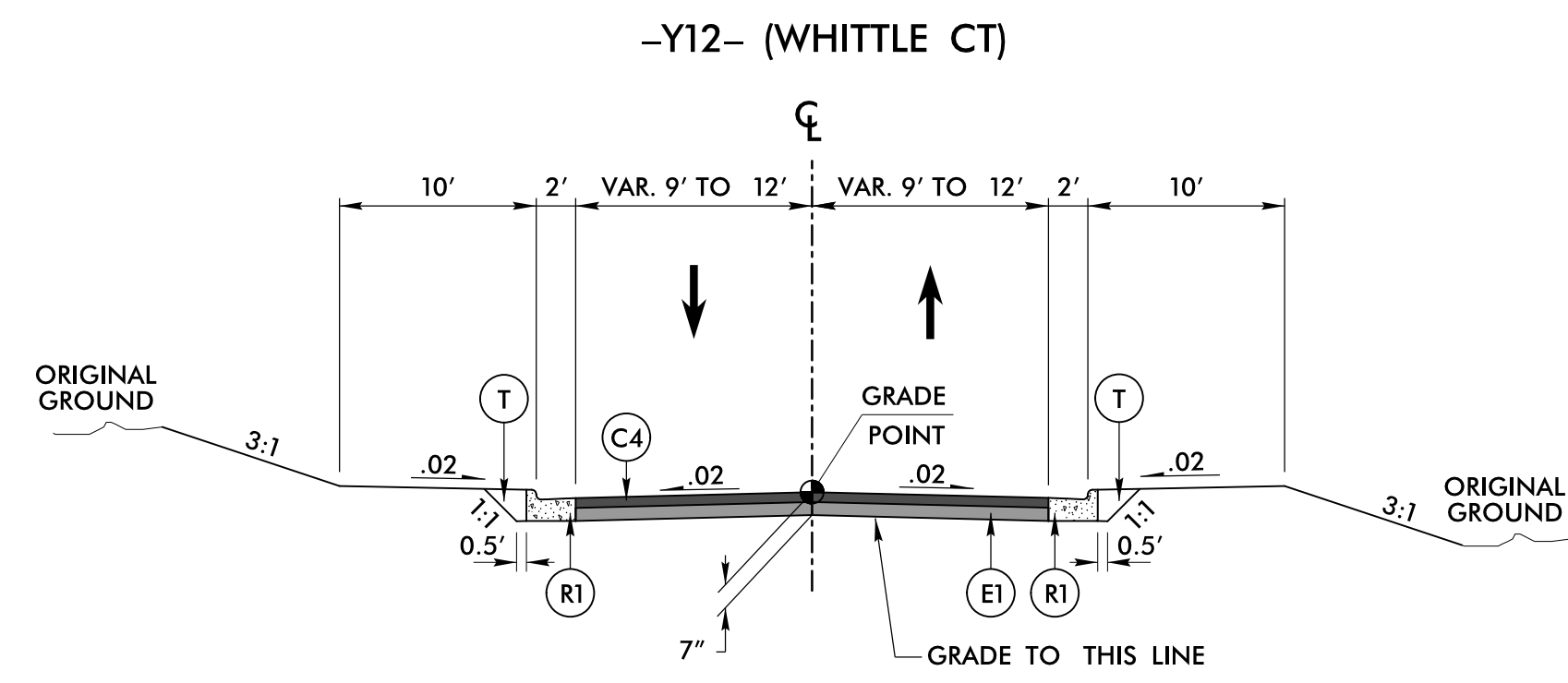
-Y3- STA. 12+08.79 TO 14+18.81\*  
 -Y3- STA. 15+19.01 TO 16+50.90  
 -Y4- STA. 11+70.00 TO 14+94.60\*  
 -Y4- STA. 16+01.27 TO 18+40.00  
 -Y5- STA. 12+80.00 TO 14+45.84\*  
 -Y5- STA. 15+45.72 TO 15+97.33

C1	1.5" S9.5B
C2	2.0" S9.5B
C3	2.5" S9.5B
C4	3.0" S9.5B
C5	VAR. S9.5B
C6	1.5" S9.5C
C7	3.0" S9.5C
C8	VAR. S9.5C
D1	2.5" I19.0B
D2	3.0" I19.0B
D3	4.0" I19.0B
D4	VAR. I19.0B
D5	4.0" I19.0C
D6	VAR. I19.0C
E1	4.0" B25.0B
E2	4.5" B25.0B
E3	VAR. B25.0B
E4	4.5" B25.0C
E5	5.5" B25.0C
E6	7.0" B25.0C
E7	VAR. B25.0C
J1	8.0" ABC
J2	6.0" ABC
J3	VAR. DEPTH ABC
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S	CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W	WEDGING
Y	MILLED RUMBLE STRIPS



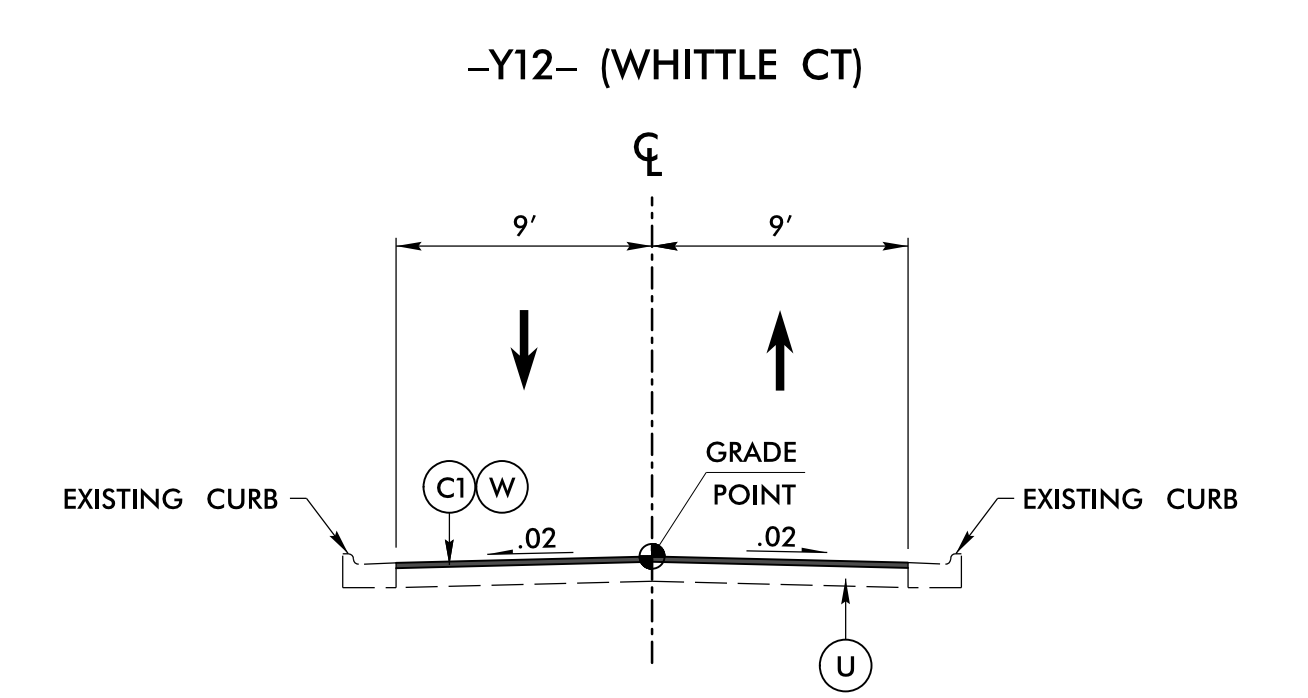
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-Y11- STA. 11+18.49 TO 11+44.93



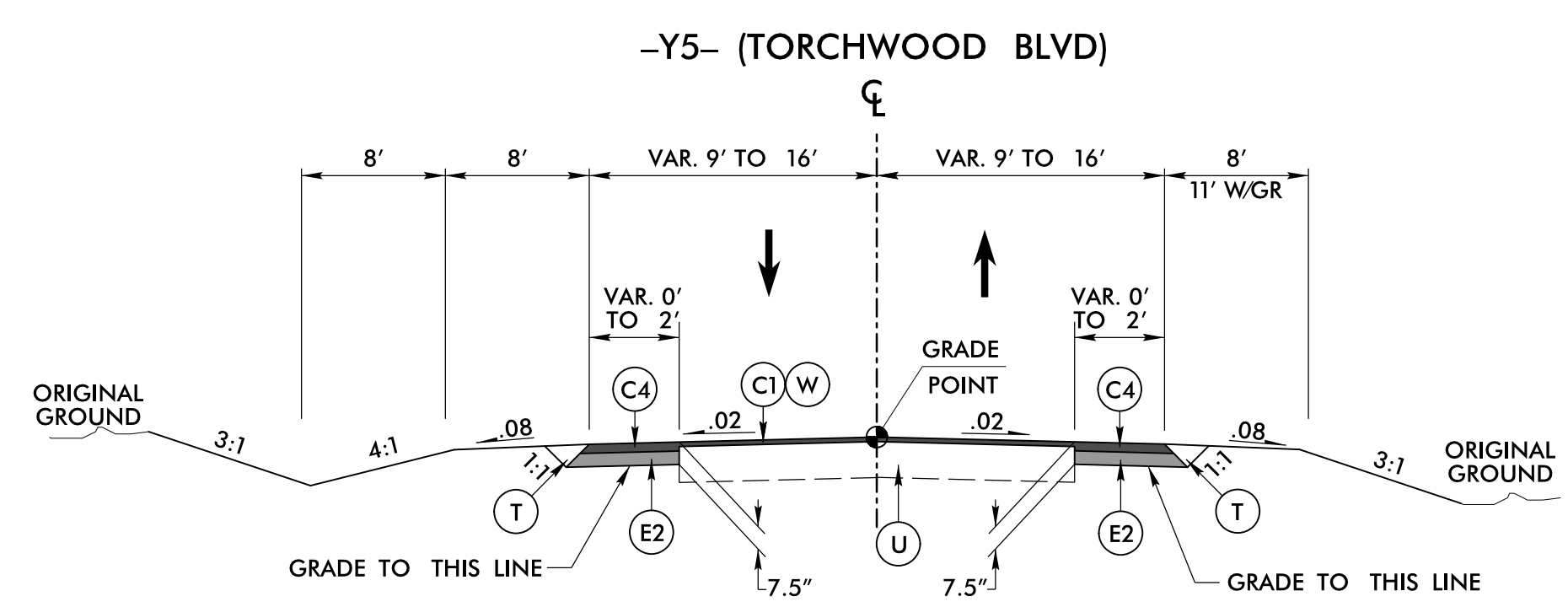
**TYPICAL SECTION NO. 16**

-Y12- STA. 10+49.52 TO 12+05.00  
 (END CURB & GUTTER 11+91.34 LT & 12+01.15 RT)



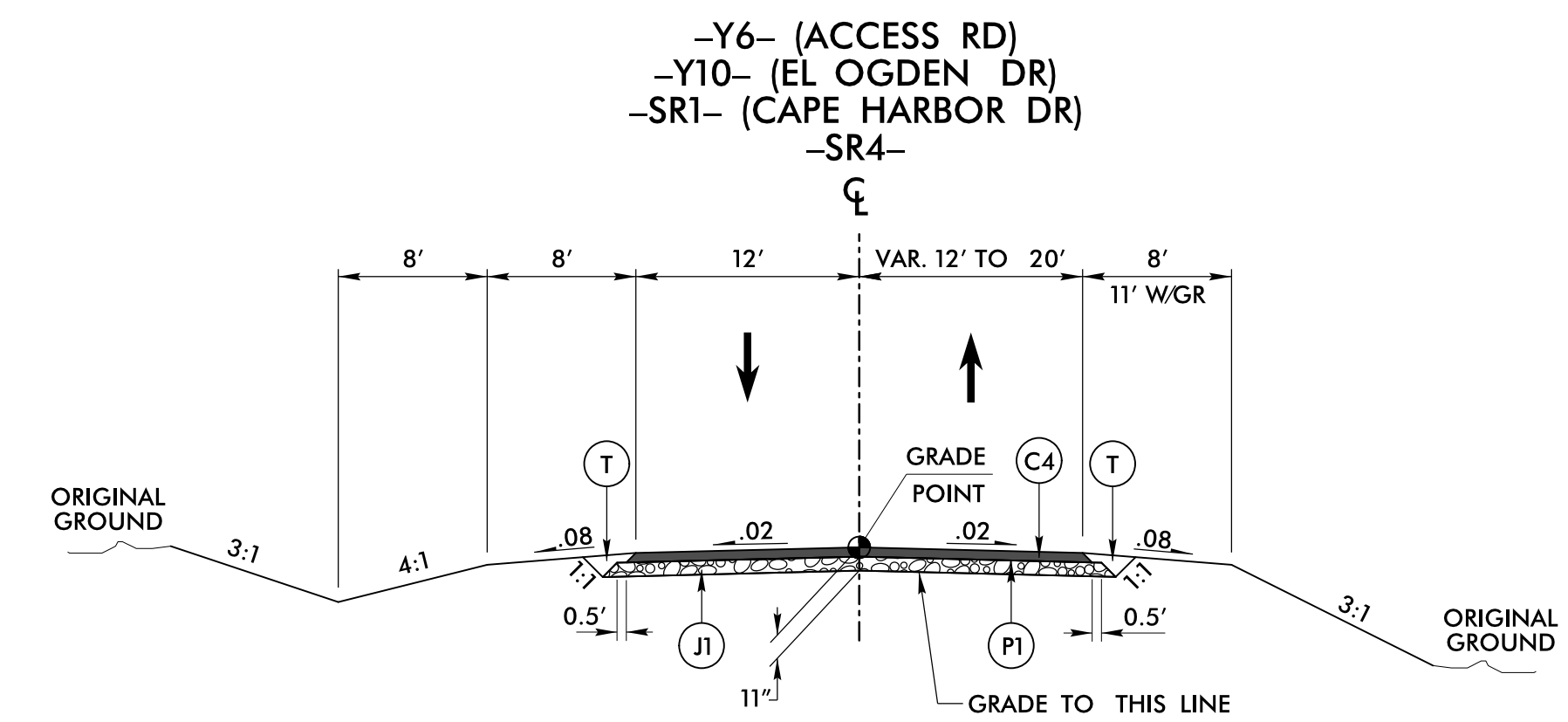
**TYPICAL SECTION NO. 17**

-Y12- STA. 12+05.00 TO 12+55.00



**TYPICAL SECTION NO. 18**

-Y5- STA. 15+97.33 TO 17+00.00



**TYPICAL SECTION NO. 19**

-Y6- STA. 10+52.51 TO 13+25.00  
 -Y10- STA. 10+47.50 TO 12+50.00  
 -SR1- STA. 11+25.00 TO 18+75.88  
 -SR4- STA. 10+54.50 TO 34+36.28

6/2/2017

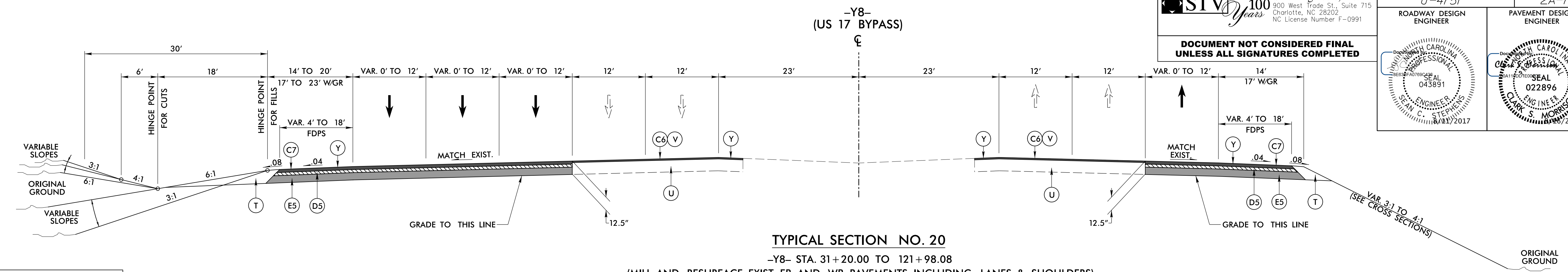
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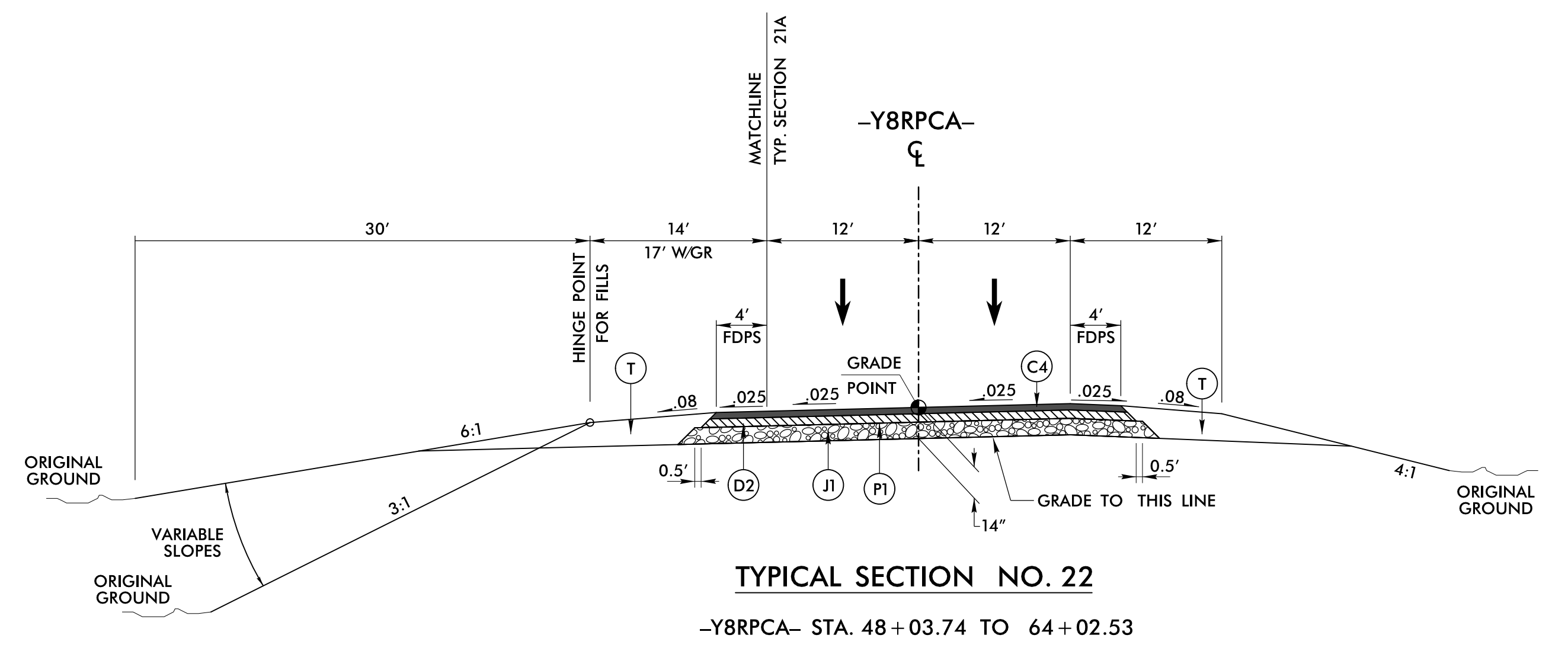
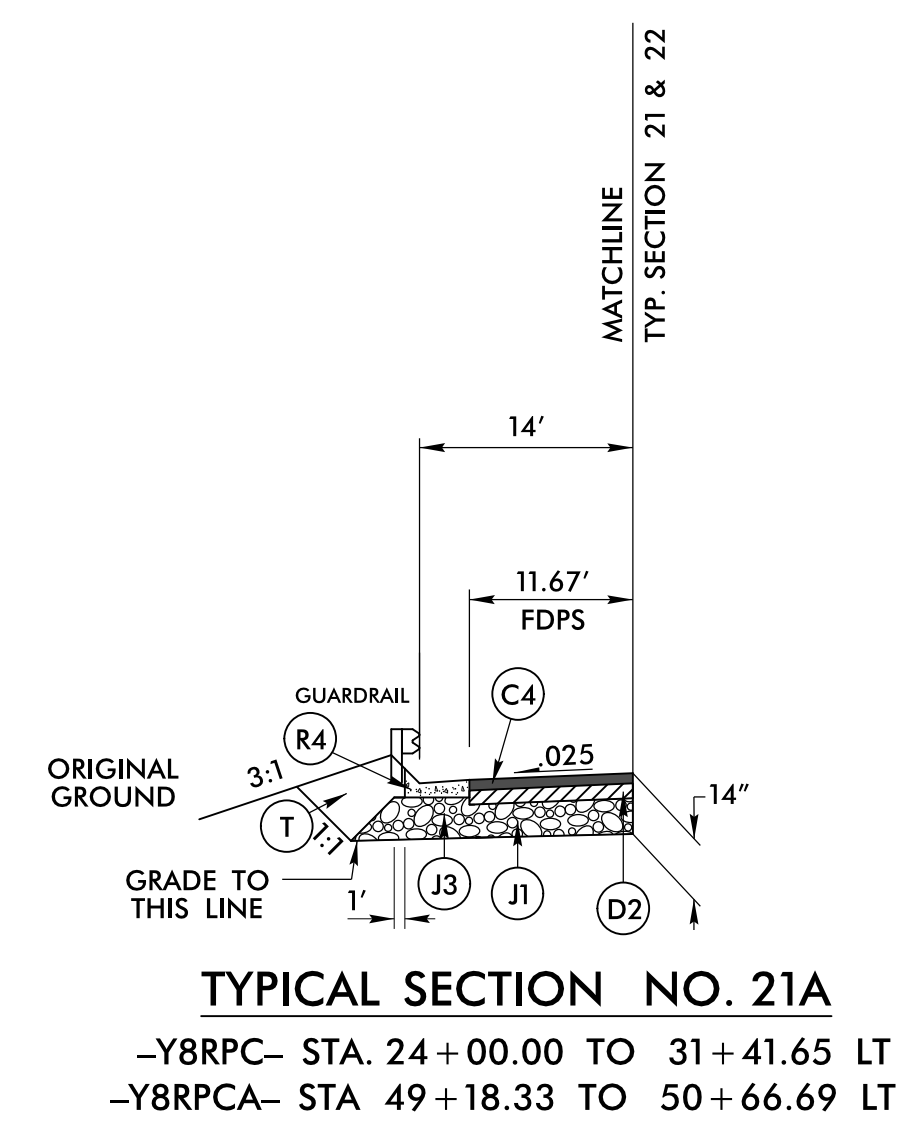
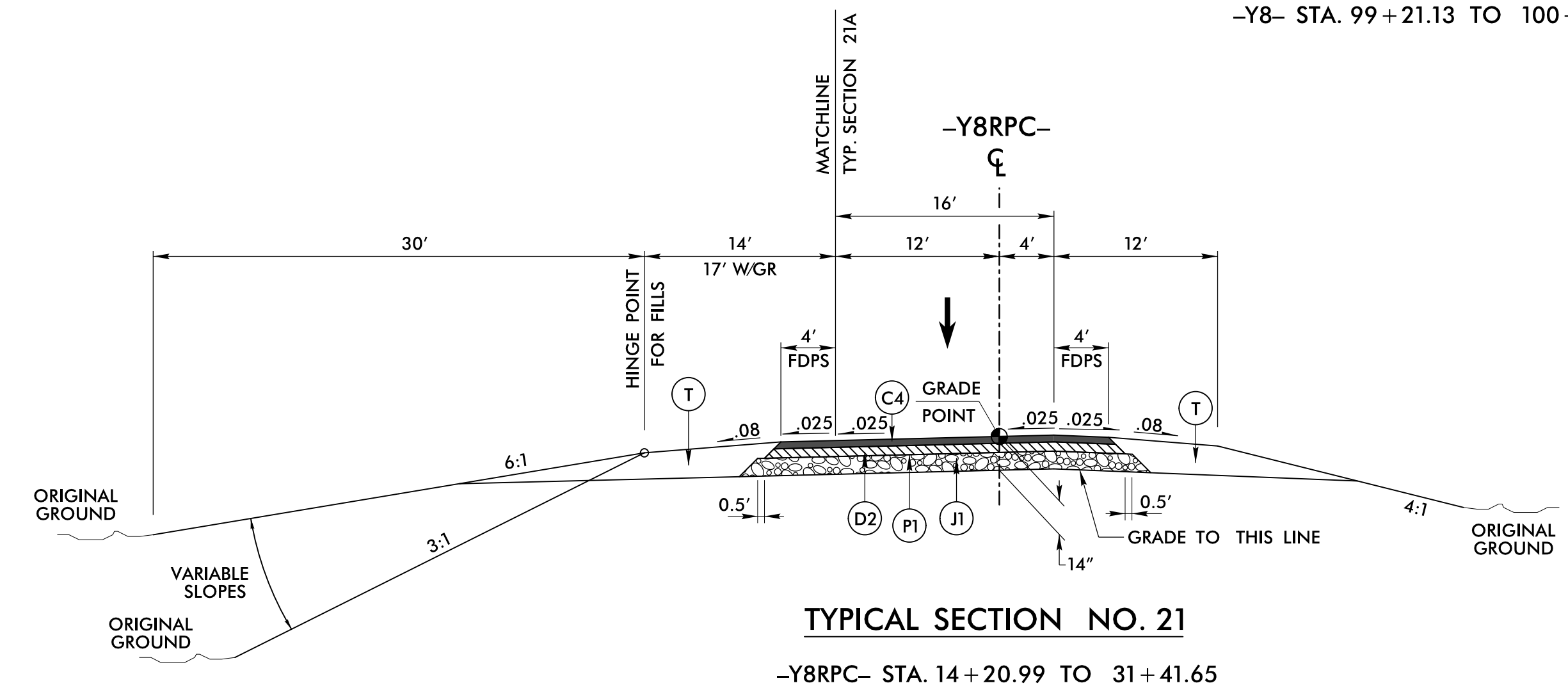
**DOCUMENT NOT CONSIDERED FINAL  
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PROJECT REFERENCE NO. <i>U-4751</i>	SHEET NO. <i>2A-7</i>
ROADWAY DESIGN ENGINEER <i>[Signature]</i>	PAVEMENT DESIGN ENGINEER <i>[Signature]</i>

Professional Engineer Seal: 043891  
 Professional Engineer Seal: 022896



C1	1.5" S9.5B
C2	2.0" S9.5B
C3	2.5" S9.5B
C4	3.0" S9.5B
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D4	VAR. I19.0B
D5	4.0" I19.0C
D6	VAR. I19.0C
E1	4.0" B25.0B
E2	4.5" B25.0B
E3	VAR. B25.0B
E4	4.5" B25.0C
E5	5.5" B25.0C
E6	7.0" B25.0C
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Y	MILLED RUMBLE STRIPS



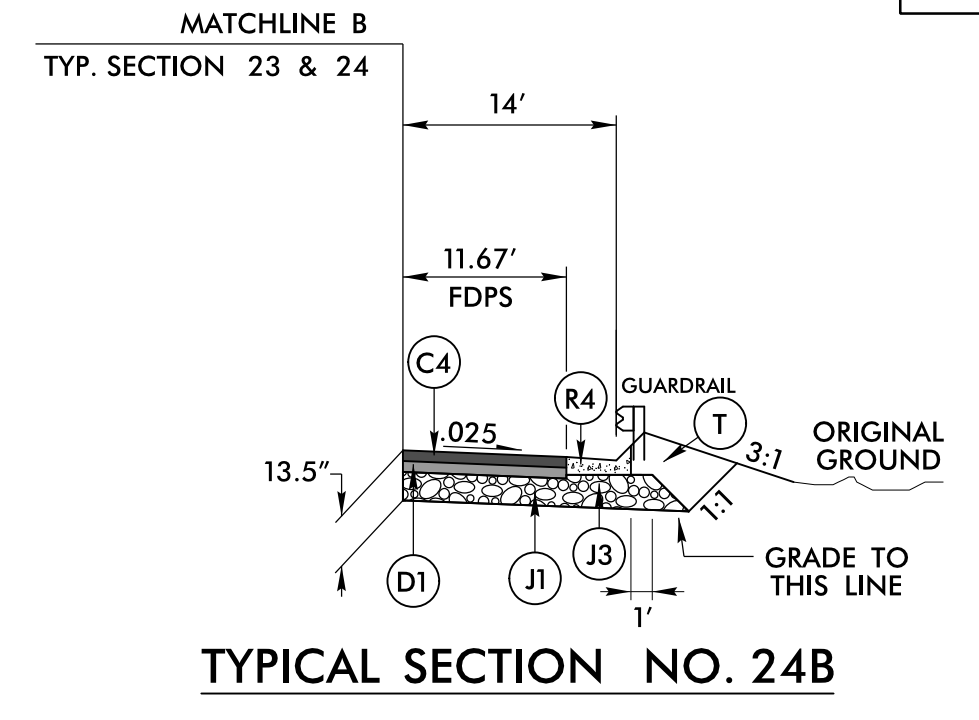
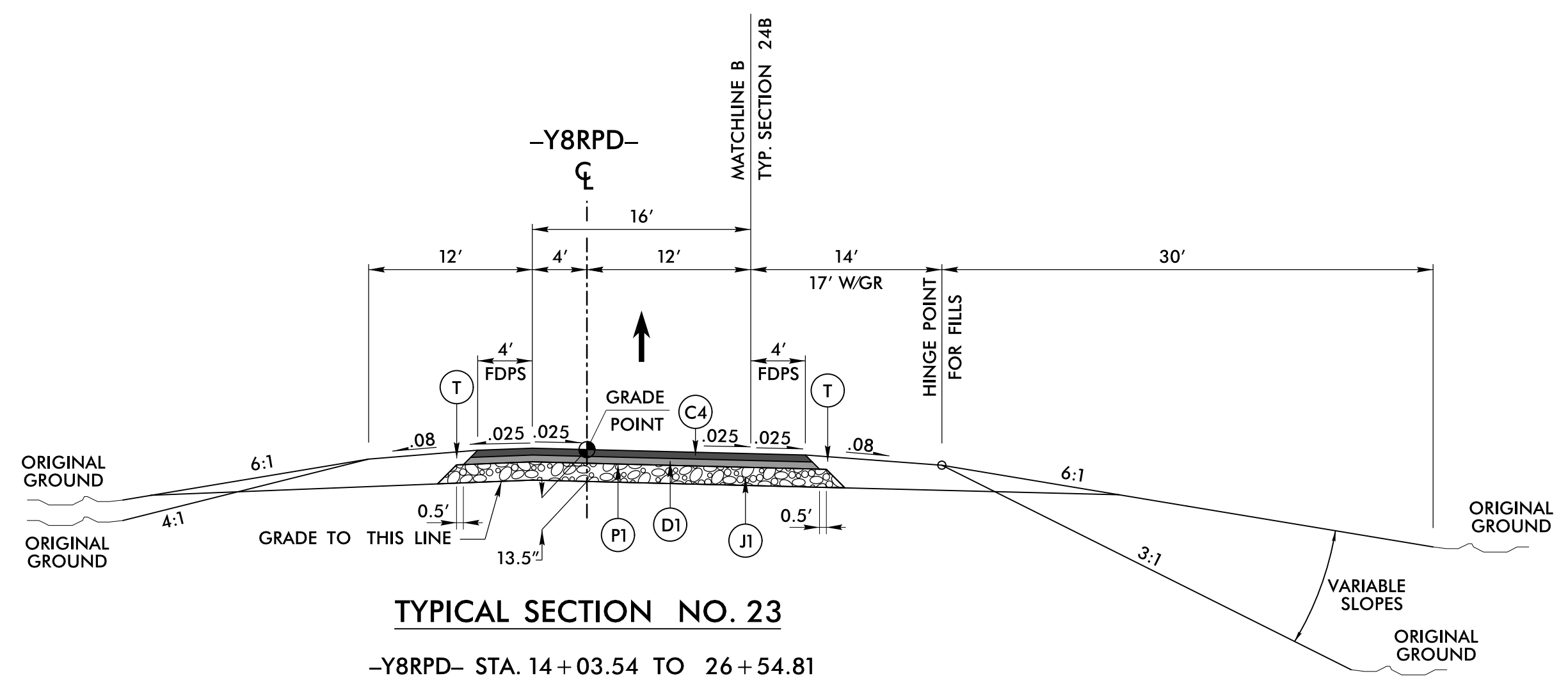
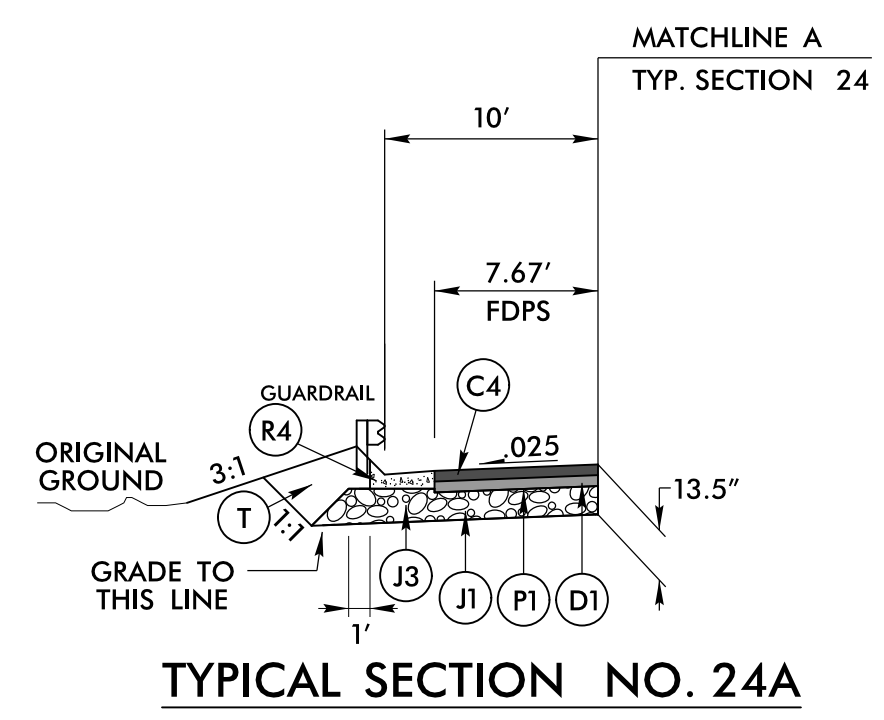
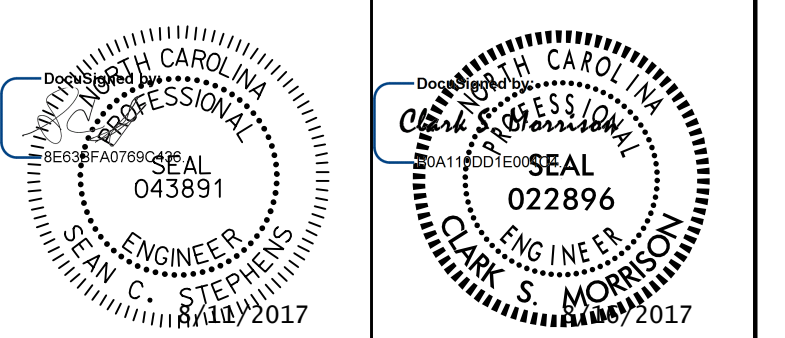
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 Charlotte, NC 28202  
 NC License Number F-0991

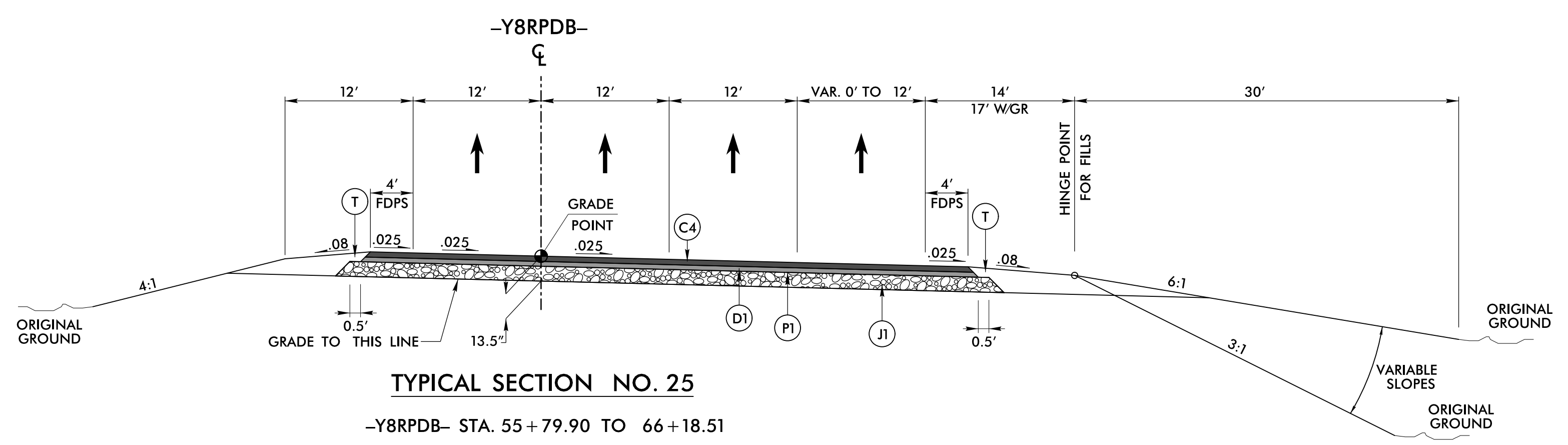
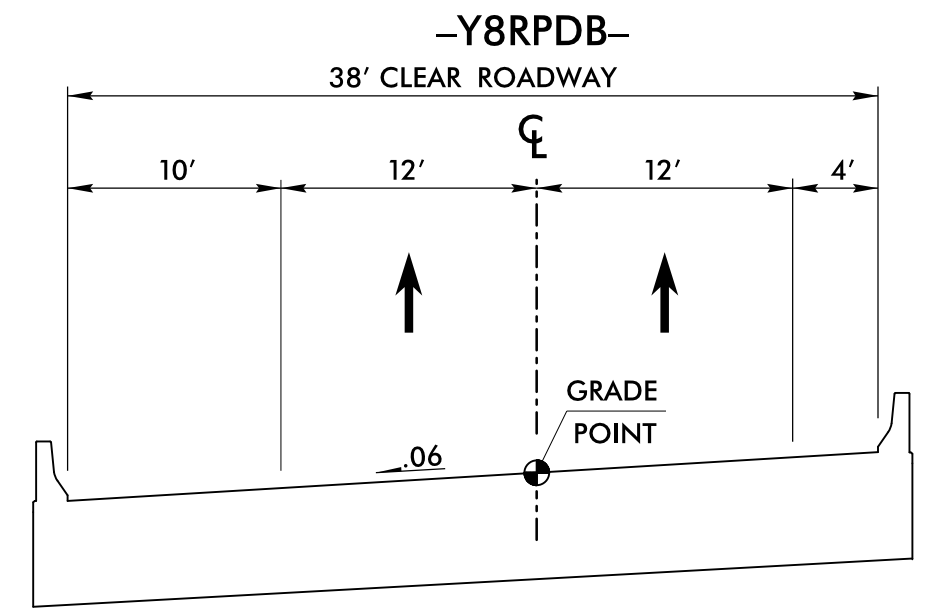
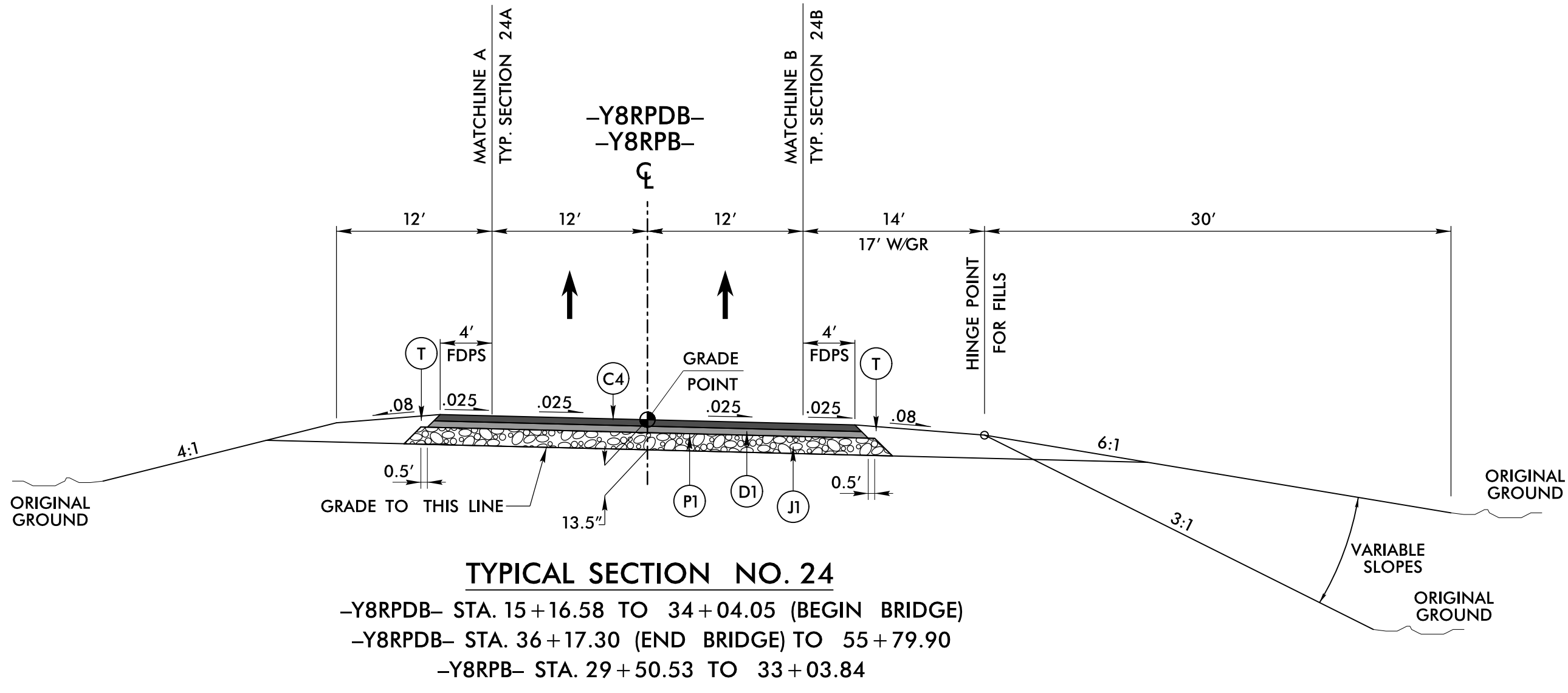
PROJECT REFERENCE NO. **U-4751** SHEET NO. **2A-8**

ROADWAY DESIGN ENGINEER  
 PAVEMENT DESIGN ENGINEER

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



C1	1.5" S9.5B
C2	2.0" S9.5B
C3	2.5" S9.5B
C4	3.0" S9.5B
C5	VAR. S9.5B
C6	1.5" S9.5C
C7	3.0" S9.5C
C8	VAR. S9.5C
D1	2.5" I19.0B
D2	3.0" I19.0B
D3	4.0" I19.0B
D4	VAR. I19.0B
D5	4.0" I19.0C
D6	VAR. I19.0C
E1	4.0" B25.0B
E2	4.5" B25.0B
E3	VAR. B25.0B
E4	4.5" B25.0C
E5	5.5" B25.0C
E6	7.0" B25.0C
E7	VAR. B25.0C
J1	8.0" ABC
J2	6.0" ABC
J3	VAR. DEPTH ABC
P1	PRIME COAT
R1	2' - 6" C&G
R2	1' - 6" C&G
R3	5" MONO. ISLAND
R4	SHOULDER BERM GUTTER
R5	2.0' VALLEY GUTTER
R6	CONC. BARRIER, TYPE T
R7	CONC. BARRIER, SINGLE
R8	2' - 9" C&G
S	CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W	WEDGING
Y	MILLED RUMBLE STRIPS



