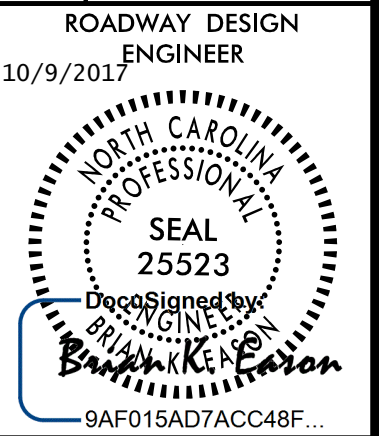


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INDEX OF SHEETS B-4462

SHEET NUMBER

1	TITLE SHEET
1A	INDEX OF SHEETS
1B	CONVENTIONAL SYMBOLS
1C-1	SURVEY CONTROL SHEET
2A-1 and 2A-2	"PAVEMENT SCHEDULE, TYPICAL SECTIONS, and WEDGING DETAILS
2C-1 thru 2C-6	GUARDRAIL PLACEMENT
2C-7 thru 2C-10	GUARDRAIL INSTALLATION
2C-11 thru 2C-14	STRUCTURE ANCHOR UNITS
2G-1	STANDARD TEMPORARY SHORING
3B-1	"SUMMARY OF EARTHWORK, SUMMARY OF SHOULDER BERM GUTTER, GUARDRAIL SUMMARY, ASPHALT PAVEMENT REMOVAL SUMMARY
3D-1	DRAINAGE SUMMARY
3G-1	GEO TECH SUMMARY
4	PLAN
5	PROFILE
TMP-1 thru TMP-6	TRANSPORTATION MANAGEMENT PLANS
PMP-1	PAVEMENT MARKING PLANS
EC-1 thru EC-5	EROSION CONTROL PLANS
SIGN-1	SIGNING PLANS
U0-1 and U0-2	UTILITY BY OTHERS
X-1A	CROSS SECTION SUMMARY
X-1 thru X-7	CROSS-SECTIONS
S-1 thru S-13	STRUCTURE PLANS

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	
200.02	Method of Clearing - Method II
225.02	Guide for Grading Subgrade - Secondary and Local
225.04	Method of Obtaining Superelevation - Two Lane Pavement
DIVISION 3 - PIPE CULVERTS	
300.01	Method of Pipe Installation
DIVISION 4 - MAJOR STRUCTURES	
422.11	Bridge Approach Fills - Sub Regional Tier
DIVISION 5 - SUBGRADE, BASES AND SHOULDERS	
560.01	Method of Shoulder Construction - High Side of Superelevated Curve - Method I
DIVISION 8 - INCIDENTALS	
815.02	Subsurface Drain
840.00	Concrete Base Pad for Drainage Structures
840.25	Anchorage for Frames - Brick or Concrete or Precast
840.29	Frames and Narrow Slot Flat Grates
840.35	Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates
840.46	Traffic Bearing Precast Drainage Structure
846.01	Concrete Curb, Gutter and Curb & Gutter
846.04	Drop Inlet Installation in Shoulder Berm Gutter
876.02	Guide for Rip Rap at Pipe Outlets
876.04	Drainage Ditches with Class 'B' Rip Rap

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 METHOD II.

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.

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 NOT SHOWN ON THE PLANS WILL BE PAID FOR AT THE CONTRACT PRICE FOR "TEMPORARY SHORING".

SUBSURFACE PLANS:

NO SUBSURFACE PLANS ARE AVAILABLE ON THIS PROJECT. THE CONTRACTOR SHOULD MAKE HIS OWN INVESTIGATION AS TO THE SUBSURFACE CONDITIONS.

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 Blue Ridge Mountain EMC,

Frontier Communications

ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.

RIGHT-OF-WAY MARKERS:

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

# STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

## CONVENTIONAL PLAN SHEET SYMBOLS

12/2/2016

### BOUNDARIES AND PROPERTY:

State Line	_____
County Line	_____
Township Line	_____
City Line	_____
Reservation Line	_____
Property Line	_____
Existing Iron Pin	○ EIP
Computed Property Corner	_____
Property Monument	□ ECM
Parcel/Sequence Number	①23
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	-WLB-
Proposed Wetland Boundary	-WLB-
Existing Endangered Animal Boundary	-EAB-
Existing Endangered Plant Boundary	-EPB-
Existing Historic Property Boundary	-HPB-
Known Contamination Area: Soil	-S-
Potential Contamination Area: Soil	-S-
Known Contamination Area: Water	-S-
Potential Contamination Area: Water	-S-
Contaminated Site: Known or Potential	☠ ?

### BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	○ S
Well	○ W
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	○ MILEPOST 35
Switch	□ 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 C/A Marker	_____
Existing Control of Access	_____
New Control of Access	_____
Existing Easement Line	-E-
New Temporary Construction Easement	-E-
New Temporary Drainage Easement	-TDE-
New Permanent Drainage Easement	-PDE-
New Permanent Drainage / Utility Easement	-DUE-
New Permanent Utility Easement	-PUE-
New Temporary Utility Easement	-TUE-
New Aerial Utility Easement	-AUE-

### ROADS AND RELATED FEATURES:

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

### VEGETATION:

Single Tree	○
Single Shrub	○

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.

6/2/99

PROJECT REFERENCE NO.	SHEET NO.
B-4462	1C-1
Location and Surveys	

# SURVEY CONTROL SHEET B-4462 -FINAL-

BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	BL-1	514376.2040	449412.6770	1564.62	OUTSIDE PROJECT LIMITS	
2	BL-2	514473.3990	449663.4000	1552.68	11+67.39	43.73 RT
3	BL-3	514469.1530	449903.8450	1559.80	14+06.89	21.96 RT
4	BL-4	514428.0380	450086.1720	1549.72	16+00.28	7.70 LT
5	BL-5	514185.5940	450103.9020	1553.55	OUTSIDE PROJECT LIMITS	

BY1 POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
6	BY1-6	514690.8170	449519.8270	1568.08	OUTSIDE PROJECT LIMITS	
22	BY1-22	514473.3990	449663.4000	1552.68	OUTSIDE PROJECT LIMITS	

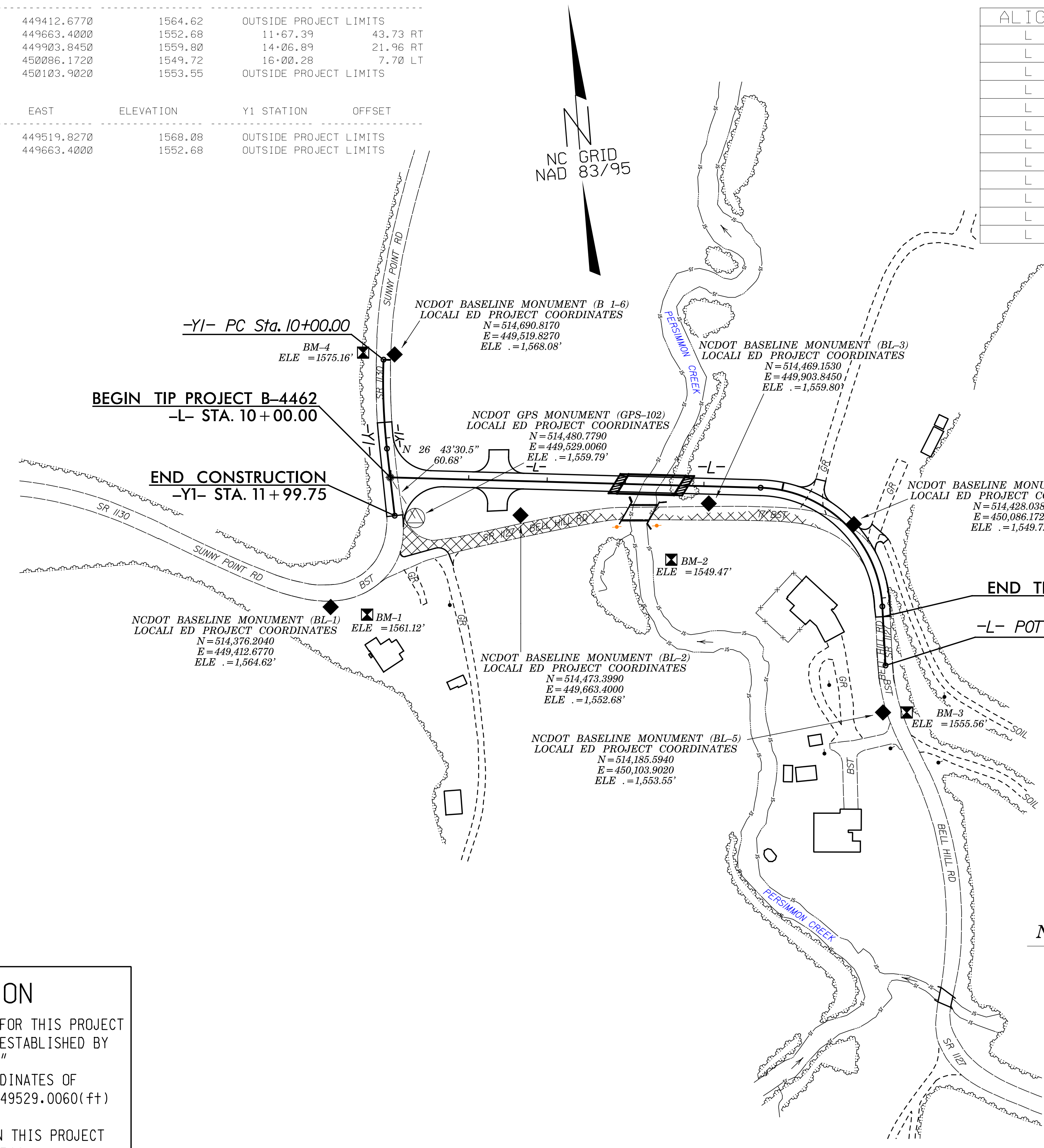
ALIGN	STATION	OFFSET	NORTH	EAST
L	10+24.57	-40.00	514572.08501	449530.46593
L	14+72.34	-40.00	514523.66938	449975.61424
L	16+85.30	-40.00	514351.06194	450152.26302
L	16+78.68	-26.34	514356.88307	450137.55163
L	17+86.11	25.00	514245.77306	450086.90459
L	16+95.57	24.40	514333.95762	450089.28434
L	16+23.06	29.93	514389.52051	450066.83308
L	16+19.82	30.64	514391.42439	450064.89229
L	15+19.24	53.03	514423.31194	449995.78975
L	13+29.22	60.97	514438.76193	449822.41003
L	12+32.50	73.55	514436.72047	449724.89817
L	10+21.45	124.99	514408.40169	449509.53143