6/2/2017  
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 John C. Stepien

6/2/2017

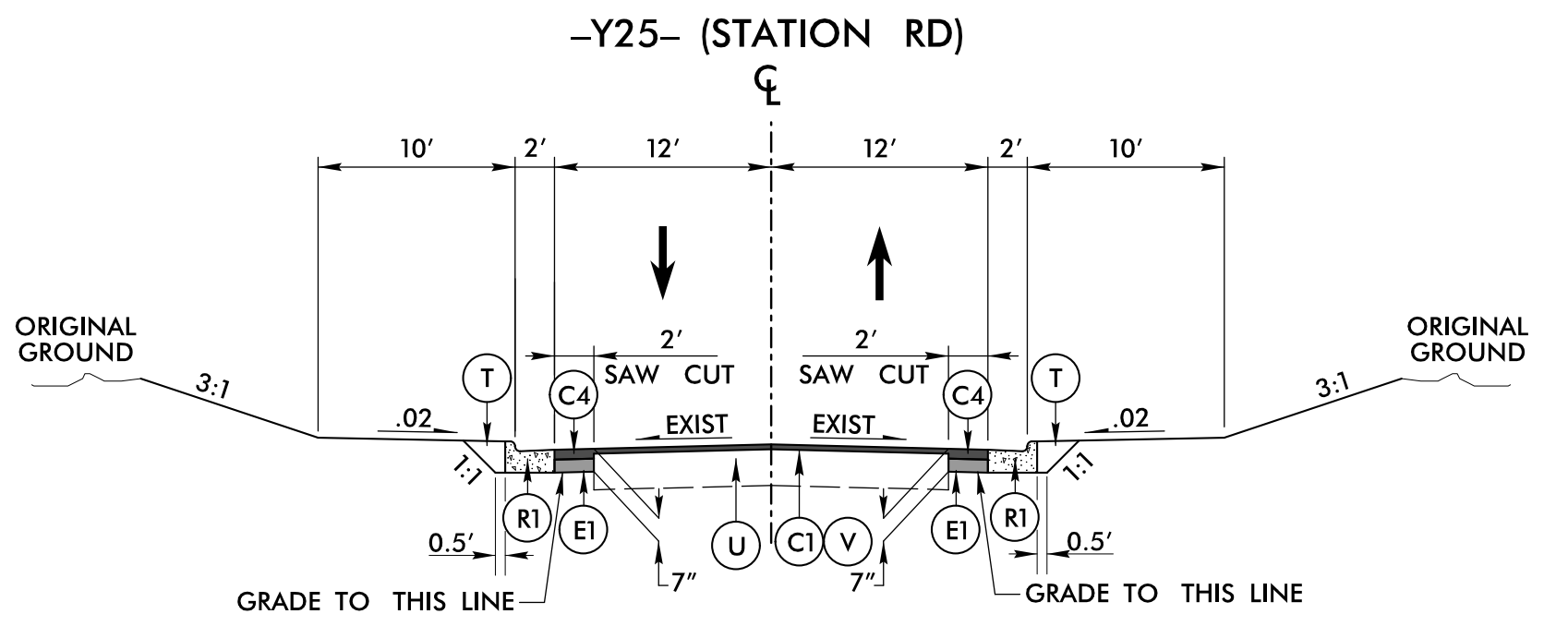
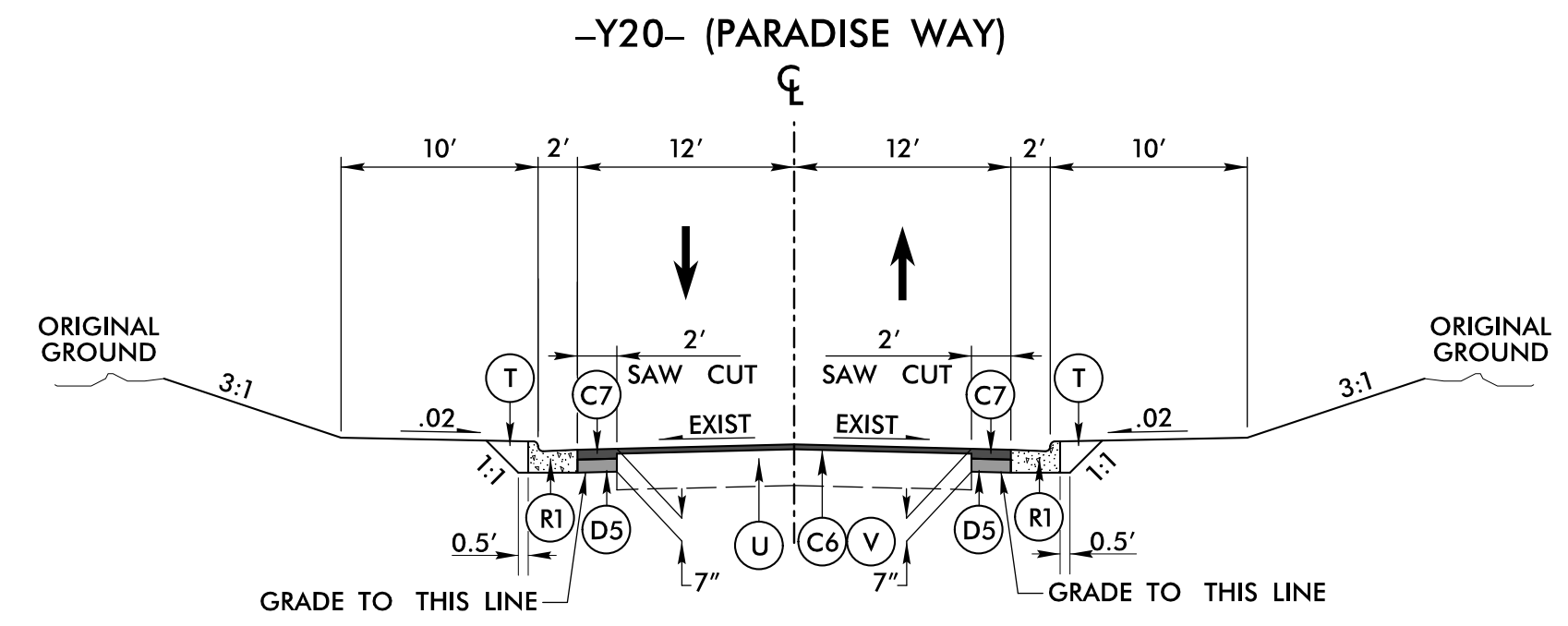
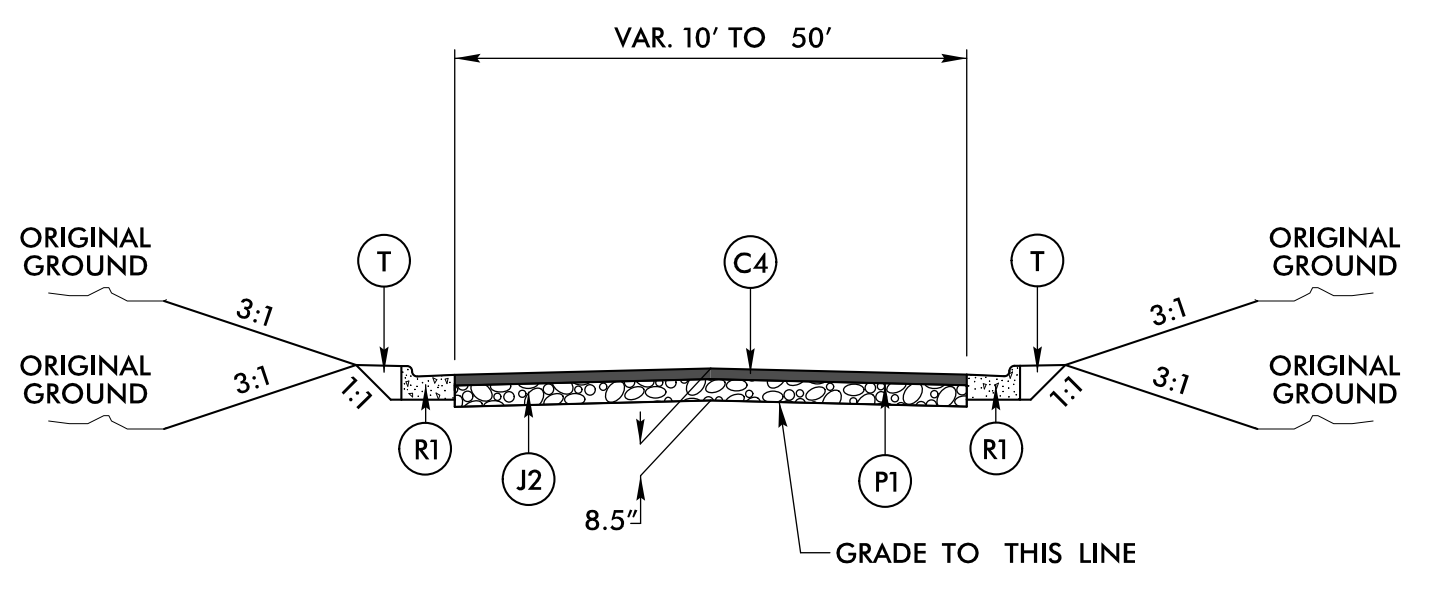
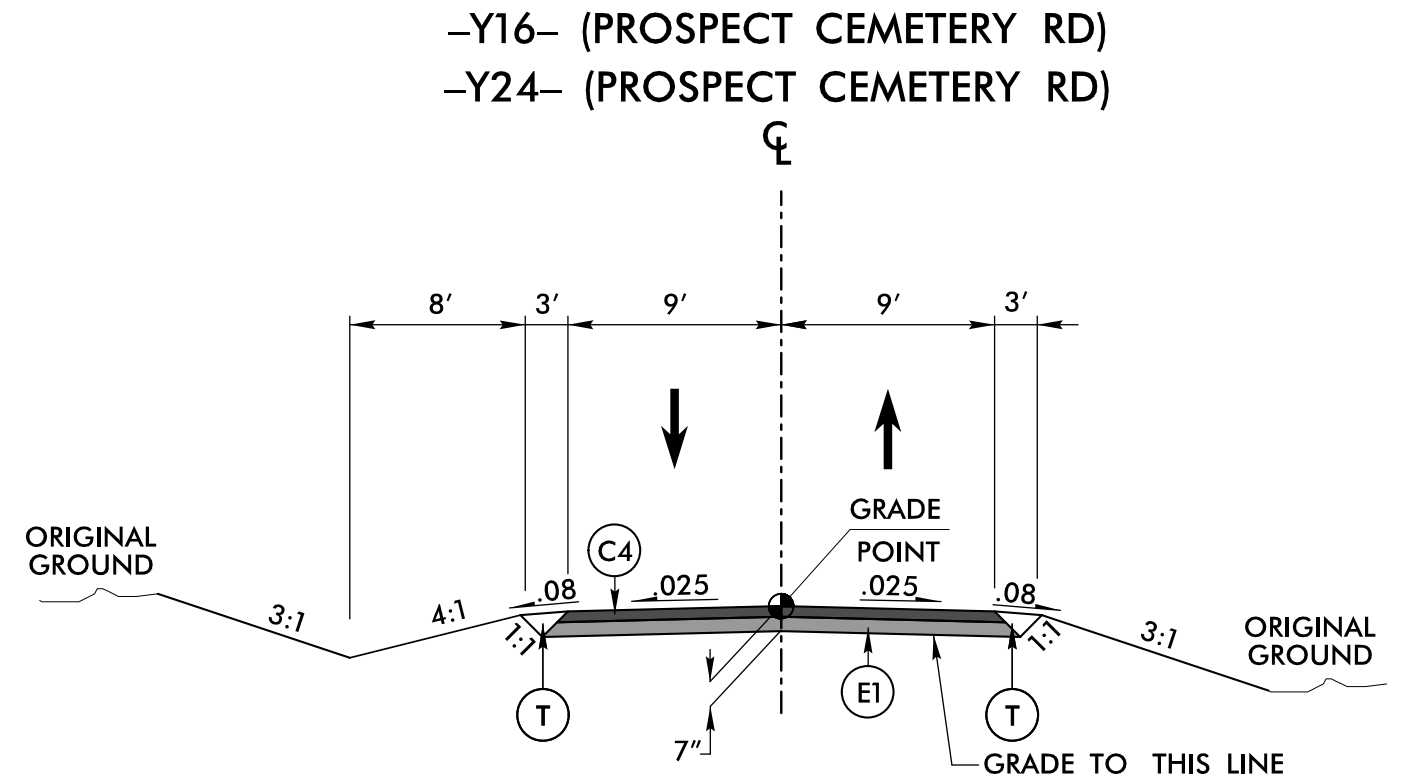
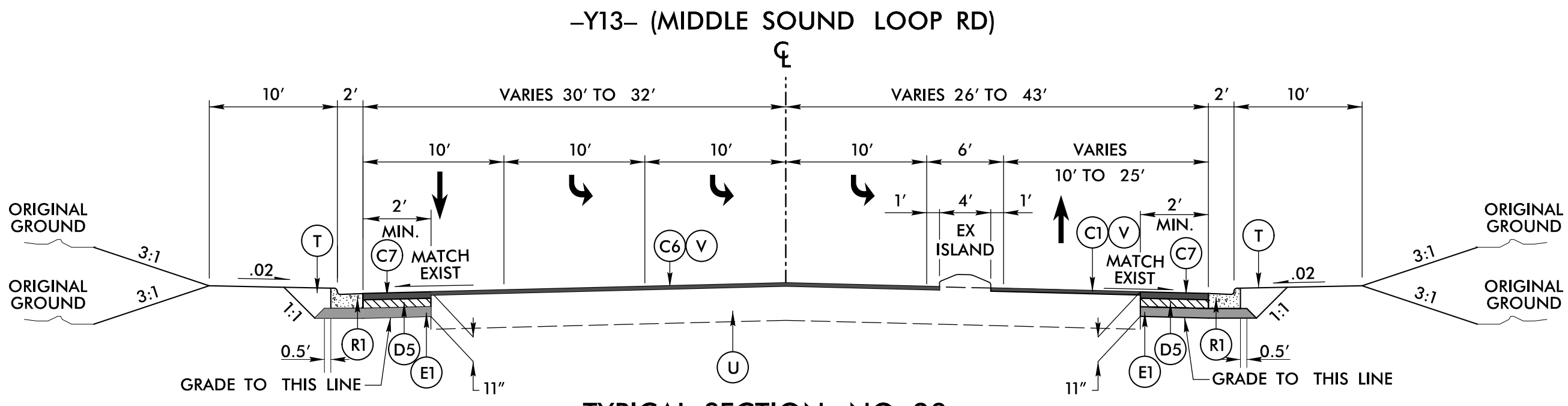
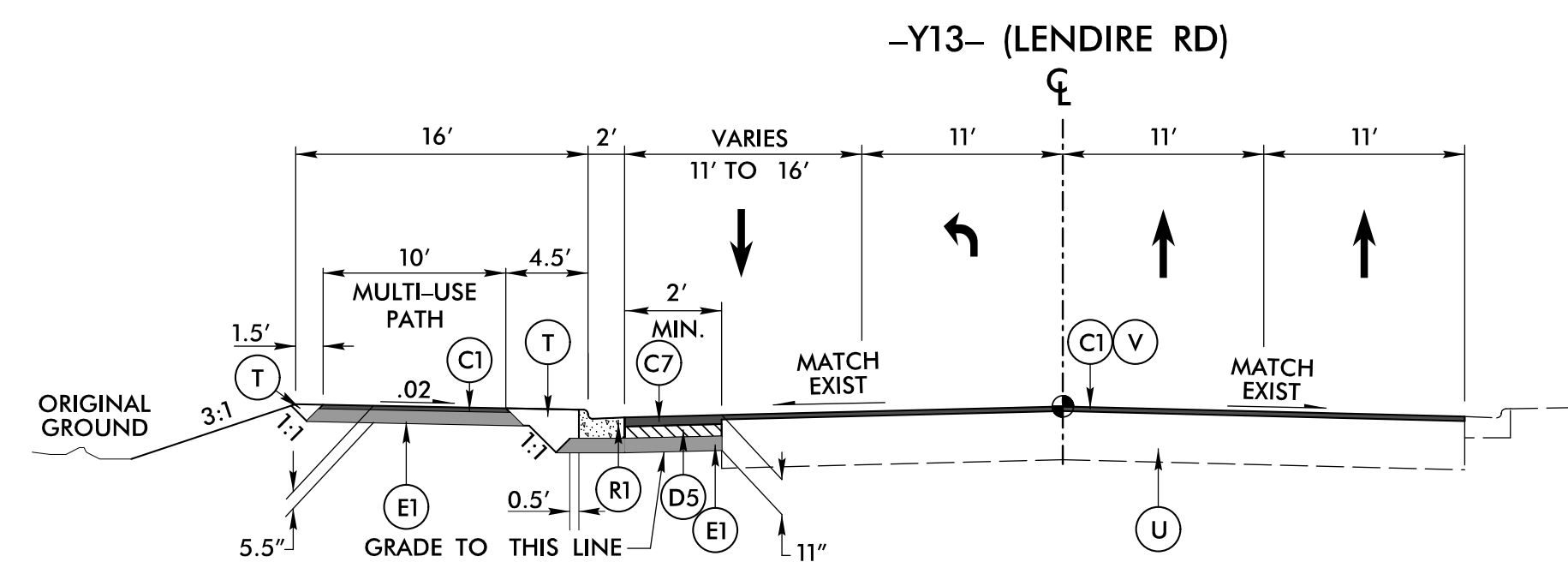
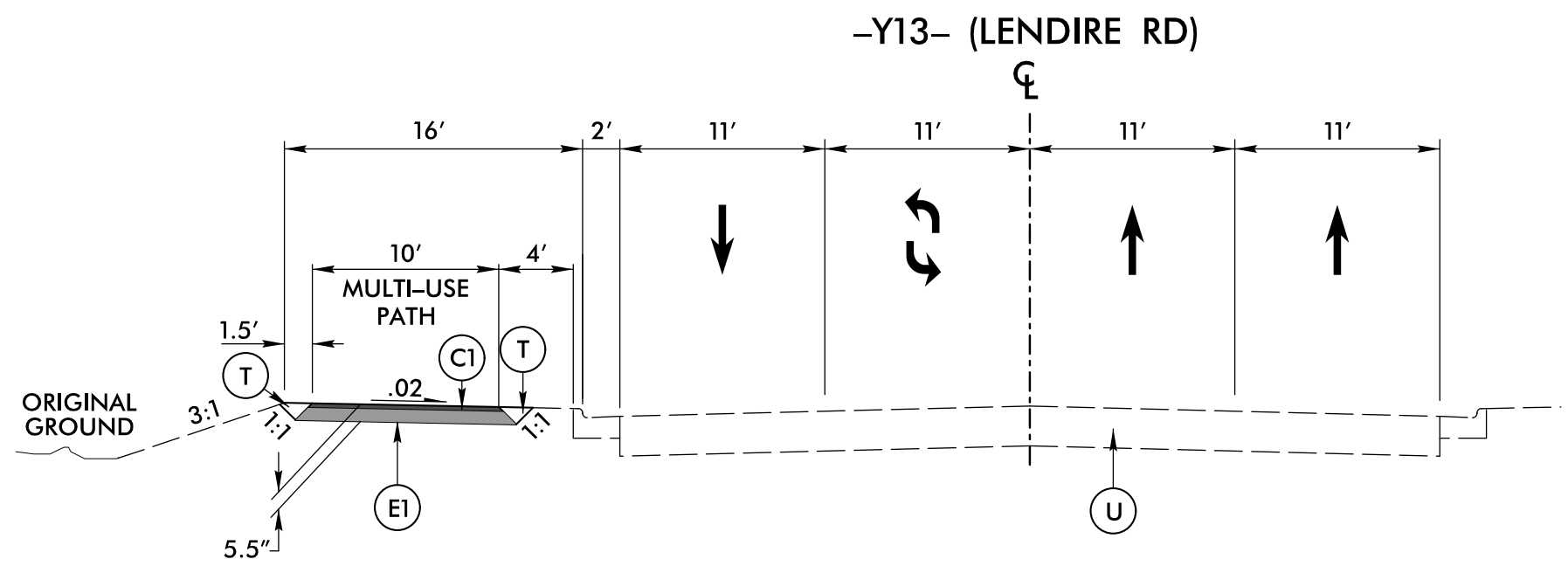
**STV** 100 Years  
 STV Engineers, Inc.  
 900 West Trade St., Suite 715  
 Charlotte, NC 28202  
 NC License Number F-0991

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

PROJECT REFERENCE NO. U-4751	SHEET NO. 2A-9
ROADWAY DESIGN ENGINEER <i>[Signature]</i>	PAVEMENT DESIGN ENGINEER <i>[Signature]</i>

SEAL 045891  
 ENGINEER  
 J. C. STEPHENS  
 10/17/2017

SEAL 022896  
 ENGINEER  
 CLARK S. MORRISON  
 10/17/2017



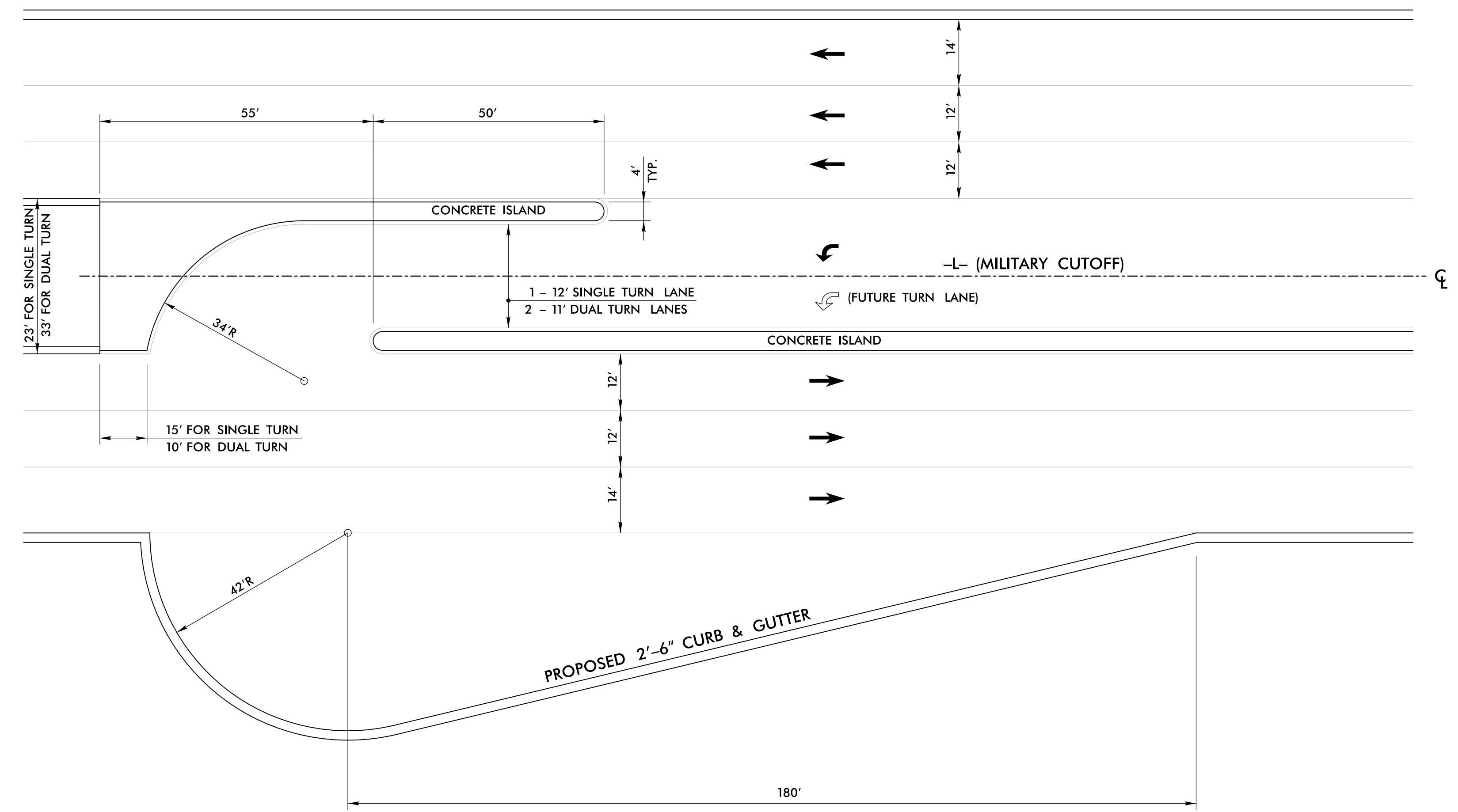
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C2	2.0" S9.5B
C3	2.5" S9.5B
C4	3.0" S9.5B
C5	VAR. S9.5B
C6	1.5" S9.5C
C7	3.0" S9.5C
C8	VAR. S9.5C
D1	2.5" I19.0B
D2	3.0" I19.0B
D3	4.0" I19.0B
D4	VAR. I19.0B
D5	4.0" I19.0C
D6	VAR. I19.0C
E1	4.0" B25.0B
E2	4.5" B25.0B
E3	VAR. B25.0B
E4	4.5" B25.0C
E5	5.5" B25.0C
E6	7.0" B25.0C
E7	VAR. B25.0C
J1	8.0" ABC
J2	6.0" ABC
J3	VAR. DEPTH ABC
P1	PRIME COAT
R1	2' - 6" C&G
R2	1' - 6" C&G
R3	5" MONO. ISLAND
R4	SHOULDER BERM GUTTER
R5	2.0' VALLEY GUTTER
R6	CONC. BARRIER, TYPE T
R7	CONC. BARRIER, SINGLE
R8	2' - 9" C&G
S	CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W	WEDGING
Y	MILLED RUMBLE STRIPS

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 stephens

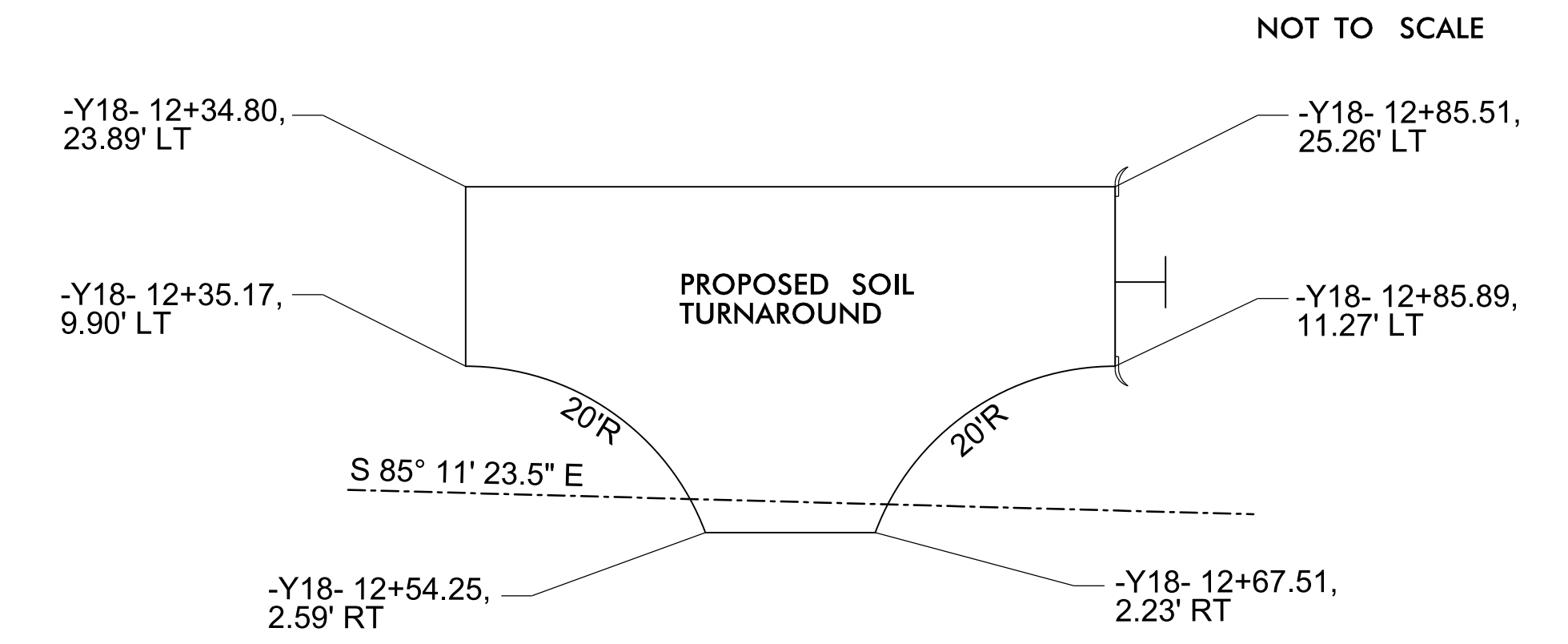
**STV** 100 Years  
 STV Engineers, Inc.  
 900 West Trade St., Suite 715  
 Charlotte, NC 28202  
 NC License Number F-0991

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

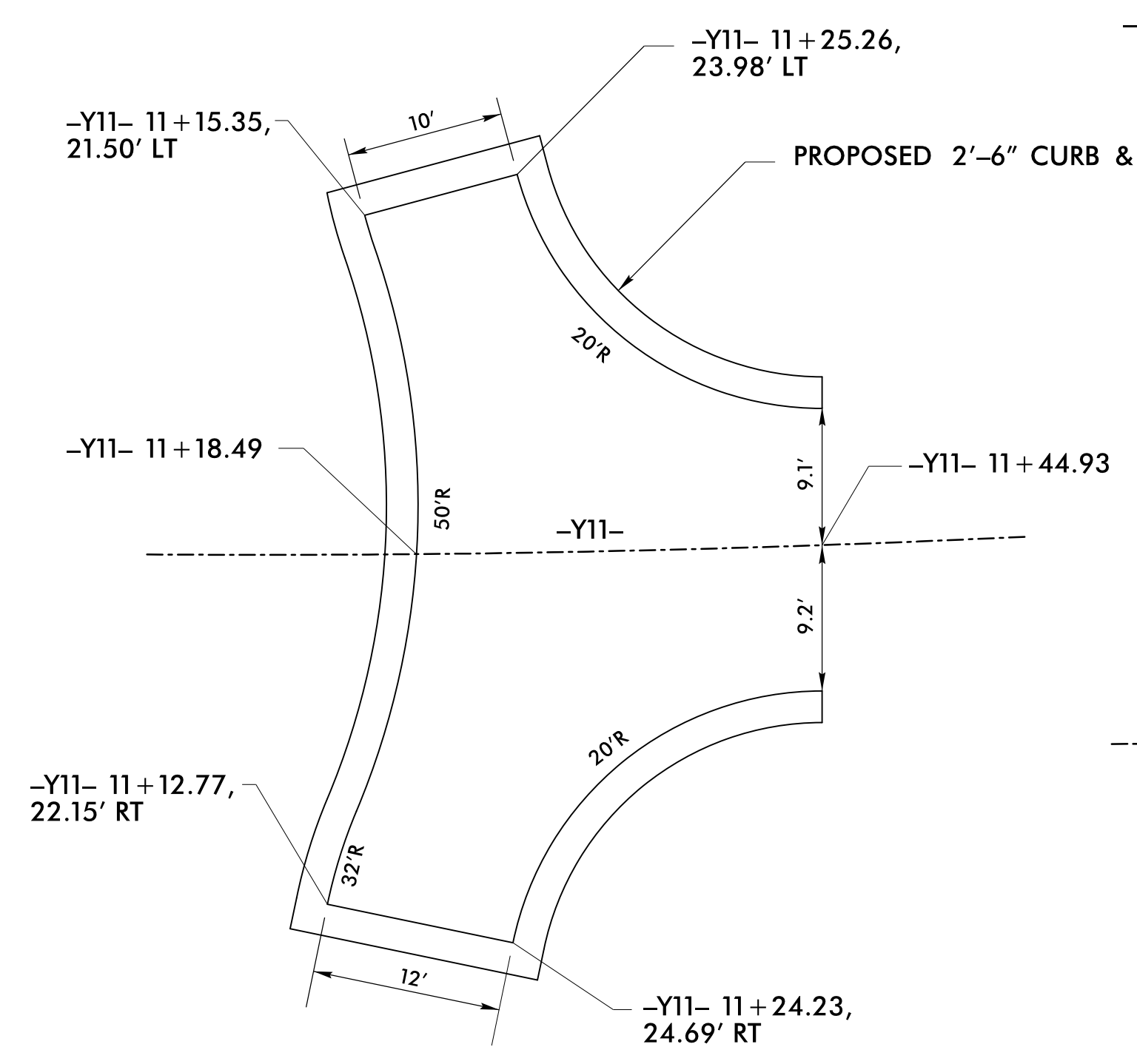
PROJECT REFERENCE NO. U-4751	SHEET NO. 2A-10
ROADWAY DESIGN ENGINEER <i>[Signature]</i> SEAL 043891	PAVEMENT DESIGN ENGINEER <i>[Signature]</i> SEAL 022896



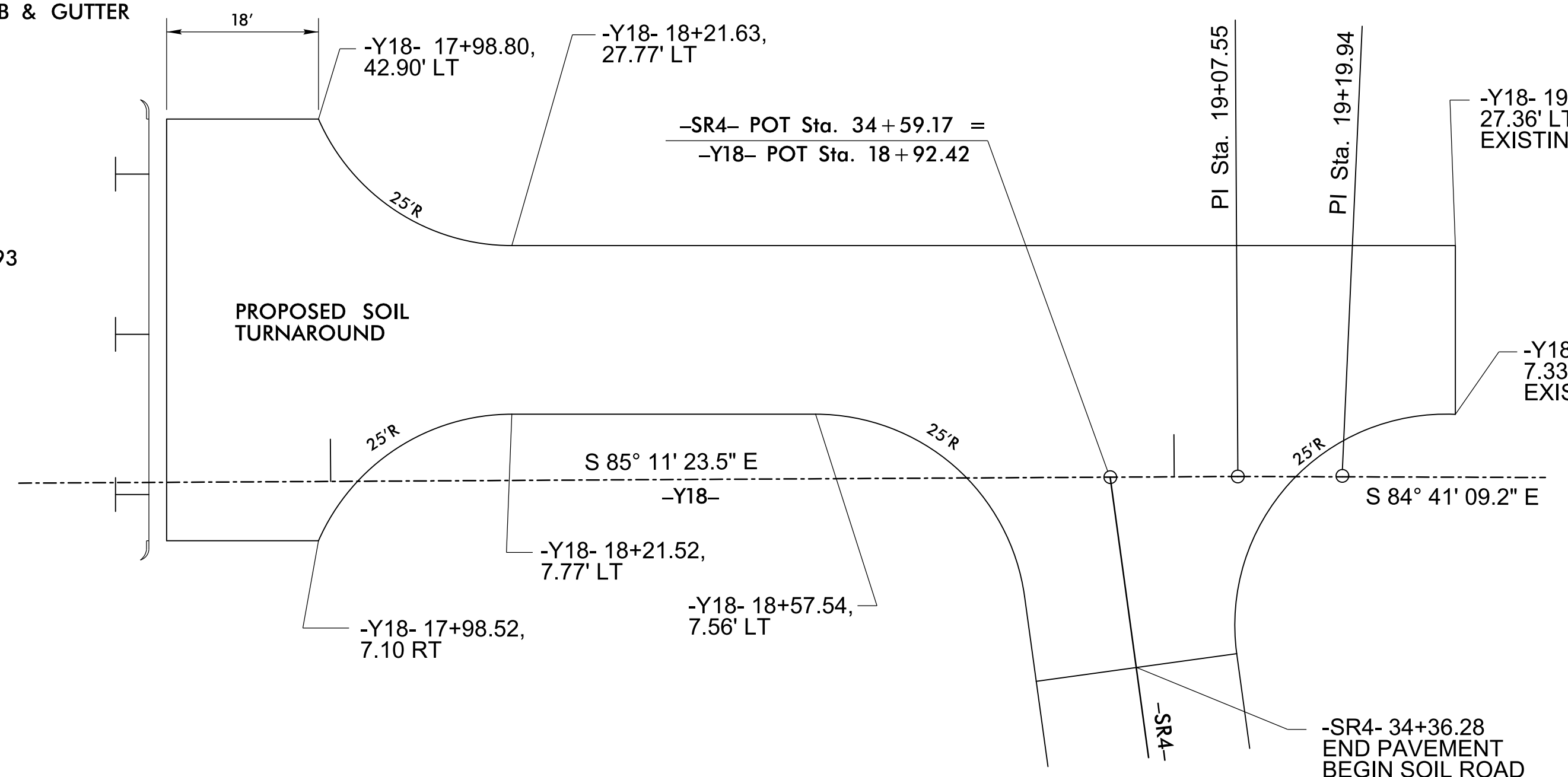
**U-TURN BULB-OUT DETAIL**  
 -L- STA. 73+00.00 TO 79+25.00, RT (DUAL)  
 -L- STA. 145+00.00 TO 151+41.23, LT (SINGLE)  
 -L- STA. 169+65.00 TO 176+49.73, RT (DUAL)  
 -L- STA. 175+50.27 TO 182+35.00, LT (DUAL)



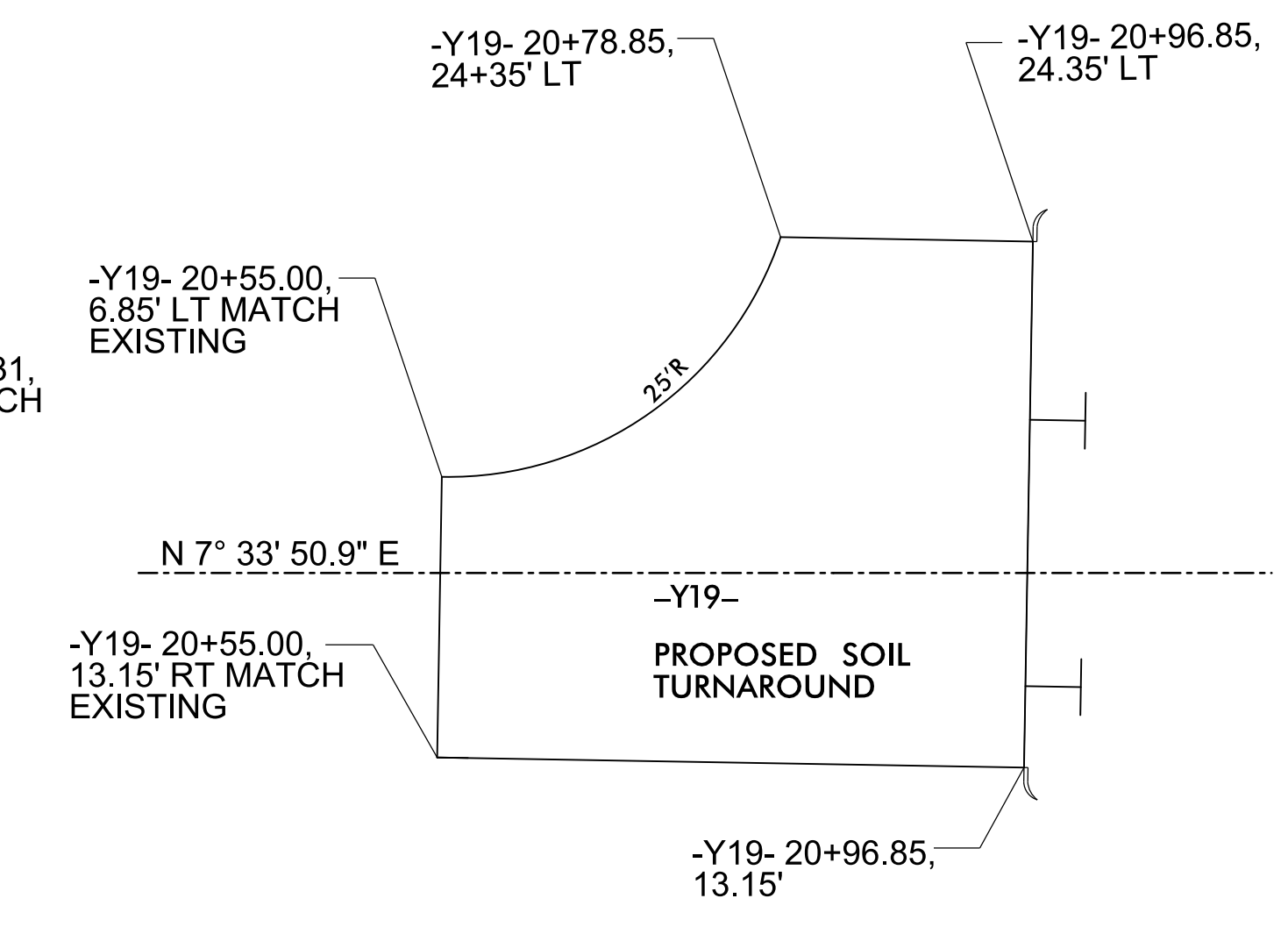
**HAMMERHEAD TURNAROUND DETAIL**  
 -Y18- (PLANTATION RD)  
 SEE PLAN SHEET 18



**TURNAROUND DETAIL**  
 -Y11- (BROOKBEND RD)  
 (SEE TYPICAL SECTION NO. 15,  
 SHEET 2A-6 FOR PAVEMENT DESIGN)  
 SEE PLAN SHEET 11



**HAMMERHEAD TURNAROUND DETAIL**  
 -Y18- (PLANTATION RD)  
 SEE PLAN SHEET 18



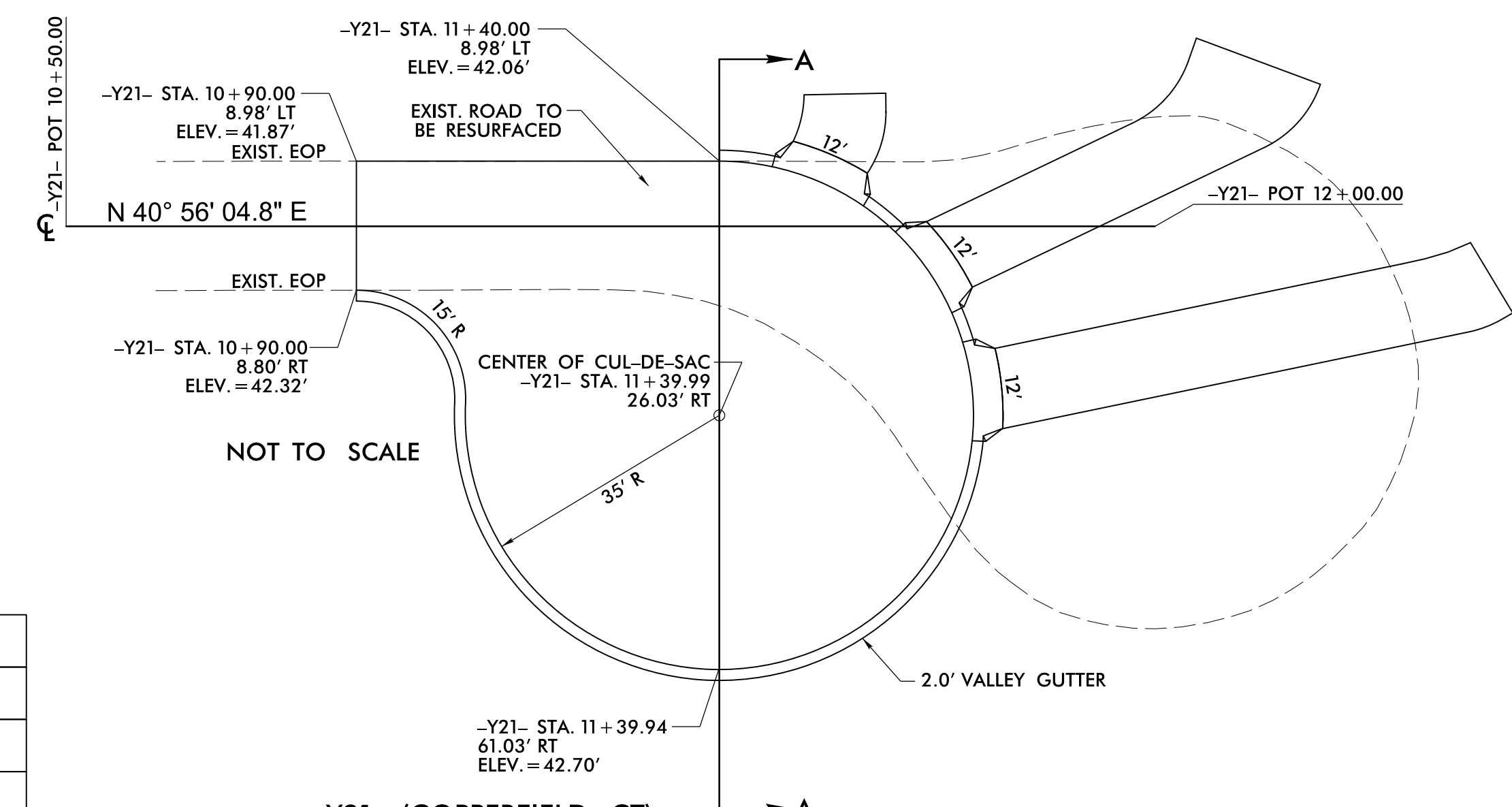
**HAMMERHEAD TURNAROUND DETAIL**  
 -Y19- (CROOKED PINE RD)  
 SEE PLAN SHEET 19

6/2/2017  
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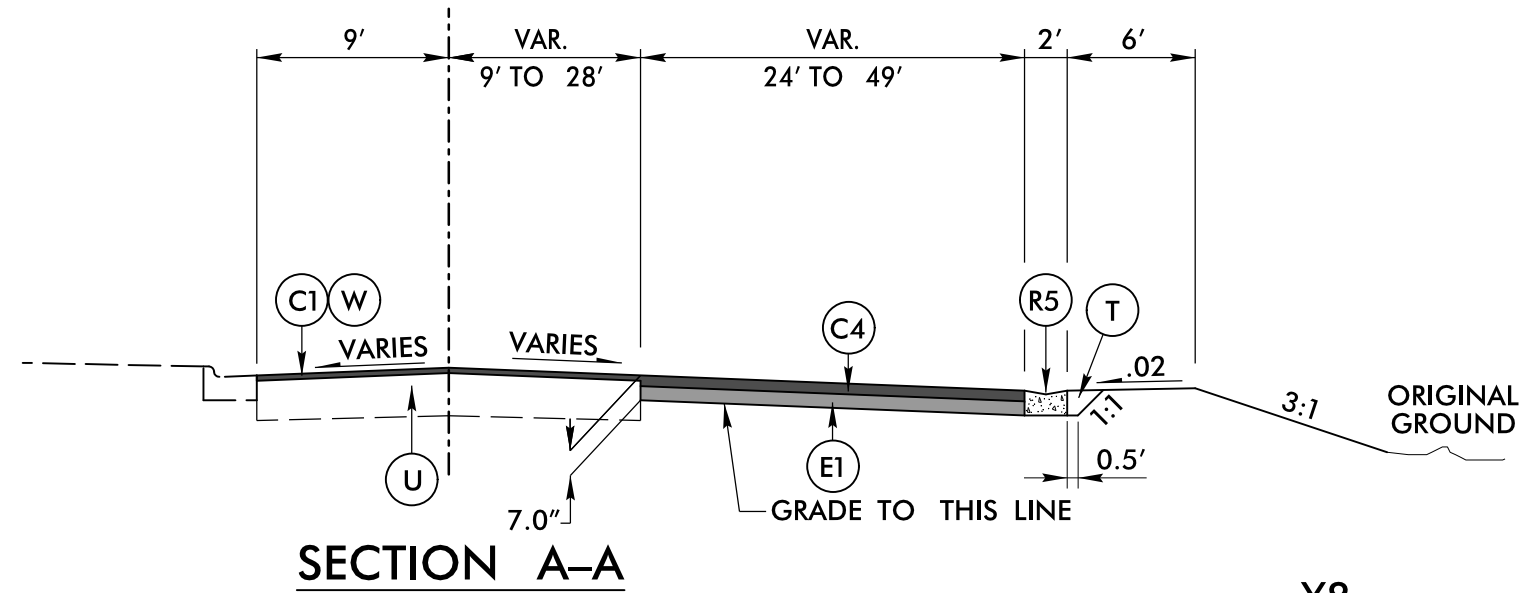
**STV** 100 Years  
 STV Engineers, Inc.  
 900 West Trade St., Suite 715  
 Charlotte, NC 28202  
 NC License Number F-0991

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

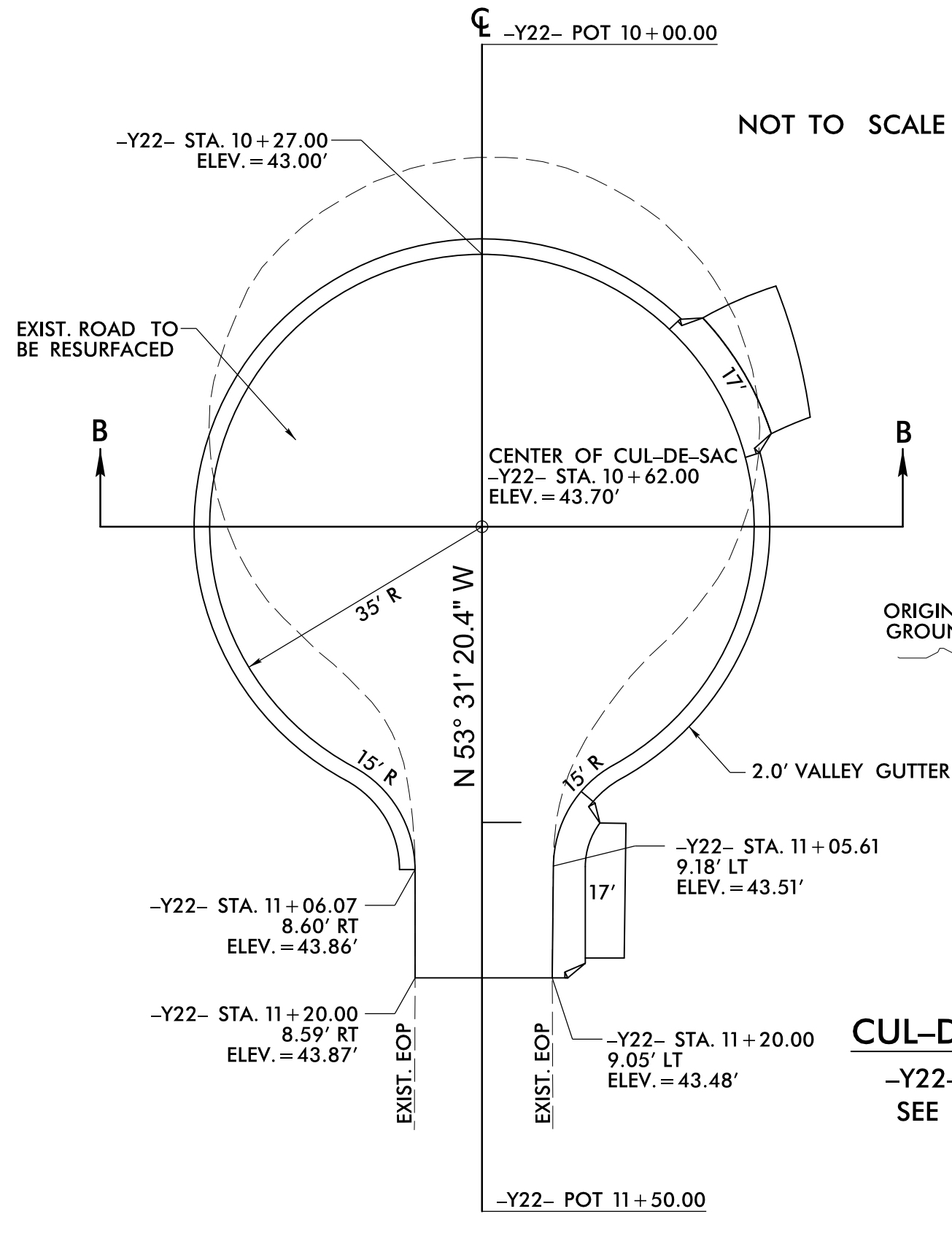
PROJECT REFERENCE NO. U-4751	SHEET NO. 2A-11
ROADWAY DESIGN ENGINEER <i>[Signature]</i>	PAVEMENT DESIGN ENGINEER <i>[Signature]</i>



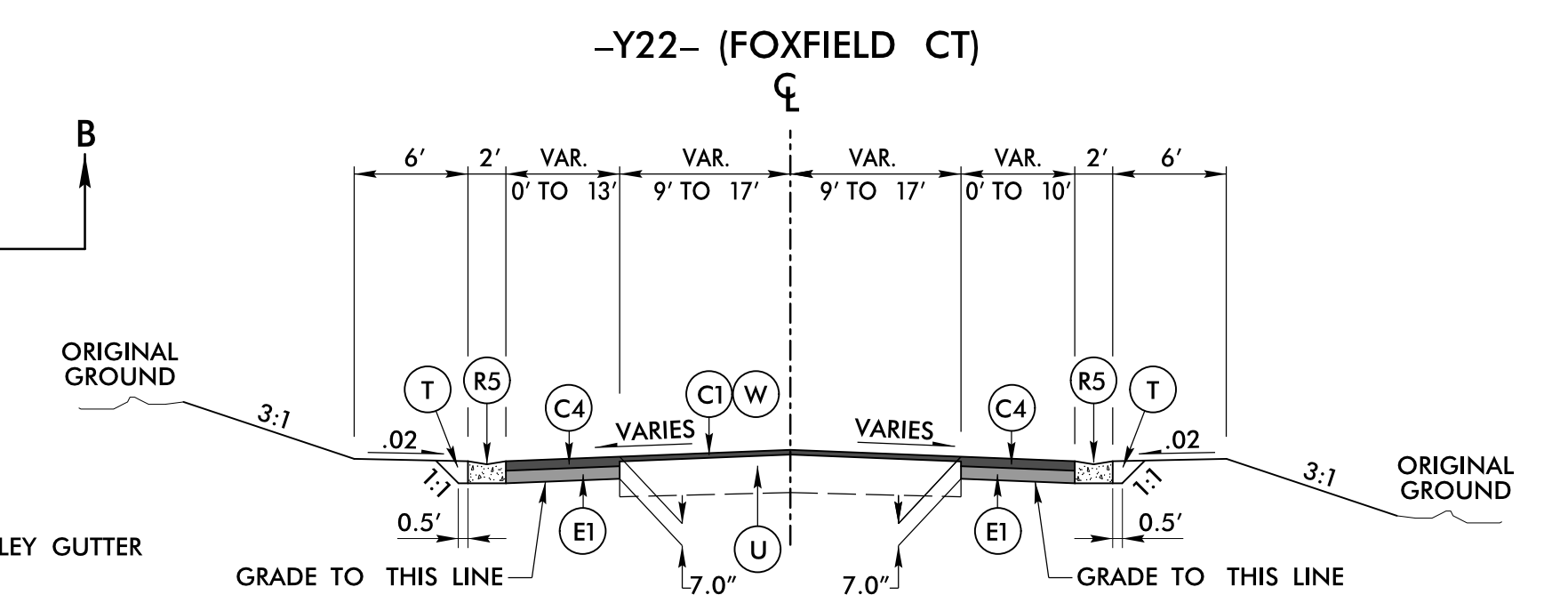
**CUL-DE-SAC DETAIL**  
 -Y21- (COPPERFIELD CT)