.....  
 BM1 ELEVATION = 1561.12  
 N 514363 E 449458  
 BL STATION 5+38.00 29 RIGHT  
 8 INCH SPIKE IN BASE OF 18 INCH PINE TREE  
 .....

.....  
 BM2 ELEVATION = 1549.47  
 N 514401 E 449850  
 BL STATION 9+57.00 69 RIGHT  
 8 INCH SPIKE IN BASE OF 16 INCH WALNUT TREE  
 .....

.....  
 BM3 ELEVATION = 1555.56  
 N 514183 E 450134  
 BL STATION 14+39.00  
 S 85°30'34.62" E DIST 30.25  
 CHISELED SQUARE IN ROCK  
 .....

.....  
 BM4 ELEVATION = 1575.16  
 N 514696 E 449480  
 BY1 STATION 5+00.00  
 N 02°01'36.83" W DIST 40.31  
 8 INCH SPIKE IN BASE OF 18 INCH IN BASE OF POPLAR  
 .....



TYPE	STATION	NORTH	EAST
POT	10+00.00	514534.9758	449501.7180
PC	14+72.34	514483.9039	449971.2892
PT	17+10.65	514320.5257	450113.9310
POT	17+86.11	514245.0987	450111.8955

TYPE	STATION	NORTH	EAST
PC	10+00.00	514685.3508	449505.1619
PT	11+13.60	514571.9619	449500.4520
POT	11+99.75	514485.8542	449503.3995

**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: B4462 LS CONTROL.T T

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.

**DATUM DESCRIPTION**

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "GPS-102"

WITH NAD 83/95 STATE PLANE GRID COORDINATES OF  
 NORTHING: 5514480.7790(±) EASTING: 449529.0060(±)  
 ELEVATION: 1559.79(±)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99980744

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "GPS-102" TO -L- STATION 10+00.00 IS  
 N 26°43'30.5" W 60.68'

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

**GEOID MODEL - GEOID99  
 NOTE: DRAWING NOT TO SCALE**

8/19/2015 PSH-01C-1.dgn

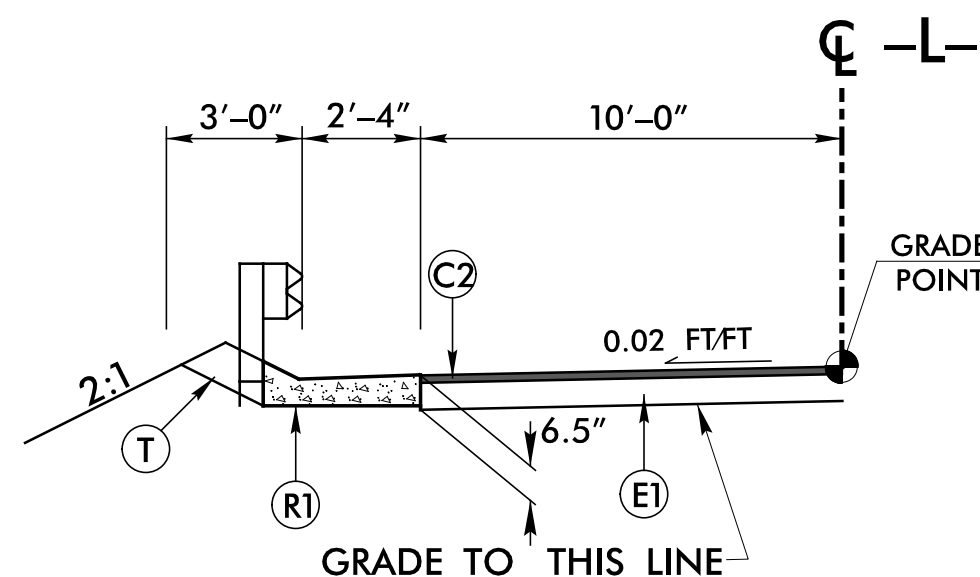
8/17/99

# PAVEMENT SCHEDULE

C1	PROP. APPROX. 1.25" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD.
C2	PROP. APPROX. 2.5" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 110 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 1 1/2" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.
R1	SHOULDER BERM GUTTER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
V	MILLING VARIABLE DEPTH.
W1	VARIABLE DEPTH ASPHALT PAVEMENT (SEE DETAIL)

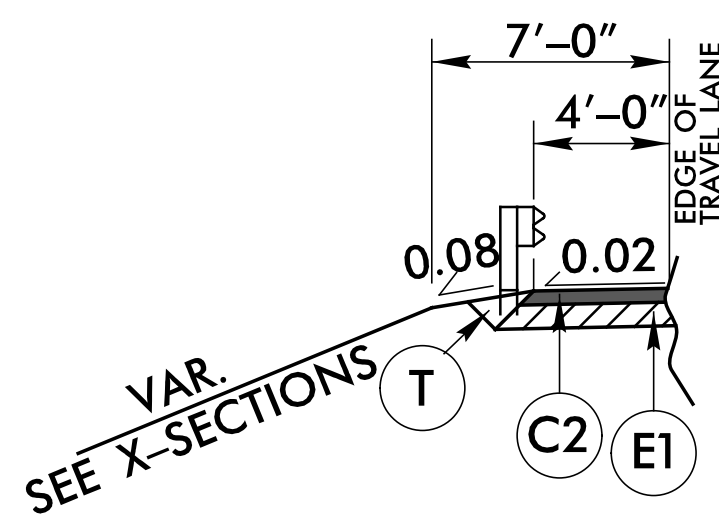
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

## SHOULDER BERM GUTTER DETAIL



USE WITH TYPICAL SECTION NO. 1  
 -L- STA. 13+72.78 TO STA. 13+86.00 RT  
 -L- STA. 13+87.22 TO STA. 14+00.00 LT

## DETAIL A PAVED SHOULDER WITH GUARDRAIL



USE DETAIL A  
 -L- STA. 11+78.28 TO STA. 12+90.78 RT  
 -L- STA. 12+30.22 TO STA. 13+05.22 LT  
 -L- STA. 13+86.00 TO STA. 14+35.78 RT  
 -L- STA. 13+87.22 TO STA. 14+87.72 LT