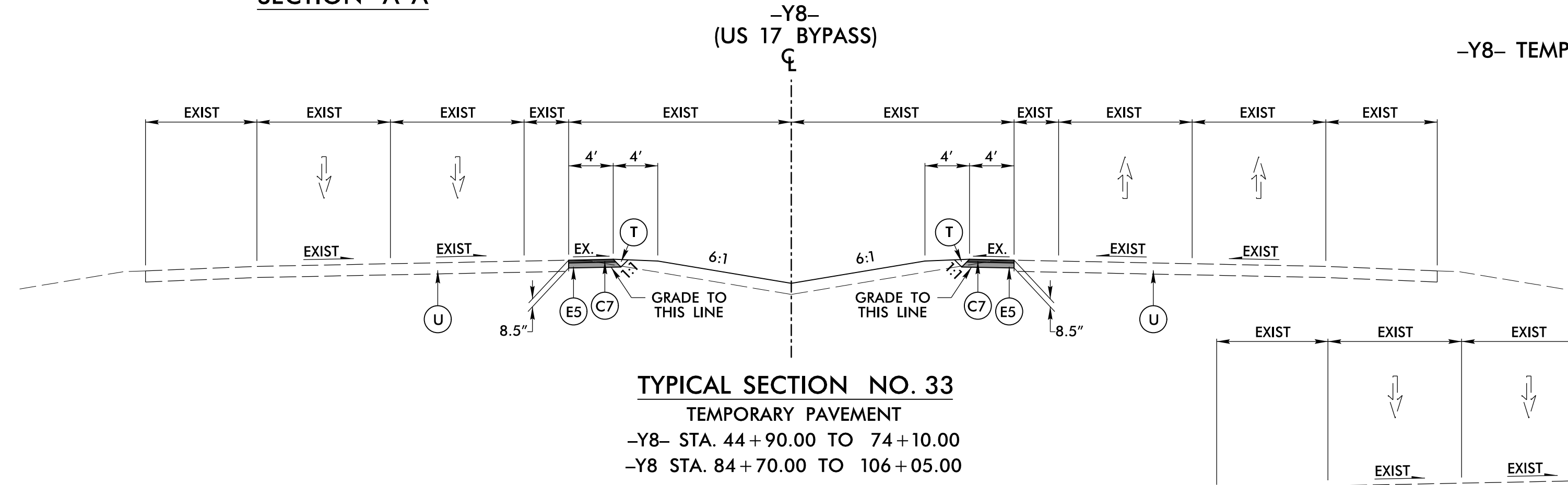
**SECTION A-A**



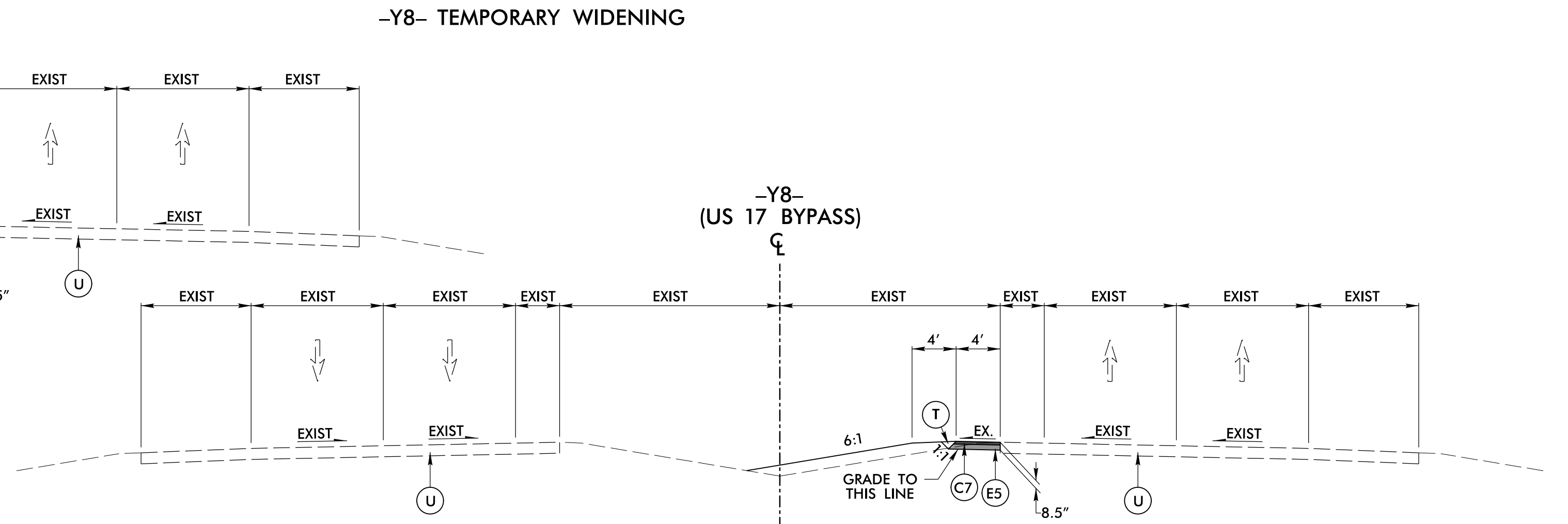
**CUL-DE-SAC DETAIL**  
 -Y22- (FOXFIELD CT)  
 SEE PLAN SHEET 11



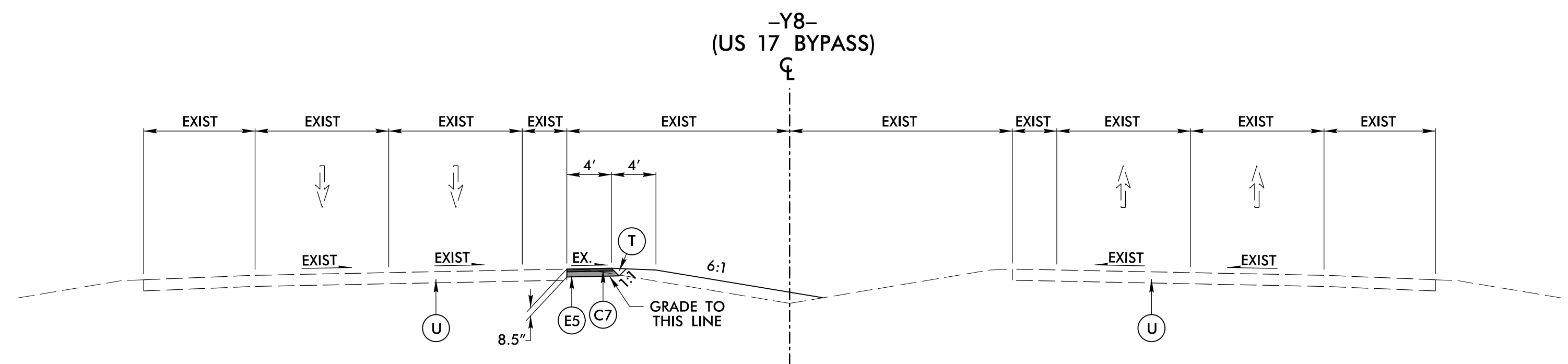
**SECTION B-B**



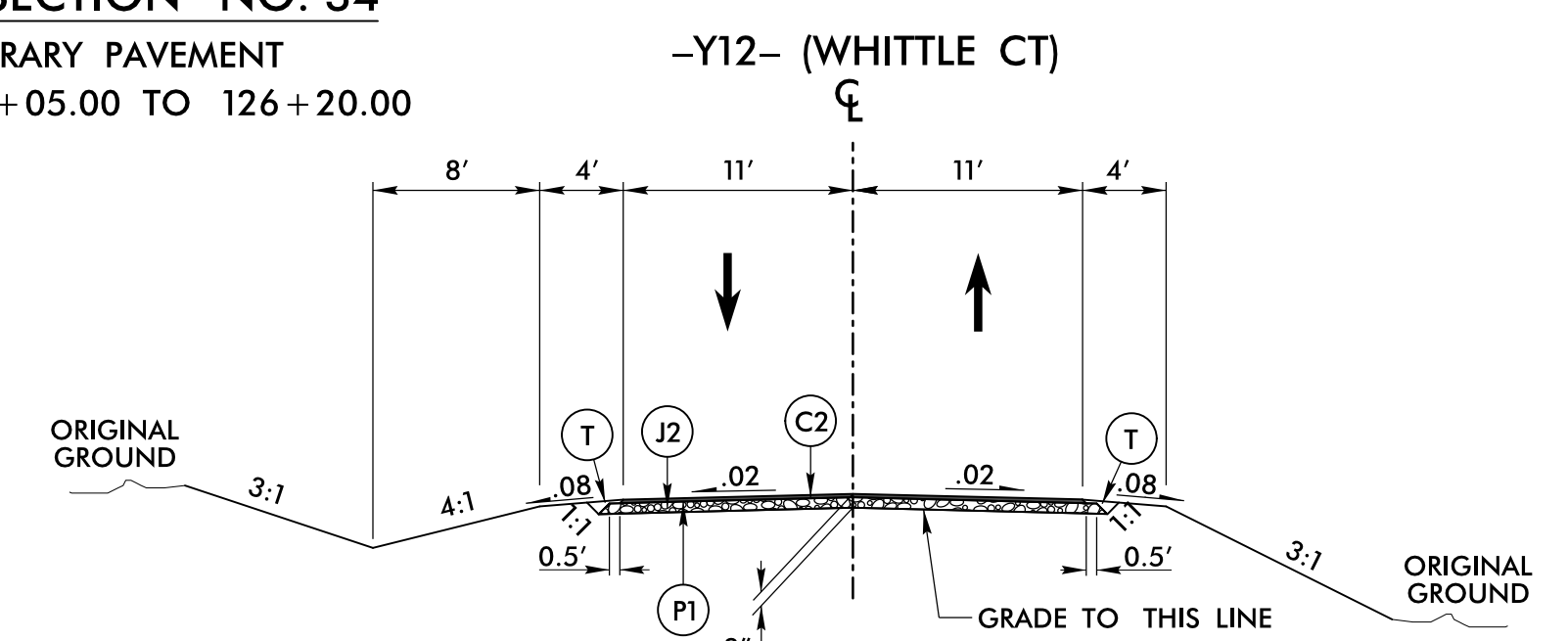
**TYPICAL SECTION NO. 33**  
 TEMPORARY PAVEMENT  
 -Y8- STA. 44+90.00 TO 74+10.00  
 -Y8 STA. 84+70.00 TO 106+05.00



**TYPICAL SECTION NO. 34**  
 TEMPORARY PAVEMENT  
 -Y8- STA. 106+05.00 TO 126+20.00



**TYPICAL SECTION NO. 35**  
 TEMPORARY PAVEMENT  
 -Y8- STA. 30+90.00 TO 44+90.00  
 -Y8- STA. 74+10.00 TO 84+70.00



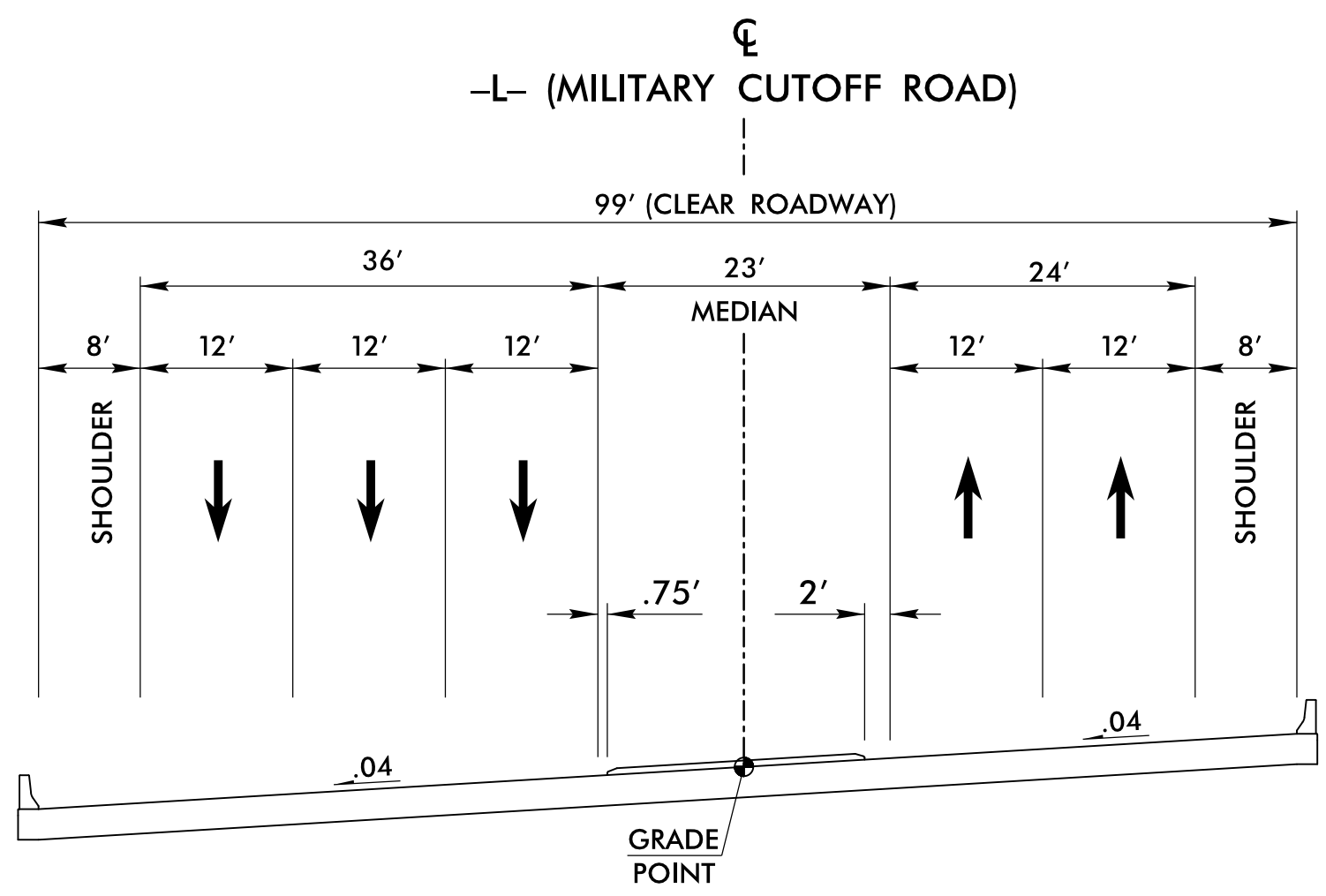
**TYPICAL SECTION NO. 36**  
 TEMPORARY PAVEMENT FOR CONNECTOR  
 SEE TEMPORARY PAVEMENT DETAIL SHEET 2B-12  
 SEE TRANSPORTATION MANAGEMENT PLANS SHEET TMP-16

C1	1.5" S9.5B
C2	2.0" S9.5B
C3	2.5" S9.5B
C4	3.0" S9.5B
C5	VAR. S9.5B
C6	1.5" S9.5C
C7	3.0" S9.5C
C8	VAR. S9.5C
D1	2.5" I19.0B
D2	3.0" I19.0B
D3	4.0" I19.0B
D4	VAR. I19.0B
D5	4.0" I19.0C
D6	VAR. I19.0C
E1	4.0" B25.0B
E2	4.5" B25.0B
E3	VAR. B25.0B
E4	4.5" B25.0C
E5	5.5" B25.0C
E6	7.0" B25.0C
E7	VAR. B25.0C
J1	8.0" ABC
J2	6.0" ABC
J3	VAR. DEPTH ABC
P1	PRIME COAT
R1	2' - 6" C&G
R2	1' - 6" C&G
R3	5" MONO. ISLAND
R4	SHOULDER BERM GUTTER
R5	2.0' VALLEY GUTTER
R6	CONC. BARRIER, TYPE T
R7	CONC. BARRIER, SINGLE
R8	2' - 9" C&G
S	CONC. SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLING
W	WEDGING
Y	MILLED RUMBLE STRIPS

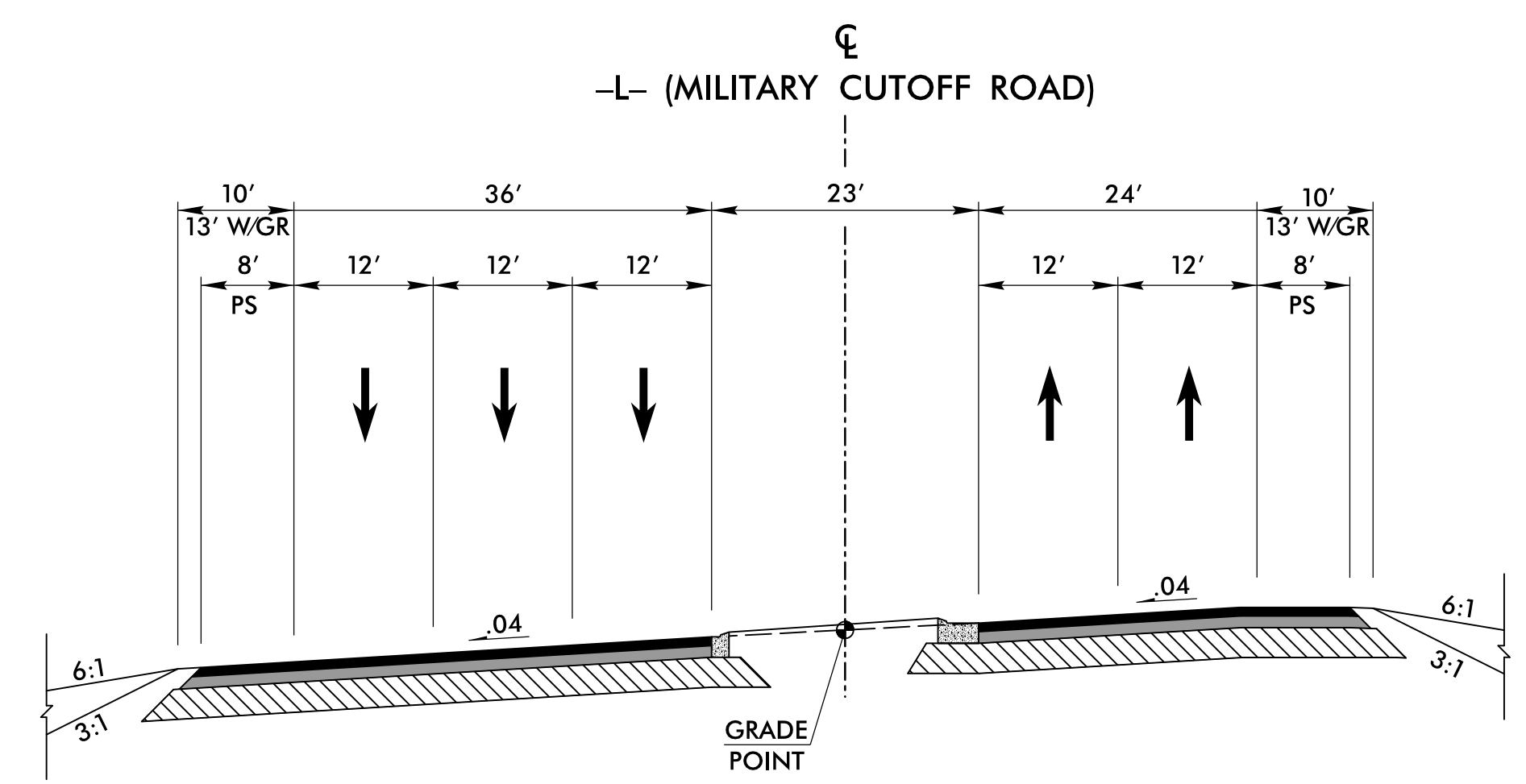
SEE TRANSPORTATION MANAGEMENT  
 PLANS SHEETS TMP-21 THRU TMP-24  
 FOR -Y8- TEMPORARY WIDENING



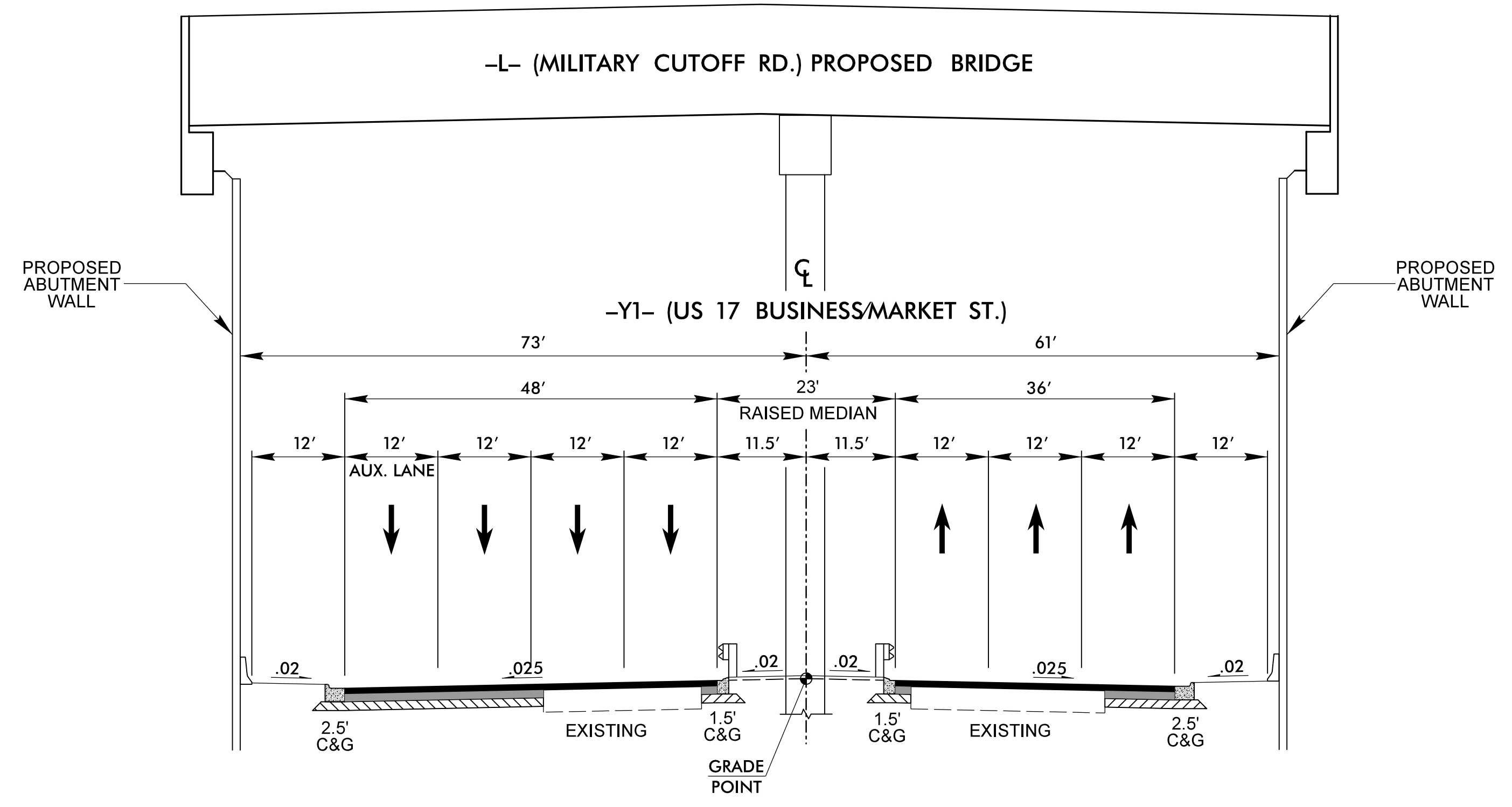
# STRUCTURE 1: -L- (MILITARY CUTOFF RD.) OVER -Y1- (US 17 BUSINESS/MARKET ST.)



TYPICAL SECTION ON STRUCTURE  
 -L- 38+94.20



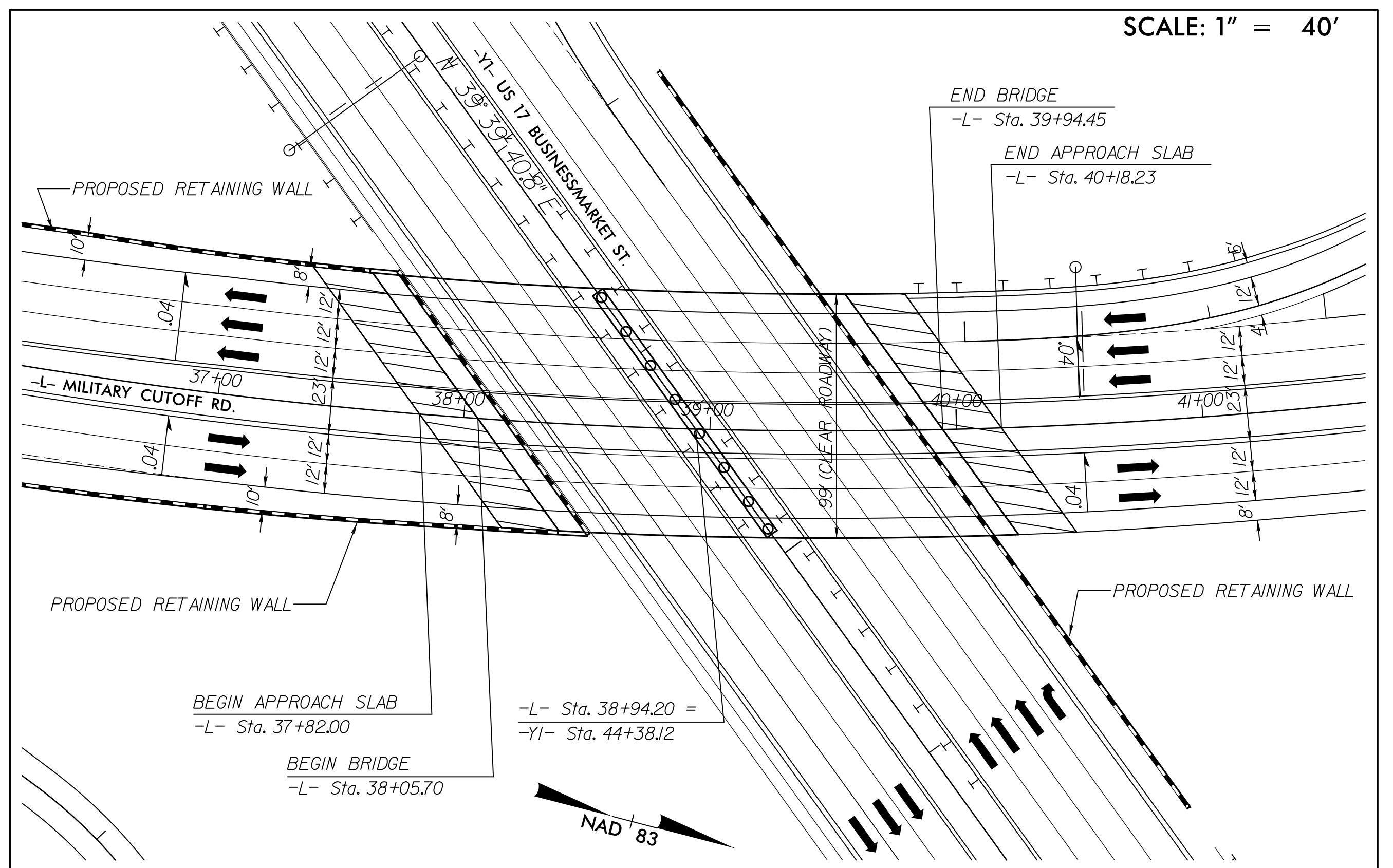
TYPICAL SECTION ON ROADWAY APPROACHING STRUCTURE  
 FUNCTIONAL CLASSIFICATION  
 ARTERIAL



TYPICAL SECTION UNDER STRUCTURE  
 -Y1- 44+38.12  
 FUNCTIONAL CLASSIFICATION  
 URBAN ARTERIAL

-Y1- DESIGN DATA	
ADT 2017	= 49,300
ADT 2037	= 57,900
TTST	= 2%
DUAL	= 4%
DHV	= 11%
DIR	= 60%

**MINIMUM VERTICAL  
 CLEARANCE = 17'-0"**



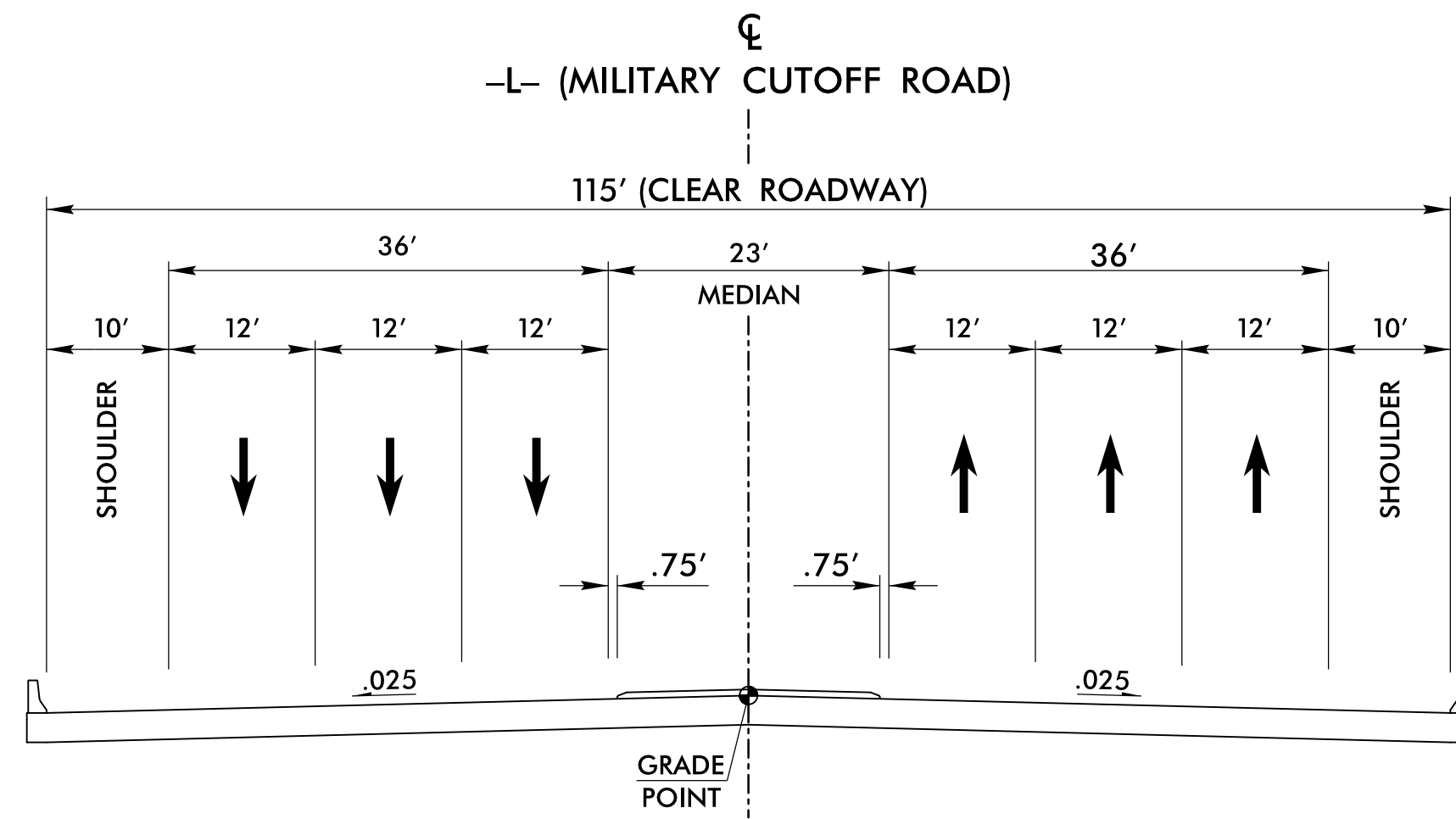
SKETCH SHOWING BRIDGE-PAVEMENT RELATIONSHIP FOR  
 -L- (MILITARY CUTOFF RD) OVER -Y1- (US 17 BUSINESS/MARKET ST.)

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 7/31/2017

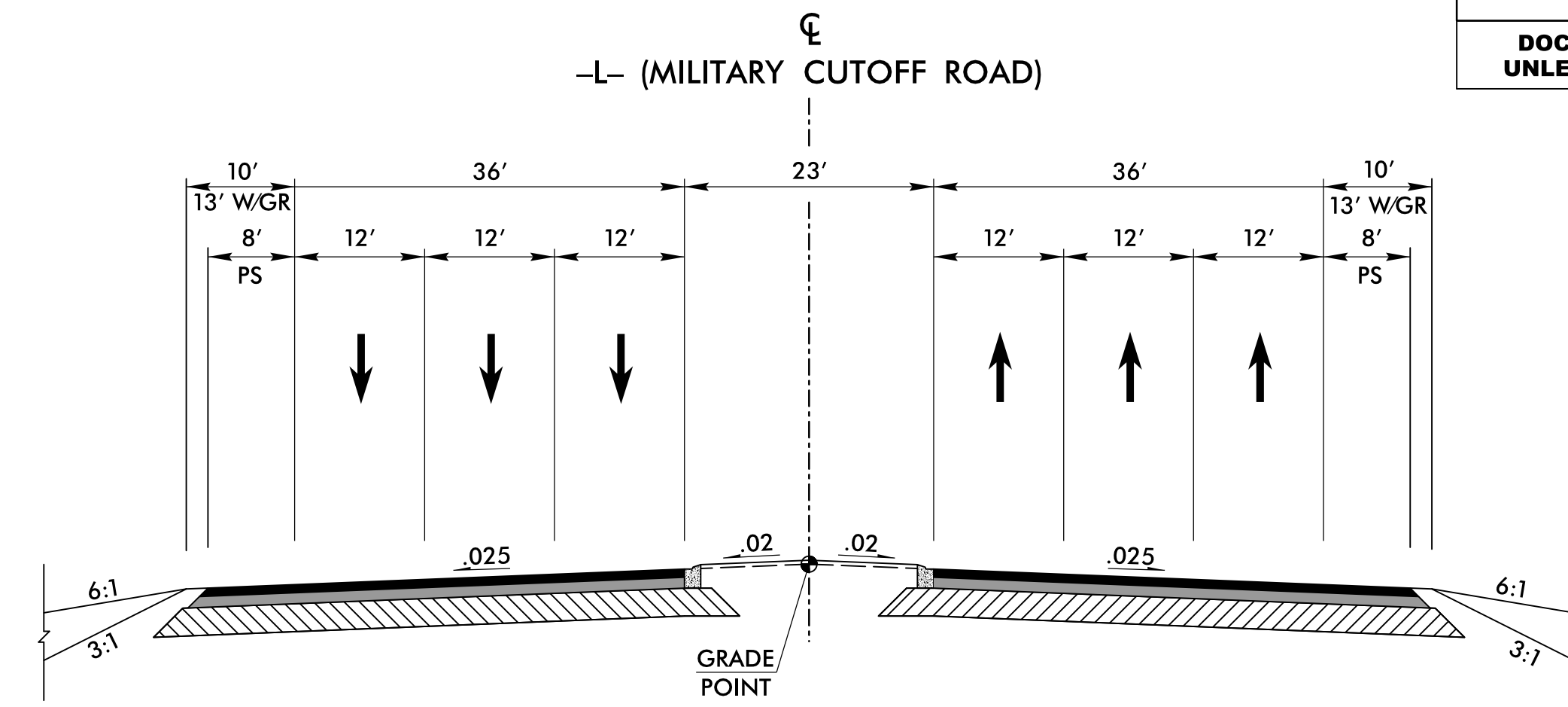
# STRUCTURE 2: -L- (MILITARY CUTOFF RD.) OVER -Y2- (OGDEN PARK DR.)

**STV** 100 Years  
**STV Engineers, Inc.**  
 900 West Trade St., Suite 715  
 Charlotte, NC 28202  
 NC License Number F-0991

PROJECT REFERENCE NO. U-4751	SHEET NO. 2B-2
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

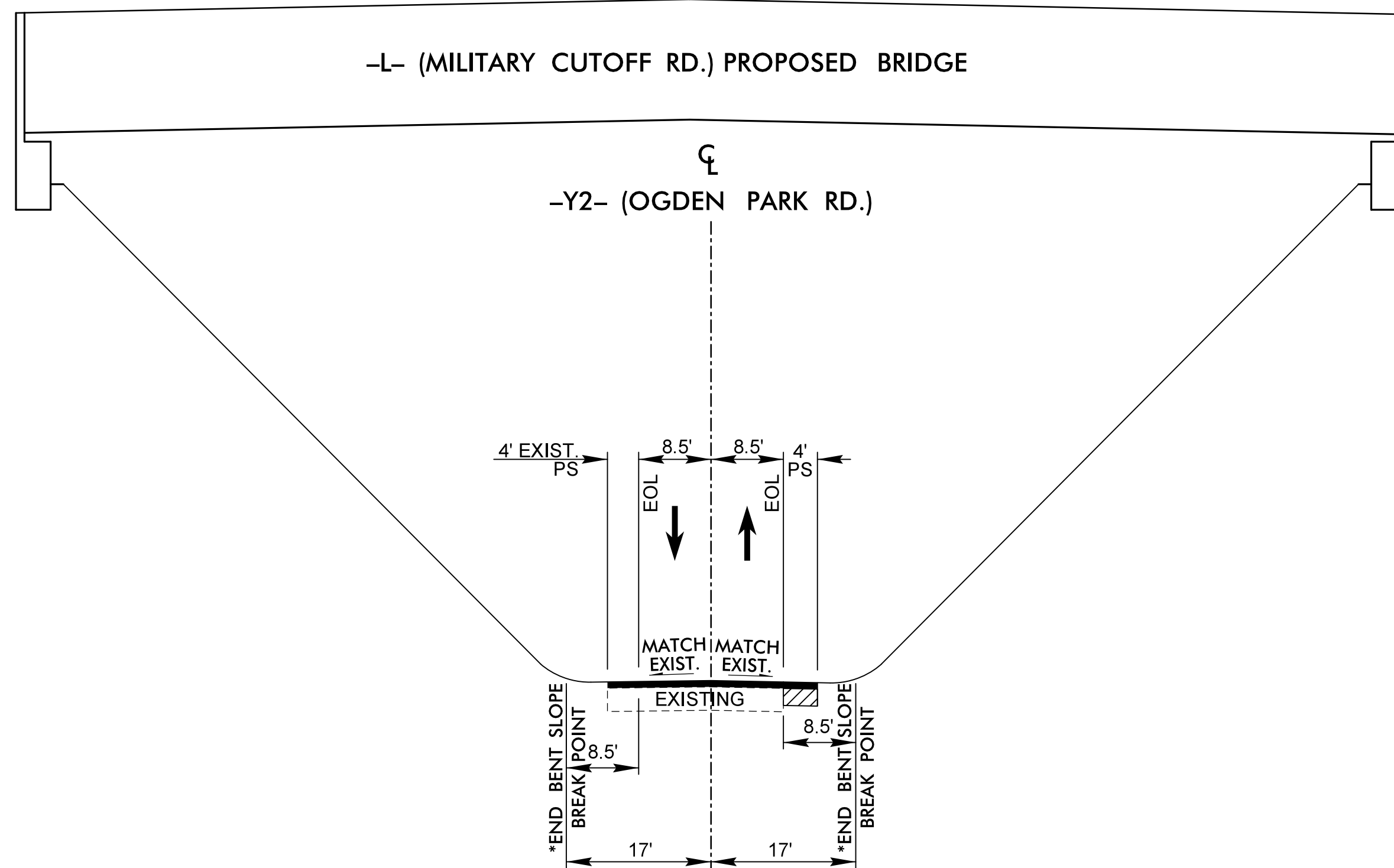


TYPICAL SECTION ON STRUCTURE  
 -L- 62+99.10



TYPICAL SECTION ON ROADWAY APPROACHING STRUCTURE  
 FUNCTIONAL CLASSIFICATION  
 ARTERIAL

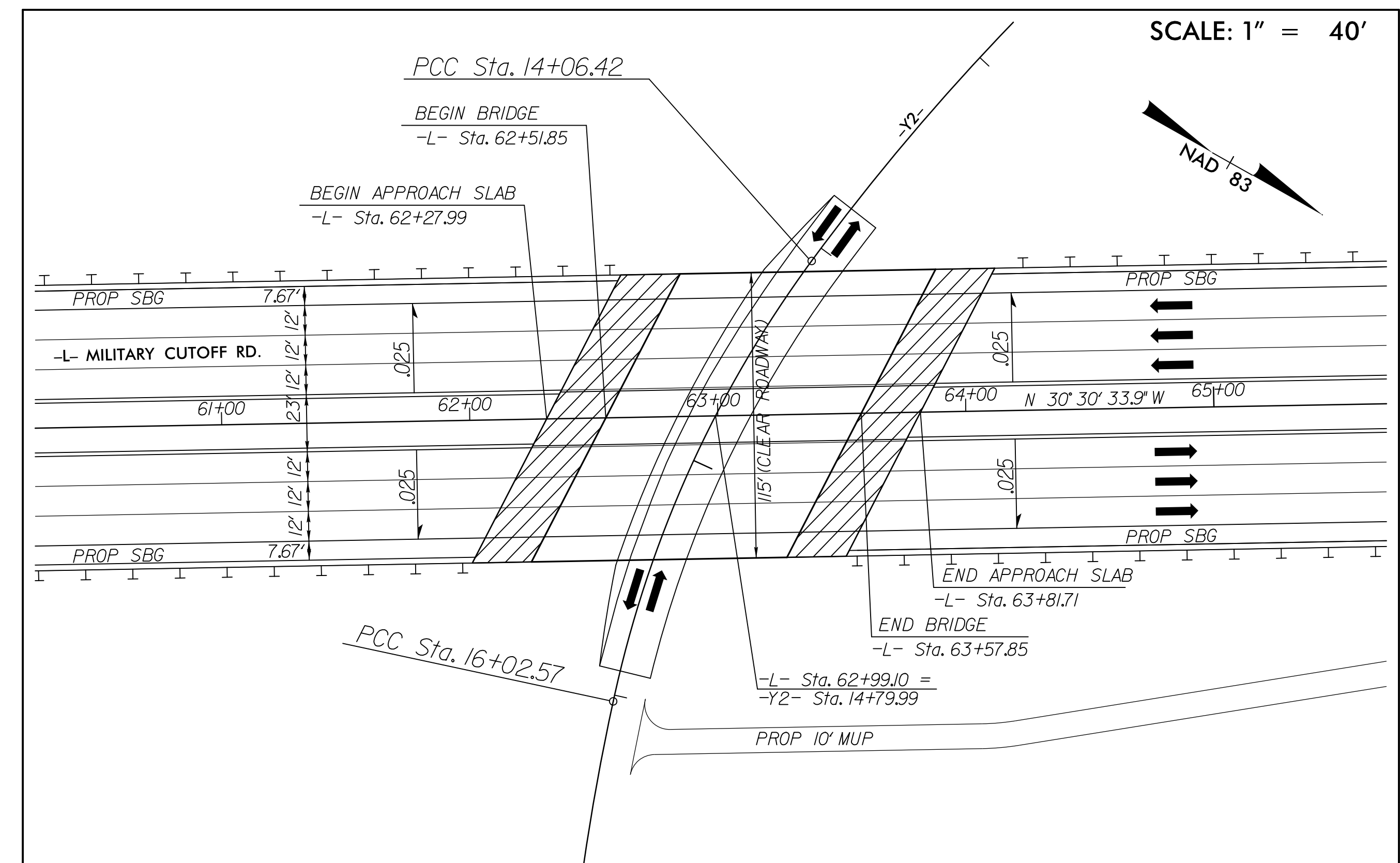
**MINIMUM VERTICAL  
 CLEARANCE = 15'-6"**



TYPICAL SECTION UNDER STRUCTURE  
 -Y2- 14+79.99

\*SEE STD. 610.03

FUNCTIONAL CLASSIFICATION  
 RURAL LOCAL



SKETCH SHOWING BRIDGE-PAVEMENT RELATIONSHIP FOR  
 -L- (MILITARY CUTOFF RD.) OVER -Y2- (OGDEN PARK DR.)

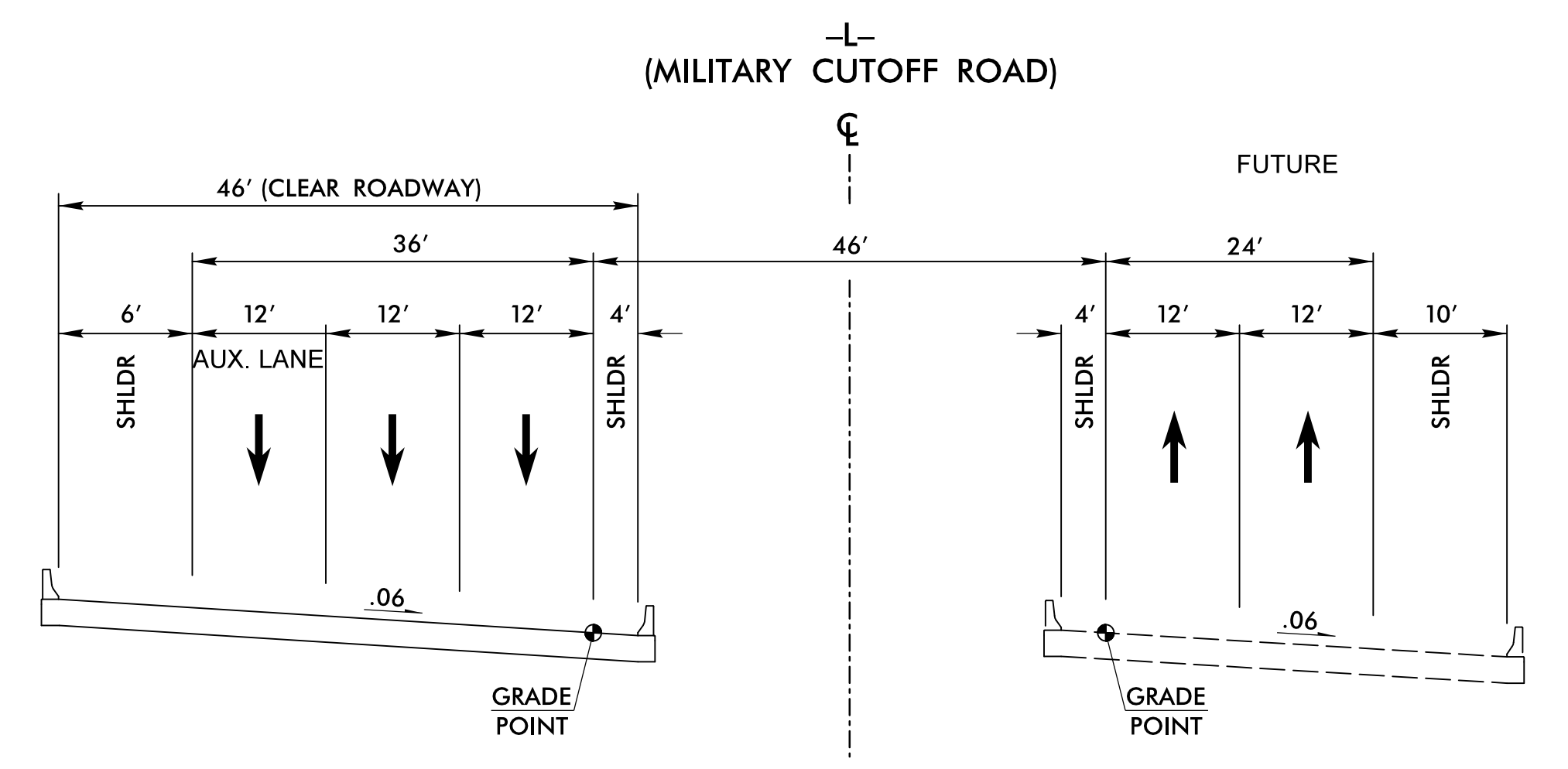
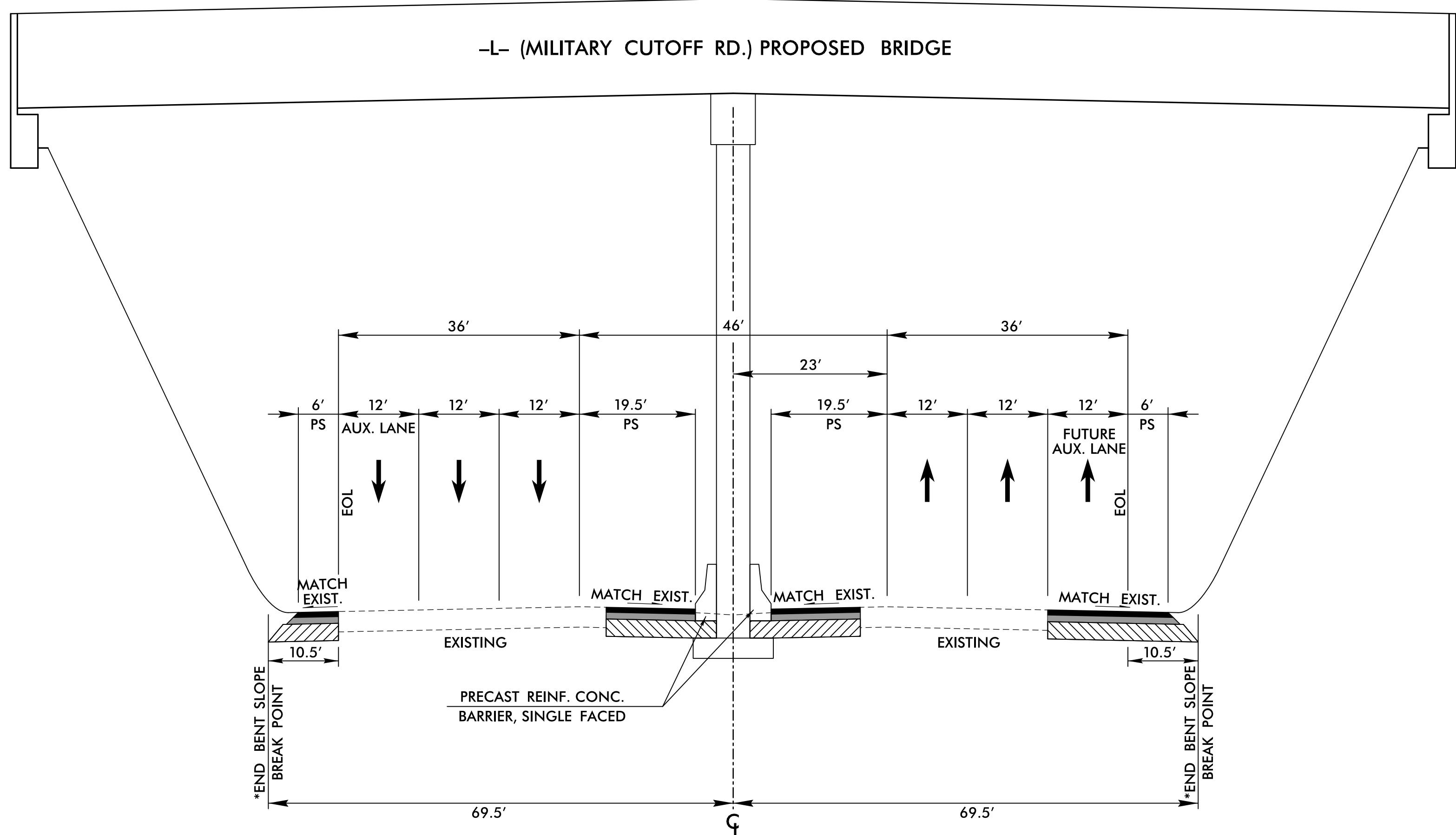
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7/14/2017

# STRUCTURE 3: -L- (MILITARY CUTOFF RD.) OVER -Y8- (US 17 BYPASS)

**STV** 100 Years  
 STV Engineers, Inc.  
 900 West Trade St., Suite 715  
 Charlotte, NC 28202  
 NC License Number F-0991

PROJECT REFERENCE NO. U-4751	SHEET NO. 2B-3
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
<b>DOCUMENT NOT CONSIDERED FINAL                  UNLESS ALL SIGNATURES COMPLETED</b>	

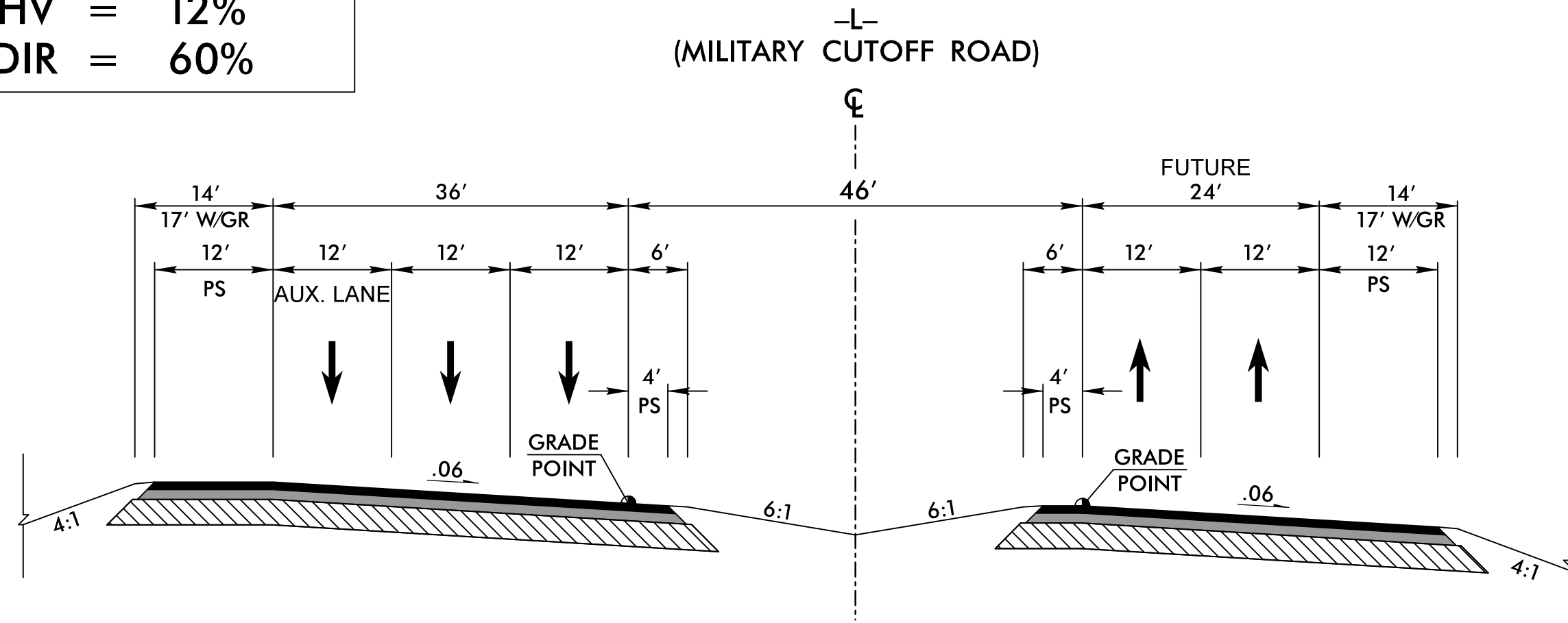


TYPICAL SECTION ON STRUCTURE  
 -L- 225 + 92.26

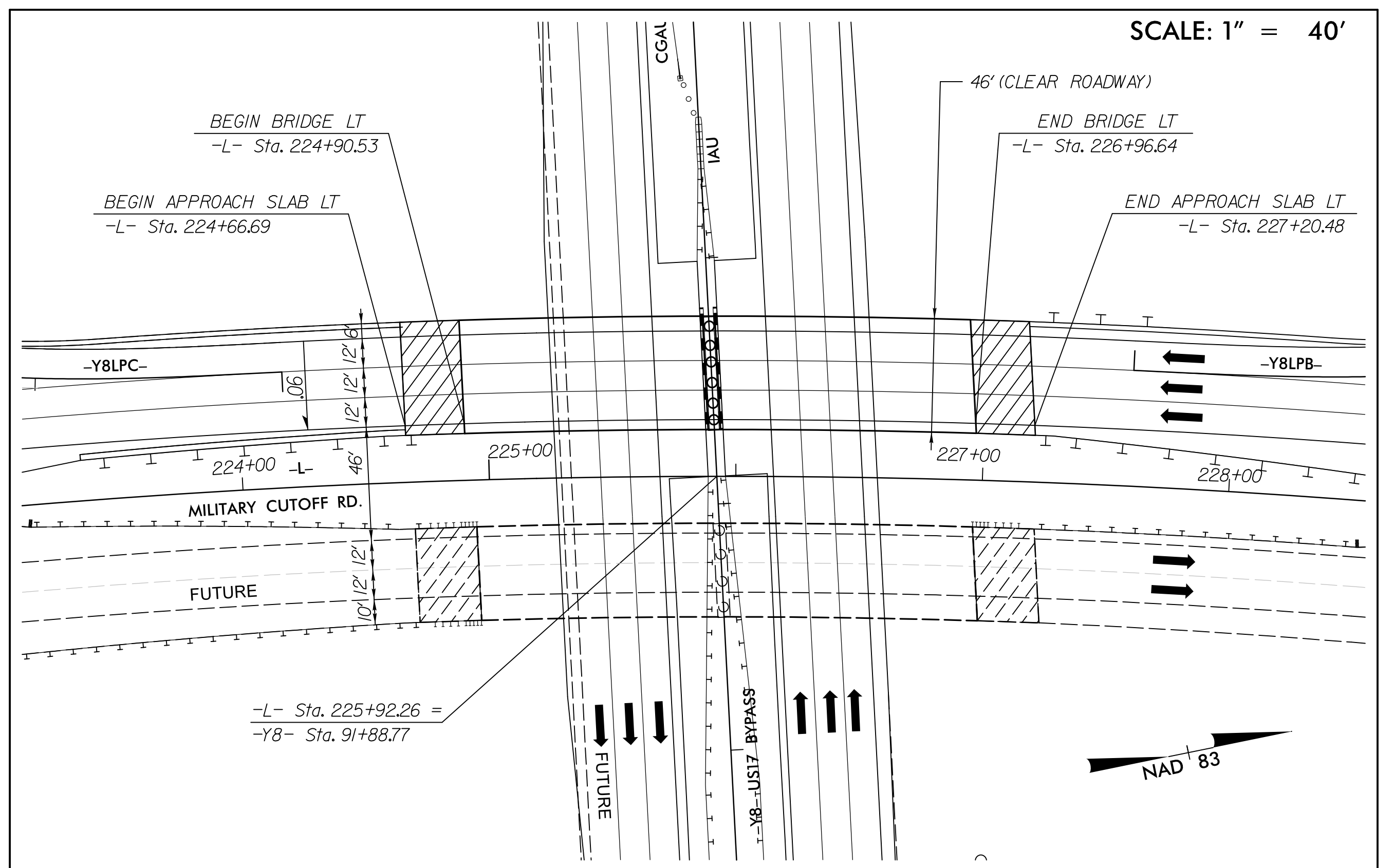
**MINIMUM VERTICAL  
 CLEARANCE = 17'-0"**

-Y8- DESIGN DATA	
ADT 2017 =	43,100
ADT 2037 =	95,200
TTST =	6%
DUAL =	4%
DHV =	12%
DIR =	60%

-Y8- (US17 BYPASS)  
 TYPICAL SECTION UNDER STRUCTURE  
 -Y8- 91 + 88.77  
 \*SEE STD. 610.03  
 FUNCTIONAL CLASSIFICATION  
 RURAL FREEWAY



TYPICAL SECTION ON ROADWAY APPROACHING STRUCTURE  
 FUNCTIONAL CLASSIFICATION  
 FREEWAY

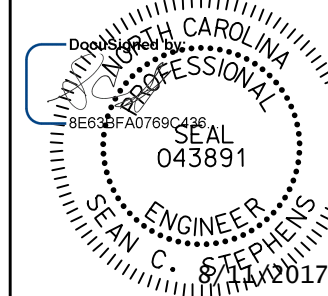


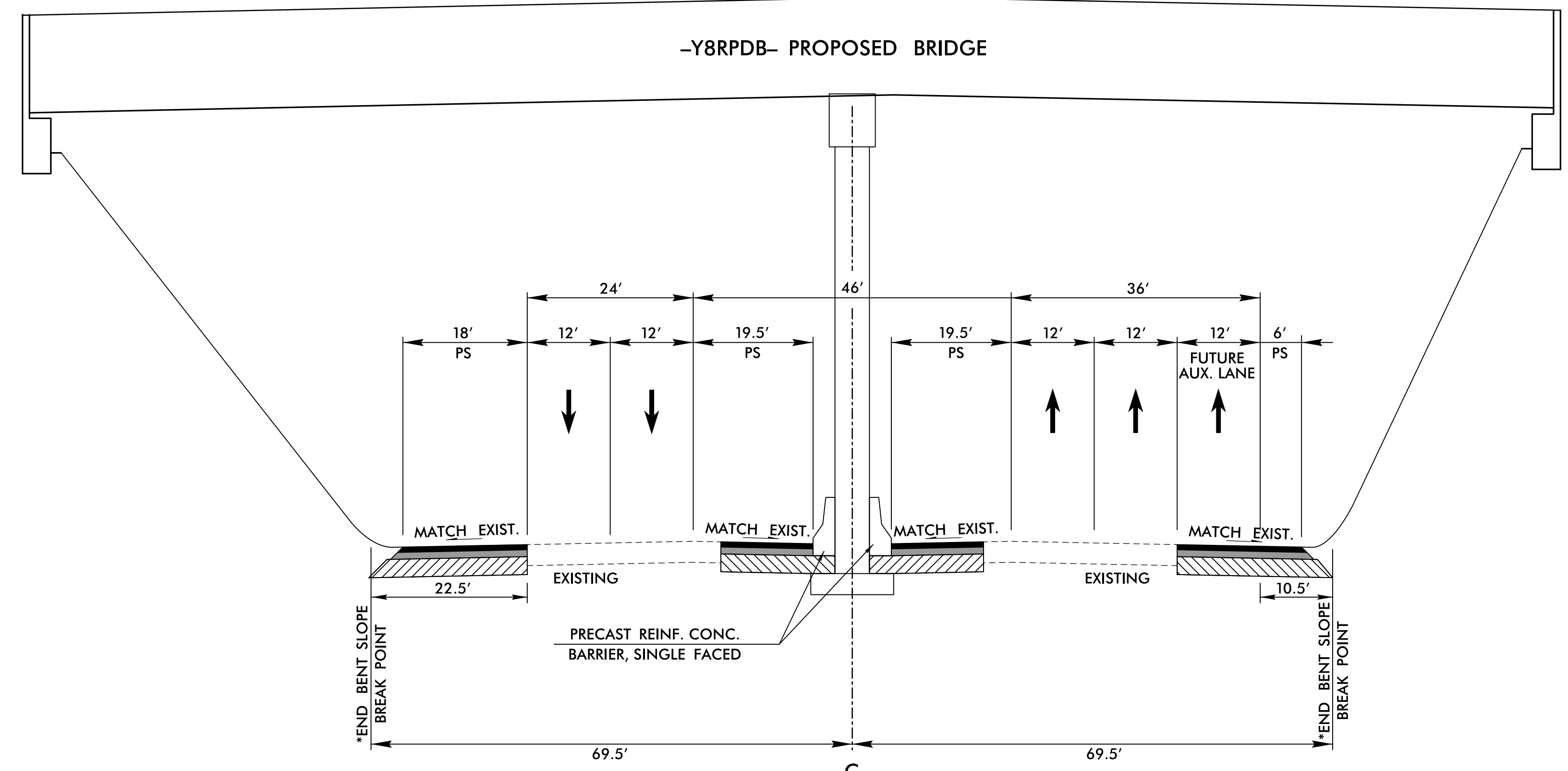
SKETCH SHOWING BRIDGE-PAVEMENT RELATIONSHIP FOR  
 -L- (MILITARY CUTOFF RD.) OVER -Y8- (US 17 WILMINGTON BYPASS)

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 7/14/2017

# STRUCTURE 4: -Y8RPDB- OVER -Y8- (US 17 BYPASS)

**STV** 100 Years  
 STV Engineers, Inc.  
 900 West Trade St., Suite 715  
 Charlotte, NC 28202  
 NC License Number F-0991

PROJECT REFERENCE NO. U-4751	SHEET NO. 2B-4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

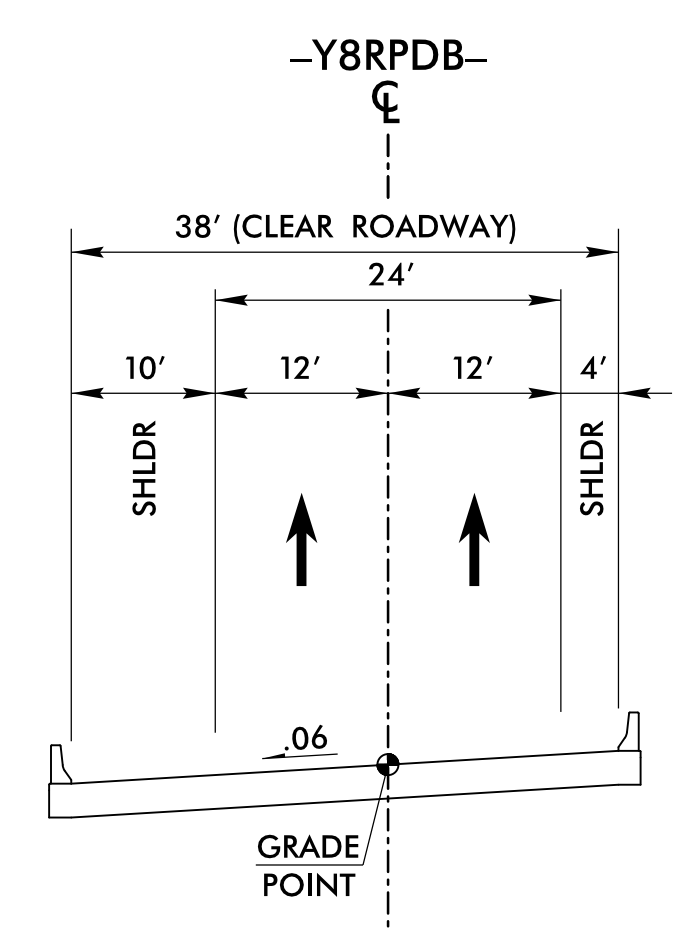


-Y8- DESIGN DATA	
ADT 2017	= 43,100
ADT 2037	= 95,200
TTST	= 6%
DUAL	= 4%
DHV	= 12%
DIR	= 60%

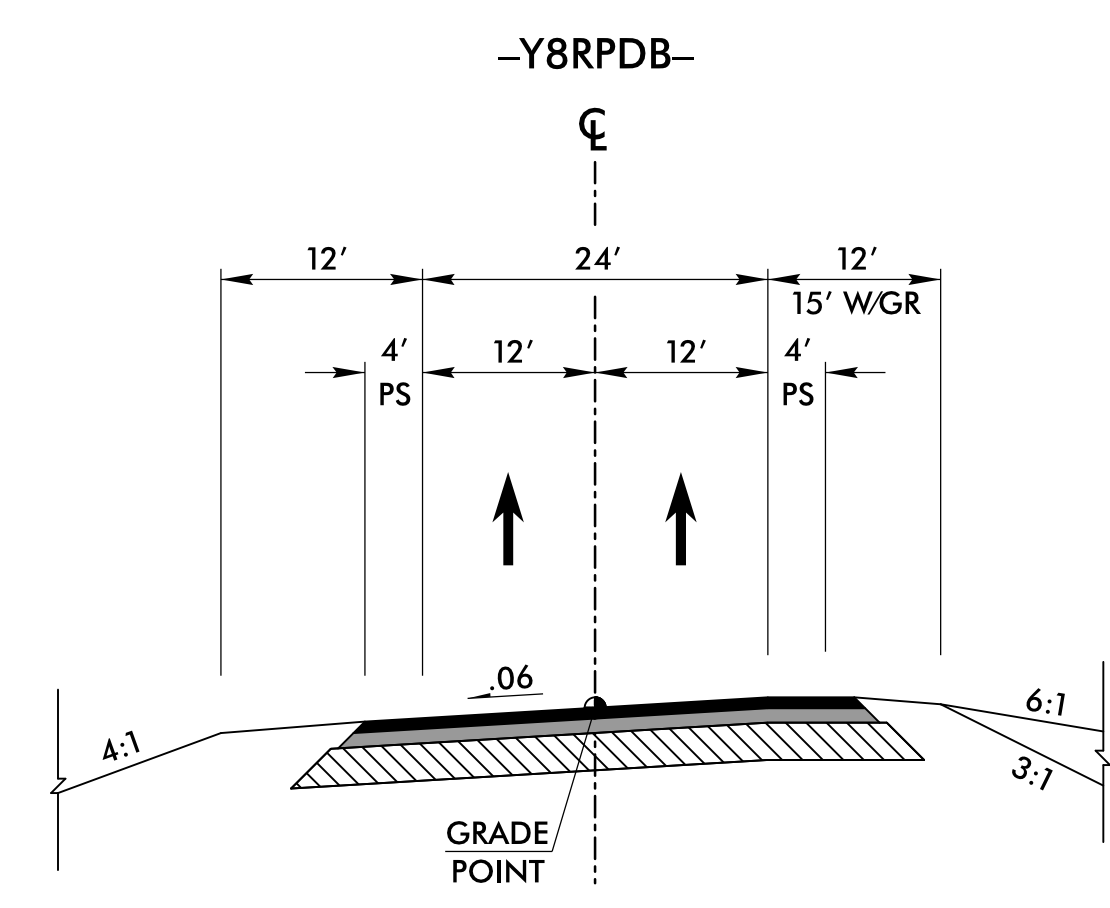
**MINIMUM VERTICAL CLEARANCE = 17'-0"**

-Y8- (US17 BYPASS)  
 TYPICAL SECTION UNDER STRUCTURE  
 -Y8- 99+67.11  
 \*SEE STD. 610.03

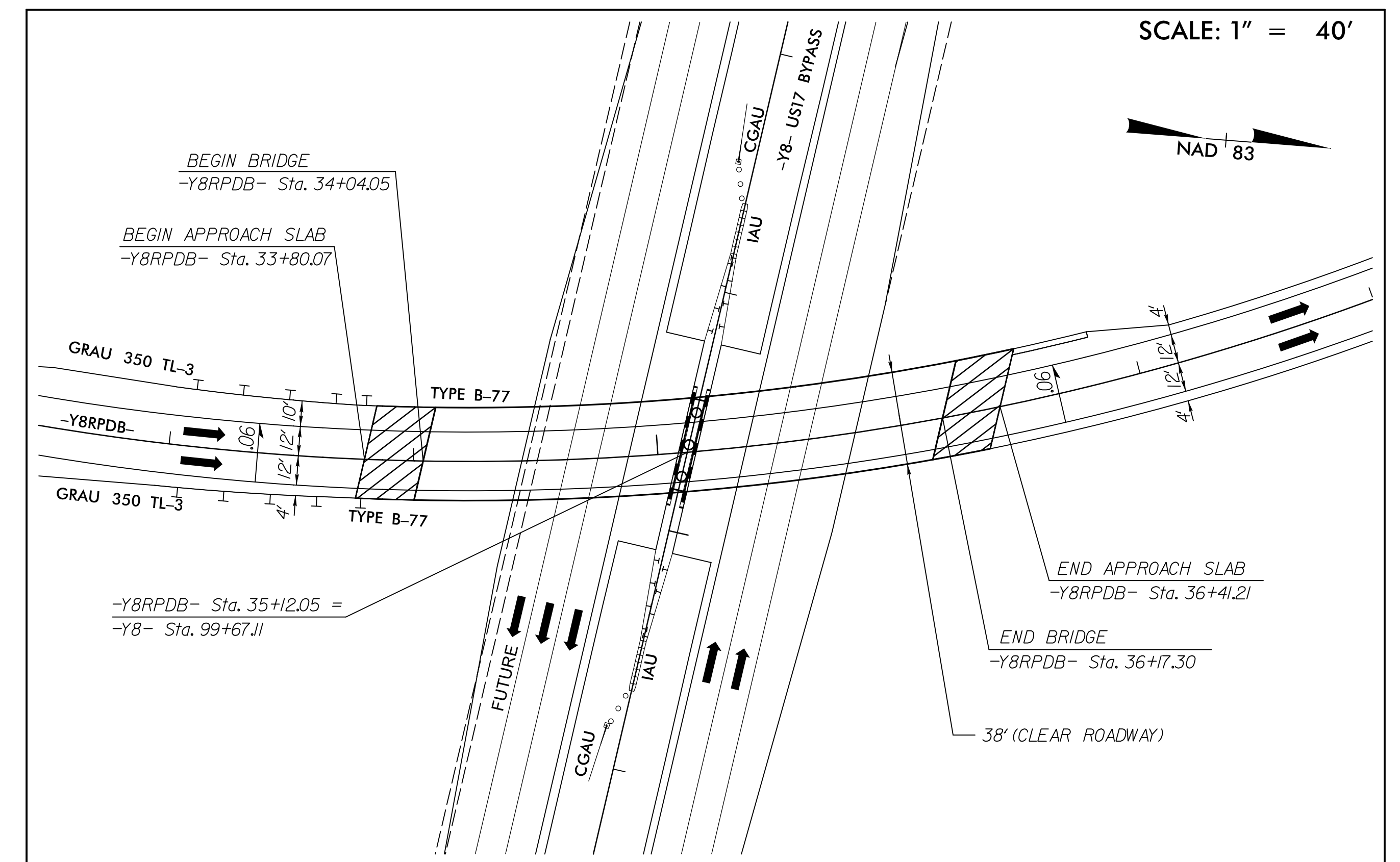
FUNCTIONAL CLASSIFICATION  
 RURAL FREEWAY



TYPICAL SECTION ON STRUCTURE  
 -Y8RPDB- 35+12.05

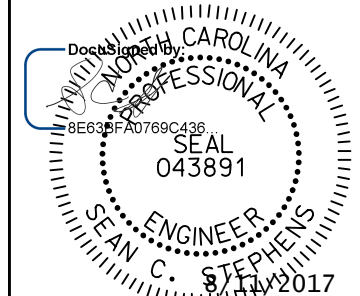


TYPICAL SECTION ON ROADWAY APPROACHING STRUCTURE  
 FUNCTIONAL CLASSIFICATION  
 RAMP



SKETCH SHOWING BRIDGE-PAVEMENT RELATIONSHIP FOR  
 -Y8RPDB- OVER -Y8- (US 17 WILMINGTON BYPASS)

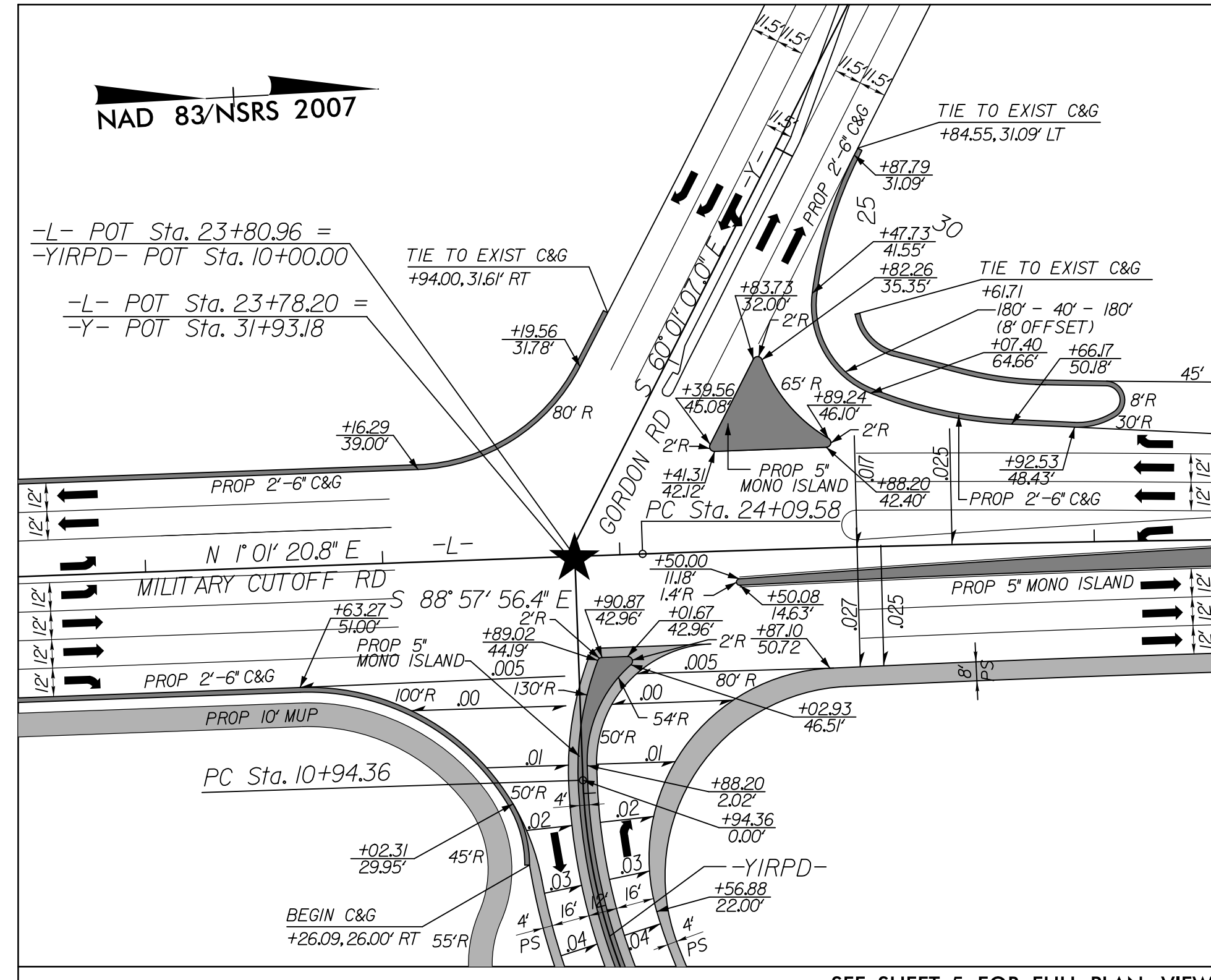
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 7/14/2017



DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

- CONCRETE CURB /GUTTER & MONOLITHIC ISLAND
SIDEWALK, MUP & FULL DEPTH PAVED SHOULDER
PROPOSED TRAFFIC SIGNAL

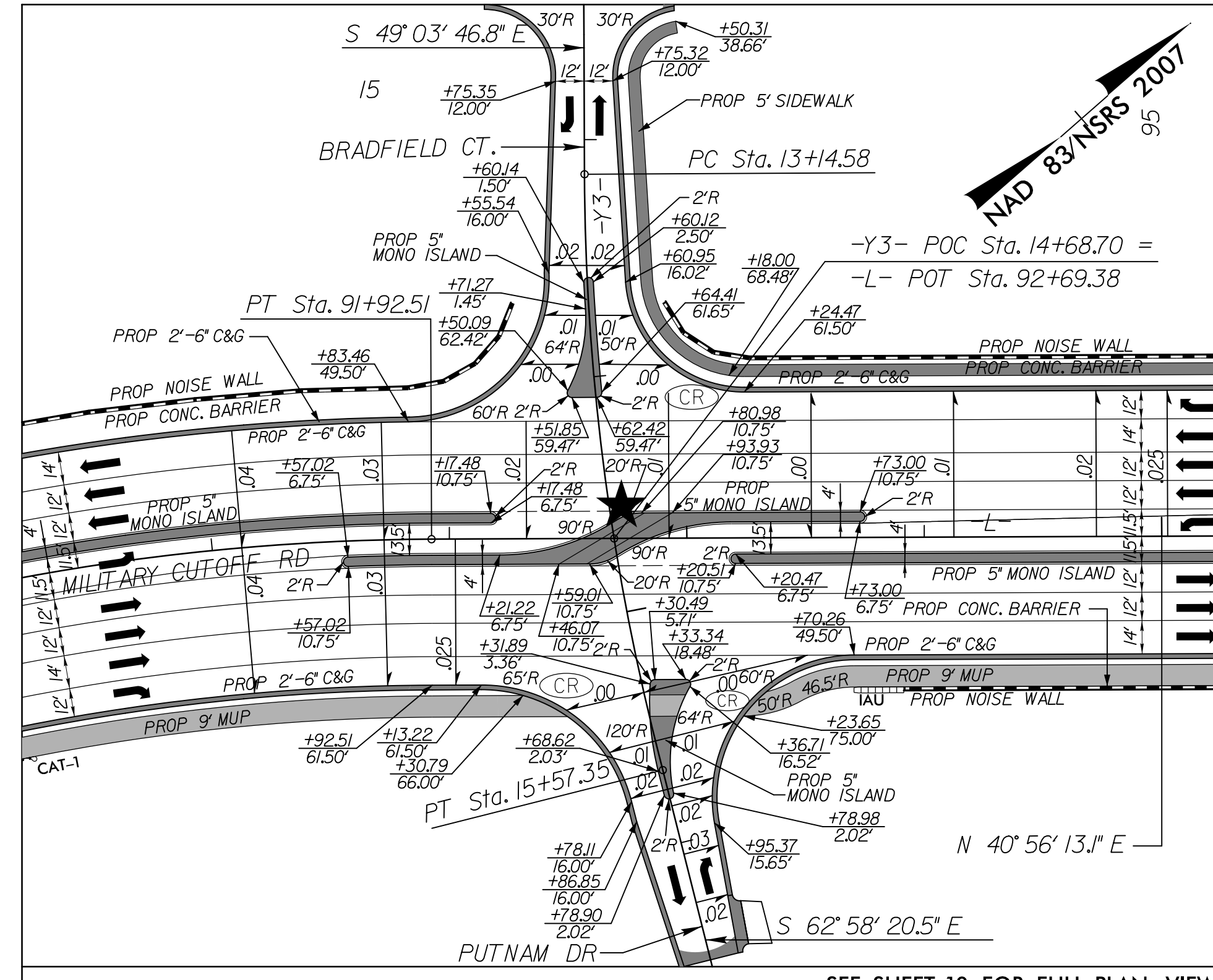
-L- MILITARY CUTOFF RD, -Y- & -Y1RPD



INTERSECTION DETAIL - A

SEE SHEET 5 FOR FULL PLAN VIEW SCALE : 1\"/>

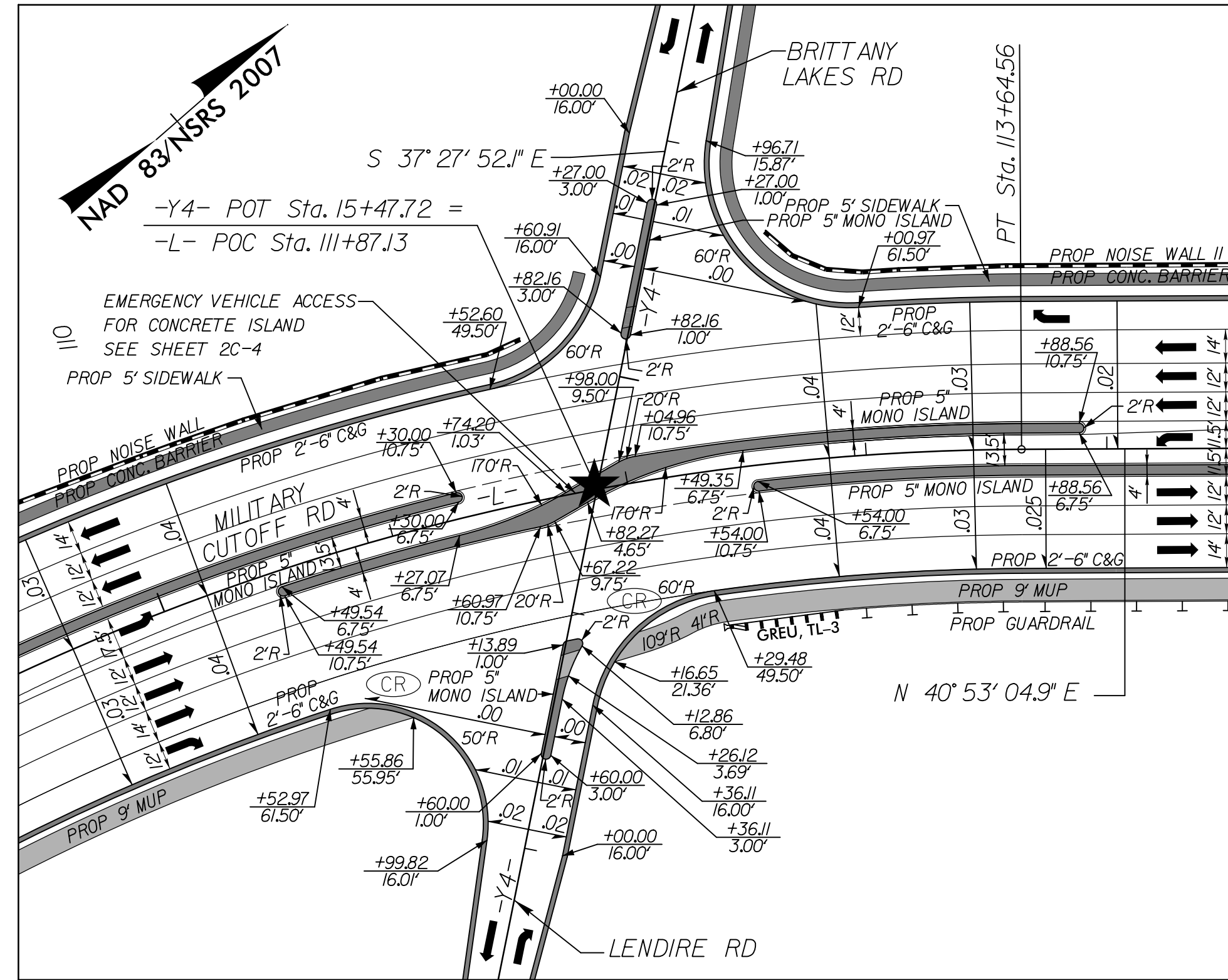
-L- MILITARY CUTOFF RD, -Y3-



INTERSECTION DETAIL - B

SEE SHEET 10 FOR FULL PLAN VIEW SCALE : 1\"/>

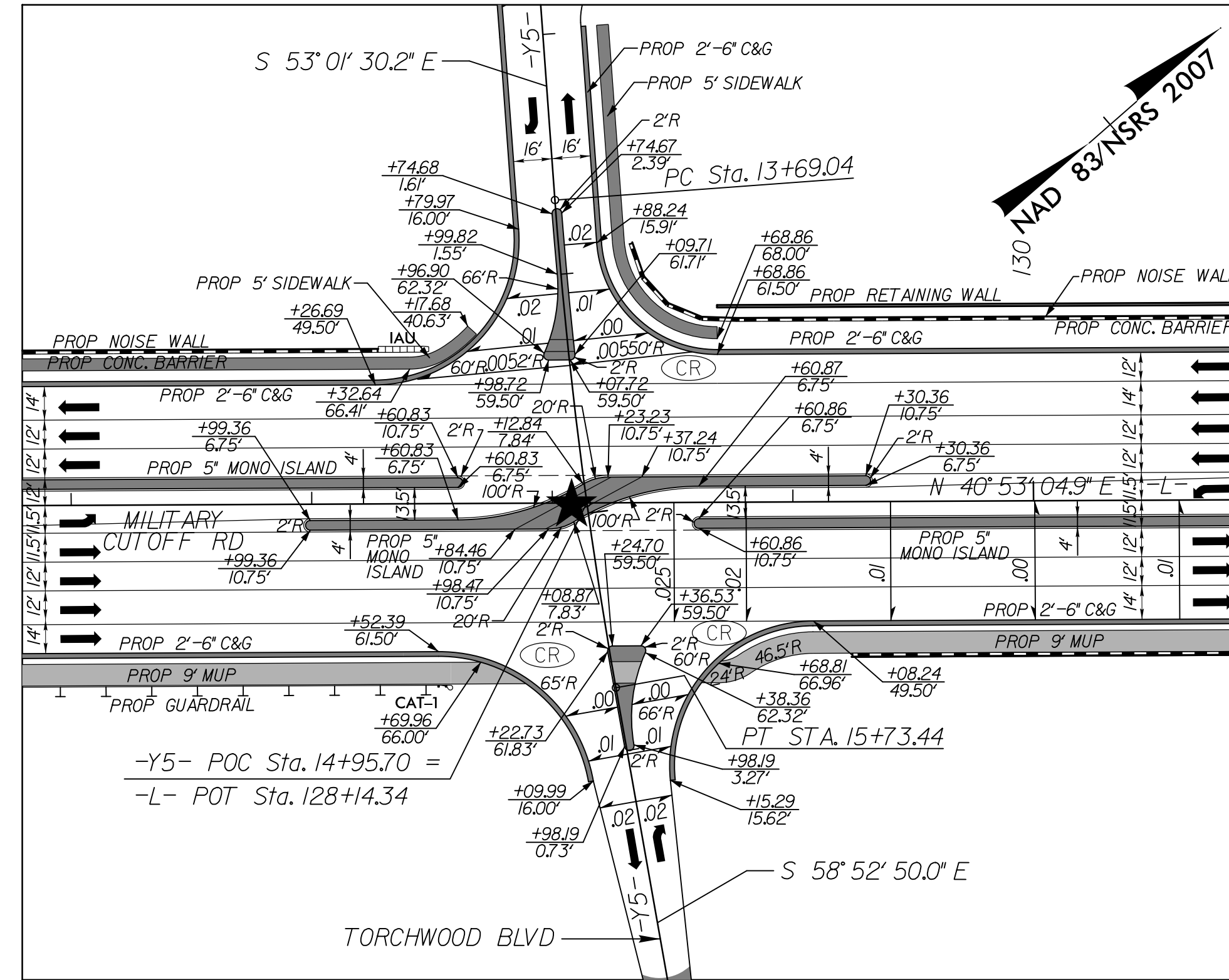
-L- MILITARY CUTOFF RD, -Y4-



INTERSECTION DETAIL - C

SEE SHEET 12 FOR FULL PLAN VIEW SCALE : 1\"/>

-L- MILITARY CUTOFF RD, -Y5-



INTERSECTION DETAIL - D

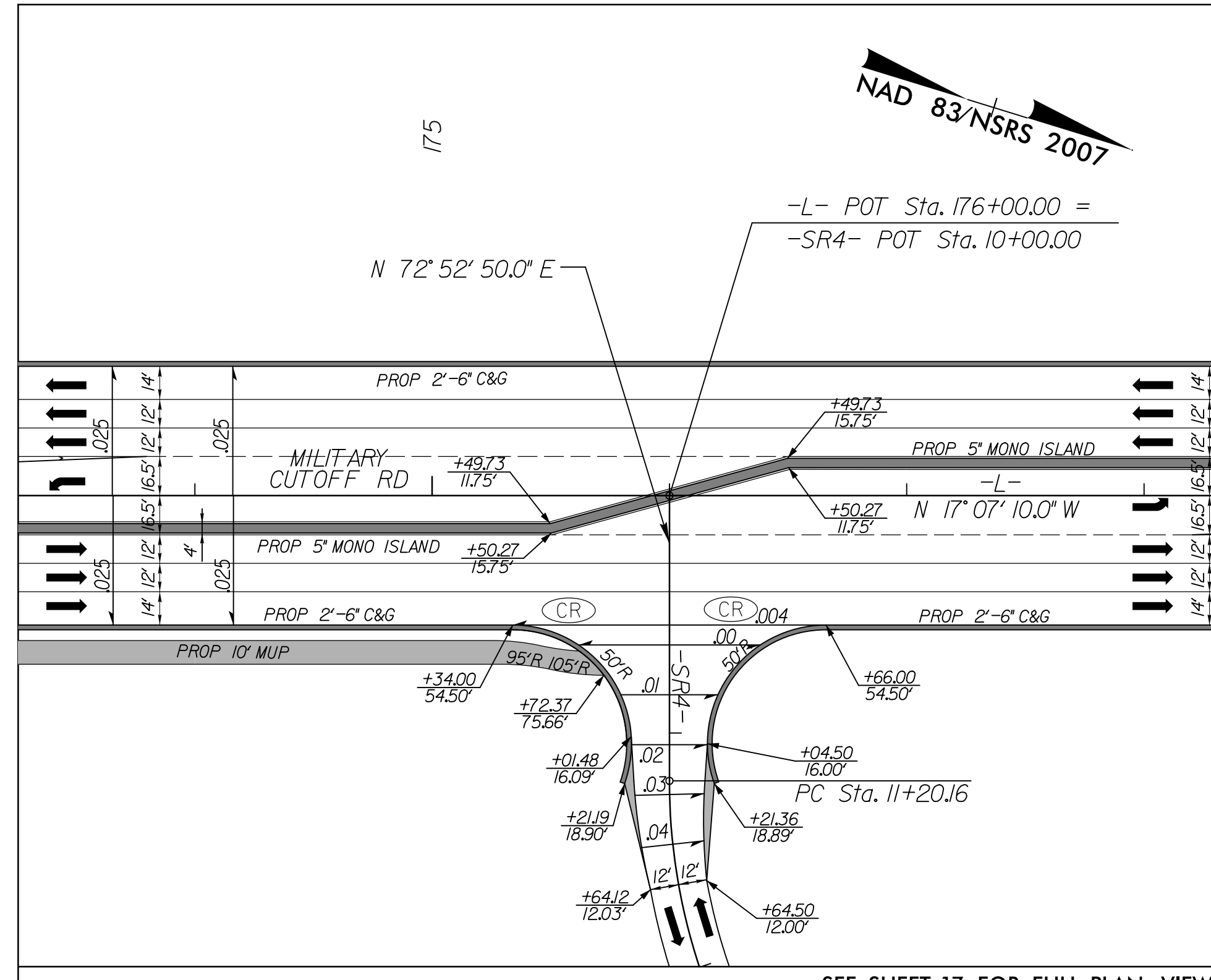
SEE SHEET 13 FOR FULL PLAN VIEW SCALE : 1\"/>

7/14/2017 R:\v\g\proj\sh04751.RD\psh02B-05-Inter\_Details.dgn

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

- CONCRETE CURB /GUTTER & MONOLITHIC ISLAND
- SIDEWALK, MUP & FULL DEPTH PAVED SHOULDER
- ★ PROPOSED TRAFFIC SIGNAL

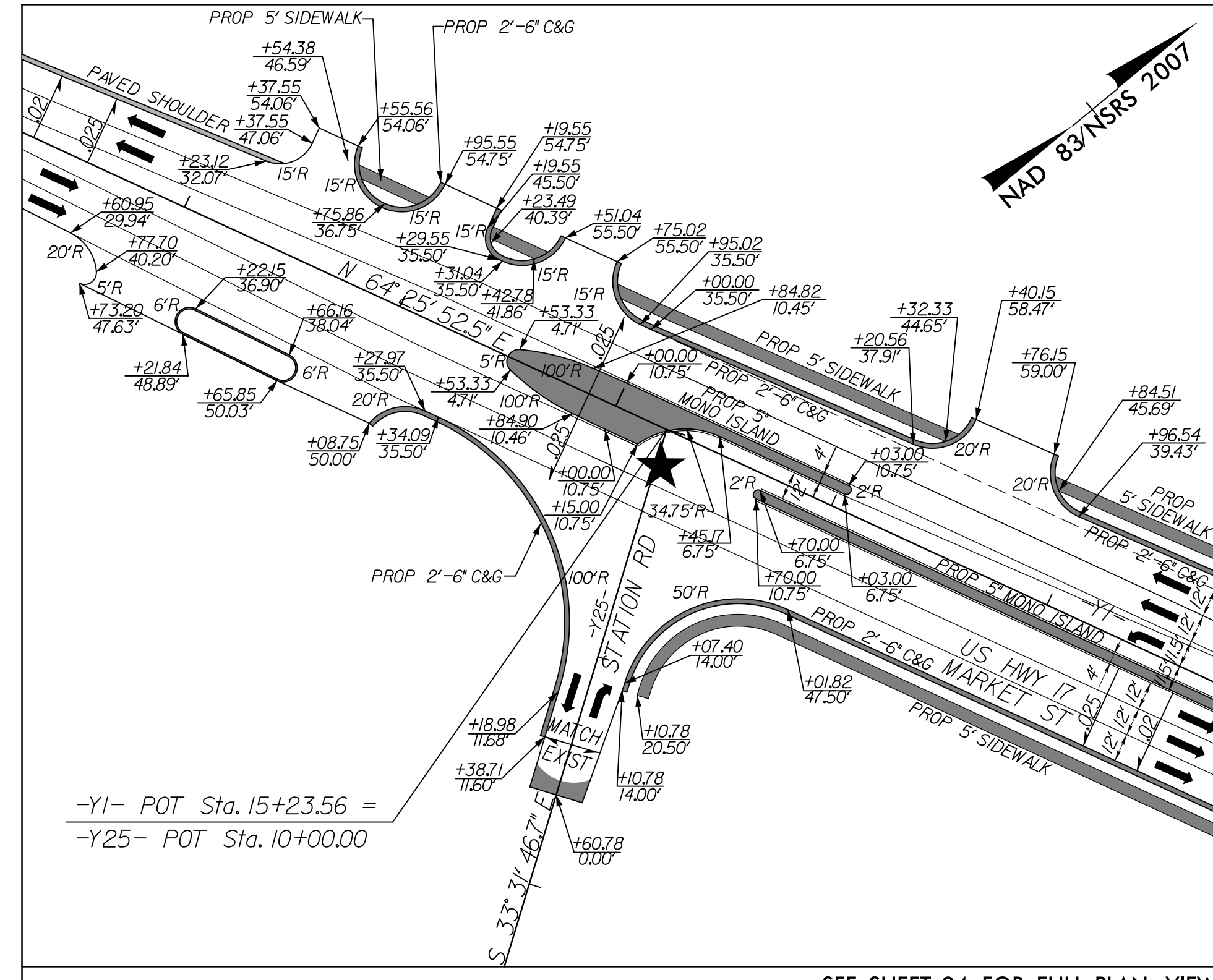
### -L- MILITARY CUTOFF RD, -SR4-



INTERSECTION DETAIL - E

SEE SHEET 17 FOR FULL PLAN VIEW  
SCALE : 1" = 50'