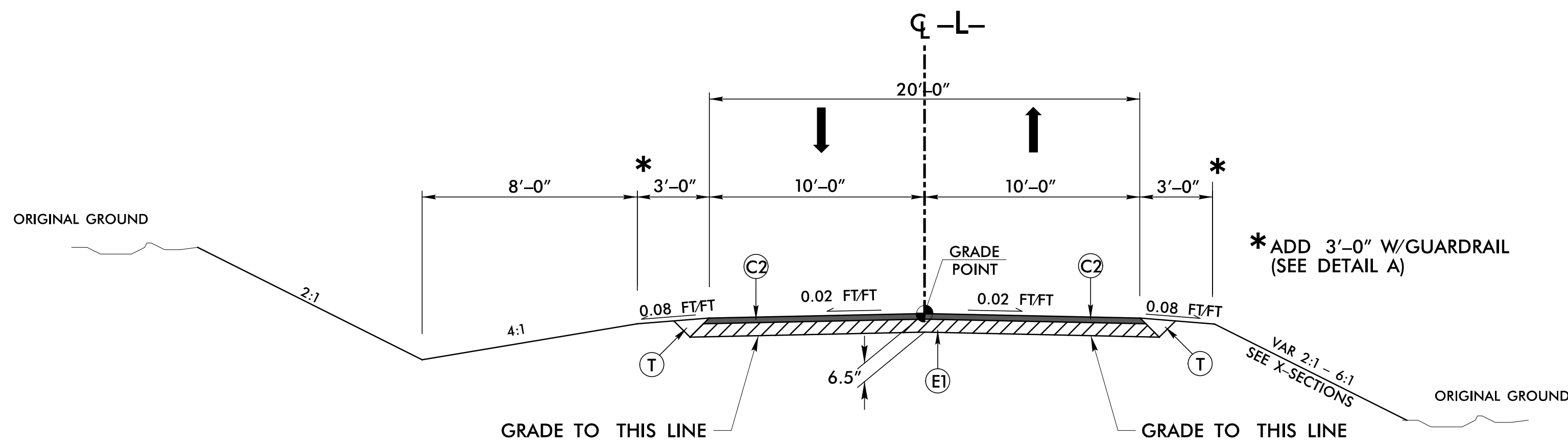
# LOCHNER

H. W. LOCHNER, INC.  
 2840 PLAZA PLACE, SUITE 202  
 RALEIGH, NC 27612

NC License  
 Number F-0159

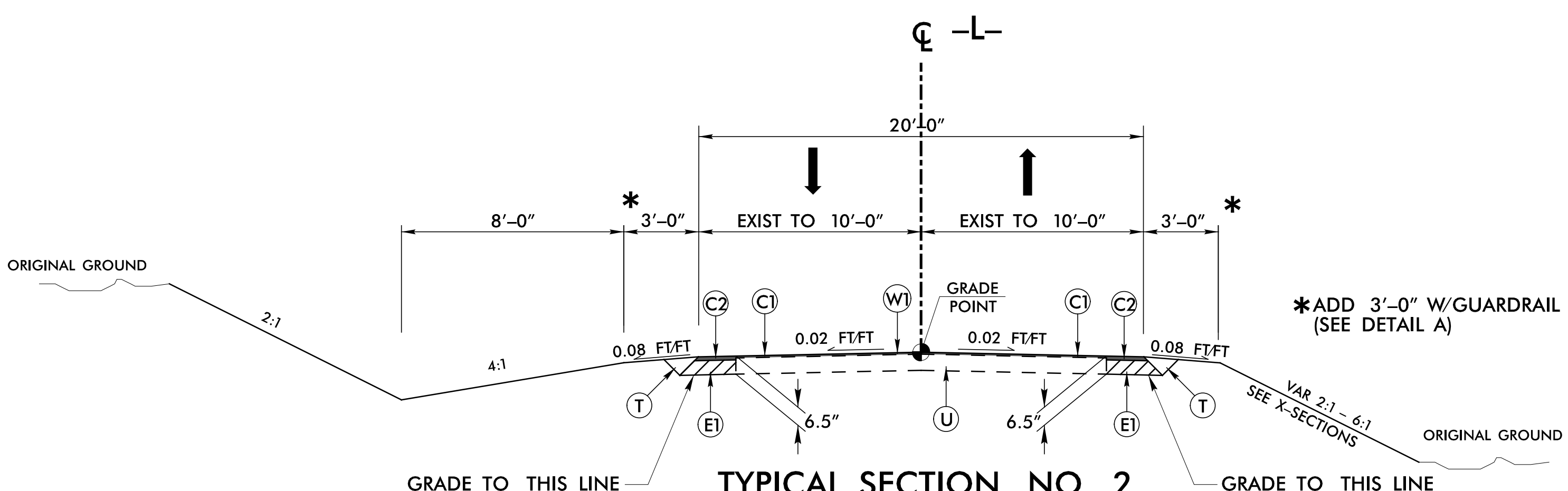
PROJECT REFERENCE NO. B-4462	SHEET NO. 2A-1
R/W SHEET NO.	PAVEMENT DESIGN ENGINEER
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
Professional Engineer Seal SEAL 25523 Date Signed: 10/9/2017 Signature: [Signature]	Professional Engineer Seal SEAL 022896 Date Signed: 10/10/2017 Signature: [Signature]

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## TYPICAL SECTION NO. 1

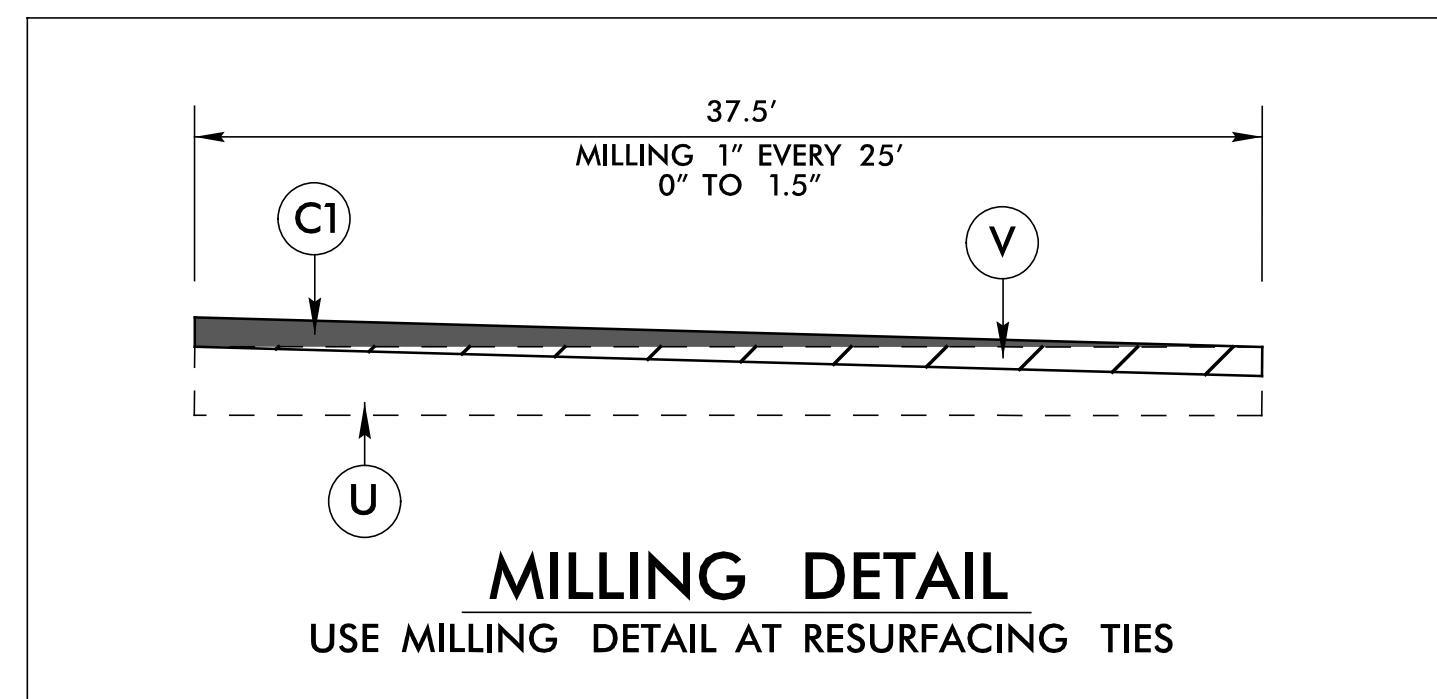
USE TYPICAL SECTION NO. 1  
 -L- STA. 10+09.16 TO STA. 12+96.70 (BEGIN BRIDGE)  
 -L- STA. 13+69.30 (END BRIDGE) TO -L- STA. 16+15.00