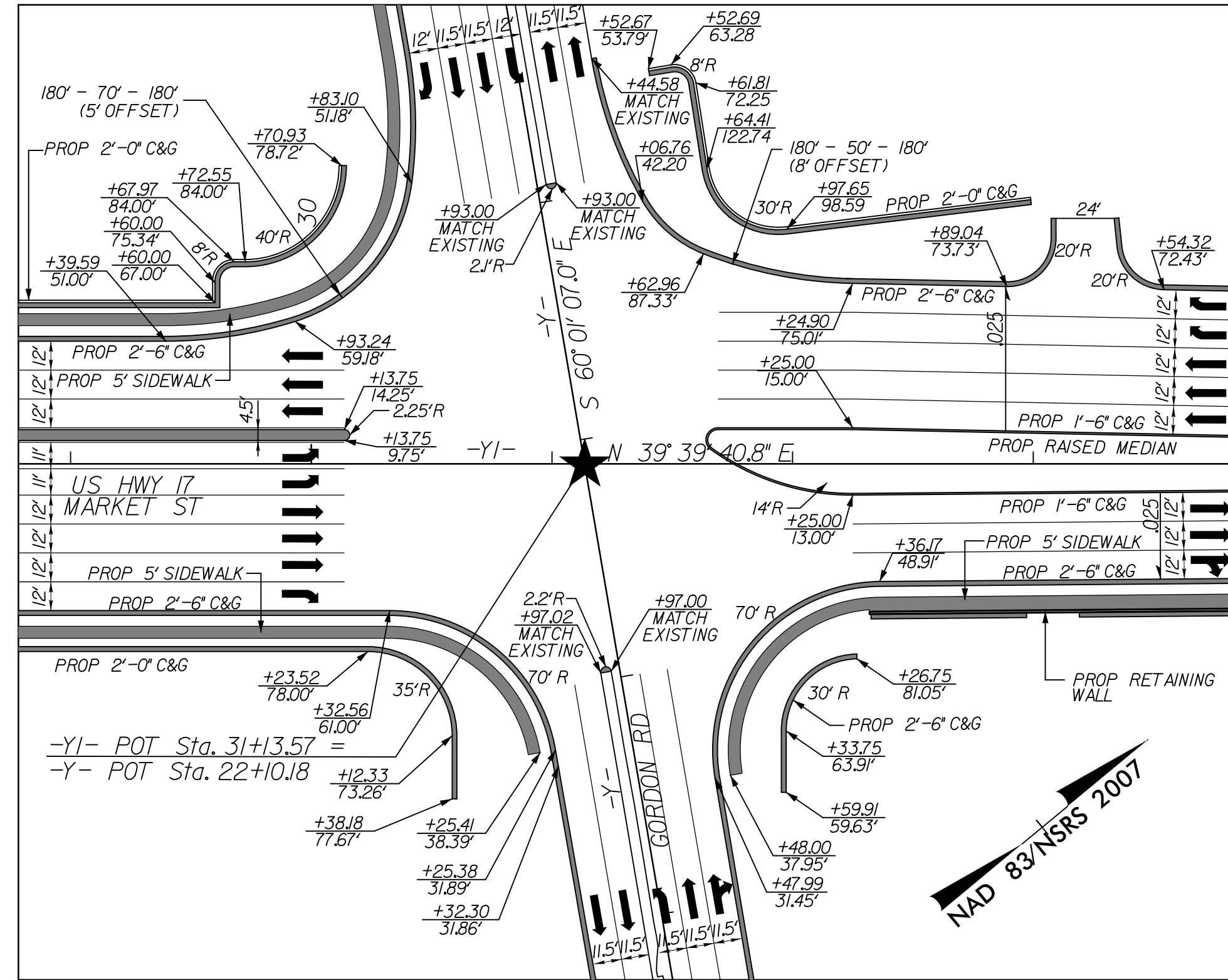
### -Y1- US 17 BUS MARKET ST, -Y25-



INTERSECTION DETAIL - F

SEE SHEET 24 FOR FULL PLAN VIEW  
SCALE : 1" = 50'

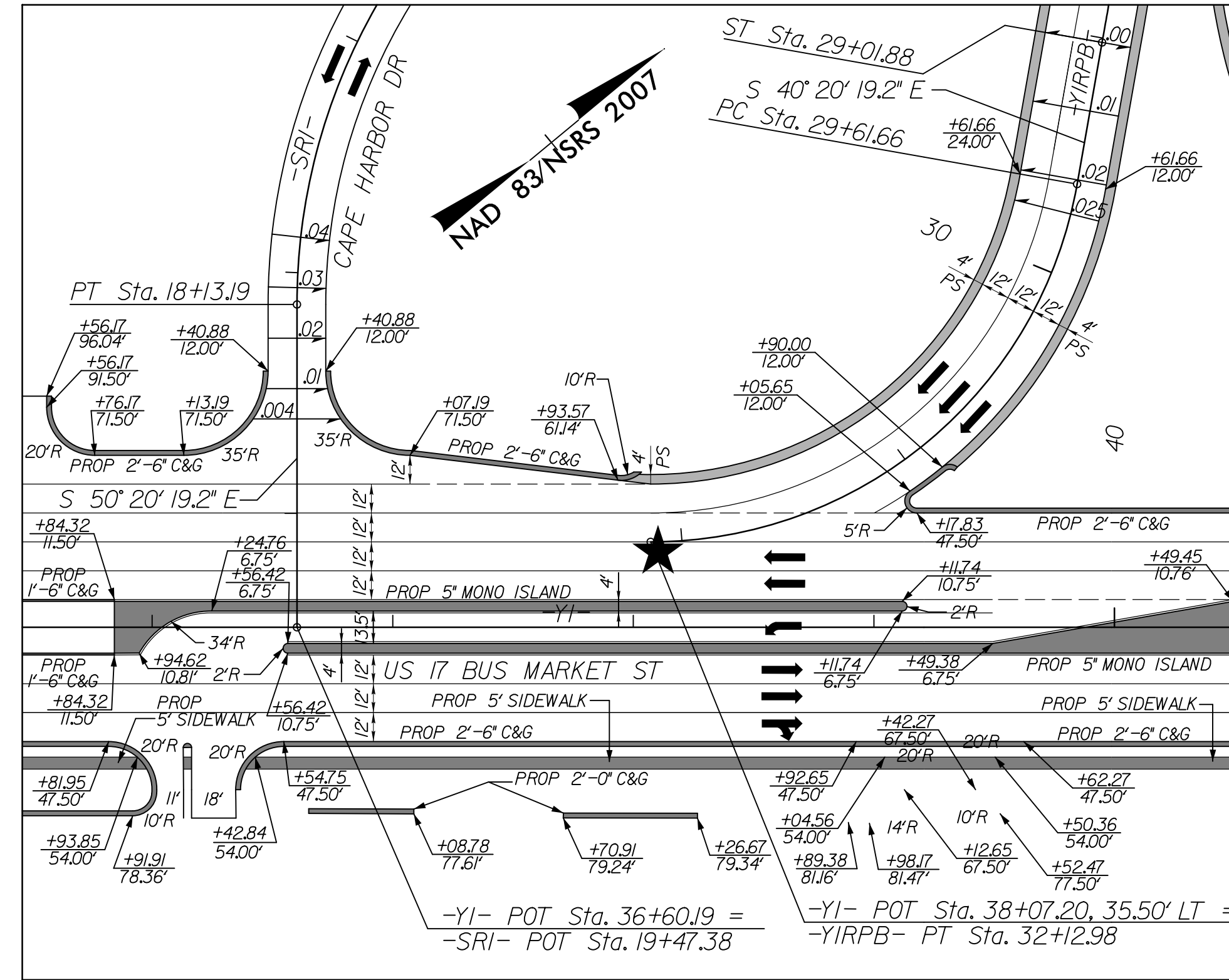
### -Y1- US 17 BUS MARKET ST, -Y-



INTERSECTION DETAIL - G

SEE SHEET 25 FOR FULL PLAN VIEW  
SCALE : 1" = 50'

### -Y1- US 17 BUS MARKET ST, -SRI- & -Y1RPB-



INTERSECTION DETAIL - H

SEE SHEET 6 FOR FULL PLAN VIEW  
SCALE : 1" = 50'

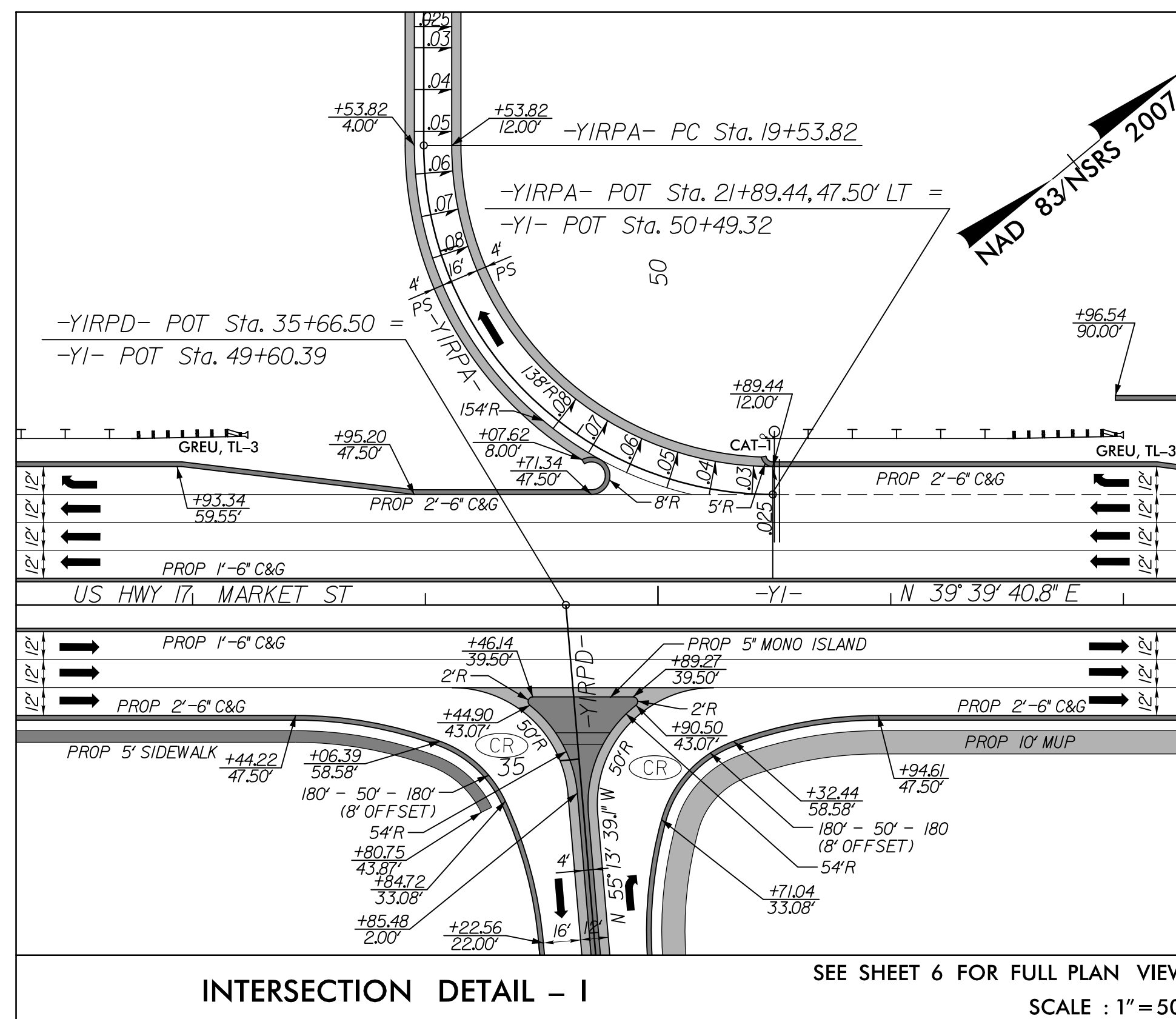
7/14/2017  
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PROJECT REFERENCE NO. U-4751	SHEET NO. 2B-7
RW SHEET NO.	ROADWAY DESIGN ENGINEER

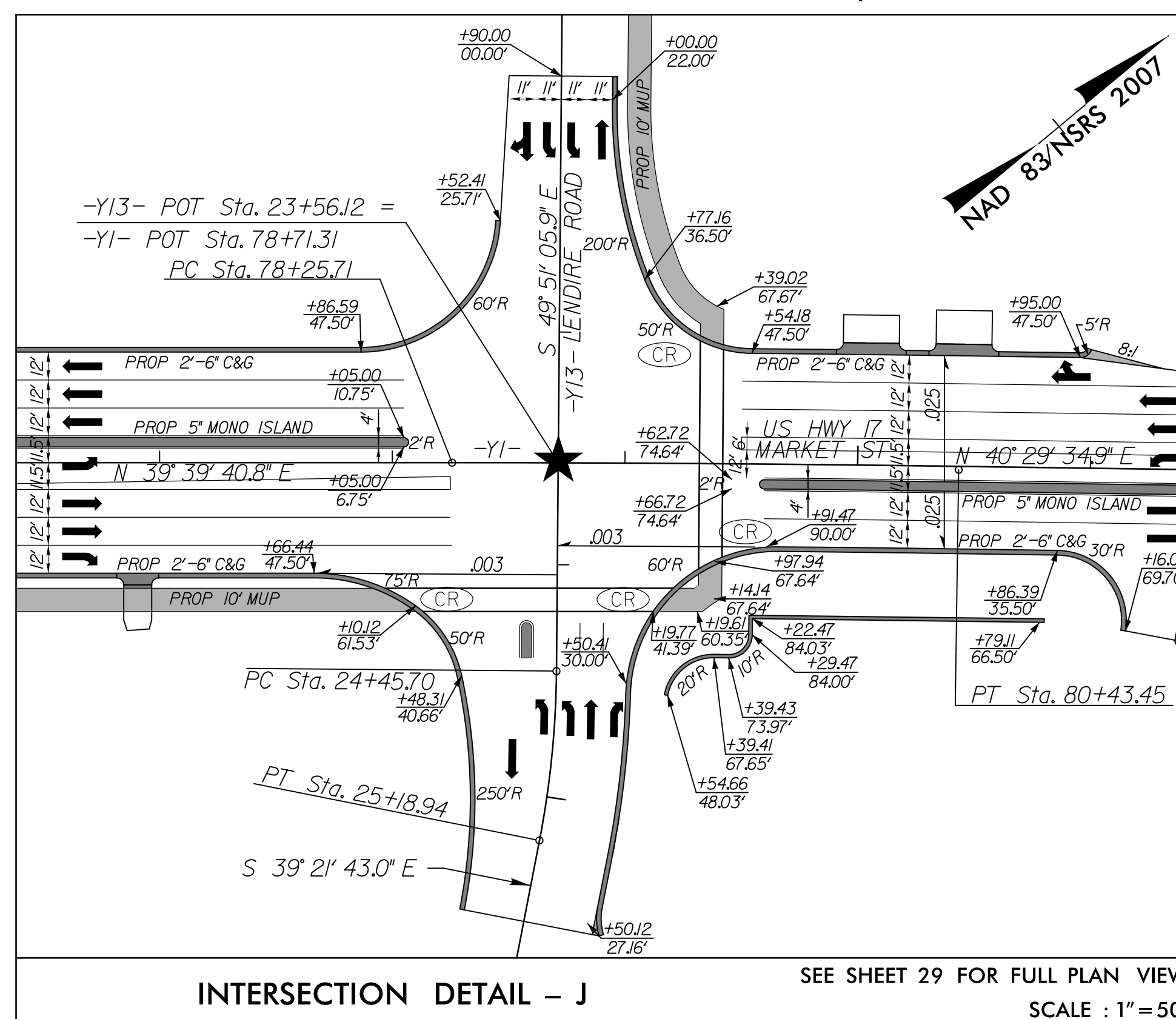
**DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED**

- CONCRETE CURB /GUTTER & MONOLITHIC ISLAND
- SIDEWALK, MUP & FULL DEPTH PAVED SHOULDER
- PROPOSED TRAFFIC SIGNAL

**-Y1- US 17 BUS MARKET ST, -Y1RPA- & -Y1RPD-**



**-Y1- US 17 BUS MARKET ST, -Y13-**



# ALIGNMENT CURVE DATA



STV Engineers, Inc.  
900 West Trade St., Suite 715  
Charlotte, NC 28202  
NC License Number F-0991

PROJECT REFERENCE NO. <i>U-4751</i>	SHEET NO. <i>2B-8</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

CURVE & SPIRAL DATA -L-				
<i>PI Sta 25+92.06</i> $\Delta = 2^{\circ} 05' 27.0''$ (RT) $D = 0^{\circ} 34' 22.6''$ $L = 364.92'$ $T = 182.48$ $R = 10,000.00'$ $e = N/A$ RUNOFF = N/A	<i>PI Sta 39+36.24</i> $\Delta = 3^{\circ} 37' 21.7''$ (LT) $D = 2^{\circ} 48' 31.0''$ $L = 1197.13'$ $T = 616.35'$ $R = 2,040.00'$ $e = 4\%$ RUNOFF = 200'	<i>PI Sta 86+83.19</i> $\Delta = 7^{\circ} 26' 47.0''$ (RT) $D = 5^{\circ} 56' 14.6''$ $L = 1,203.33'$ $T = 694.02'$ $R = 965.00'$ $e = 4\%$ RUNOFF = 240'	<i>PI Sta 104+94.44</i> $\Delta = 3^{\circ} 36' 12.2''$ (LT) $D = 5^{\circ} 43' 46.5''$ $L = 586.49'$ $T = 301.95'$ $R = 1,000.00'$ $e = 4\%$ RUNOFF = 240'	<i>PI Sta 110+80.43</i> $\Delta = 3^{\circ} 33' 04.0''$ (RT) $D = 5^{\circ} 43' 46.5''$ $L = 585.58'$ $T = 301.45'$ $R = 1,000.00'$ $e = 4\%$ RUNOFF = 240'
<i>PI Sta 146+07.40</i> $\Delta = 5^{\circ} 00' 14.9''$ (LT) $D = 2^{\circ} 11' 42.9''$ $L = 2,642.27'$ $T = 1,446.87'$ $R = 2,610.00'$ $e = 4\%$ RUNOFF = 240'	<i>PIs Sta 209+35.33</i> $\Theta_s = 2^{\circ} 16' 29.9''$ $L_s = 270.00'$ $LT = 180.01'$ $ST = 90.01'$	<i>PI Sta 226+97.66</i> $\Delta = 5^{\circ} 22' 55.5''$ (RT) $D = 1^{\circ} 41' 06.6''$ $L = 3,108.42'$ $T = 1,672.35'$ $R = 3,400.00'$ $e = 6\%$ RUNOFF = 270'	<i>PIs Sta 242+23.74</i> $\Theta_s = 2^{\circ} 16' 29.9''$ $L_s = 270.00'$ $LT = 180.01'$ $ST = 90.01'$	

CURVE DATA -Y1-	
<i>PI Sta 22+16.57</i> $\Delta = 2^{\circ} 46' 11.7''$ (LT) $D = 5^{\circ} 43' 46.5''$ $L = 432.32'$ $T = 219.59$ $R = 1,000.00'$ $e = 4\%$ RUNOFF = 200'	<i>PI Sta 79+34.58</i> $\Delta = 0^{\circ} 49' 54.1''$ (RT) $D = 0^{\circ} 22' 55.1''$ $L = 217.74'$ $T = 108.87'$ $R = 15,000.00'$ $e = N/A$ RUNOFF = N/A

CURVE DATA -Y2-		
<i>PI Sta 12+83.62</i> $\Delta = 15^{\circ} 03' 24.1''$ (LT) $D = 6^{\circ} 05' 43.1''$ $L = 247.02'$ $T = 124.23'$ $R = 940.00'$ $e = N/A$ RUNOFF = N/A	<i>PI Sta 15+05.97</i> $\Delta = 2^{\circ} 10' 08.7''$ (LT) $D = 12^{\circ} 19' 18.0''$ $L = 196.15'$ $T = 99.56'$ $R = 465.00'$ $e = N/A$ RUNOFF = N/A	<i>PI Sta 16+70.01</i> $\Delta = 7^{\circ} 43' 00.0''$ (LT) $D = 5^{\circ} 43' 46.5''$ $L = 134.68'$ $T = 67.44'$ $R = 1,000.00'$ $e = N/A$ RUNOFF = N/A

CURVE DATA -Y3-
<i>PI Sta 14+36.56</i> $\Delta = 13^{\circ} 54' 33.8''$ (LT) $D = 5^{\circ} 43' 46.5''$ $L = 242.76'$ $T = 121.98'$ $R = 1,000.00'$ $e = N/A$ RUNOFF = N/A

CURVE DATA -Y4-	
<i>PI Sta 11+48.13</i> $\Delta = 9^{\circ} 44' 59.7''$ (LT) $D = 5^{\circ} 35' 23.4''$ $L = 174.42'$ $T = 87.42'$ $R = 1,025.00'$ $e = N/A$ RUNOFF = N/A	<i>PI Sta 19+03.01</i> $\Delta = 15^{\circ} 56' 34.6''$ (LT) $D = 12^{\circ} 43' 56.6''$ $L = 125.22'$ $T = 63.01'$ $R = 450.00'$ $e = N/A$ RUNOFF = N/A

CURVE DATA -Y5-	
<i>PI Sta 11+30.23</i> $\Delta = 6^{\circ} 37' 30.3''$ (RT) $D = 2^{\circ} 32' 47.3''$ $L = 260.17'$ $T = 130.23'$ $R = 2,250.00'$ $e = N/A$ RUNOFF = N/A	<i>PI Sta 14+71.33</i> $\Delta = 5^{\circ} 51' 19.8''$ (LT) $D = 2^{\circ} 51' 53.2''$ $L = 204.40'$ $T = 102.29'$ $R = 2,000.00'$ $e = N/A$ RUNOFF = N/A

CURVE DATA -Y8-	
<i>PI Sta 18+91.61</i> $\Delta = 8^{\circ} 53' 34.4''$ (RT) $D = 0^{\circ} 29' 58.9''$ $L = 1,779.64'$ $T = 891.61'$ $R = 11,466.00'$ $e = N/A$ RUNOFF = N/A	<i>PI Sta 65+00.11</i> $\Delta = 13^{\circ} 25' 32.9''$ (LT) $D = 0^{\circ} 44' 58.4''$ $L = 1,791.18'$ $T = 899.71'$ $R = 7,644.00'$ $e = N/A$ RUNOFF = N/A

CURVE DATA -Y10-
<i>PI Sta 12+80.43</i> $\Delta = 2^{\circ} 31' 12.3''$ (LT) $D = 8^{\circ} 11' 06.4''$ $L = 299.57'$ $T = 152.11'$ $R = 700.00'$ $e = N/A$ RUNOFF = N/A

CURVE DATA -Y11-
<i>PI Sta 11+36.35</i> $\Delta = 13^{\circ} 08' 12.8''$ (LT) $D = 5^{\circ} 38' 41.7''$ $L = 232.72'$ $T = 116.87'$ $R = 1,015.00'$ $e = N/A$ RUNOFF = N/A

CURVE DATA -Y12-	
<i>PI Sta 10+83.37</i> $\Delta = 14^{\circ} 11' 09.4''$ (LT) $D = 8^{\circ} 33' 05.8''$ $L = 165.89'$ $T = 83.37'$ $R = 670.00'$ $e = N/A$ RUNOFF = N/A	<i>PI Sta 12+42.87</i> $\Delta = 10^{\circ} 56' 18.2''$ (LT) $D = 7^{\circ} 07' 34.8''$ $L = 153.49'$ $T = 76.98'$ $R = 804.00'$ $e = N/A$ RUNOFF = N/A

CURVE DATA -Y13-			
<i>PI Sta 14+51.80</i> $\Delta = 80^{\circ} 49' 21.3''$ (RT) $D = 22^{\circ} 55' 05.9''$ $L = 352.66'$ $T = 212.85'$ $R = 250.00'$ $e = 4\%$ RUNOFF = 72'	<i>PI Sta 17+67.74</i> $\Delta = 70^{\circ} 20' 06.3''$ (LT) $D = 22^{\circ} 55' 05.9''$ $L = 306.89'$ $T = 176.14'$ $R = 250.00'$ $e = 4\%$ RUNOFF = 72'	<i>PI Sta 19+48.70</i> $\Delta = 12^{\circ} 43' 56.6''$ (LT) $D = 12^{\circ} 43' 56.6''$ $L = 100.00'$ $T = 50.21'$ $R = 450.00'$ $e = N/A$ RUNOFF = N/A	<i>PI Sta 24+82.42</i> $\Delta = 10^{\circ} 29' 22.8''$ (RT) $D = 14^{\circ} 19' 26.2''$ $L = 73.23'$ $T = 36.72'$ $R = 400.00'$ $e = N/A$ RUNOFF = N/A

CURVE DATA -SRI-			
<i>PI Sta 10+30.81</i> $\Delta = 11^{\circ} 43' 44.9''$ (LT) $D = 19^{\circ} 05' 54.9''$ $L = 61.41'$ $T = 30.81'$ $R = 300.00'$ $e = N/A$ RUNOFF = N/A	<i>PI Sta 11+01.02</i> $\Delta = 15^{\circ} 02' 28.6''$ (RT) $D = 19^{\circ} 05' 54.9''$ $L = 78.76'$ $T = 39.61'$ $R = 300.00'$ $e = N/A$ RUNOFF = N/A	<i>PI Sta 14+01.99</i> $\Delta = 67^{\circ} 38' 28.0''$ (RT) $D = 22^{\circ} 55' 05.9''$ $L = 295.14'$ $T = 167.49'$ $R = 250.00'$ $e = 4\%$ RUNOFF = 84'	<i>PI Sta 16+88.86</i> $\Delta = 64^{\circ} 59' 08.1''$ (LT) $D = 22^{\circ} 55' 05.9''$ $L = 283.55'$ $T = 159.22'$ $R = 250.00'$ $e = 4\%$ RUNOFF = 84'

CURVE & SPIRAL DATA -Y1LPB-		
<i>PIs Sta 10+83.57</i> $\Theta_s = 17^{\circ} 00' 45.4''$ $L_s = 132.00'$ $LT = 83.57'$ $ST = 49.29'$	<i>PI Sta 13+62.65</i> $\Delta = 27^{\circ} 36' 34.4''$ (LT) $D = 22^{\circ} 55' 05.9''$ $L = 1,198.21'$ $T = 230.65'$ $R = 250.00'$ $e = 8\%$ RUNOFF = 110'	<i>PIs Sta 23+67.05</i> $\Theta_s = 12^{\circ} 36' 18.3''$ $L_s = 110.00'$ $LT = 73.52'$ $ST = 36.84'$

CURVE & SPIRAL DATA -Y1RPB-			
<i>PIs Sta 15+82.07</i> $\Delta = 5^{\circ} 47' 17.0''$ $L_s = 198.00'$ $LT = 132.07'$ $ST = 66.06'$	<i>PI Sta 18+86.57</i> $\Delta = 27^{\circ} 21' 49.4''$ (RT) $D = 5^{\circ} 50' 47.4''$ $L = 468.04'$ $T = 238.57'$ $R = 980.00'$ $e = 8\%$ RUNOFF = 198'	<i>PIs Sta 21+98.83</i> $\Theta_s = 7^{\circ} 14' 58.8''$ $L_s = 248.00'$ $LT = 165.47'$ $ST = 82.79'$	<i>PIs Sta 25+30.74</i> $\Theta_s = 22^{\circ} 37' 34.9''$ $L_s = 248.00'$ $LT = 166.70'$ $ST = 83.91'$
<i>PI Sta 26+41.04</i> $\Delta = 10^{\circ} 33' 15.9''$ (LT) $D = 18^{\circ} 14' 49.4''$ $L = 57.84'$ $T = 29.00'$ $R = 314.00'$ $e = 8\%$ RUNOFF = 248'	<i>PIs Sta 27+48.23</i> $\Theta_s = 21^{\circ} 09' 59.7''$ $L_s = 232.00'$ $LT = 155.79'$ $ST = 78.35'$	<i>PI Sta 31+12.69</i> $\Delta = 80^{\circ} 00' 00.0''$ (RT) $D = 31^{\circ} 49' 51.6''$ $L = 251.33'$ $T = 151.04'$ $R = 180.00'$ $e = NC$ RUNOFF = N/A	

CURVE & SPIRAL DATA -Y1RPA-			
<i>PIs Sta 11+12.04</i> $\Theta_s = 4^{\circ} 48' 46.2''$ $L_s = 168.00'$ $LT = 112.04'$ $ST = 56.04'$	<i>PI Sta 12+57.28</i> $\Delta = 10^{\circ} 12' 12.8''$ (LT) $D = 5^{\circ} 43' 46.5''$ $L = 178.09'$ $T = 89.28'$ $R = 1,000.00'$ $e = 6\%$ RUNOFF = 168'	<i>PIs Sta 14+02.12</i> $\Theta_s = 4^{\circ} 48' 46.2''$ $L_s = 168.00'$ $LT = 112.04'$ $ST = 56.04'$	<i>PI Sta 21+03.82</i> $\Delta = 90^{\circ} 00' 00.0''$ (LT) $D = 38^{\circ} 11' 49.9''$ $L = 235.62'$ $T = 150.00'$ $R = 150.00'$ $e = 8\%$ RUNOFF = 184'

CURVE DATA -Y1RPD-	
<i>PI Sta 12+38.87</i> $\Delta = 60^{\circ} 03' 33.1''$ (LT) $D = 22^{\circ} 55' 05.9''$ $L = 262.06'$ $T = 144.51'$ $R = 250.00'$ $e = 4\%$ RUNOFF = 100'	<i>PI Sta 28+38.51</i> $\Delta = 86^{\circ} 12' 09.7''$ (LT) $D = 11^{\circ} 27' 33.0''$ $L = 752.26'$ $T = 467.91'$ $R = 500.00'$ $e = 4\%$ RUNOFF = 100'

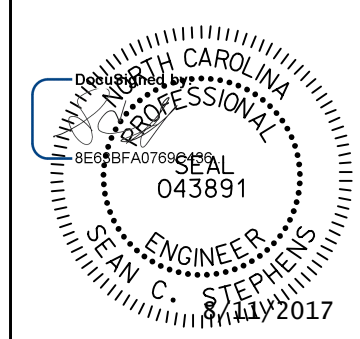
CURVE DATA -Y24-		
<i>PI Sta 12+02.25</i> $\Delta = 7^{\circ} 39' 07.3''$ (RT) $D = 95^{\circ} 29' 34.7''$ $L = 78.18'$ $T = 45.75'$ $R = 60.00'$ $e = N/A$ RUNOFF = N/A	<i>PI Sta 13+94.94</i> $\Delta = 15^{\circ} 17' 19.8''$ (RT) $D = 28^{\circ} 38' 52.4''$ $L = 53.37'$ $T = 26.84'$ $R = 200.00'$ $e = N/A$ RUNOFF = N/A	<i>PI Sta 15+11.41</i> $\Delta = 18^{\circ} 55' 29.7''$ (LT) $D = 28^{\circ} 38' 52.4''$ $L = 66.06'$ $T = 33.33'$ $R = 200.00'$ $e = N/A$ RUNOFF = N/A

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# ALIGNMENT CURVE DATA

**STV** 100 Years  
 STV Engineers, Inc.  
 900 West Trade St., Suite 715  
 Charlotte, NC 28202  
 NC License Number F-0991

PROJECT REFERENCE NO. <i>U-4751</i>	SHEET NO. <i>2B-9</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
	
<b>DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED</b>	

*CURVE & SPIRAL DATA -Y8LPB-*

<i>Pls Sta 11+69.89</i> <i>Δs = 26° 15' 06.8"</i> <i>Ls = 252.00'</i> <i>LT = 169.89'</i> <i>ST = 85.72'</i>	<i>Pls Sta 17+54.54</i> <i>Δ = 237° 22' 37.3" (LT)</i> <i>D = 20° 50' 05.4"</i> <i>L = 1,139.33'</i> <i>T = 502.54'</i> <i>R = 275.00'</i> <i>e = 8%</i> <i>RUNOFF = 252'</i>	<i>Pls Sta 24+30.16</i> <i>Δs = 12° 05' 03.1"</i> <i>Ls = 116.00'</i> <i>LT = 77.51'</i> <i>ST = 38.83'</i>
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*CURVE & SPIRAL DATA -Y8RPB-*

<i>Pls Sta 32+37.18</i> <i>Δs = 0° 42' 58.3"</i> <i>Ls = 100.00'</i> <i>LT = 66.67'</i> <i>ST = 33.33'</i>	<i>Pls Sta 22+81.75</i> <i>Δ = 26° 55' 21.6" (RT)</i> <i>D = 1° 25' 56.6"</i> <i>L = 1,879.56'</i> <i>T = 957.46'</i> <i>R = 4,000.00'</i> <i>e = 3%</i> <i>RUNOFF = 100'</i>	<i>Pls Sta 12+90.95</i> <i>Δs = 0° 42' 58.3"</i> <i>Ls = 100.00'</i> <i>LT = 66.67'</i> <i>ST = 33.33'</i>
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*CURVE & SPIRAL DATA -Y8RPC-*

<i>Pls Sta 10+40.00</i> <i>Δs = 0° 42' 58.3"</i> <i>Ls = 60.00'</i> <i>LT = 40.00'</i> <i>ST = 20.00'</i>	<i>Pls Sta 16+67.09</i> <i>Δ = 28° 23' 26.3" (LT)</i> <i>D = 2° 23' 14.4"</i> <i>L = 1,189.22'</i> <i>T = 607.09'</i> <i>R = 2,400.00'</i> <i>e = 5%</i> <i>RUNOFF = 120'</i>	<i>Pls Sta 22+89.23</i> <i>Δs = 1° 25' 56.6"</i> <i>Ls = 120.00'</i> <i>LT = 80.00'</i> <i>ST = 40.00'</i>
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*CURVE & SPIRAL DATA -Y8RPA-*

<i>Pls Sta 10+74.52</i> <i>Δs = 5° 09' 03.7"</i> <i>Δs = 3° 34' 05.0"</i> <i>Ls = 132.00'</i> <i>LT = 74.52'</i> <i>ST = 57.57'</i>	<i>Pls Sta 22+88.29</i> <i>Δ = 94° 58' 31.0" (LT)</i> <i>D = 5° 24' 18.9"</i> <i>L = 1,757.09'</i> <i>T = 1,156.29'</i> <i>R = 1,060.00'</i> <i>e = N/A</i> <i>RUNOFF = N/A</i>	<i>Pls Sta 29+22.43</i> <i>Δs = 2° 42' 09.5"</i> <i>Ls = 100.00'</i> <i>LT = 66.67'</i> <i>ST = 33.34'</i>
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*CURVE & SPIRAL DATA -Y8LPC-*

<i>Pls Sta 11+70.29</i> <i>Δs = 28° 52' 37.5"</i> <i>Ls = 252.00'</i> <i>LT = 170.29'</i> <i>ST = 86.09'</i>	<i>Pls Sta 18+15.30</i> <i>Δ = 227° 51' 53.4" (RT)</i> <i>D = 22° 55' 05.9"</i> <i>L = 994.25'</i> <i>T = 563.30'</i> <i>R = 250.00'</i> <i>e = N/A</i> <i>RUNOFF = N/A</i>	<i>Pls Sta 22+85.11</i> <i>Δs = 13° 17' 33.4"</i> <i>Ls = 116.00'</i> <i>LT = 77.55'</i> <i>ST = 38.87'</i>
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*CURVE & SPIRAL DATA -Y8RPD-*

<i>Pls Sta 12+70.93</i> <i>Δs = 3° 11' 31.9"</i> <i>Ls = 156.00'</i> <i>LT = 104.02'</i> <i>ST = 52.02</i>	<i>Pls Sta 21+81.12</i> <i>Δ = 63° 01' 00.1" (RT)</i> <i>D = 4° 05' 33.2"</i> <i>L = 1,539.79'</i> <i>T = 858.20'</i> <i>R = 1,400.00'</i> <i>e = 7%</i> <i>RUNOFF = 196'</i>	<i>Pls Sta 29+14.72</i> <i>Δs = 3° 11' 31.9"</i> <i>Ls = 156.00'</i> <i>LT = 104.02'</i> <i>ST = 52.02'</i>
--	--	---

*CURVE & SPIRAL DATA -Y8RPCA-*

<i>Pls Sta 10+56.00</i> <i>Δs = 1° 00' 09.6"</i> <i>Ls = 84.00'</i> <i>LT = 56.00'</i> <i>ST = 28.00'</i>	<i>Pls Sta 16+50.24</i> <i>Δ = 26° 33' 02.1" (LT)</i> <i>D = 2° 23' 14.4"</i> <i>L = 1,112.15'</i> <i>T = 566.24'</i> <i>R = 2,400.00'</i> <i>e = 6%</i> <i>RUNOFF = 150'</i>	<i>Pls Sta 22+24.15</i> <i>Δs = 1° 00' 09.6"</i> <i>Ls = 84.00'</i> <i>LT = 56.00'</i> <i>ST = 28.00'</i>	<i>Pls Sta 29+47.88</i> <i>Δs = 3° 53' 30.4"</i> <i>Ls = 144.00'</i> <i>LT = 96.02'</i> <i>ST = 48.02'</i>	<i>Pls Sta 45+32.44</i> <i>Δ = 110° 48' 03.8" (RT)</i> <i>D = 5° 24' 18.9"</i> <i>L = 2,049.87'</i> <i>T = 1,536.59'</i> <i>R = 1,060.00'</i> <i>e = 6%</i> <i>RUNOFF = 144'</i>
<i>Pls Sta 50+93.75</i> <i>Δs = 3° 53' 30.4"</i> <i>Ls = 144.00'</i> <i>LT = 96.02'</i> <i>ST = 48.02'</i>	<i>Pls Sta 56+66.64</i> <i>Δs = 1° 00' 09.6"</i> <i>Ls = 84.00'</i> <i>LT = 56.00'</i> <i>ST = 28.00'</i>	<i>Pls Sta 60+91.56</i> <i>Δ = 18° 46' 52.9" (LT)</i> <i>D = 2° 23' 14.4"</i> <i>L = 786.71'</i> <i>T = 396.92'</i> <i>R = 2,400.00'</i> <i>e = 6%</i> <i>RUNOFF = 144'</i>	<i>Pls Sta 65+09.36</i> <i>Δs = 1° 00' 09.6"</i> <i>Ls = 84.00'</i> <i>LT = 56.00'</i> <i>ST = 28.00'</i>	

*CURVE & SPIRAL DATA -Y8RPDB-*


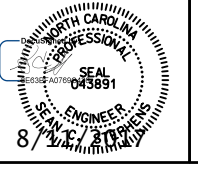
<i>Pls Sta 14+14.48</i> <i>Δs = 5° 43' 46.5"</i> <i>Ls = 240.00'</i> <i>LT = 160.08'</i> <i>ST = 80.08'</i>	<i>Pls Sta 17+81.62</i> <i>Δ = 26° 55' 17.5" (RT)</i> <i>D = 4° 46' 28.7"</i> <i>L = 563.84'</i> <i>T = 287.23'</i> <i>R = 1,200.00'</i> <i>e = 8%</i> <i>RUNOFF = 240</i>	<i>Pls Sta 21+38.31</i> <i>Δs = 5° 43' 46.5"</i> <i>Ls = 240.00'</i> <i>LT = 160.08'</i> <i>ST = 80.08'</i>	<i>Pls Sta 28+96.75</i> <i>Δs = 3° 53' 30.4"</i> <i>Ls = 144.00'</i> <i>LT = 96.02'</i> <i>ST = 48.02'</i>	<i>Pls Sta 50+39.08</i> <i>Δ = 126° 18' 36.0" (LT)</i> <i>D = 5° 24' 18.9"</i> <i>L = 2,336.80'</i> <i>T = 2,094.35'</i> <i>R = 1,060.00'</i> <i>e = 6%</i> <i>RUNOFF = 144'</i>
<i>Pls Sta 53+29.54</i> <i>Δs = 3° 53' 30.4"</i> <i>Ls = 144.00'</i> <i>LT = 96.02'</i> <i>ST = 48.02'</i>	<i>Pls Sta 62+86.82</i> <i>Δs = 5° 15' 07.6"</i> <i>Ls = 220.00'</i> <i>LT = 146.73'</i> <i>ST = 73.39'</i>	<i>Pls Sta 65+65.61</i> <i>Δ = 19° 26' 16.0" (RT)</i> <i>D = 4° 46' 28.7"</i> <i>L = 407.10'</i> <i>T = 205.53'</i> <i>R = 1,200.00'</i> <i>e = 8%</i> <i>RUNOFF = 320'</i>	<i>Pls Sta 68+50.63</i> <i>Δs = 0° 49' 47.8"</i> <i>Δs = 5° 15' 11.1"</i> <i>Ls = 220.00'</i> <i>LT = 136.75'</i> <i>ST = 83.44'</i>	

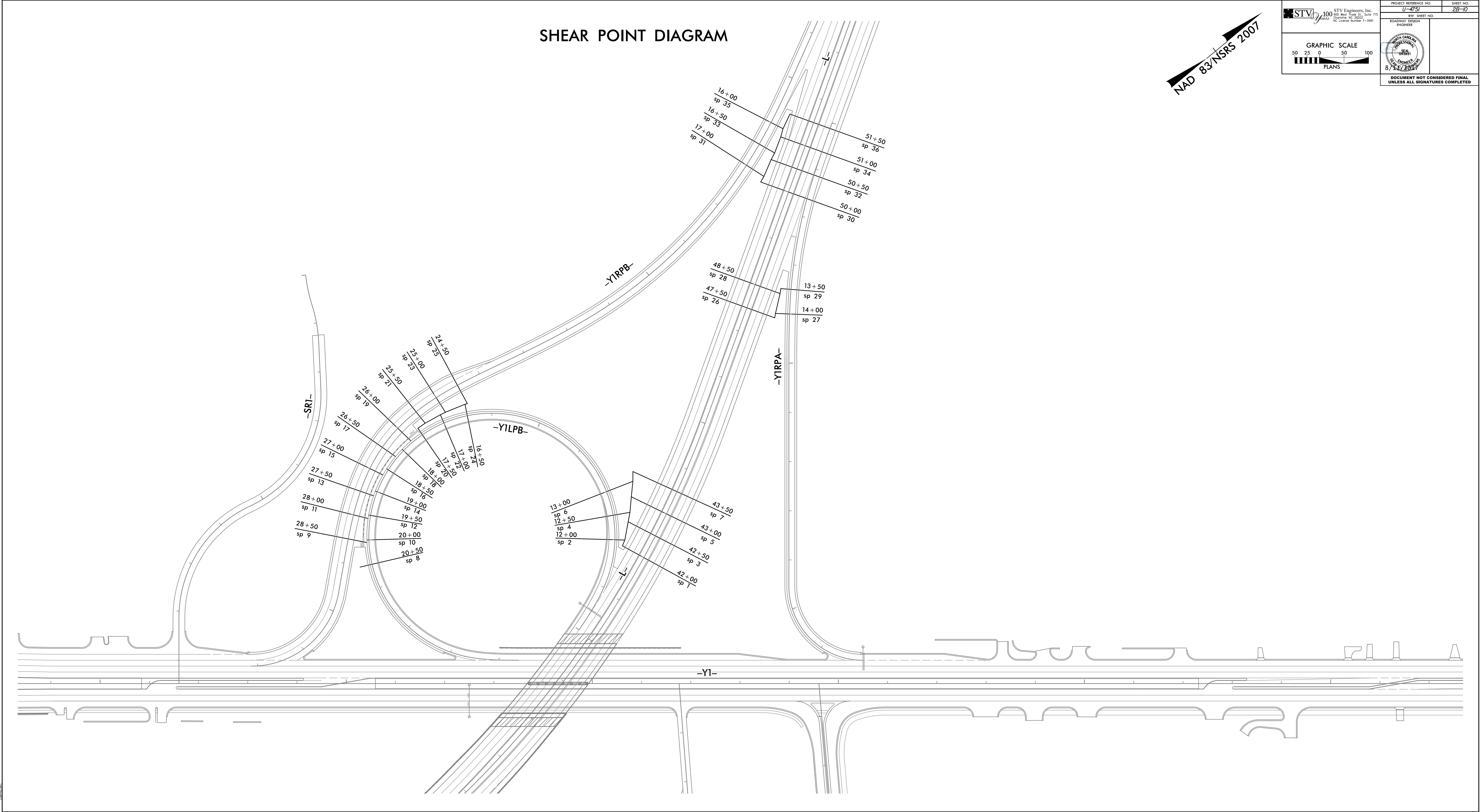
*CURVE DATA -SR4-*

<i>Pls Sta 19+02.83</i> <i>Δ = 144° 34' 17.0" (LT)</i> <i>D = 22° 55' 05.9"</i> <i>L = 630.81'</i> <i>T = 782.68'</i> <i>R = 250.00'</i> <i>e = 4%</i> <i>RUNOFF = 84'</i>	<i>Pls Sta 18+79.92</i> <i>Δ = 54° 34' 17.0" (RT)</i> <i>D = 22° 55' 05.9"</i> <i>L = 238.11'</i> <i>T = 128.96'</i> <i>R = 250.00'</i> <i>e = 4%</i> <i>RUNOFF = 84'</i>	<i>Pls Sta 24+51.14</i> <i>Δ = 14° 26' 00.8" (RT)</i> <i>D = 7° 38' 22.0"</i> <i>L = 188.93'</i> <i>T = 94.97'</i> <i>R = 750.00'</i> <i>e = 3%</i> <i>RUNOFF = 63'</i>
---	--	--

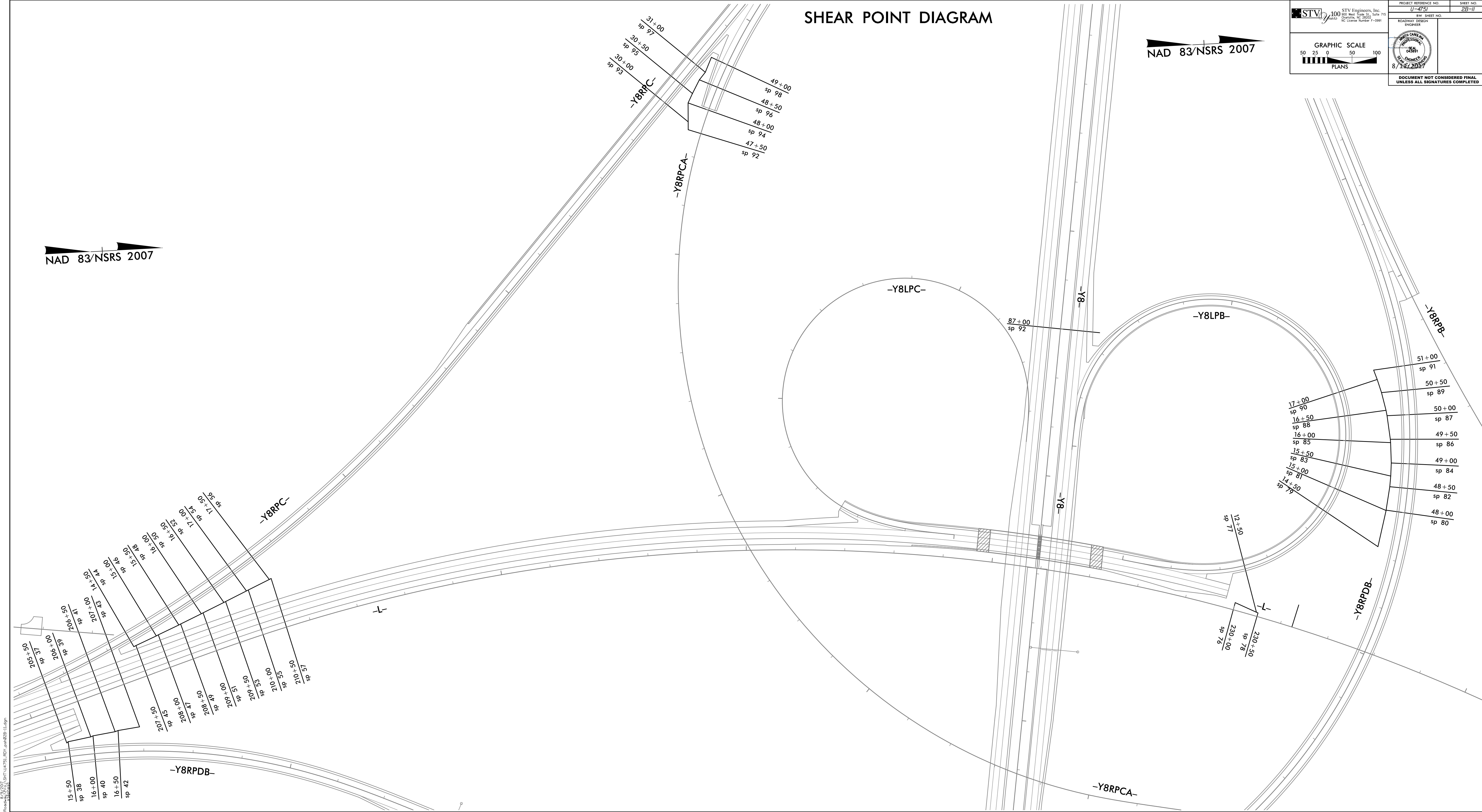
# SHEAR POINT DIAGRAM

NAD 83/NGS 2007

 STV Engineers, Inc. 500 West Edge St., Suite 715 Raleigh, NC 27603 NC License Number F-2991	PROJECT REFERENCE NO.	SHEET NO.
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 ROADWAY DESIGN ENGINEER	RW SHEET NO.	
	S/2/A/2007	
GRAPHIC SCALE 50 25 0 50 100 PLANS		
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



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**STV** 100 STV Engineers, Inc.  
 100 West 5th Street, Suite 715  
 Norfolk, VA 23510  
 License Number 1-2091

PROJECT REFERENCE NO. **U-4751** SHEET NO. **2B-11**  
 REV. SHEET NO. \_\_\_\_\_  
 ROADWAY DESIGN  
 ENGINEER

GRAPHIC SCALE  
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 PLANS

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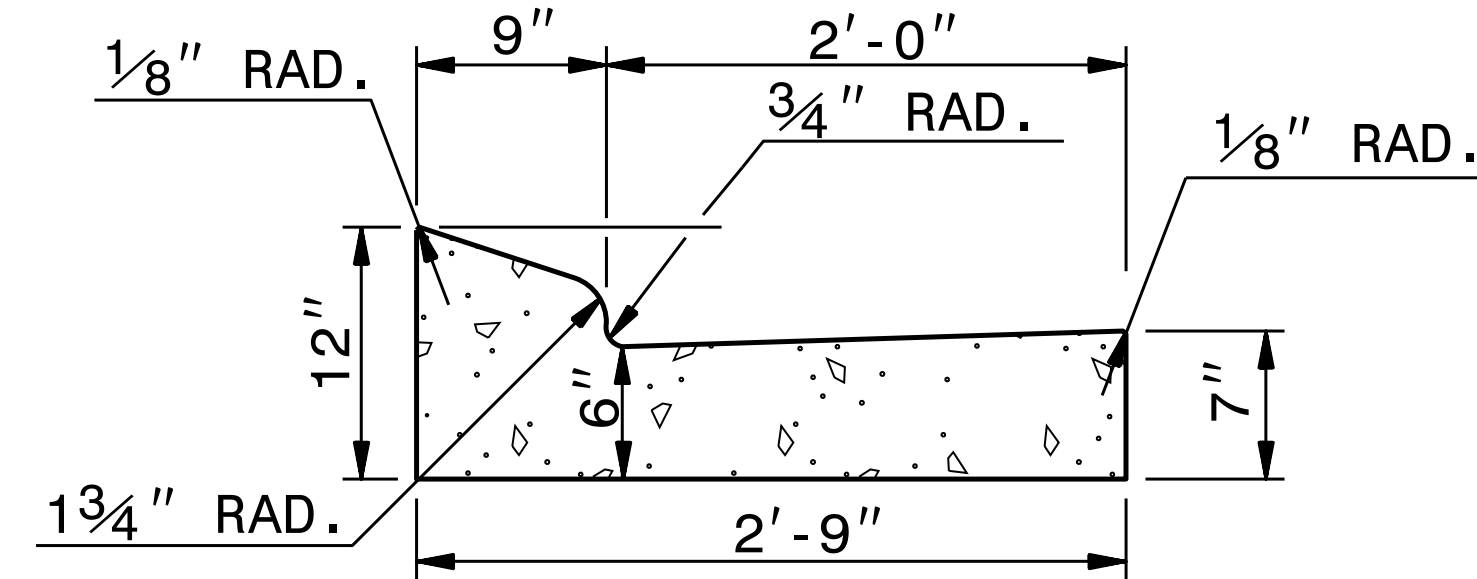
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STATE OF  
 NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.

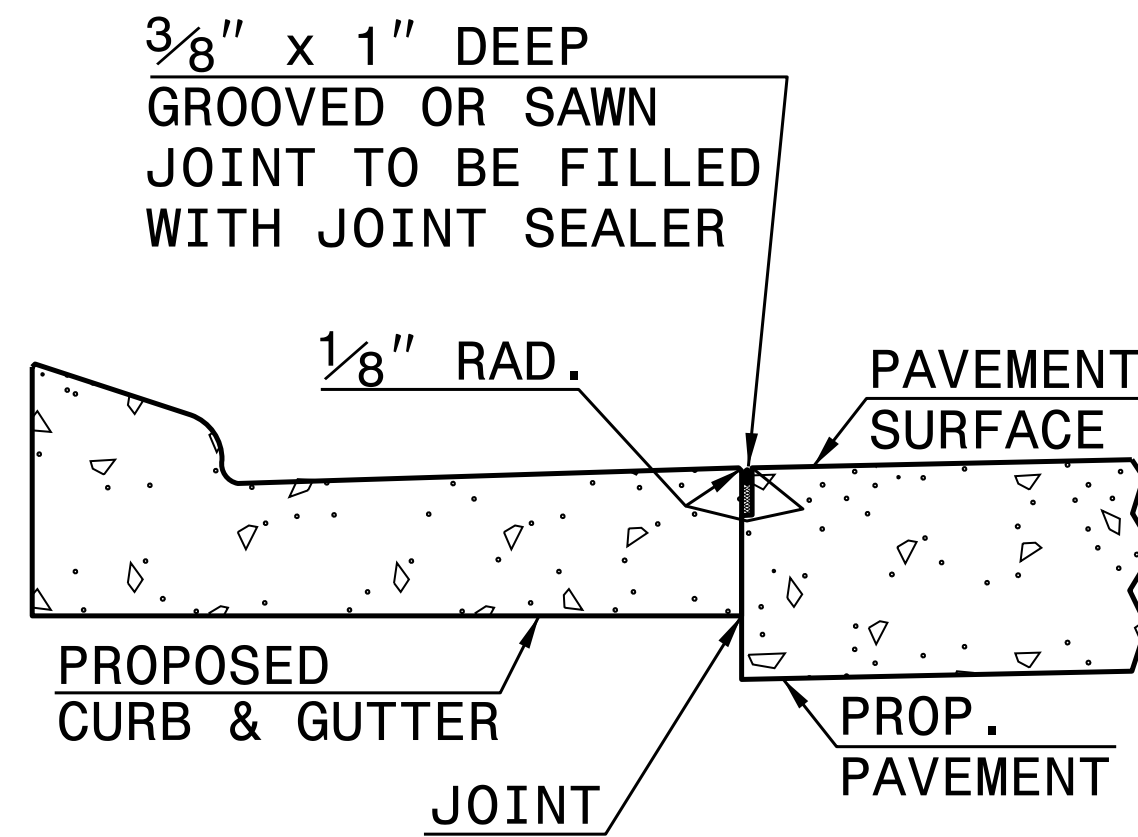
ENGLISH DETAIL DRAWING FOR  
**2'-9" CONCRETE CURB & GUTTER**

- 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. MAKE 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.

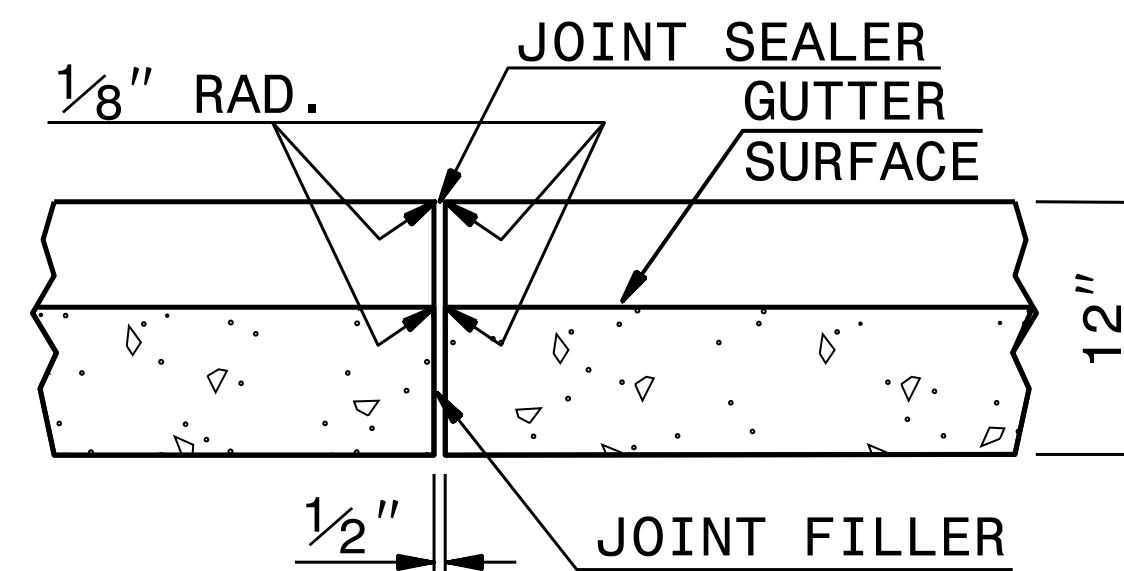


**2'-9" CURB AND GUTTER**

**SECTION VIEW OF CURB AND GUTTER**



**LONGITUDINAL JOINT**



**TRANSVERSE EXPANSION JOINT  
IN CURB AND GUTTER**

**SECTION VIEW OF JOINTS**

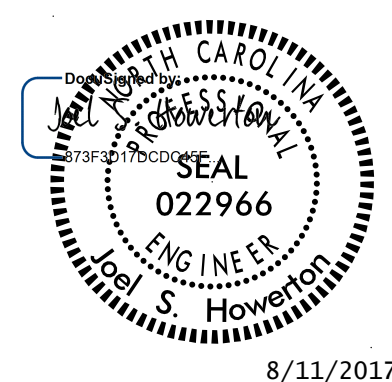
STATE OF  
 NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR  
**2'-9" CONCRETE CURB & GUTTER**

SHEET 1 OF 1  
**846D01**

SHEET 1 OF 1  
**846D01**

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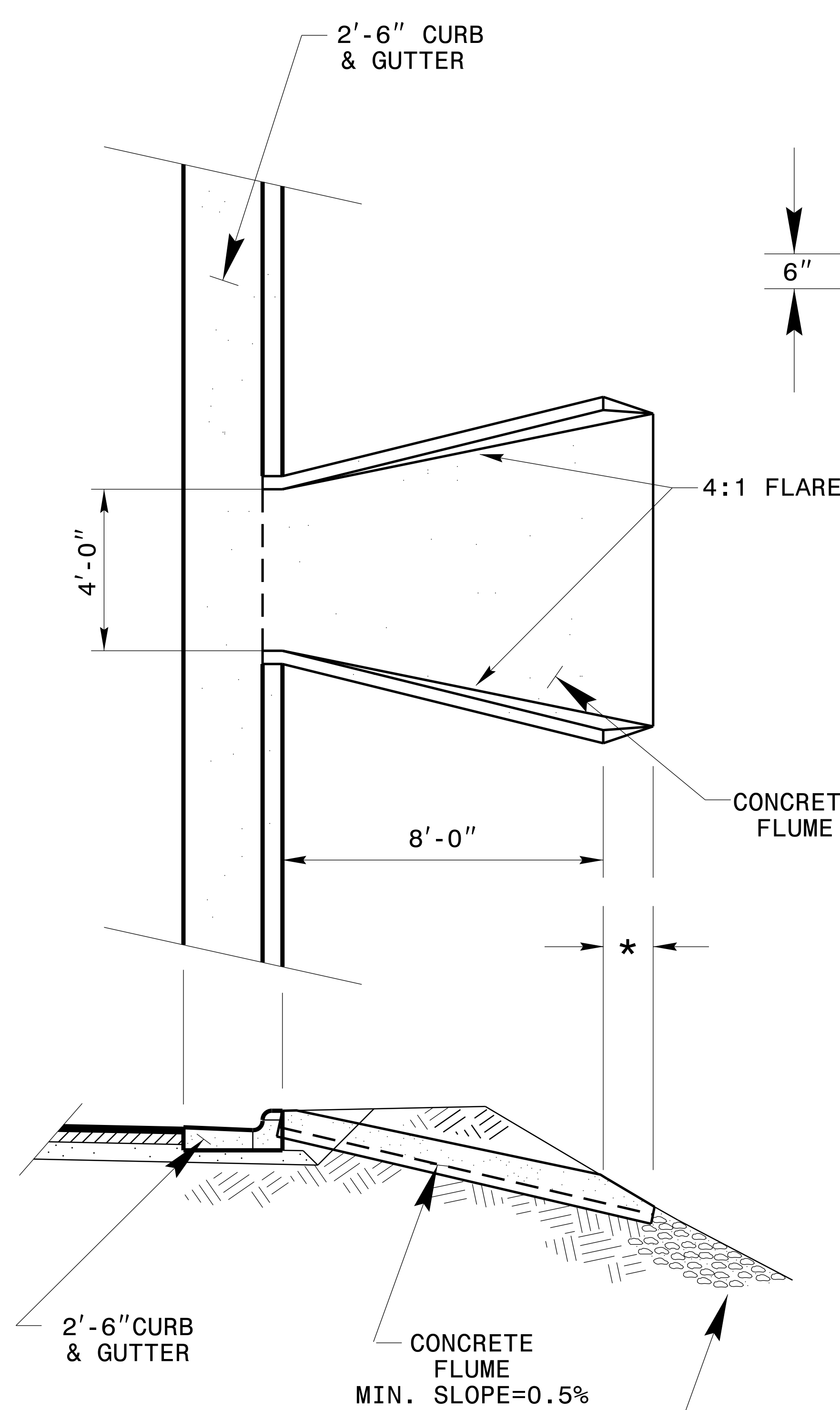


8/11/2017

**CONTRACT STANDARDS  
AND DEVELOPMENT UNIT**  
Office 919-250-4128 FAX 919-250-4119

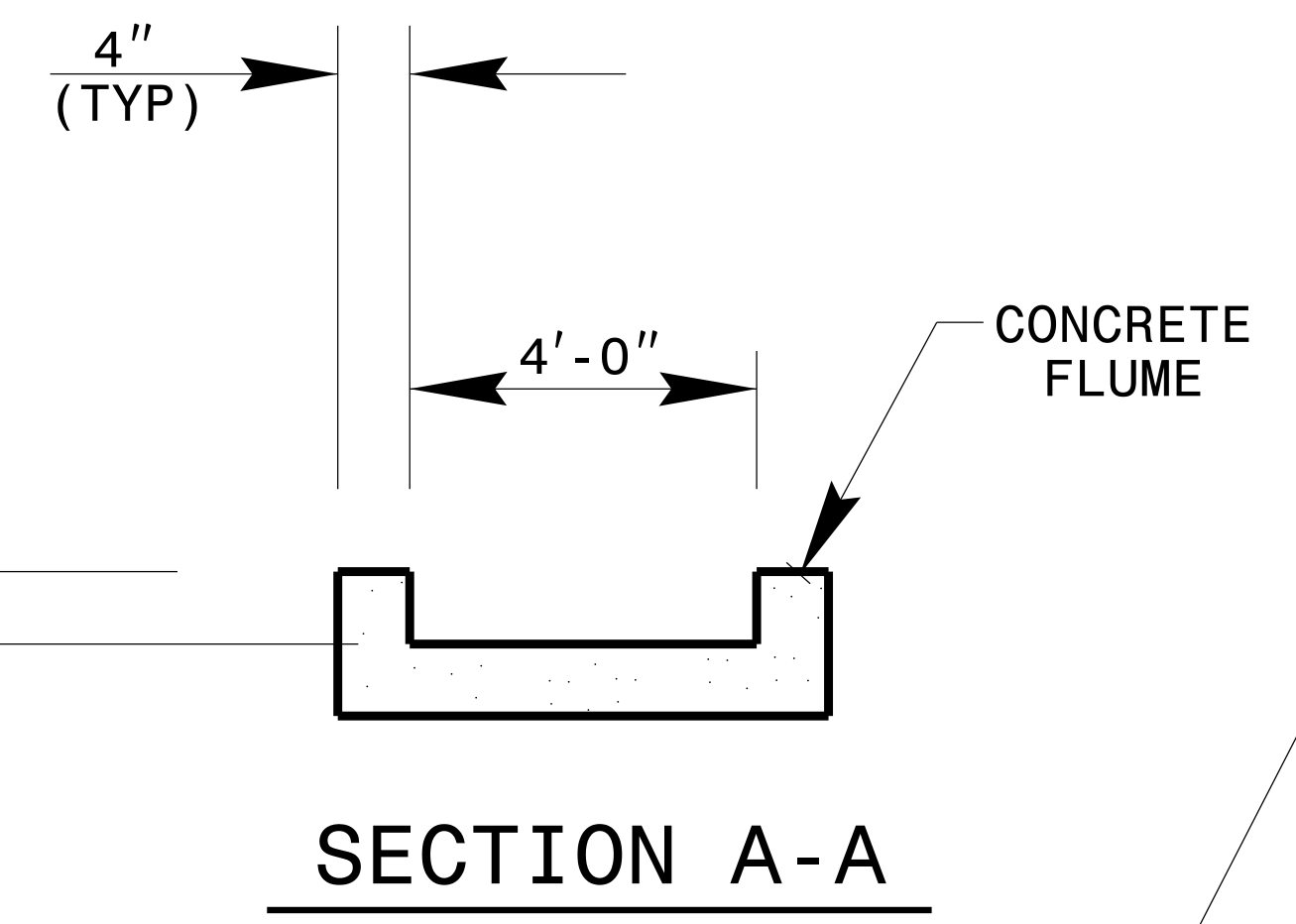
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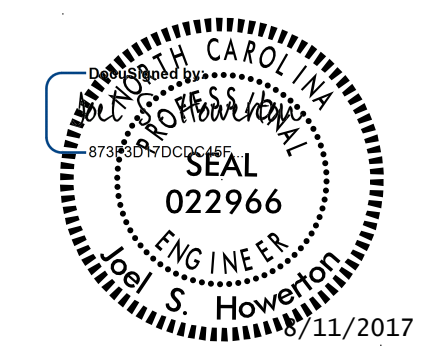
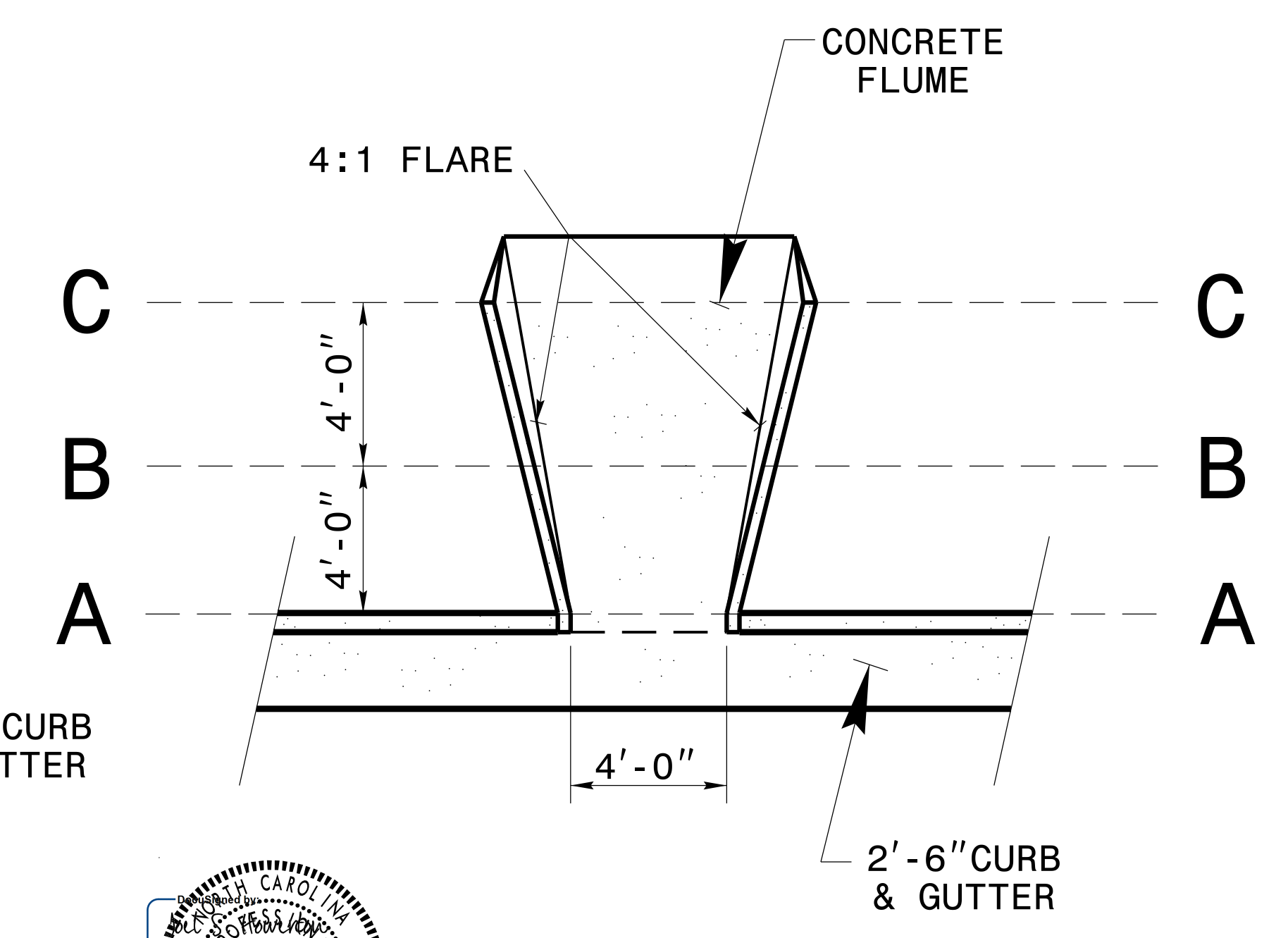
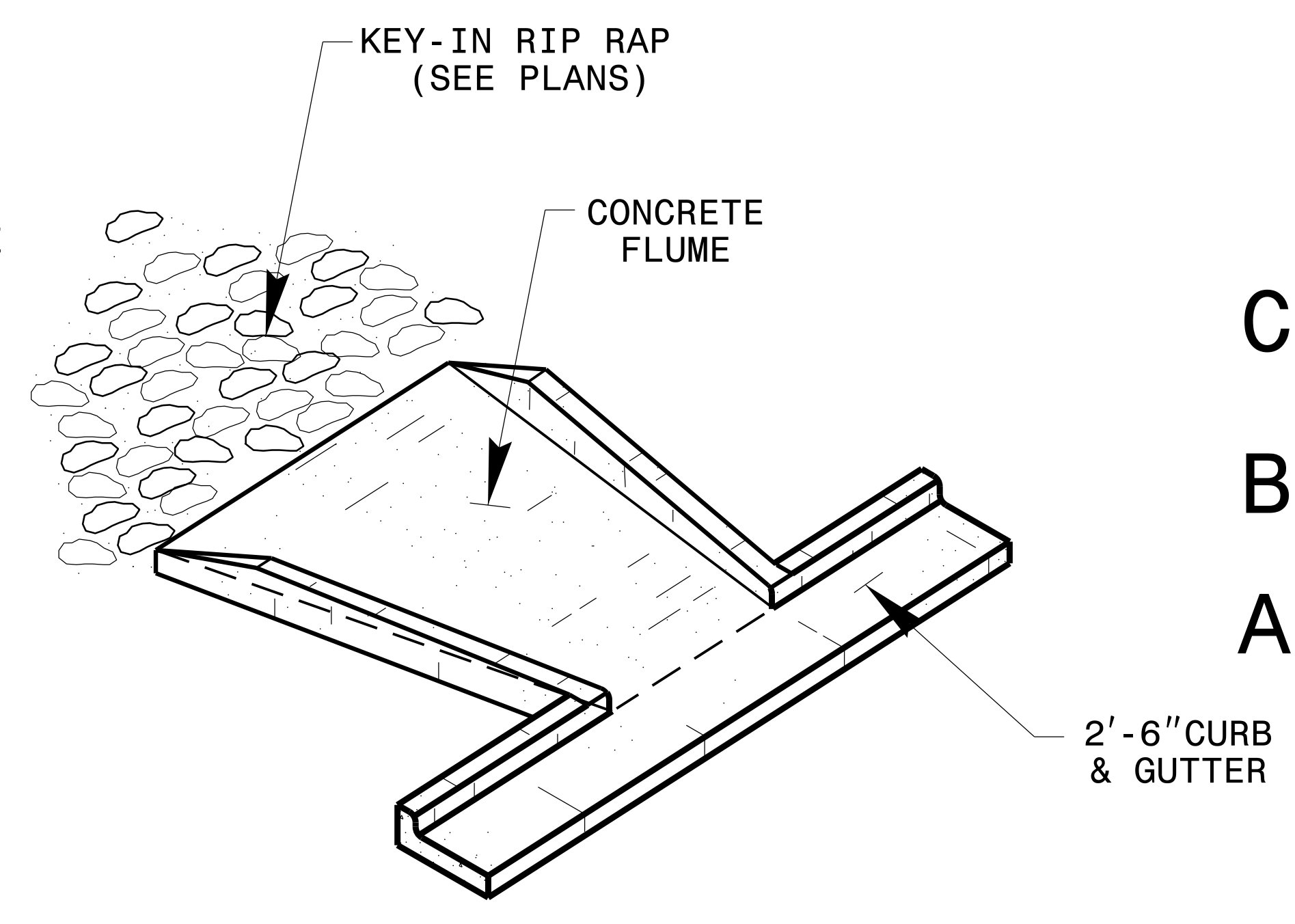
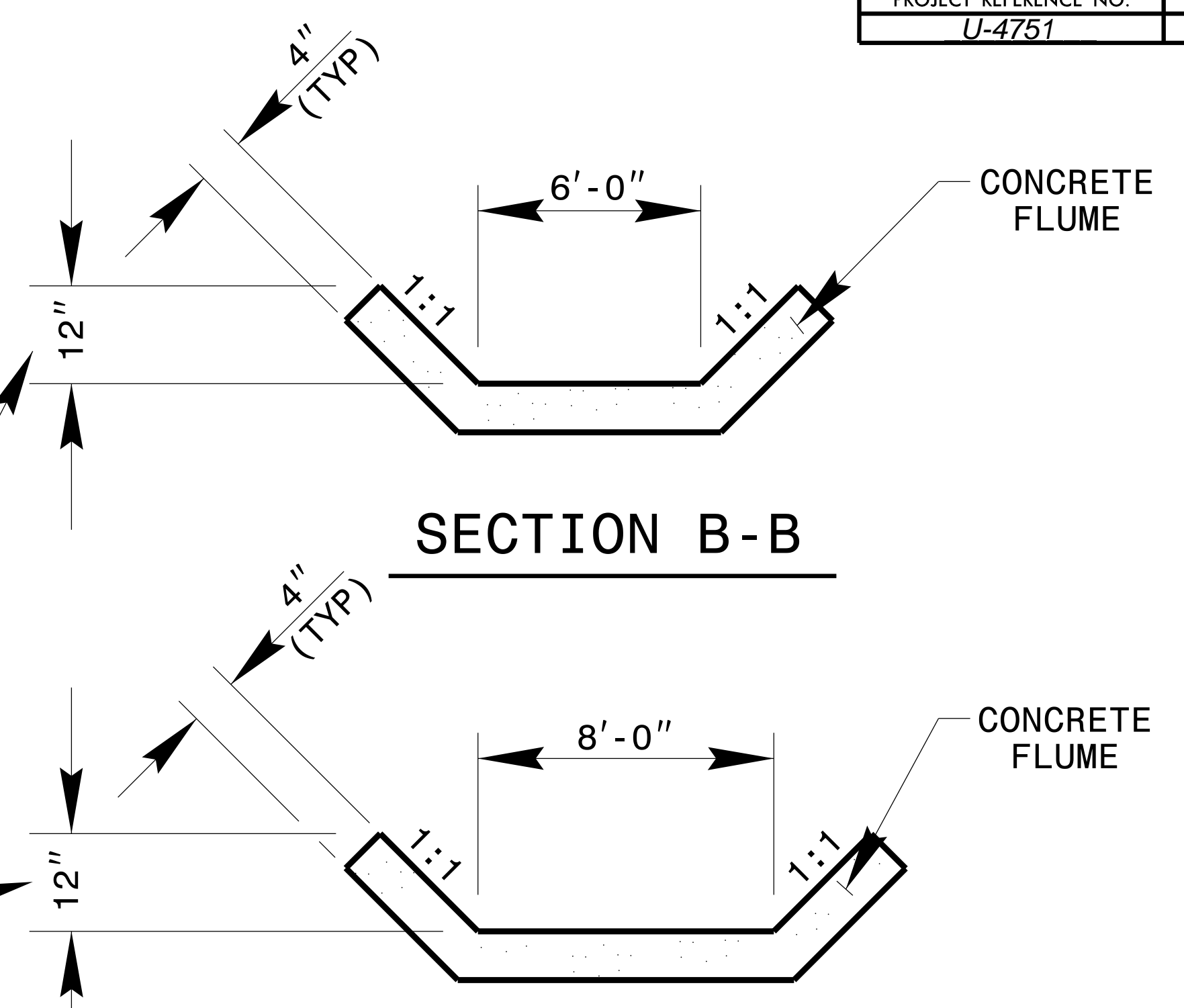


**ELEVATION**

\* LENGTH VARIABLE WITH DITCH SLOPE



FLUME SIDES SHOULD BE FLUSH WITH ADJACENT GROUND LINE TO A MAX. HEIGHT OF 12"

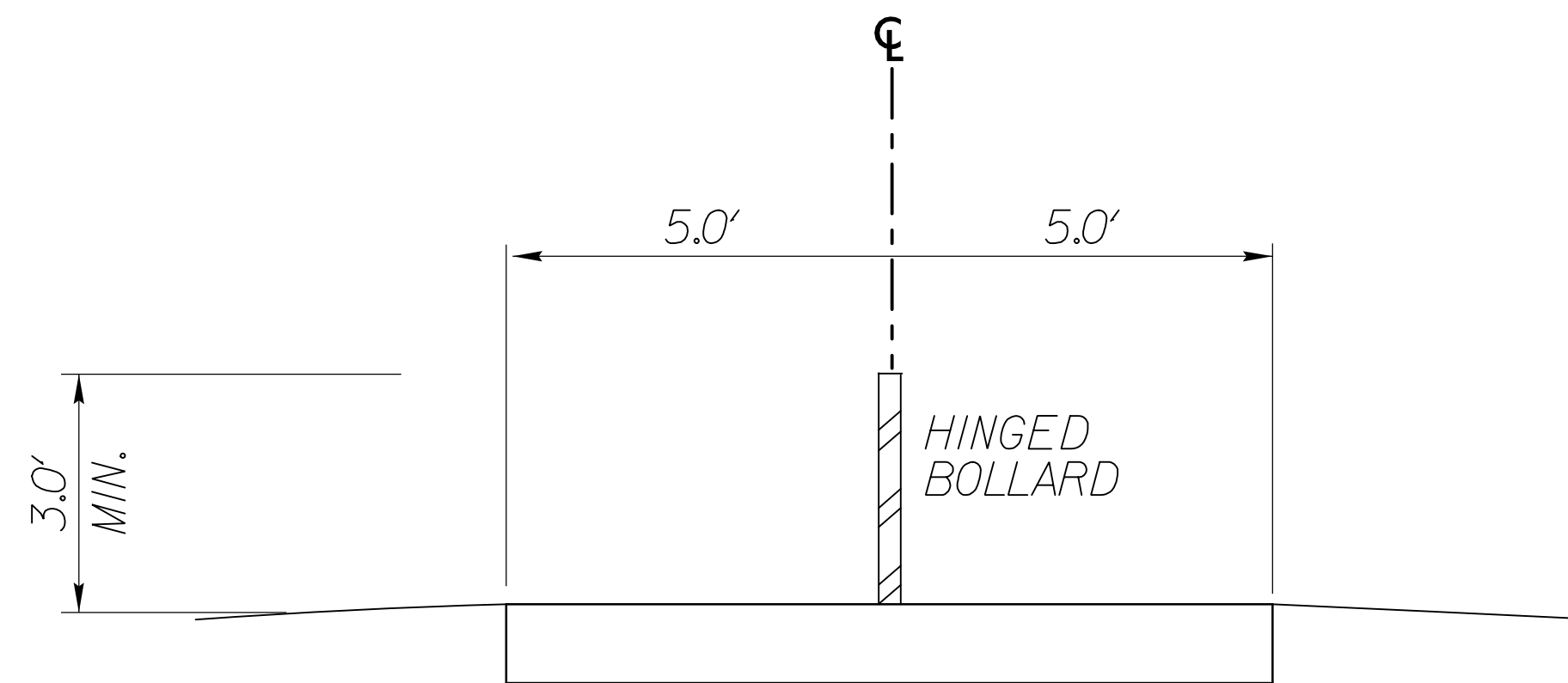


- NOTES:
- CONSTRUCT CONCRETE FLUME IN ACCORDANCE WITH THIS DETAIL.
  - RIP RAP LINED DITCH WILL BE THE TYPE AND LENGTH SPECIFIED BY THE ROADWAY PLANS. PLACE RIP-RAP AT THE END OF THE DITCH AS INDICATED BY STD. DWG. 876.02 FOR AN 18" PIPE.
  - MODIFICATIONS MAY BE MADE AS DIRECTED BY THE ENGINEER.

CONTRACT STANDARDS & DEVELOPMENT UNIT  
STANDARDS AND SPECIAL DESIGN  
Office 919-707-6950 FAX 919-250-4119

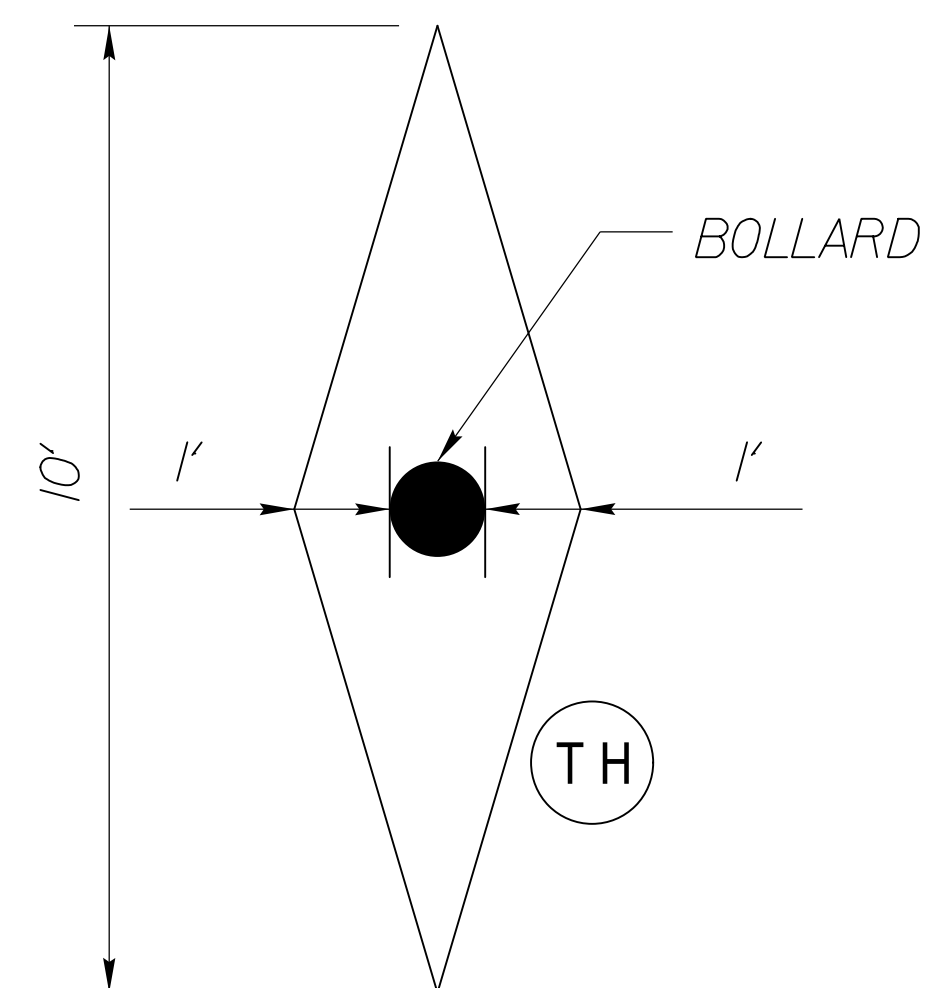
**CONCRETE FLUME**

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**TYPICAL BOLLARD PLACEMENT**


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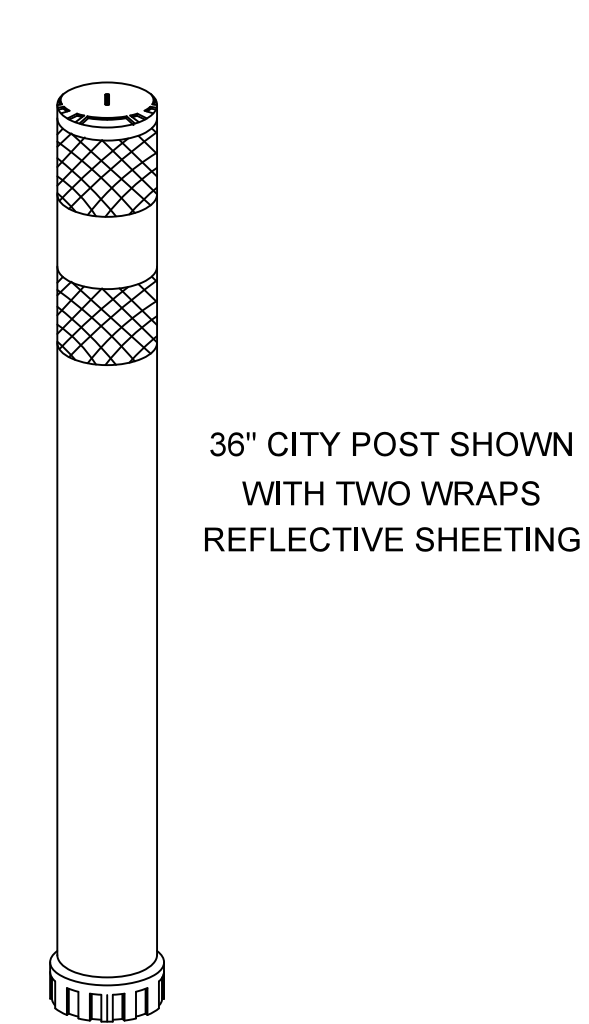
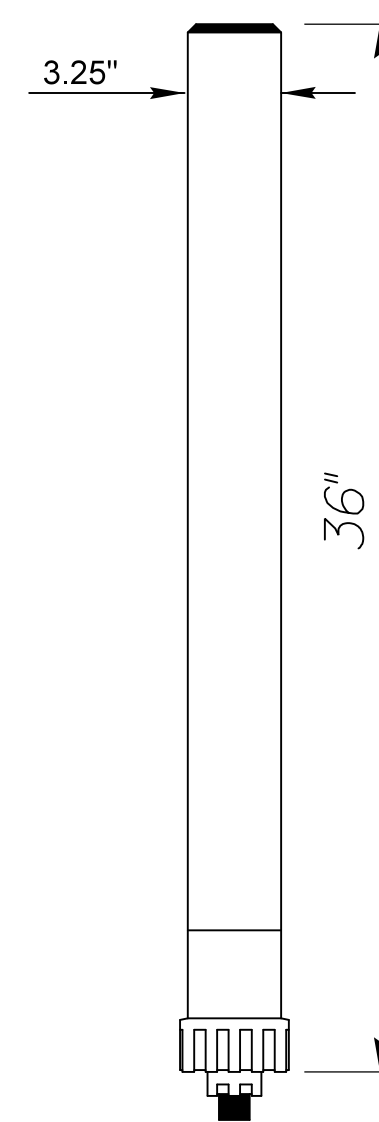


**TYPICAL BOLLARD MARKINGS DETAIL**

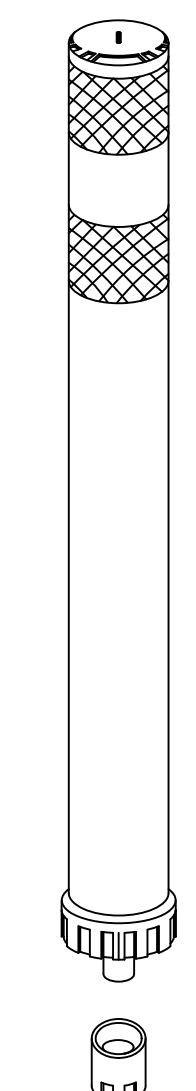
SELECT DESIRED COLOR:

- BCP\_WHT000 WHITE
  - BCP\_YEL000 YELLOW
  - BCP\_ORG000 ORANGE
  - BCP\_BLK000 BLACK
- = LENGTH IN INCHES

  
 AT-GRADE  
 EMBEDDED ANCHOR  
 CUP 800BASE211 1.9" O.D.



ISOMETRIC  
WITH TWO WRAPS  
REFLECTIVE SHEETING



ISOMETRIC  
WITH EMBEDDED ANCHOR CUP

- BOLLARD NOTES:**
- BOLLARD POSTS AT INTERSECTIONS TO BE REFLECTORIZED.
  - BOLLARD PLACEMENT OFFSET FROM INTERSECTIONS IS A MINIMUM OF 5 FEET.
  - BOLLARD AND SIGNS TO BE INSTALLED BY THE CONTRACTOR IN ACCORDANCE WITH SPECIFICATIONS.
  - BOLLARDS SHALL BE YELLOW WITH AMBER REFLECTIVE TAPE.
  - BOLLARDS SHALL BE DP 200 FLEXIBLE CHANNELIZER CITY POST OR APPROVED EQUAL.

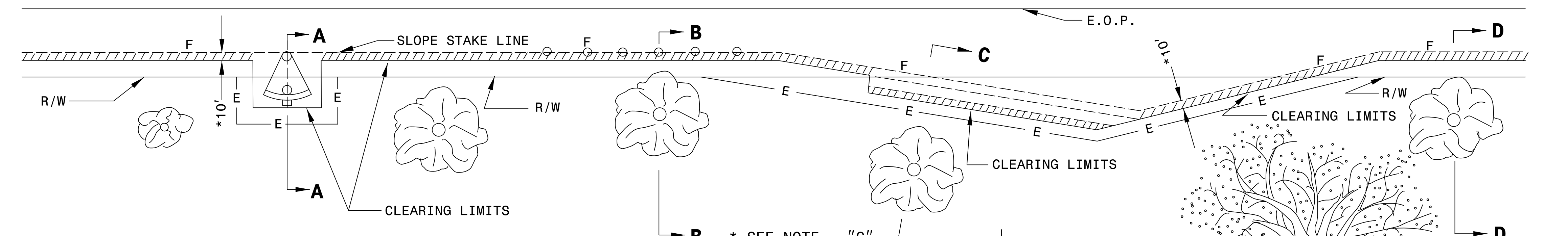
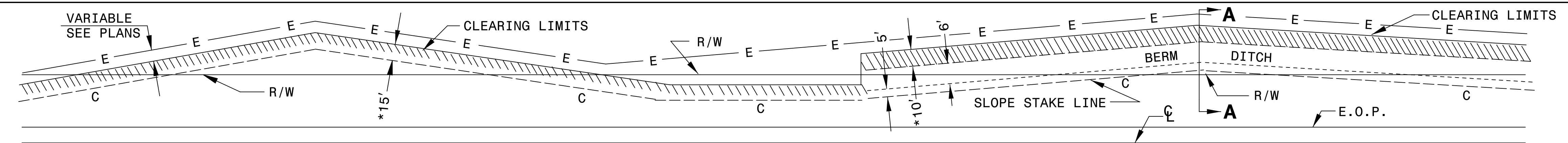
**BOLLARD DETAILS**

SEE PLAN SHEET 8 FOR PROPOSED BOLLARD LOCATION

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

ENGLISH DETAIL DRAWING FOR METHOD OF CLEARING MODIFIED METHOD - III

SHEET 1 OF 1 200D03



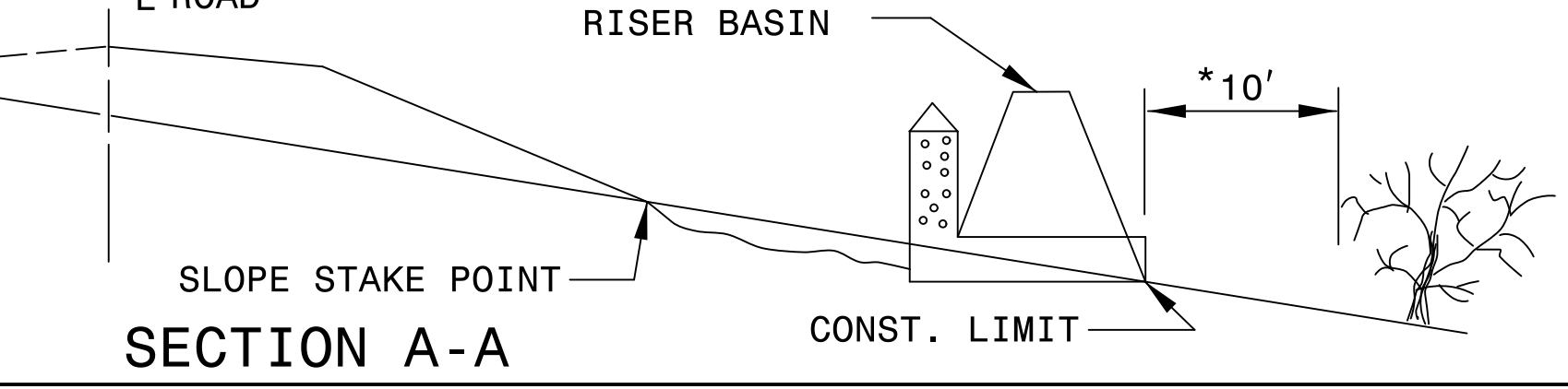
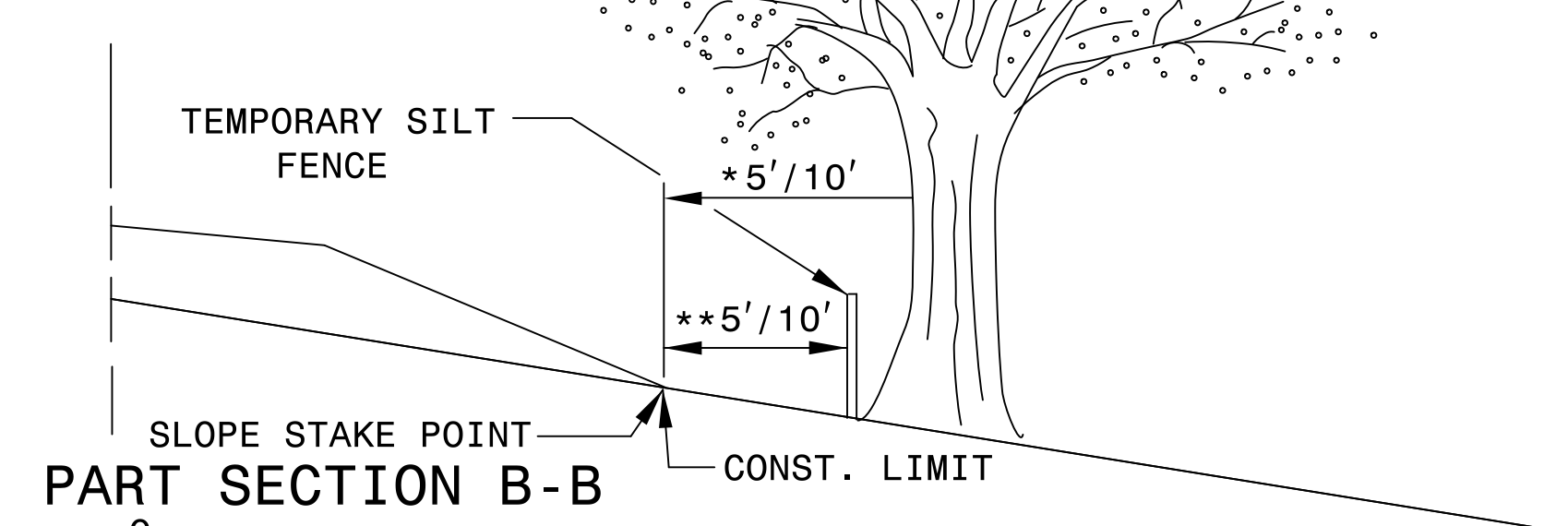
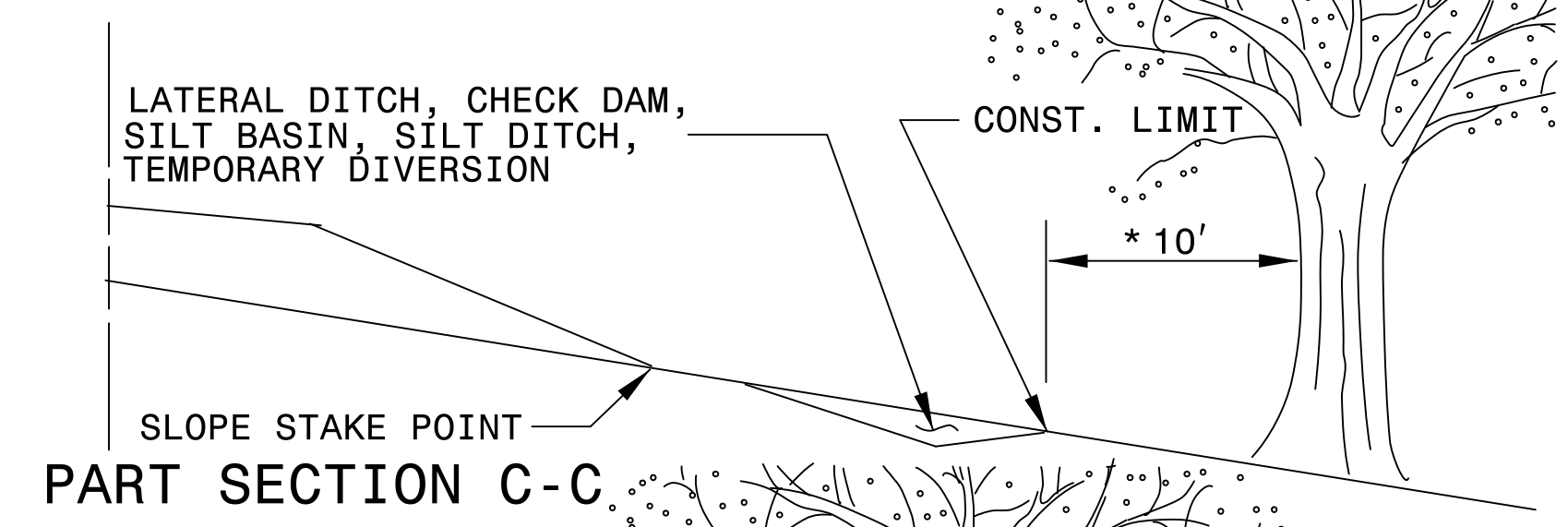
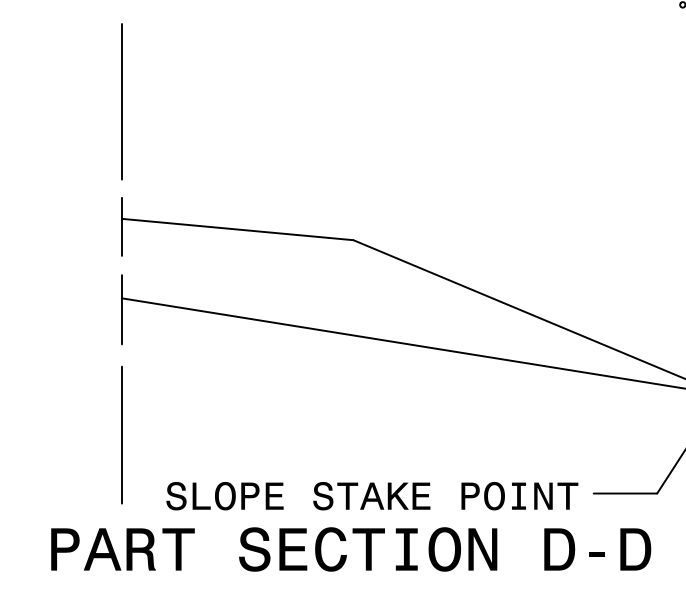
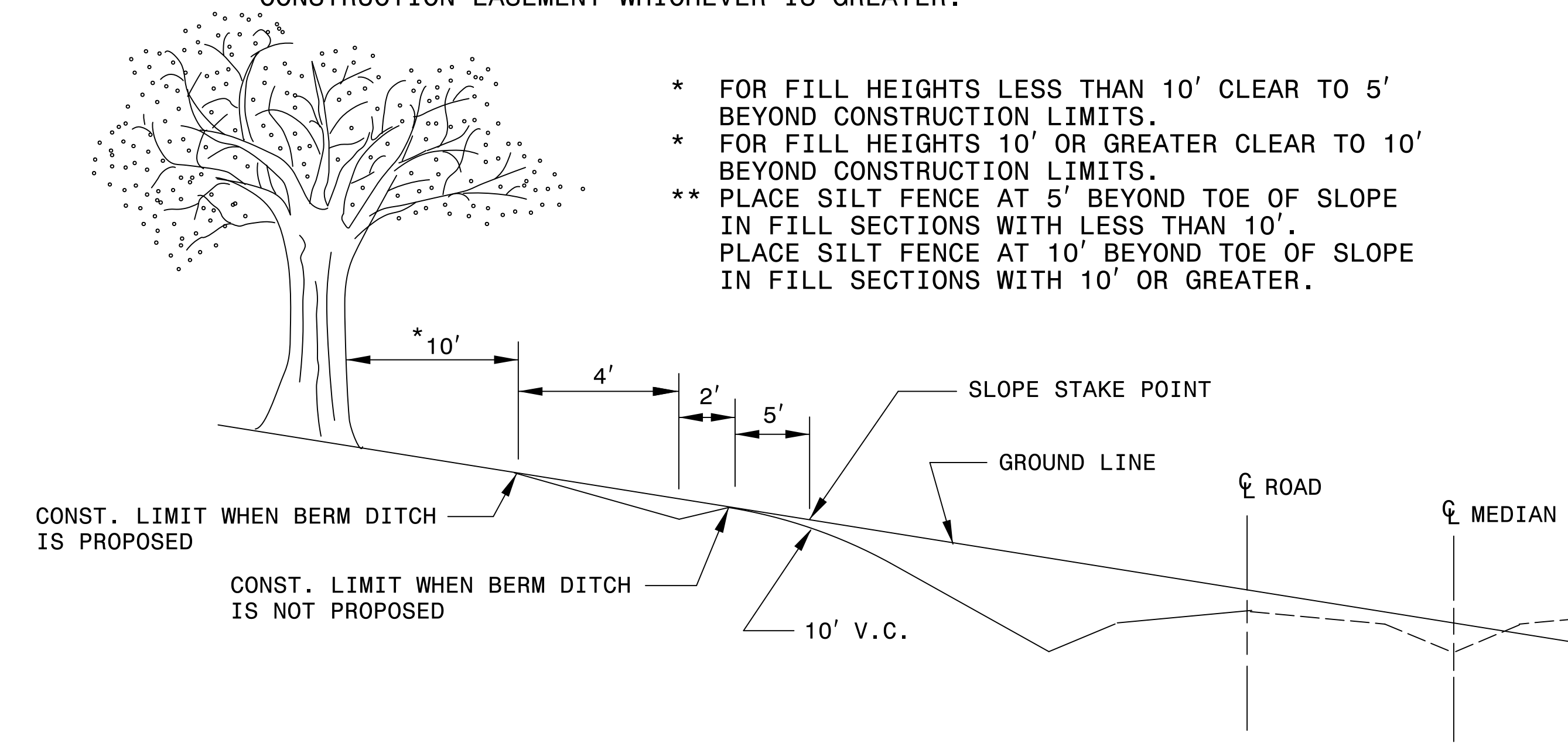
GENERAL NOTES:

1. REMOVE TREES OUTSIDE THE CLEARING LIMIT WHEN, IN THE OPINION OF THE ENGINEER, THE UTILITY OF A TREE WILL BE DESTROYED BY THE CONSTRUCTION OR THE CLEARING OPERATION.
2. CLEAR IN ACCORDANCE WITH THIS STANDARD EXCEPT WHERE ADDITIONAL CLEARING IS REQUIRED FOR SAFETY AS SHOWN ON THE PLANS.