## TYPICAL SECTION NO. 2

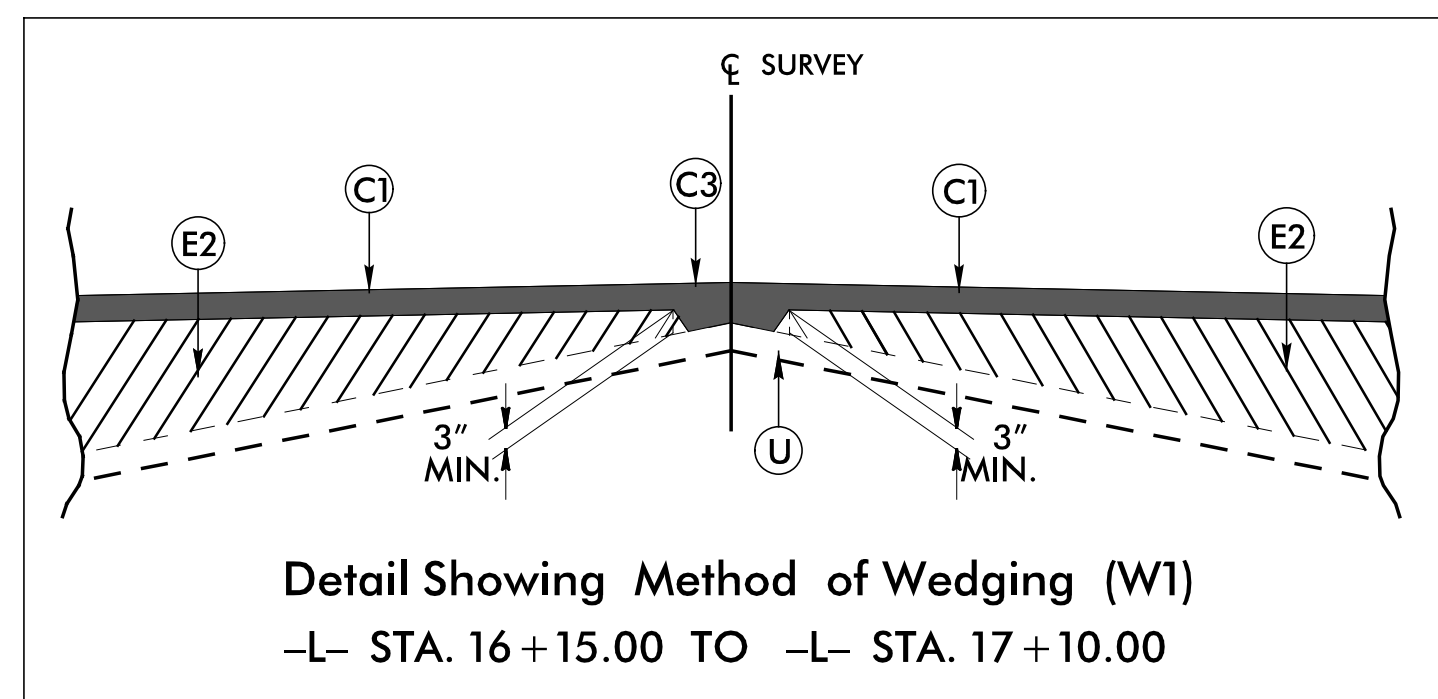
USE TYPICAL SECTION NO. 2  
 -L- STA. 16+15.00 TO -L- STA. 17+10.00