METHOD III CLEARING LIMITS

- (A) CUTS -- CLEAR TO CONSTRUCTION LIMITS.
- (B) FILLS - CLEAR TO 5'/10' \* BEYOND CONSTRUCTION LIMITS, UNLESS SPECIFIED OTHERWISE BY WETLAND PERMIT.
- (C) CUTS AND FILLS - WHEN THE CLEARING LIMITS (A AND B) EXCEED THE PROPOSED R/W OR PROPOSED CONSTRUCTION EASEMENTS, THEN CLEAR ONLY TO THE R/W OR CONSTRUCTION EASEMENT WHICHEVER IS GREATER.

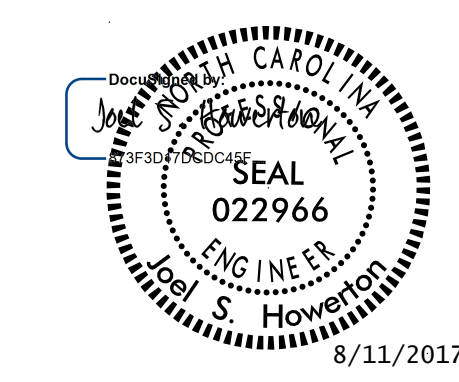
- \* FOR FILL HEIGHTS LESS THAN 10' CLEAR TO 5' BEYOND CONSTRUCTION LIMITS.
- \* FOR FILL HEIGHTS 10' OR GREATER CLEAR TO 10' BEYOND CONSTRUCTION LIMITS.
- \*\* PLACE SILT FENCE AT 5' BEYOND TOE OF SLOPE IN FILL SECTIONS WITH LESS THAN 10'. PLACE SILT FENCE AT 10' BEYOND TOE OF SLOPE IN FILL SECTIONS WITH 10' OR GREATER.



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

ENGLISH DETAIL DRAWING FOR METHOD OF CLEARING MODIFIED METHOD - III

SHEET 1 OF 1 200D03



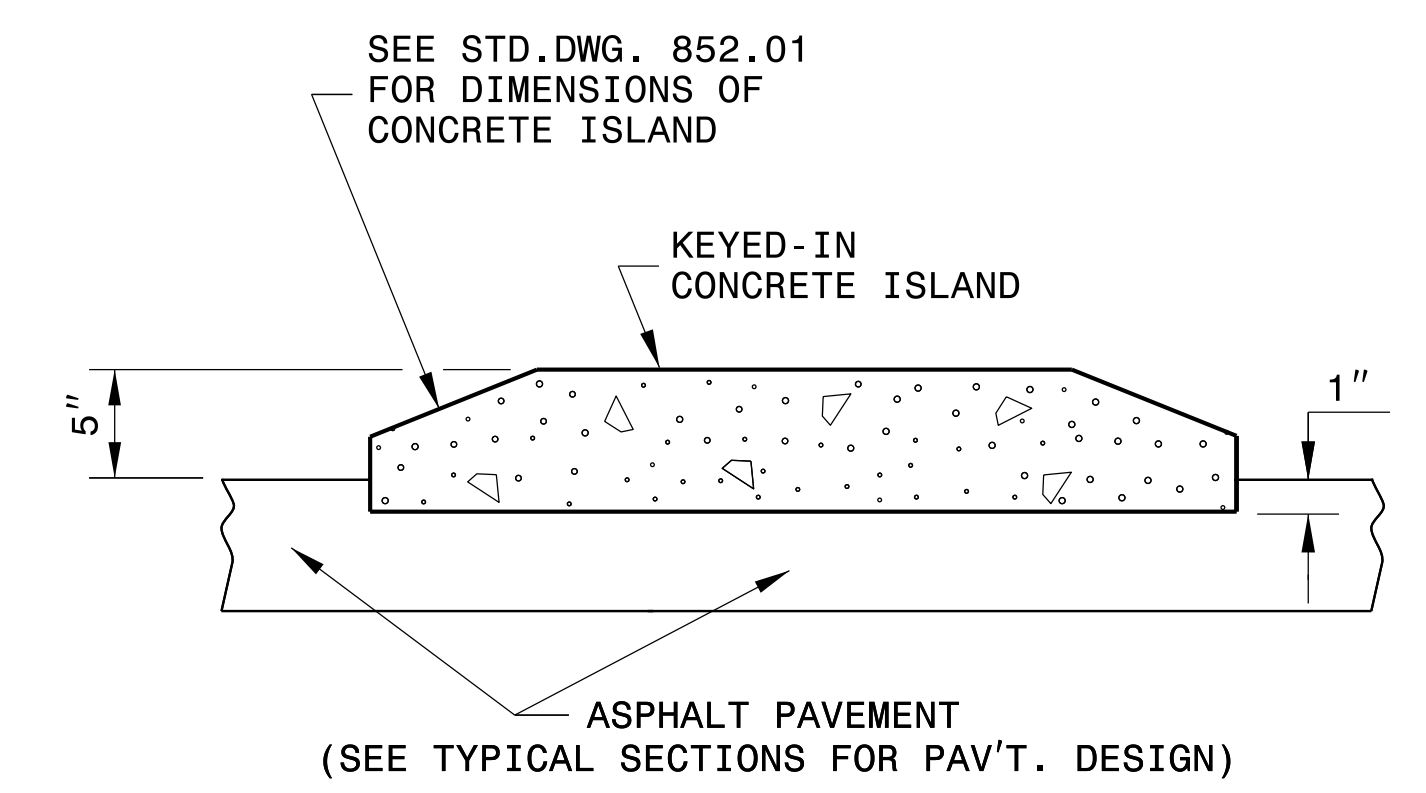
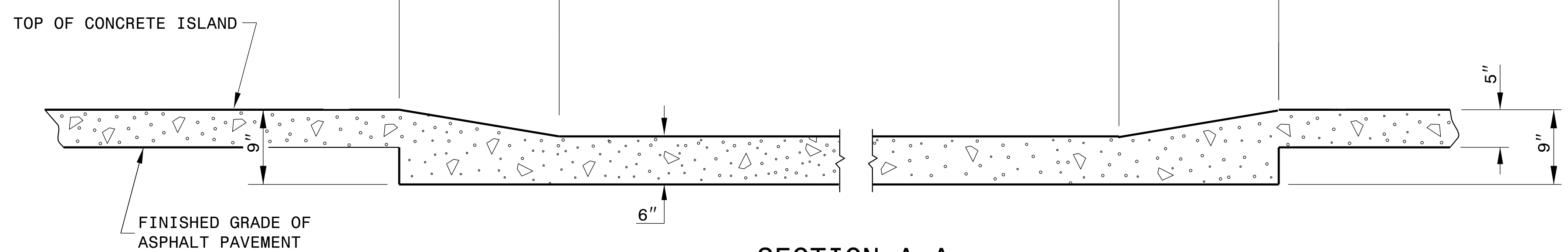
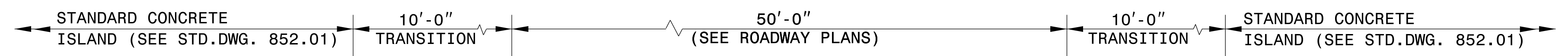
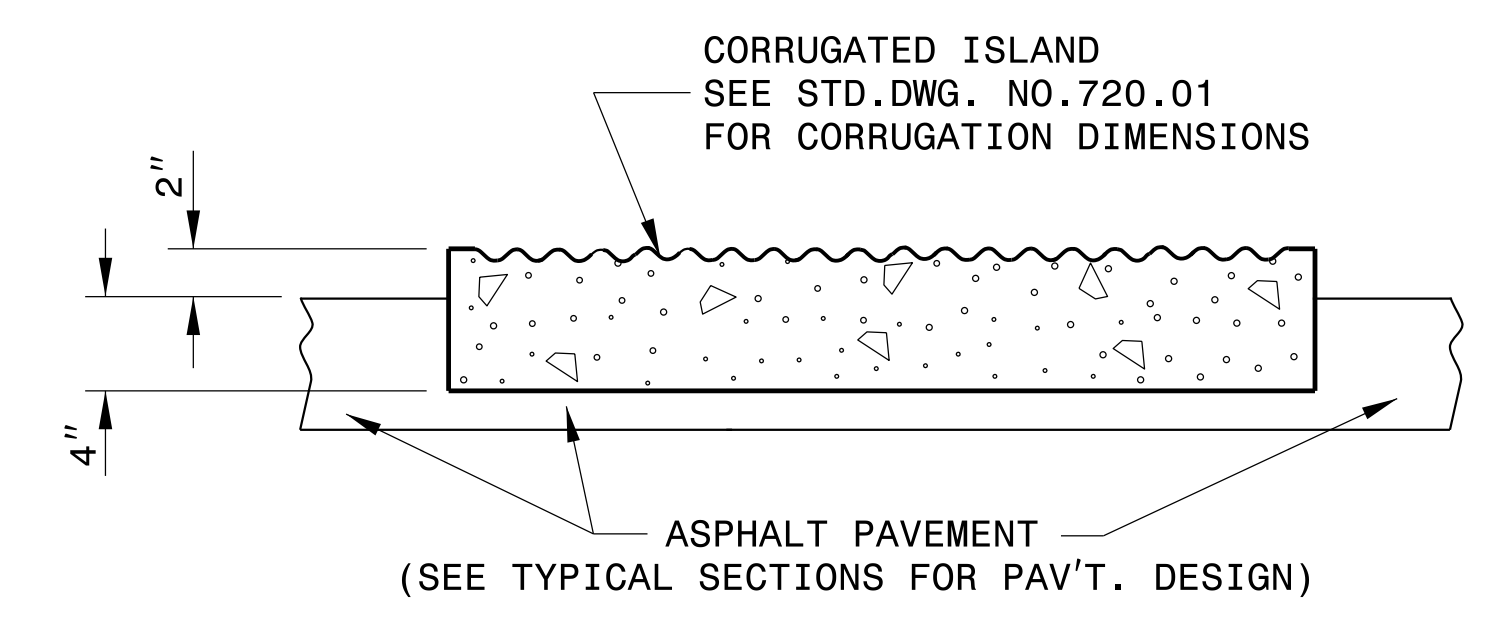
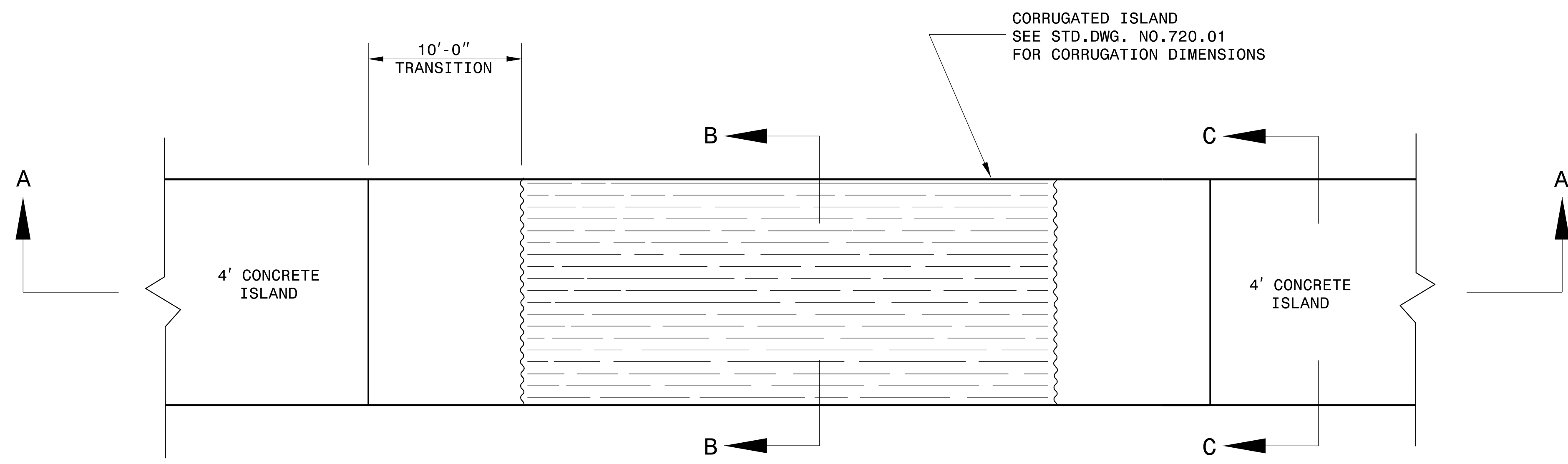
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SEE TITLE BLOCK

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MODIFIED BY: K.A.K. DATE: AUG. 2016  
CHECKED BY: DATE:  
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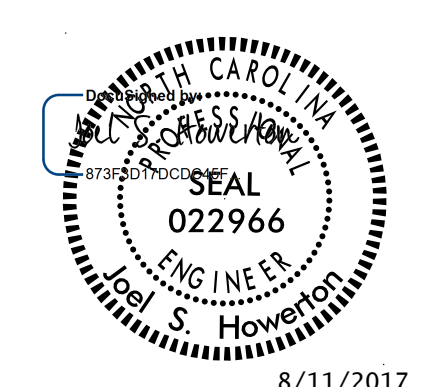


## DETAIL OF EMERGENCY VEHICLE ACCESS

- NOTES:**
- REFER TO SECTION 852 OF STANDARD SPECIFICATIONS FOR CONCRETE ISLANDS.
  - REFER TO STANDARD DRAWING 852.01 FOR CONTRACTION/EXPANSION JOINTS.
  - PLACE W6xW6 REINFORCING WIRE MESH IN THE BOTTOM 3RD OF THE EMERGENCY VEHICLE ACCESS PORTION OF THE CONCRETE ISLAND THAT MEETS SECTION 1070 OF THE STANDARD SPECIFICATIONS.

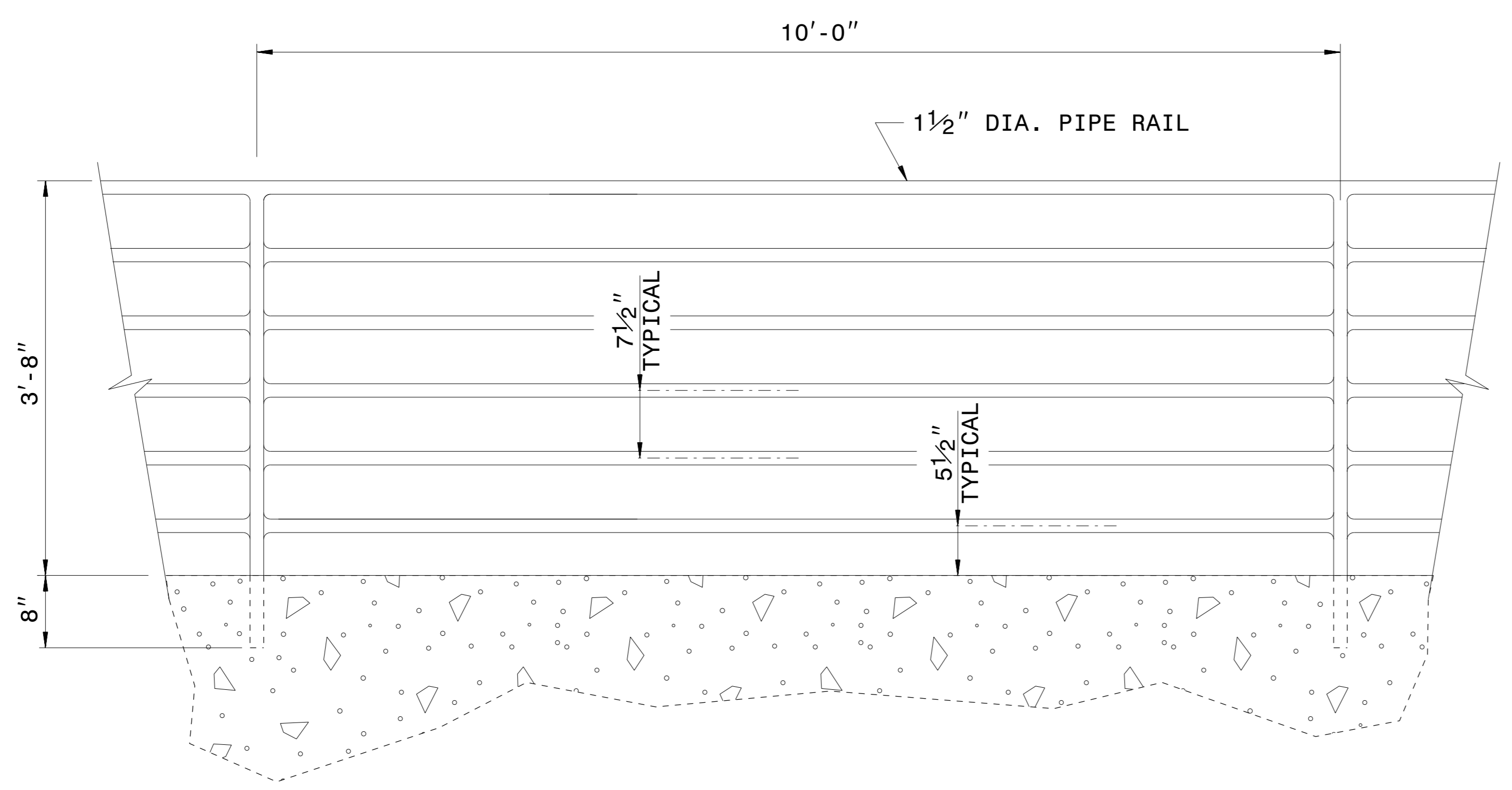
**SEE PLAN SHEET 12**

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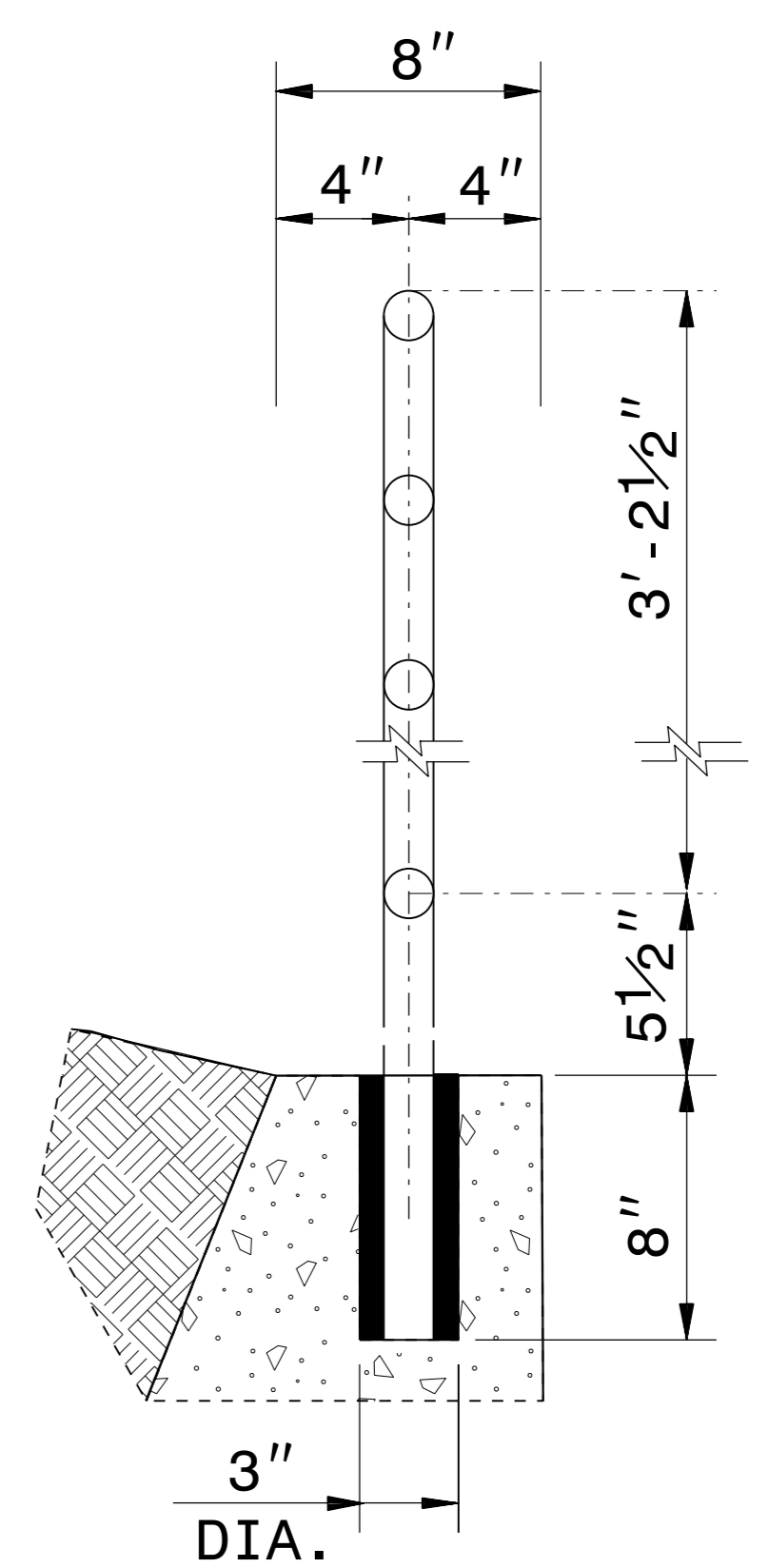


8/11/2017

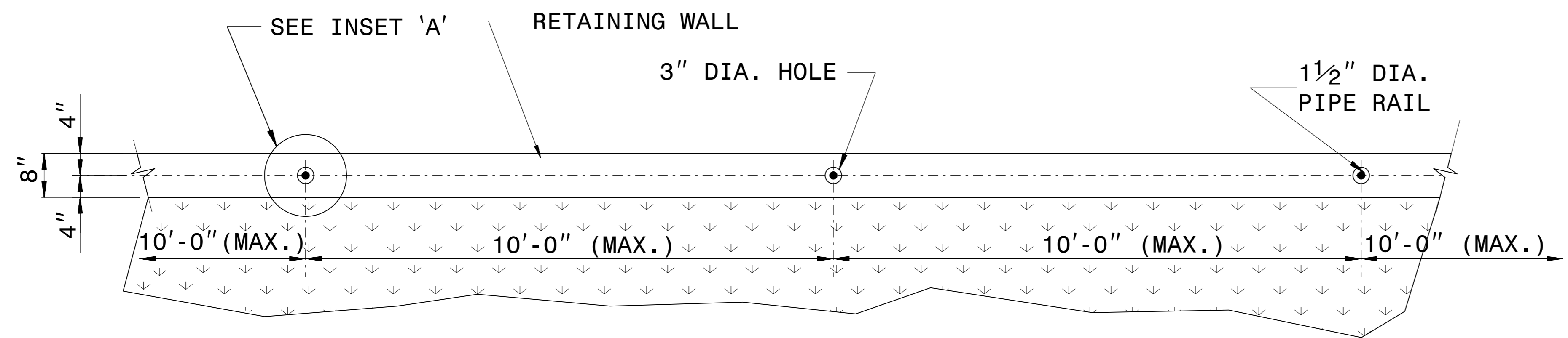
<b>CONTRACT STANDARDS AND DEVELOPMENT UNIT</b>	
Office 919-707-6950 FAX 919-250-4119	
<b>EMERGENCY VEHICLE ACCESS FOR CONCRETE ISLAND</b>	
ORIGINAL BY: E.E. WARD	DATE: 12-99
MODIFIED BY: T.S. SPELL	DATE: 12-05
CHECKED BY:	DATE:
FILE SPEC.: nbritt\metric\urban\3613b_emergency_access.dgn	



**ELEVATION OF HANDRAIL**



**INSET 'A'**

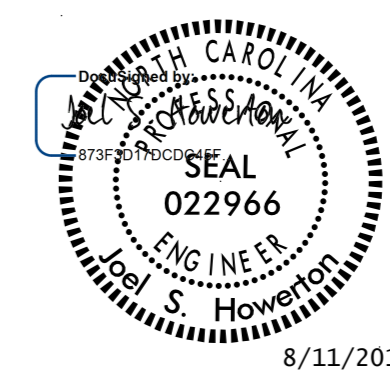


**PLAN VIEW**

**NOTES:**

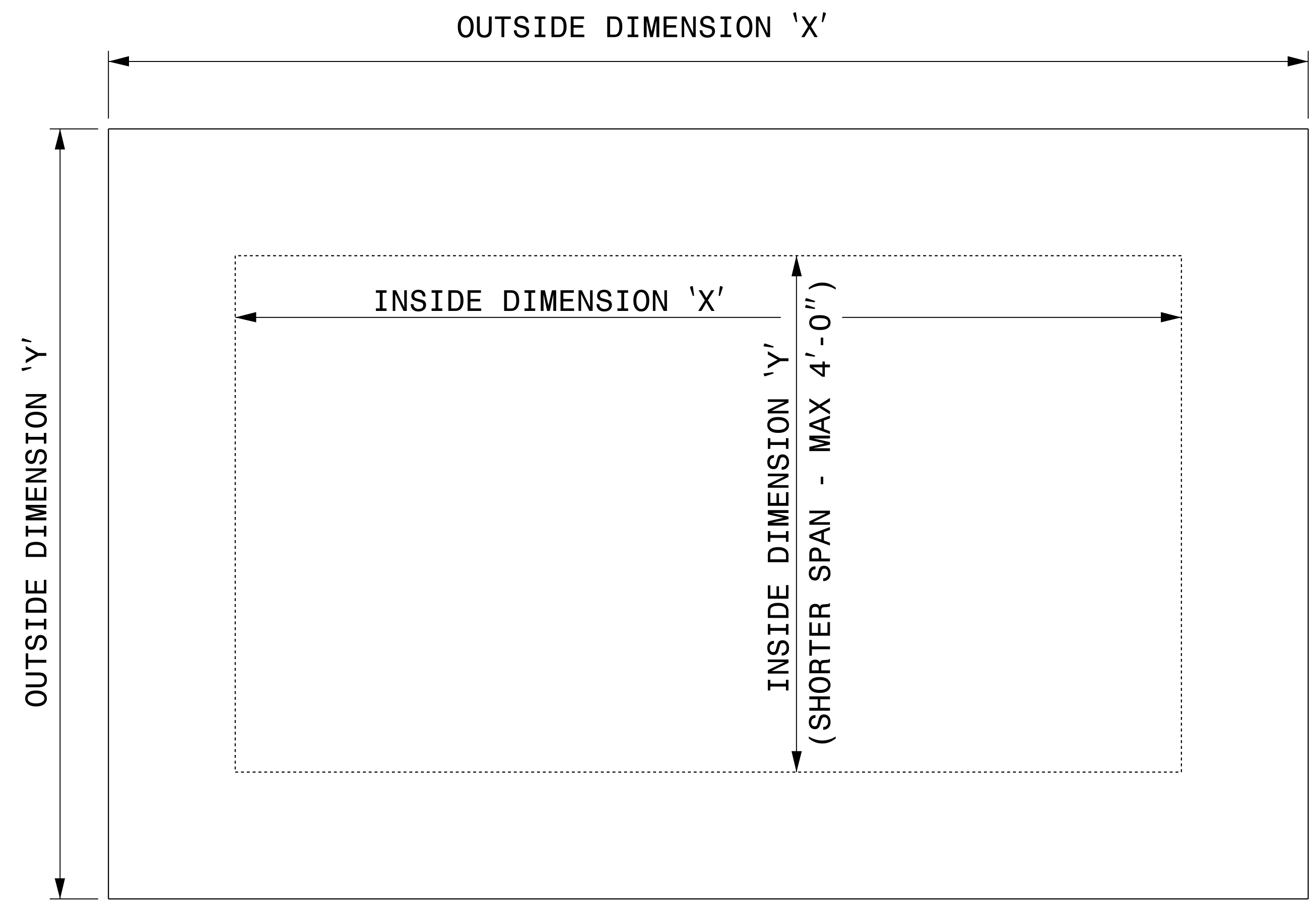
- CONSTRUCT PROPOSED STEEL PIPE RAIL 1 1/2" DIAMETER SCHEDULE 40 PLAIN END GALVANIZED STEEL PIPE MEETING THE REQUIREMENTS OF ASTM A53.
- EMBED PIPE RAIL 8" INTO PROPOSED WALL WITH CHEMICAL OR CONCRETE GROUT ANCHORING SYSTEM AS DIRECTED BY THE ENGINEER.
- REPAIR GALVANIZING IN ACCORDANCE WITH SECTION 1076 OF THE NCDOT STANDARD SPECIFICATIONS.
- PAINT, IF REQUIRED BY THE ENGINEER, IN ACCORDANCE WITH SECTION 1080 OF THE STANDARD SPECIFICATIONS.
- CENTER THE PROPOSED RAILING ON TOP OF THE WALL WITH POST SPACING SYMMETRICAL ABOUT THE CENTER-LINE OF THE WALL.
- USE A ROTARY DRILL IF NEEDED FOR EMBEDMENT HOLES OF RAIL IN WALL. ROTARY DRILL ONLY (NO ROTARY-IMPACT DRILLS).
- WELD IN ACCORDANCE WITH ARTICLE 1072-18 OF THE STANDARD SPECIFICATIONS.

SEE SHEET 2B-4 AND PLAN SHEET 28



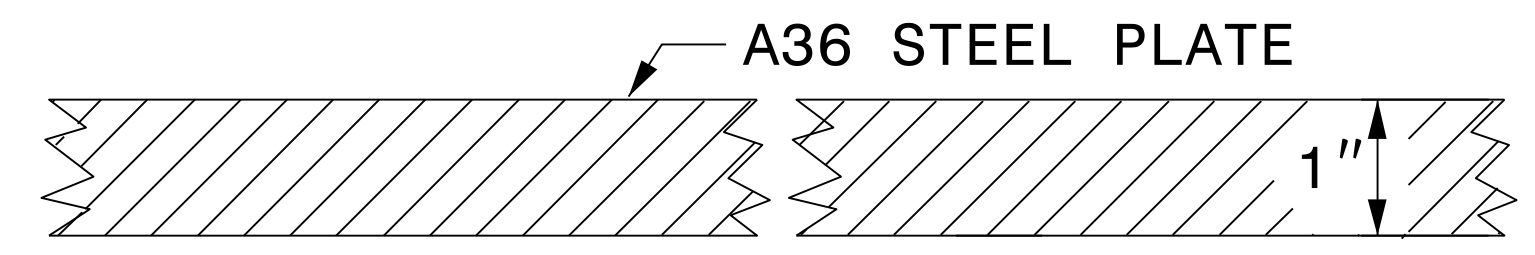
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<b>CONTRACT STANDARDS AND DEVELOPMENT UNIT</b> Office 919-707-6950 FAX 919-250-4119	
<b>DETAIL OF PIPE HANDRAIL MOUNTED ON RETAINING WALL</b>	
ORIGINAL BY: E.E. WARD	DATE: 12-99
MODIFIED BY:	DATE:
CHECKED BY:	DATE:
FILE SPEC.: jhowerton/handrail on retaining_wall.dgn	

TIME \$\$\$\$\$\$  
 DATE \$\$\$\$\$\$  
 USER \$\$\$\$\$\$  
 NAME \$\$\$\$\$\$



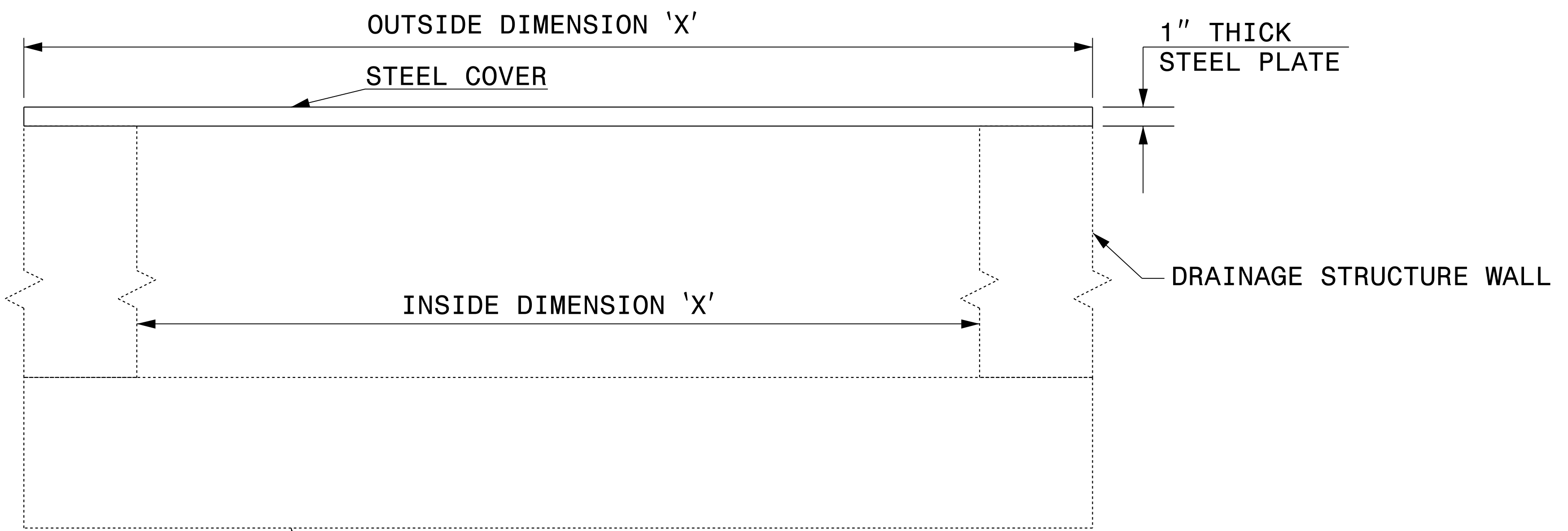
GENERAL NOTES:

- USE GRADE A36 STEEL
- STEEL COVERS ARE FOR TEMPORARY USE DURING PHASE CONSTRUCTION.
- FILL SHALL BE PLACED DIRECTLY OVER THE STEEL PLATES.
- SEE ROADWAY PLANS AND PROVISIONS FOR LOCATIONS
- QUANTITIES TO BE PAID FOR AT THE UNIT PRICE BID PER EACH.

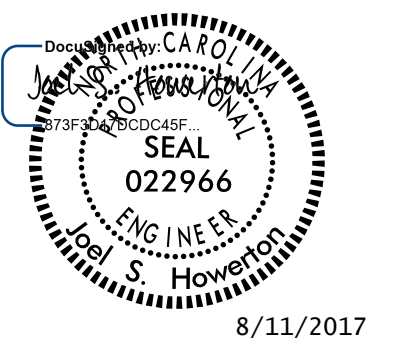


SECTION VIEW OF STEEL TOP PLATE

PLAN VIEWS



ELEVATION VIEWS



8/11/2017

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

**DETAIL OF TEMPORARY 1" STEEL COVER OVER DRAINAGE STRUCTURE**

ORIGINAL BY: E.E. WARD DATE: 2-2-98  
 MODIFIED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
 CHECKED BY: \_\_\_\_\_ DATE: \_\_\_\_\_  
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STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ROADWAY DETAIL DRAWING FOR <b>GUARDRAIL PLACEMENT</b>	SHEET 2 OF 11 <b>862D01</b>
ROADWAY DETAIL DRAWING FOR <b>GUARDRAIL PLACEMENT</b>		
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.		

PLAN VIEW: 50' IMPACT ATTENUATOR (TYPE TL-3), 15:1 TRANSITION, 25', 25', 3'-1 1/2" SIGN SUPPORT, 6'-3" MEDIAN, SHOULDER, PAVED.

NOTE SPECIAL LAYER OF PAVEMENT .....

USE 3'-1 1/2" POST SPACING ON THE 50' OF GUARDRAIL PARALLEL TO LANES AND 6'-3" POST SPACING ON 15:1 TRANSITION SECTIONS.

GRADE MEDIAN IN THE VICINITY OF THE SIGN SUPPORT AS ILLUSTRATED IN THE ROADWAY STANDARD DRAWINGS (STANDARD 862D01 SHEET 1 OF 12).

SECT. YY

SECT. ZZ

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ROADWAY DETAIL DRAWING FOR <b>GUARDRAIL PLACEMENT</b>	SHEET 1 OF 11 <b>862D01</b>
ROADWAY DETAIL DRAWING FOR <b>GUARDRAIL PLACEMENT</b>		
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.		

PLAN VIEW: 50' IMPACT ATTENUATOR (TYPE TL-3), 15:1 TRANSITION, 20:1 TAPER, 20:1 TAPER, MEDIAN DITCH, SHOULDER (VAR.), SHOULDER SLOPE PER PLANS (10:1 OR FLATTER), PAVED SHOULDER, PAVED SHOULDER, SINGLE FACED PRECAST CONCRETE BARRIER SEE STD. DWG. 857.01.

NOTE: WHEN OFFSET DISTANCE FROM FACE OF OBSTRUCTION TO FACE OF GUARDRAIL IS BETWEEN 3'-6" AND 5'-6" BEGIN 3'-1 1/2" POST SPACING AT POINT 25' BEFORE REACHING THE OBSTRUCTION AND CARRY THROUGHOUT ITS LENGTH. IF THE OFFSET IS LESS THAN 3'-6" USE CONCRETE BARRIER.

SECT. XX

SECT. YY

SECT. ZZ

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ROADWAY DETAIL DRAWING FOR <b>GUARDRAIL PLACEMENT</b>	SHEET 1 OF 11 <b>862D01</b>
ROADWAY DETAIL DRAWING FOR <b>GUARDRAIL PLACEMENT</b>		
STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.		

PLAN VIEW: 50' IMPACT ATTENUATOR (TYPE TL-3), 15:1 TRANSITION, 12' MIN. DESIRABLE, 10:1 OR FLATTER, MEDIAN HAZARD, SINGLE FACED PRECAST CONCRETE BARRIER SEE STD. DWG. 857.01.

NOTE: WHEN OFFSET DISTANCE FROM FACE OF OBSTRUCTION TO FACE OF GUARDRAIL IS BETWEEN 3'-6" AND 5'-6" BEGIN 3'-1 1/2" POST SPACING AT POINT 25' BEFORE REACHING THE OBSTRUCTION AND CARRY THROUGHOUT ITS LENGTH. IF THE OFFSET IS LESS THAN 3'-6" USE CONCRETE BARRIER.

SECT. XX

SECT. YY

SECT. ZZ

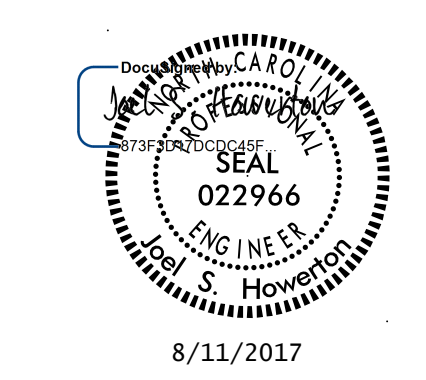
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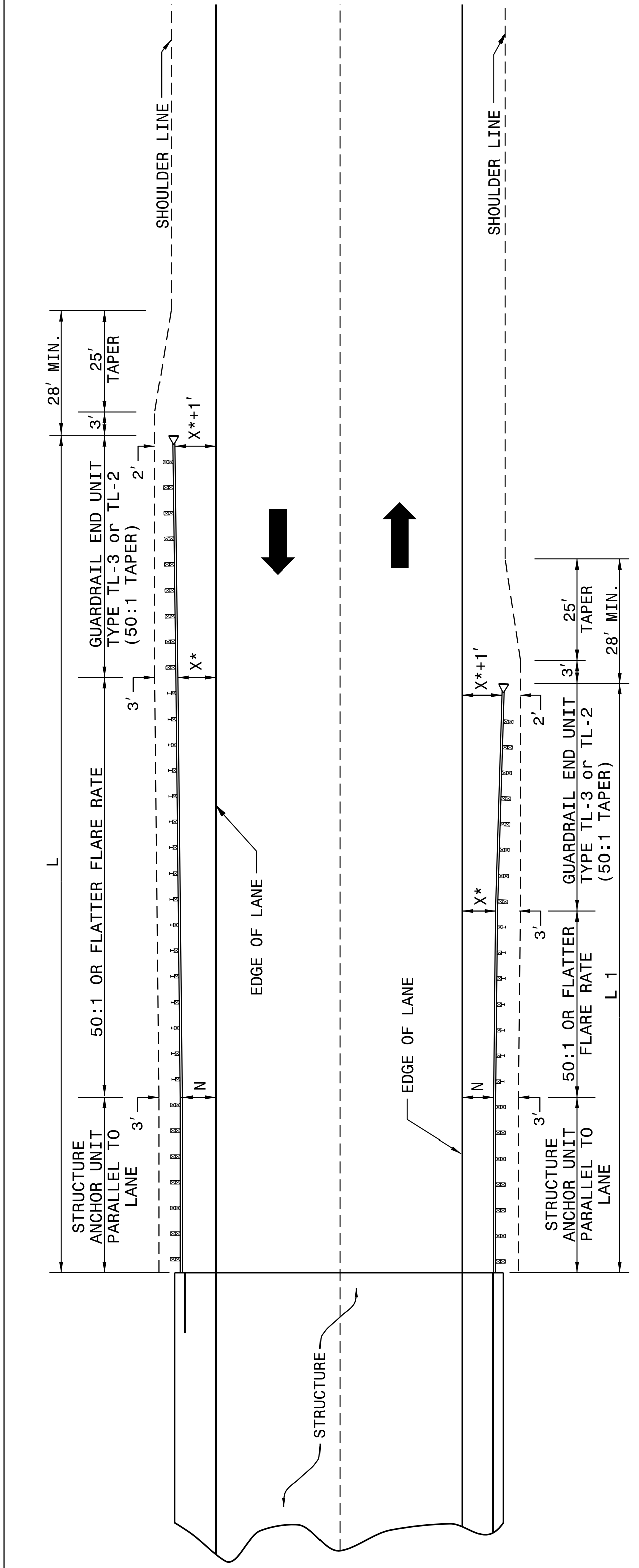


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ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

SHEET 4 OF 11  
**862D01**



**GUARDRAIL INSTALLATION AT BRIDGE APPROACHES FOR TWO-LANE, TWO-WAY TRAFFIC**

DESIGN SPEED (MPH)	"L" APPROACH LENGTH (FT.)		"L" TRAILING LENGTH (FT.)	
	DESIGN YEAR ADT OVER 2000	CURRENT YEAR ADT UNDER 400	DESIGN YEAR ADT OVER 2000	CURRENT YEAR ADT UNDER 400
70	362.5'	362.5'	350.0'	287.5'
60	300.0'	287.5'	275.0'	225.0'
50	212.5'	212.5'	200.0'	162.5'
40	175.0'	150.0'	137.5'	112.5'
X*	8'	6'	4'	4'

\* USE FLARE RATE AS THE CONTROL IF THE "X" DISTANCE IS NOT OBTAINED. ("X" IS BASED ON SHOULDER WIDTHS IN THE HIGHWAY DESIGN BRANCH MANUAL, PART 1, 1-4B, F1).  
 \*\* "N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.  
 \*\*\* SEE STD. 862.03 FOR STRUCTURE ANCHOR UNITS  
 FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3  
 FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

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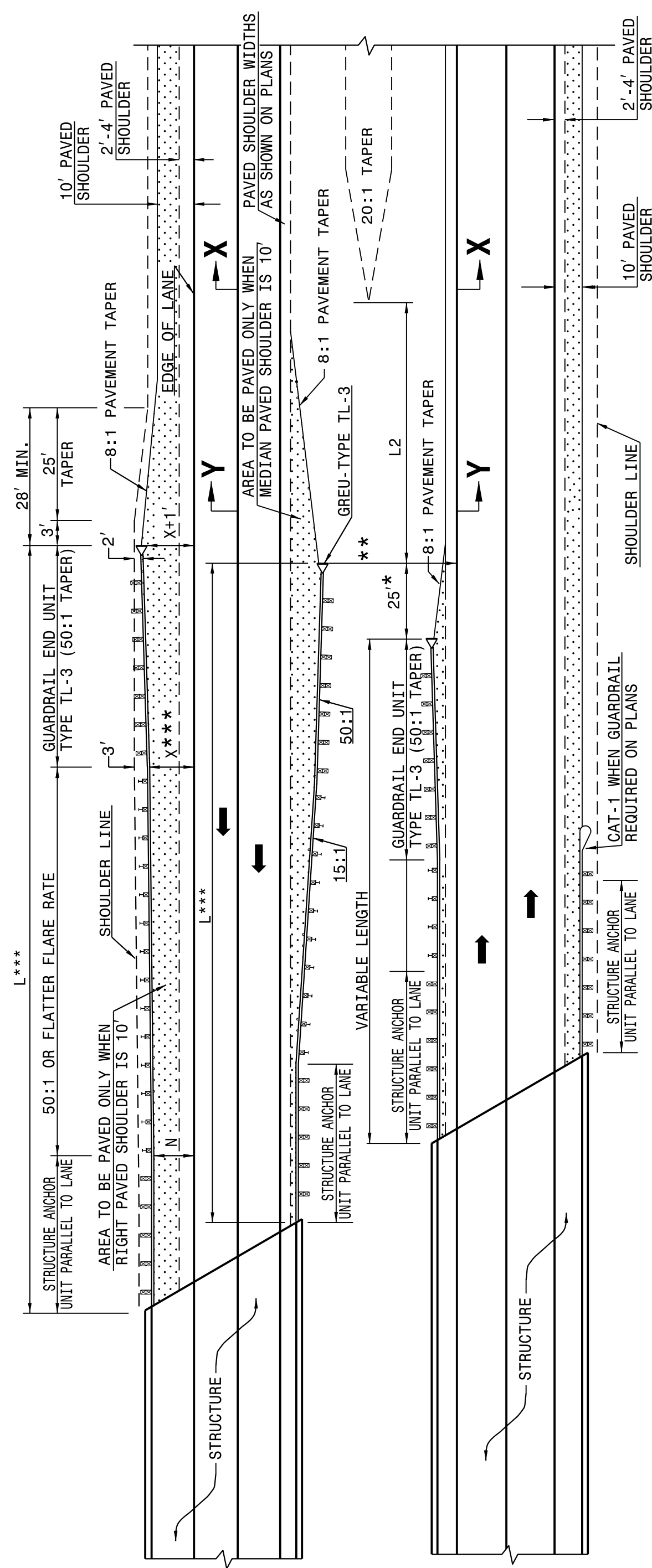
ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

SHEET 4 OF 11  
**862D01**

**LENGTHS AND OFFSETS FOR PROPOSED GUARDRAIL AT TWO LANE - TWO WAY LOCATIONS**

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ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**



FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3  
 FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

**DIMENSIONS FOR LENGTH OF GUARDRAIL APPROACHING DUAL LANE BRIDGES**

MEDIAN WIDTH	-L-***		-L2- DIM.
	60 MPH	50 MPH	
30'	300.0'	250.0'	80.0'
36'	300.0'	250.0'	60.0'
40' & ABOVE	300.0'	250.0'	40.0'

NOTES: \* MINOR VARIATION TO THE 25'-0" DIMENSION IS PERMISSIBLE TO ACCOMMODATE THE 12'-6" IN GUARDRAIL LENGTHS.  
 \*\* NO GUARDRAIL IS REQUIRED ON THE TRAILING END WHEN THIS DISTANCE EXCEEDS CLEAR ROADSIDE RECOVERY AREA FOR THE APPROPRIATE DESIGN SPEED.  
 \*\*\* BASED ON "X" OF 12' USE FLARE RATE AS THE CONTROL IF THE "X" DISTANCE IS NOT OBTAINED. ("X" IS BASED ON SHOULDER WIDTHS IN THE HIGHWAY DESIGN BRANCH MANUAL, PART 1, 1-4B, F1A).  
 "N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.  
 THE DESIGN LAYOUT FOR LENGTHS SHOWN ON THIS STANDARD ARE MINIMUM DESIGN LENGTHS.  
 SEE SHEET 1 OF 12 FOR SECTIONS XX, YY  
 SEE STD. 862.03 FOR STRUCTURE ANCHOR UNITS

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ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

SHEET 3 OF 11  
**862D01**

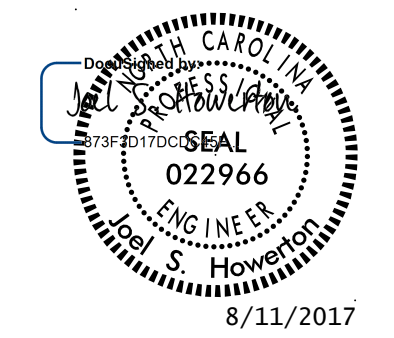
**DETAIL OF GUARDRAIL APPROACHING DUAL LANE BRIDGES**

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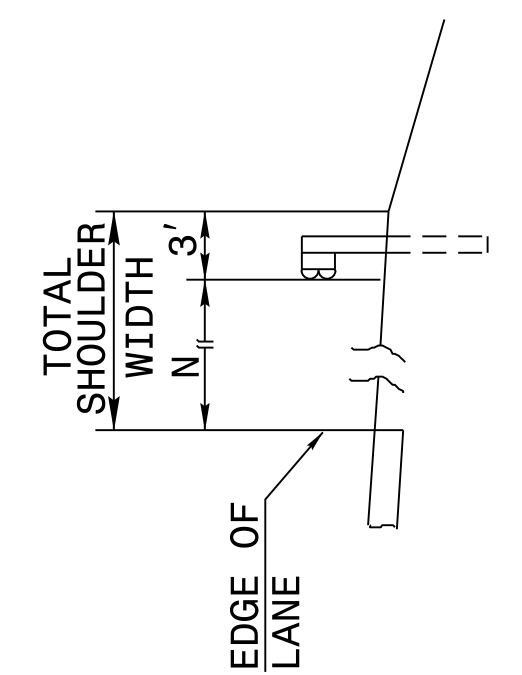
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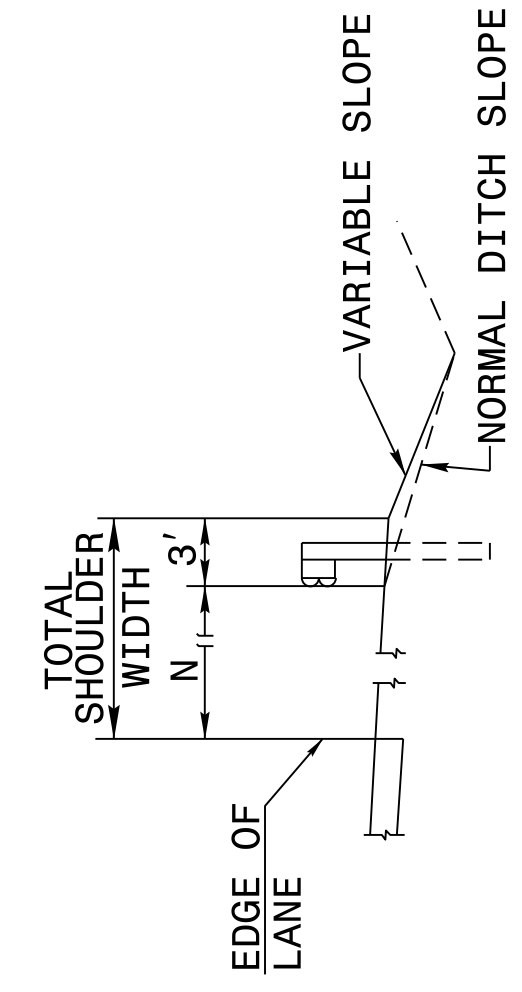


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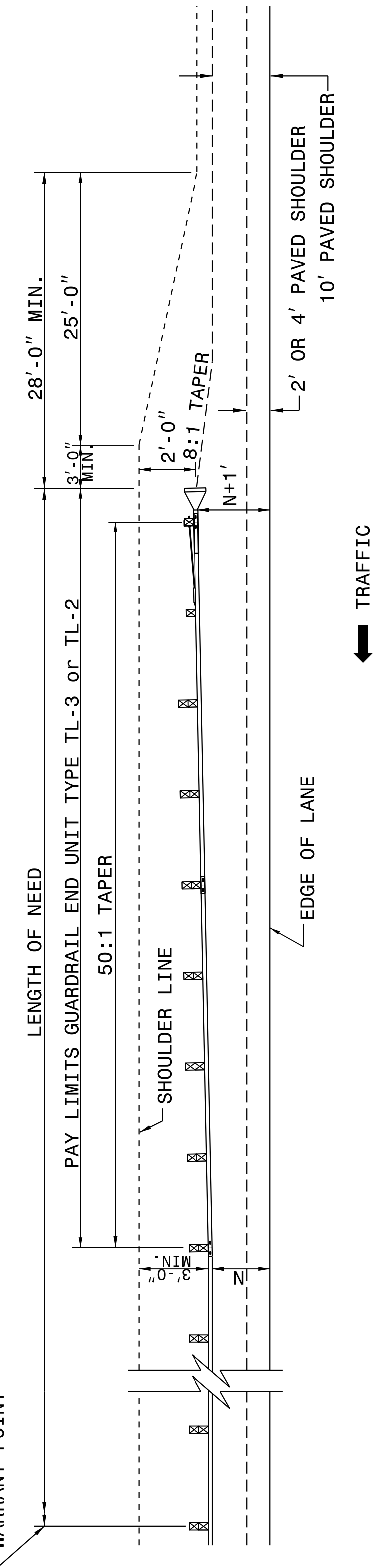


**FILL SECTION**



**CUT SECTION**

"N"= DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL WHERE GUARDRAIL IS PARALLEL TO LANE.



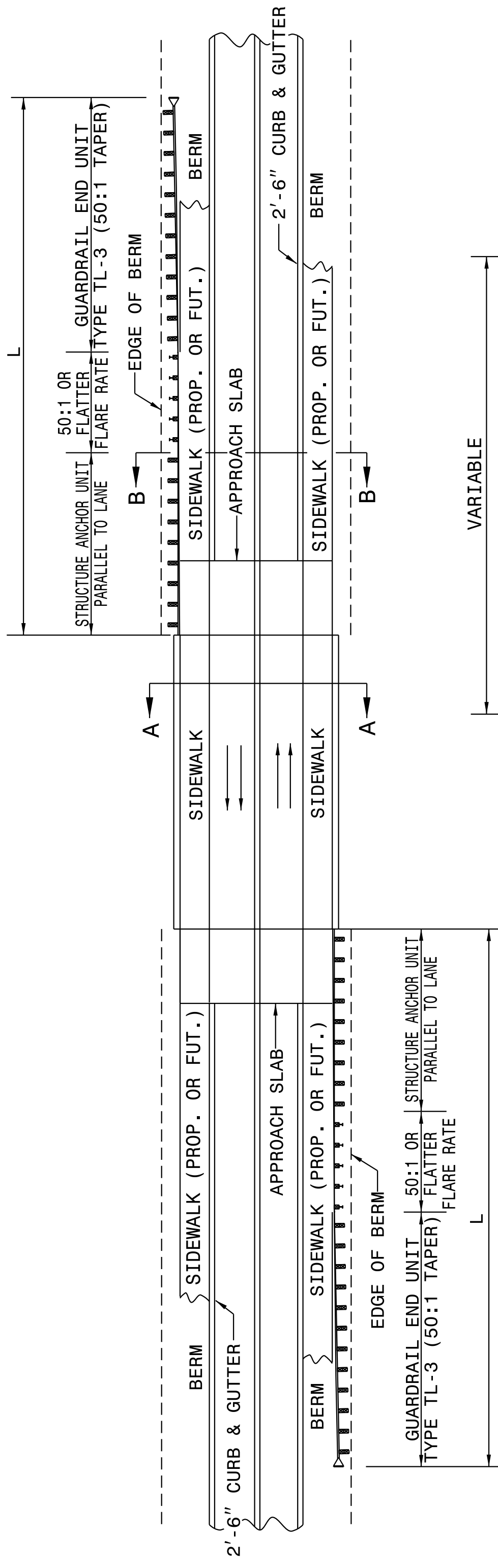
FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3  
 FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

SHEET 6 OF 11  
**862D01**

**DETAIL OF BEGINNING OF GUARDRAIL IN CUT OR FILL SECTION**

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MINIMUM GUARDRAIL LENGTHS "L" REQUIRED AT BRIDGE APPROACHES ON 2'-6" CONCRETE CURB AND GUTTER ROADWAYS	"L"
DESIGN SPEED (MPH)	150'
	225'

NOTE: "L" VALUES ARE BASED ON NO HAZARDS OTHER THAN END OF BRIDGE BEING PRESENT WITHIN THE CLEAR ZONE.

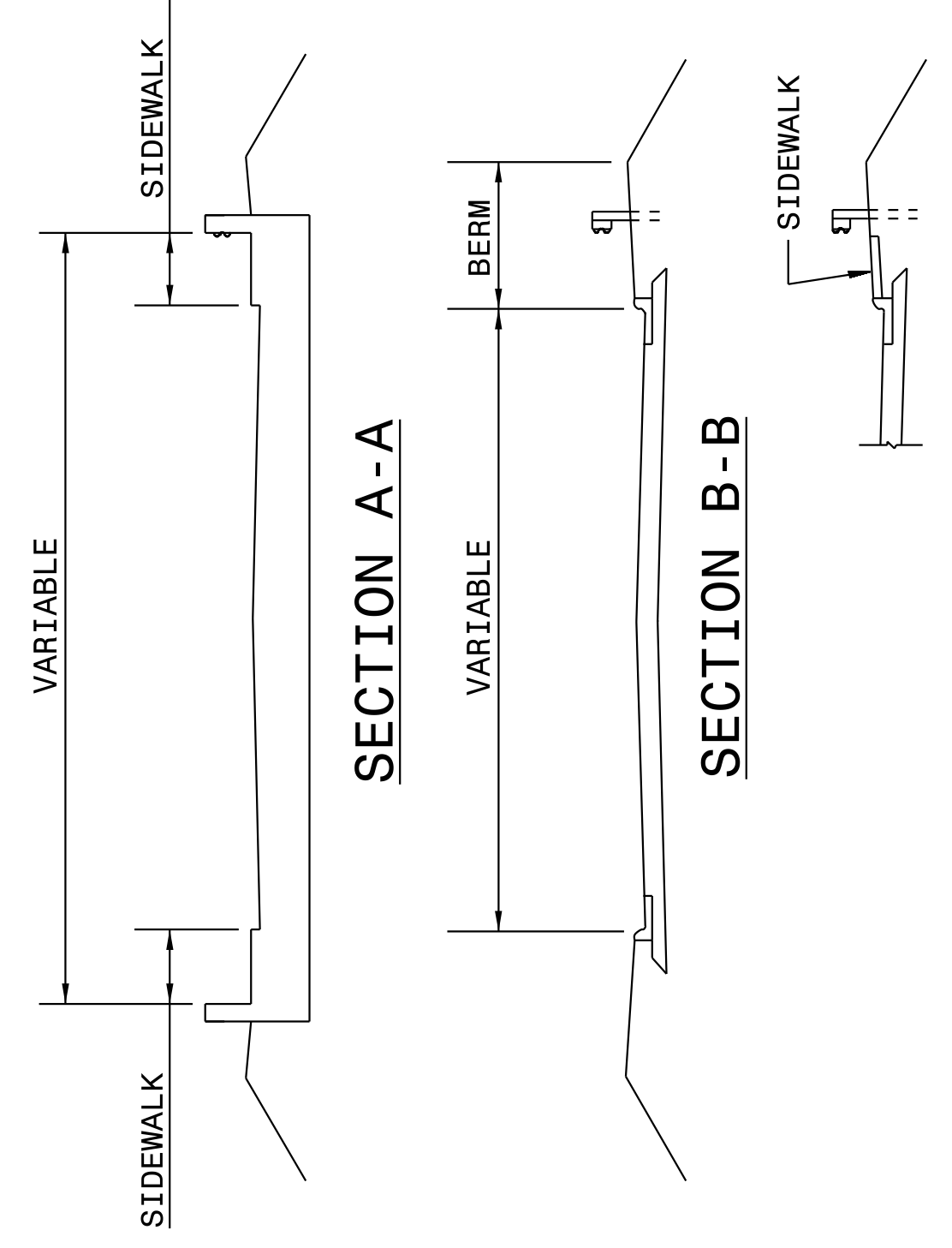
SEE STD. 862D03 FOR STRUCTURE ANCHOR UNITS.

FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3  
 FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

SHEET 5 OF 11  
**862D01**

**STANDARD GUARDRAIL PLACEMENT AT BRIDGES WITH 2'-6" CONCRETE CURB AND GUTTER**

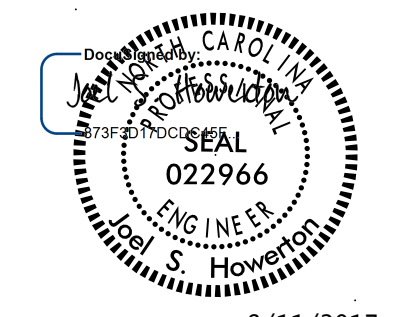


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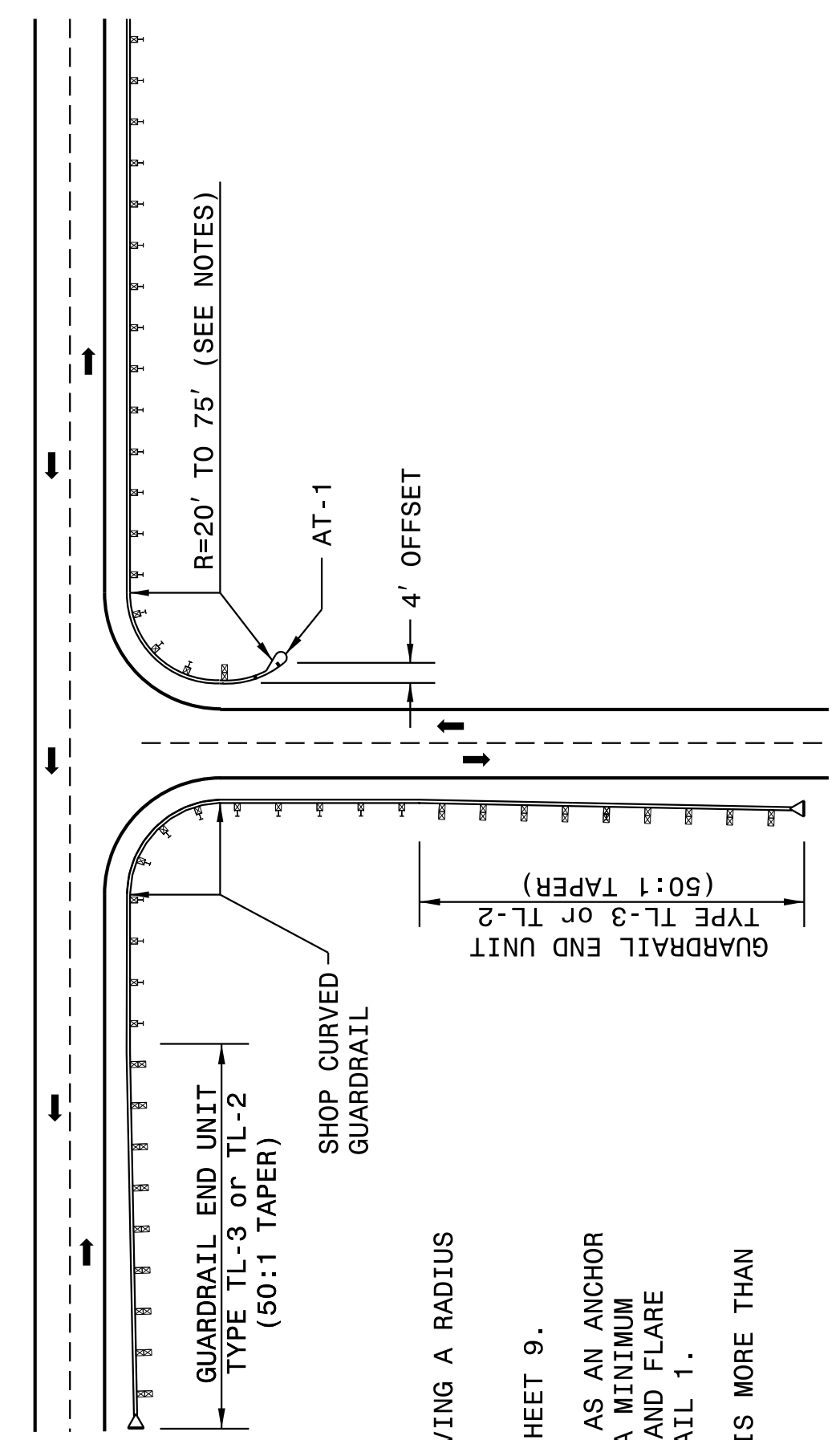
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**ROADWAY DETAIL DRAWING FOR  
GUARDRAIL PLACEMENT**

SHEET 8 OF 11  
**862D01**

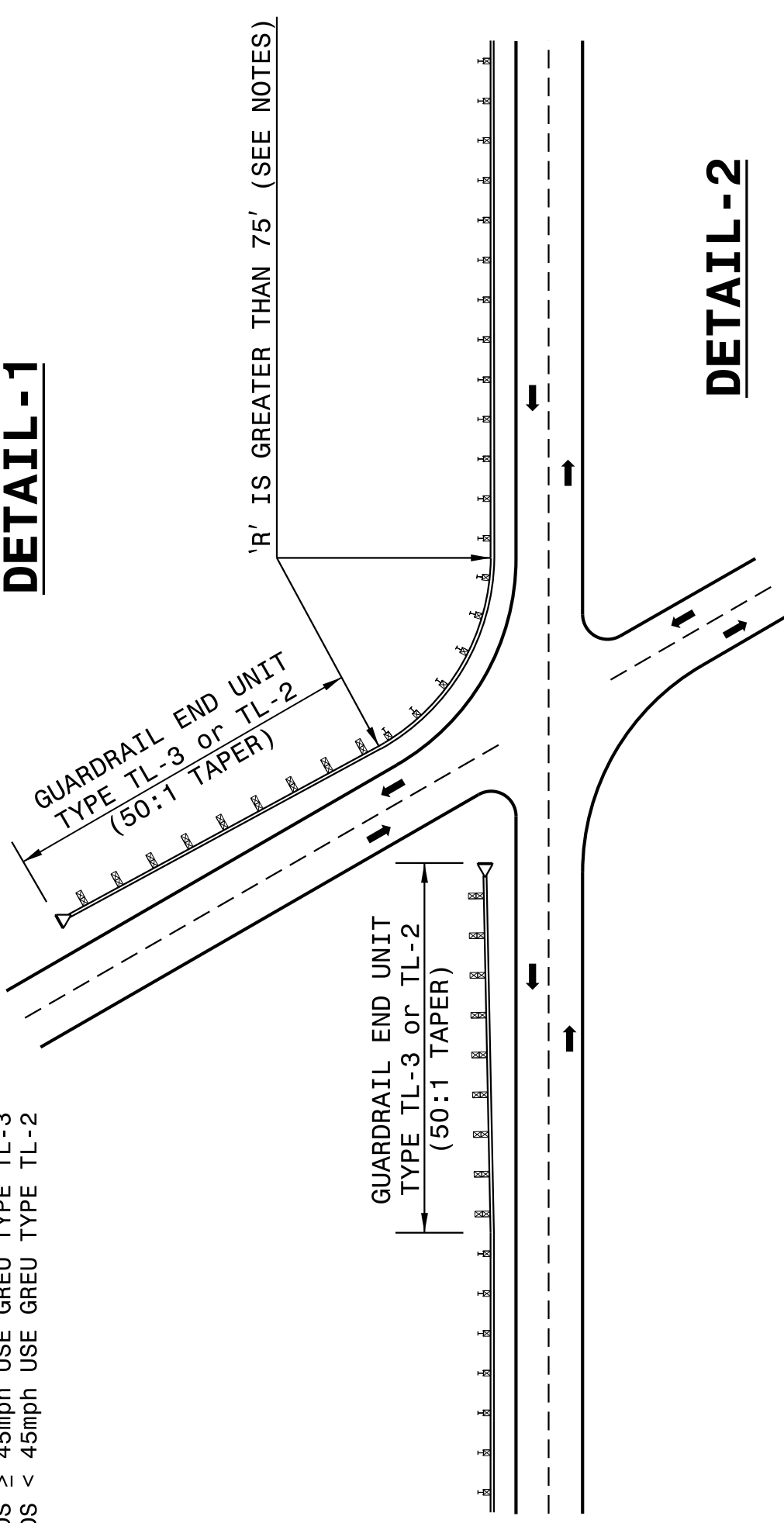


**NOTES:**  
 SHOP CURVED GUARDRAIL IS DEFINED AS HAVING A RADIUS OF 150' OR LESS.  
 WHEN RADIUS IS LESS THAN 20' REFER TO SHEET 9.  
 WHENEVER SHOP CURVED GUARDRAIL IS USED AS AN ANCHOR AND THE RADIUS IS FROM 20' TO 75', USE A MINIMUM LENGTH OF 50' OF SHOP CURVED GUARDRAIL AND FLARE WITH AN AT-1 ANCHOR UNIT. REFER TO DETAIL 1.  
 WHENEVER SHOP CURVED GUARDRAIL RADIUS IS MORE THAN 75', REFER TO DETAIL 2.

MAINTAIN CLEAR SIGHT DISTANCE.

FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3  
 FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

**DETAIL -1**



**DETAIL -2**

**GUARDRAIL TREATMENT AT INTERSECTIONS**

SHEET 8 OF 11  
**862D01**

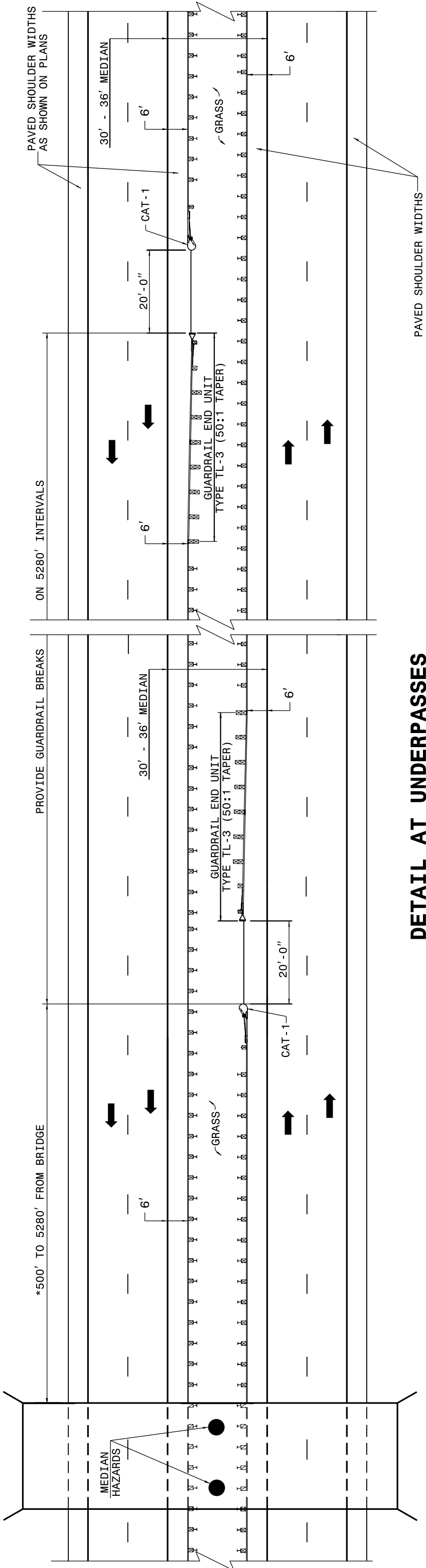
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**ROADWAY DETAIL DRAWING FOR  
GUARDRAIL PLACEMENT**

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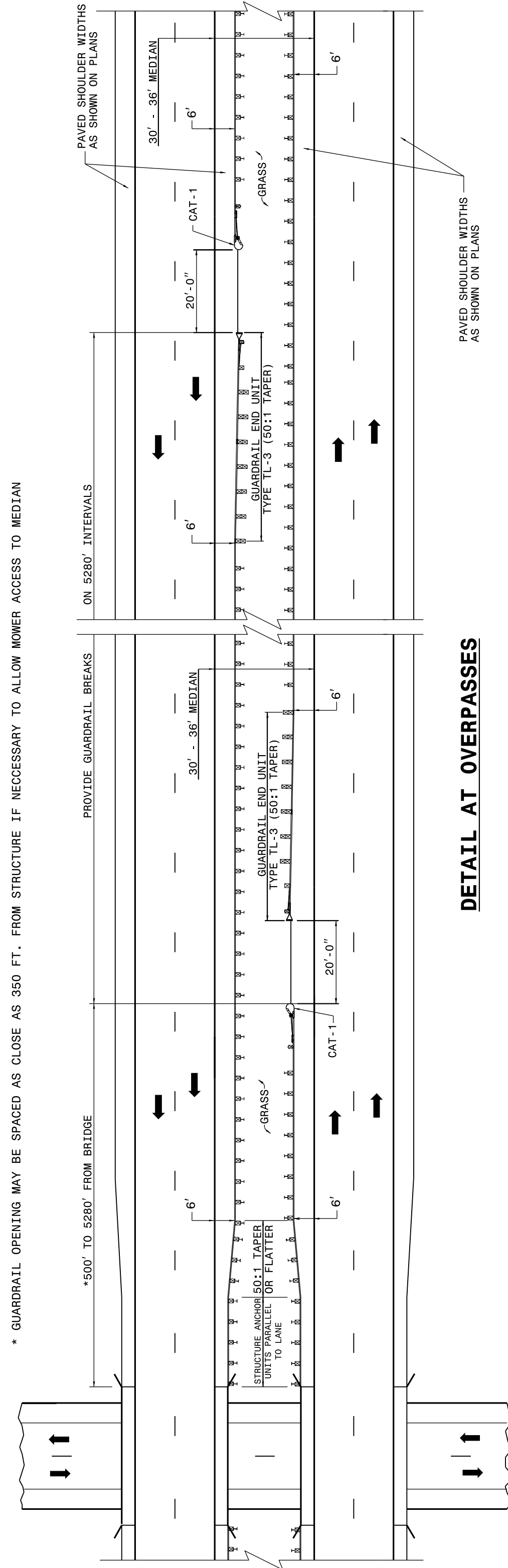
**ROADWAY DETAIL DRAWING FOR  
GUARDRAIL PLACEMENT**

SHEET 7 OF 11  
**862D01**



**DETAIL AT UNDERPASSES**

\* GUARDRAIL OPENING MAY BE SPACED AS CLOSE AS 350 FT. FROM STRUCTURE IF NECESSARY TO ALLOW MOWER ACCESS TO MEDIAN



**DETAIL AT OVERPASSES**

FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3  
 FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

**GUARDRAIL BREAK INTERVALS WITH 30' - 36' MEDIANS**

SHEET 7 OF 11  
**862D01**

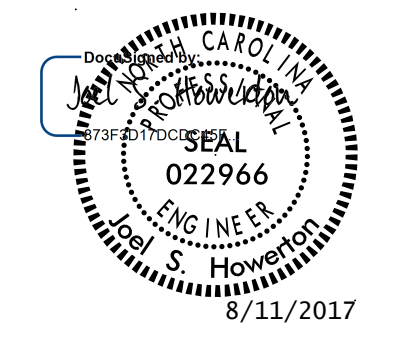
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**ROADWAY DETAIL DRAWING FOR  
GUARDRAIL PLACEMENT**

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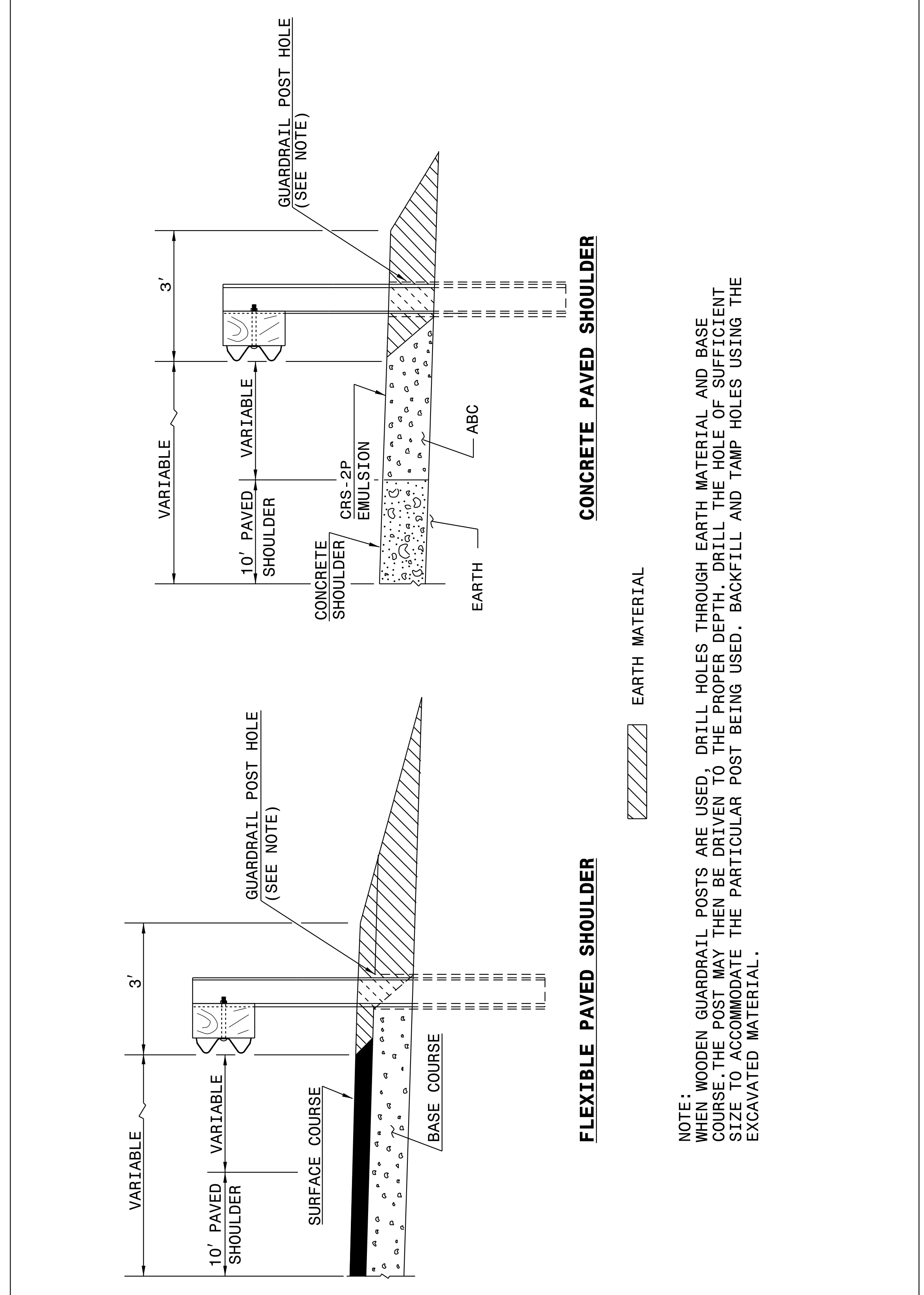
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ENGLISH DETAIL DRAWING FOR GUARDRAIL PLACEMENT

SHEET 10 OF 11 **862D01**



NOTE: WHEN WOODEN GUARDRAIL POSTS ARE USED, DRILL HOLES THROUGH EARTH MATERIAL AND BASE COURSE. THE POST MAY THEN BE DRIVEN TO THE PROPER DEPTH. DRILL THE HOLE OF SUFFICIENT SIZE TO ACCOMMODATE THE PARTICULAR POST BEING USED. BACKFILL AND TAMP HOLES USING THE EXCAVATED MATERIAL.

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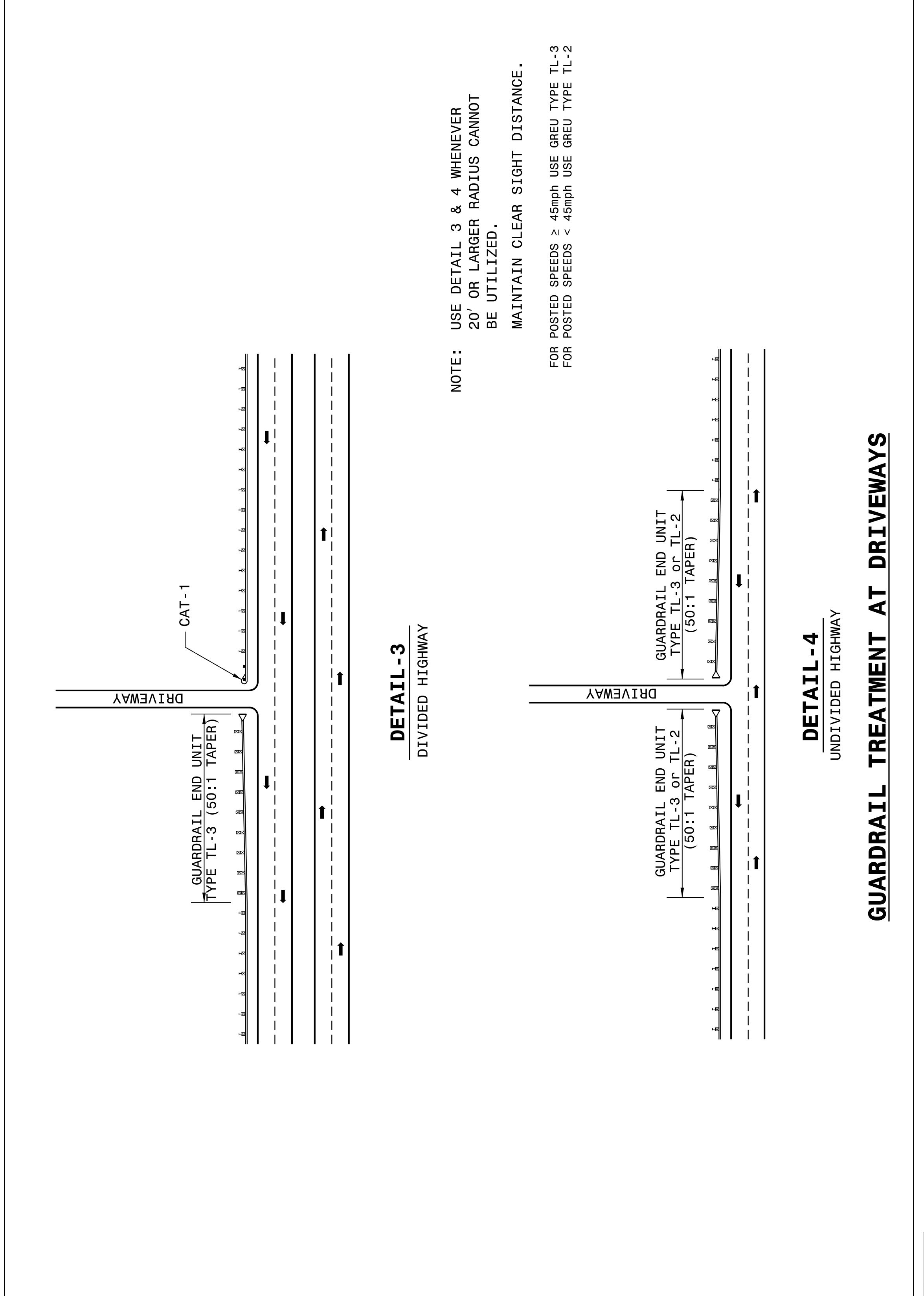
ENGLISH DETAIL DRAWING FOR GUARDRAIL PLACEMENT

SHEET 10 OF 11 **862D01**

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ROADWAY DETAIL DRAWING FOR GUARDRAIL PLACEMENT

SHEET 9 OF 11 **862D01**



NOTE: USE DETAIL 3 & 4 WHENEVER 20' OR LARGER RADIUS CANNOT BE UTILIZED. MAINTAIN CLEAR SIGHT DISTANCE.

FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3  
 FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

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

ROADWAY DETAIL DRAWING FOR GUARDRAIL PLACEMENT

SHEET 9 OF 11 **862D01**

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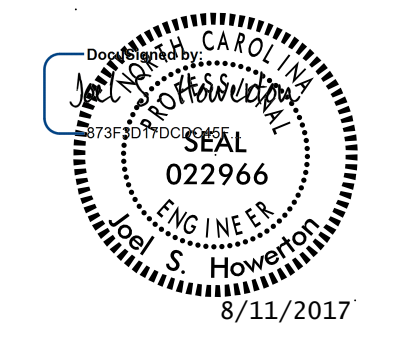
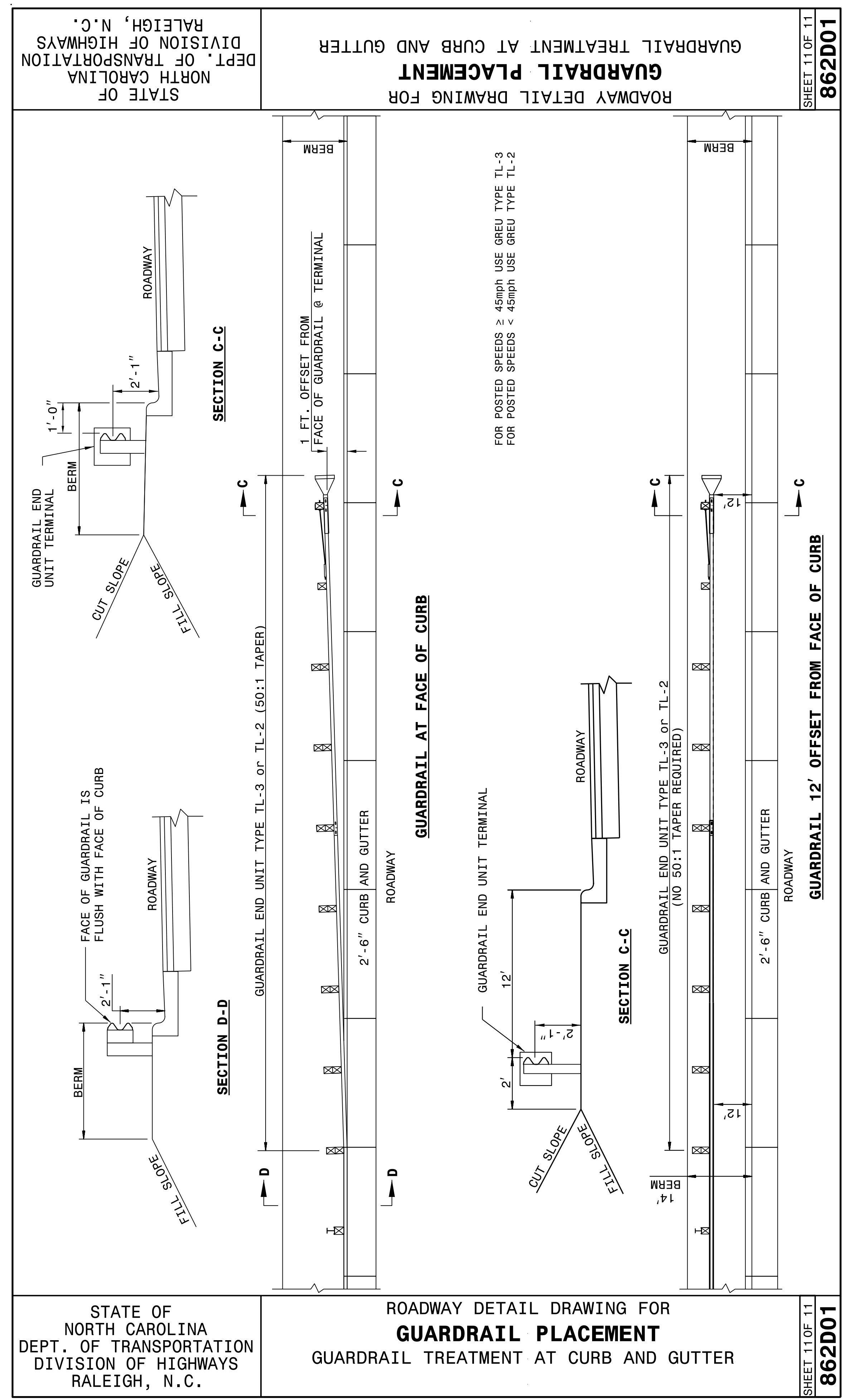
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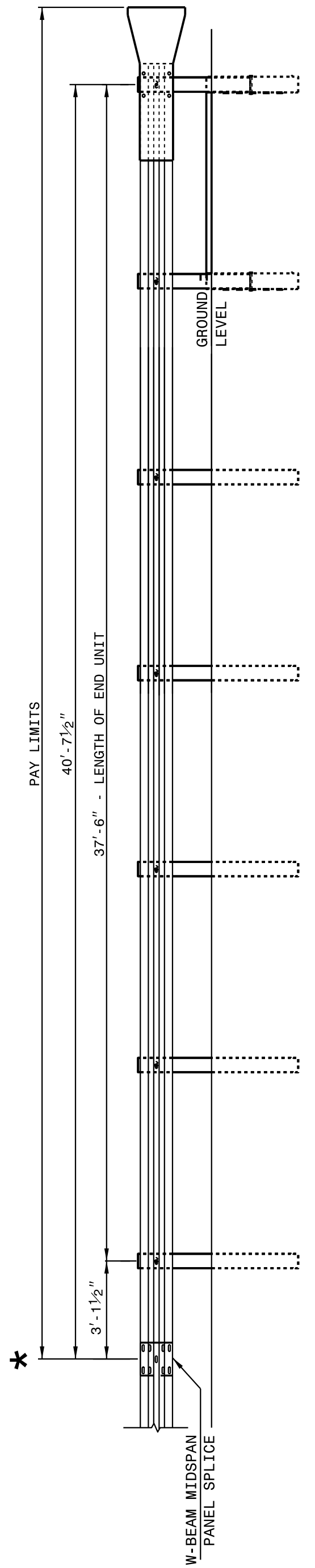
ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 2 OF 8  
**862D02**

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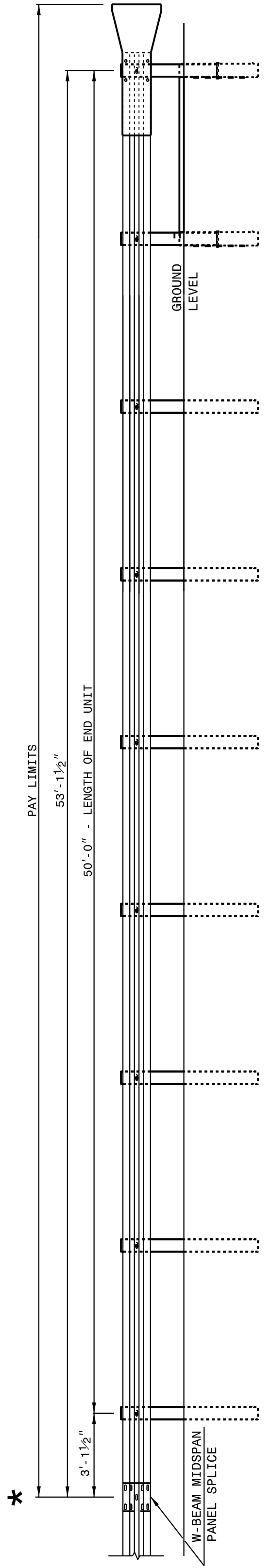
ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 2 OF 8  
**862D02**



**FLARED AND TANGENT  
ELEVATION VIEW**

\* WHEN INSTALLING GUARDRAIL END UNITS THAT ARE 2'-1" MOUNTING HEIGHT TO EXISTING GUARDRAIL, REMOVE THE EXISTING GUARDRAIL TO TRANSITION FROM THE EXISTING HEIGHT TO THE PROPOSED 2'-1" HEIGHT. SEE 862.02, SHEET 4 OF 8 FOR TRANSITION DETAILS.



**FLARED AND TANGENT  
ELEVATION VIEW**

**APPROACH END UNITS**

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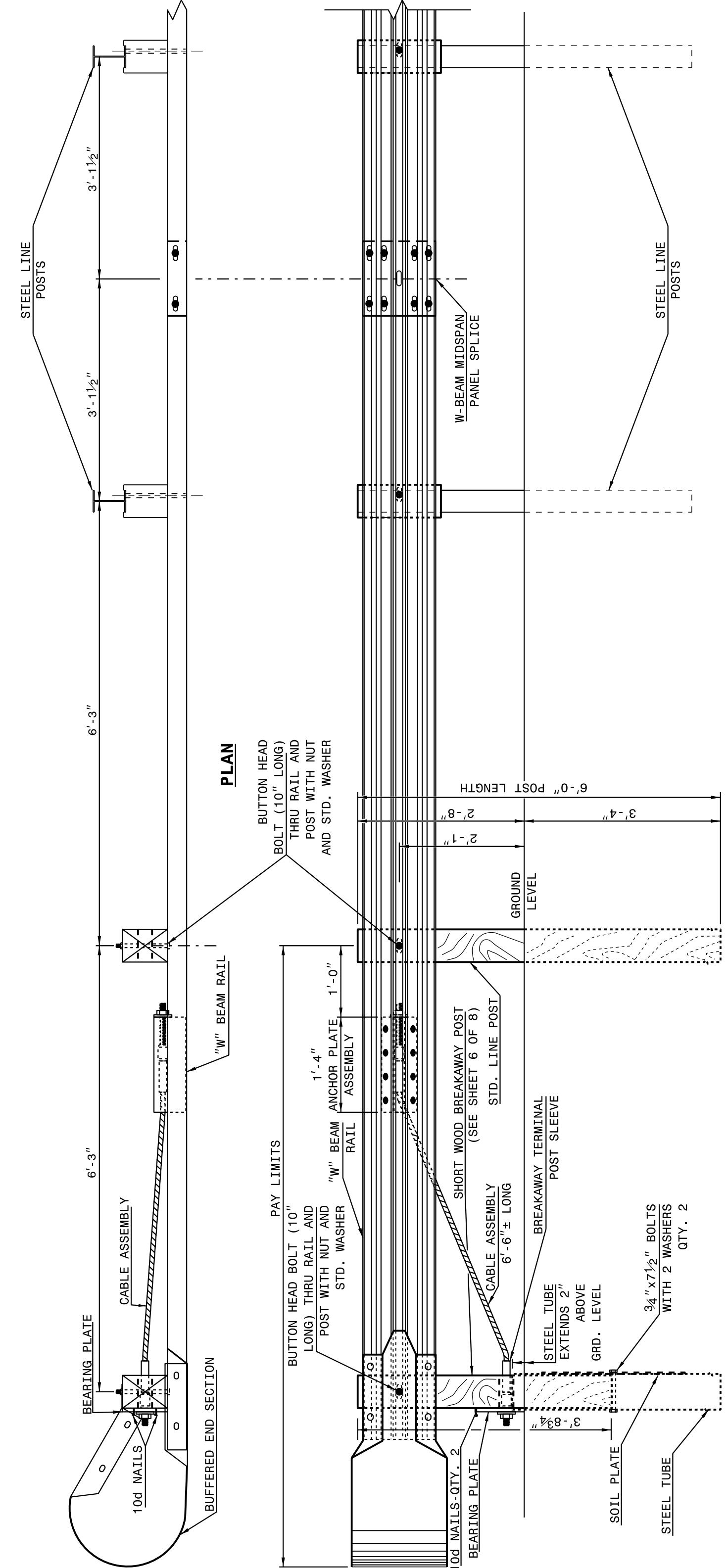
ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 1 OF 8  
**862D02**

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ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 1 OF 8  
**862D02**



**ELEVATION**

**TRAILING END UNIT ASSEMBLY  
C.A.T.-1 SYSTEM**

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