NOTE:  
 TRANSITION FROM TYPICAL SECTION NO. 2 TO EXISTING  
 -L- STA. 17+10.00 TO -L- STA. 17+23.76



## MILLING DETAIL

USE MILLING DETAIL AT RESURFACING TIES



## Detail Showing Method of Wedging (W1)

-L- STA. 16+15.00 TO -L- STA. 17+10.00

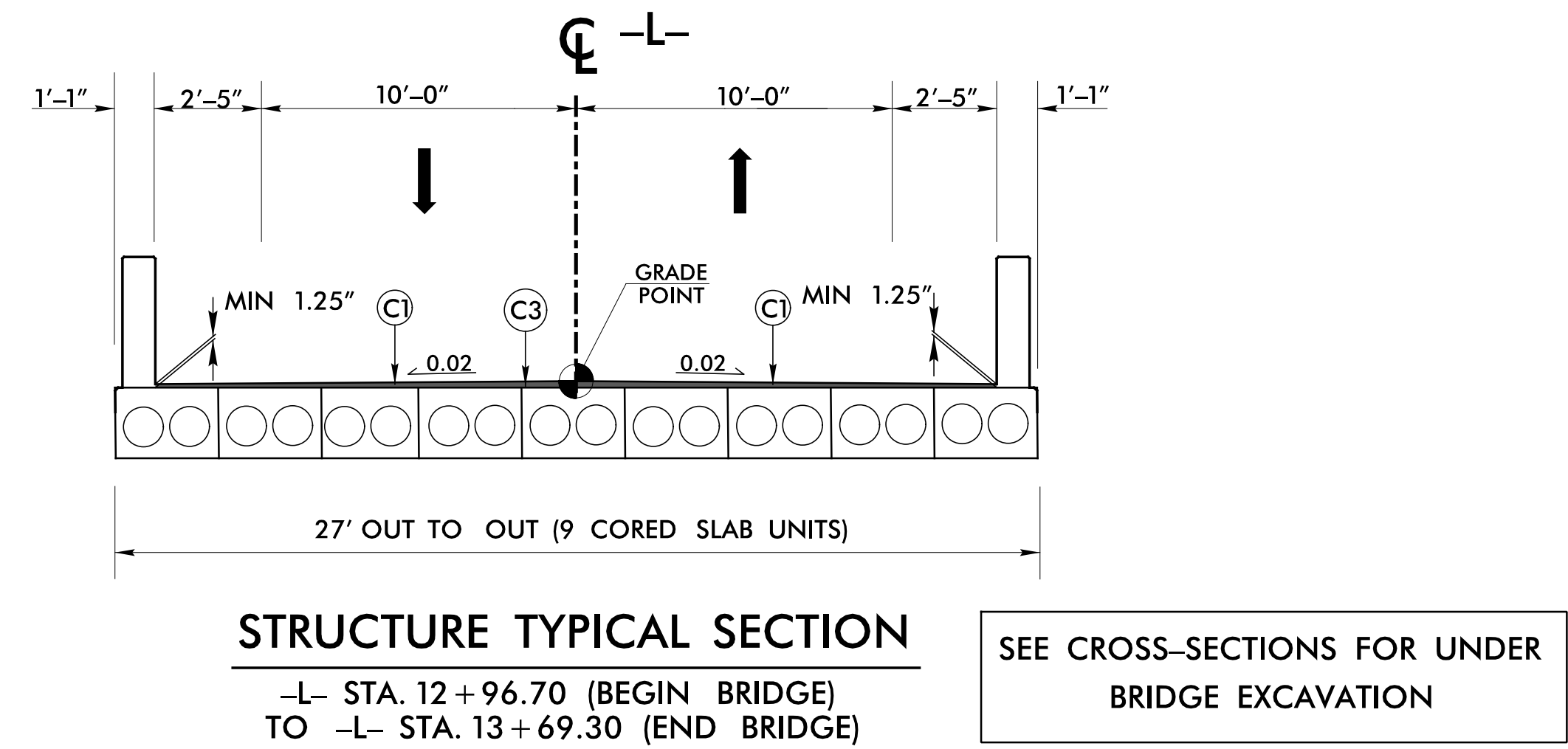
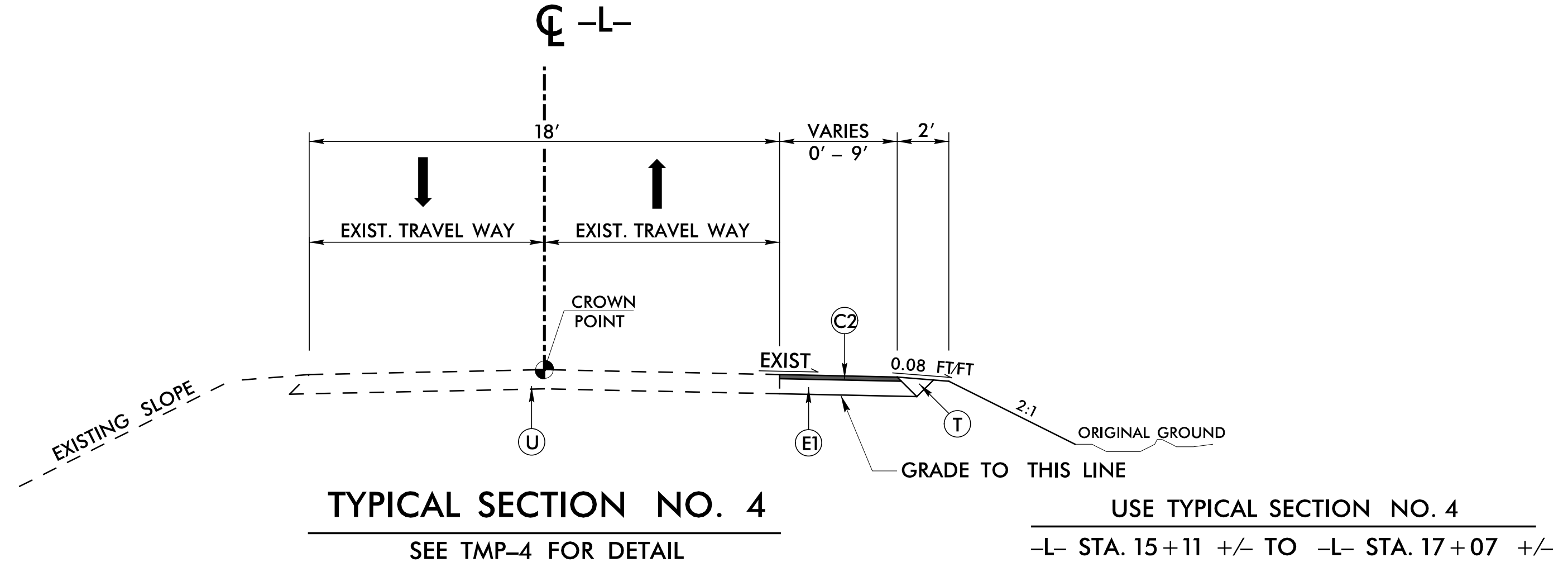
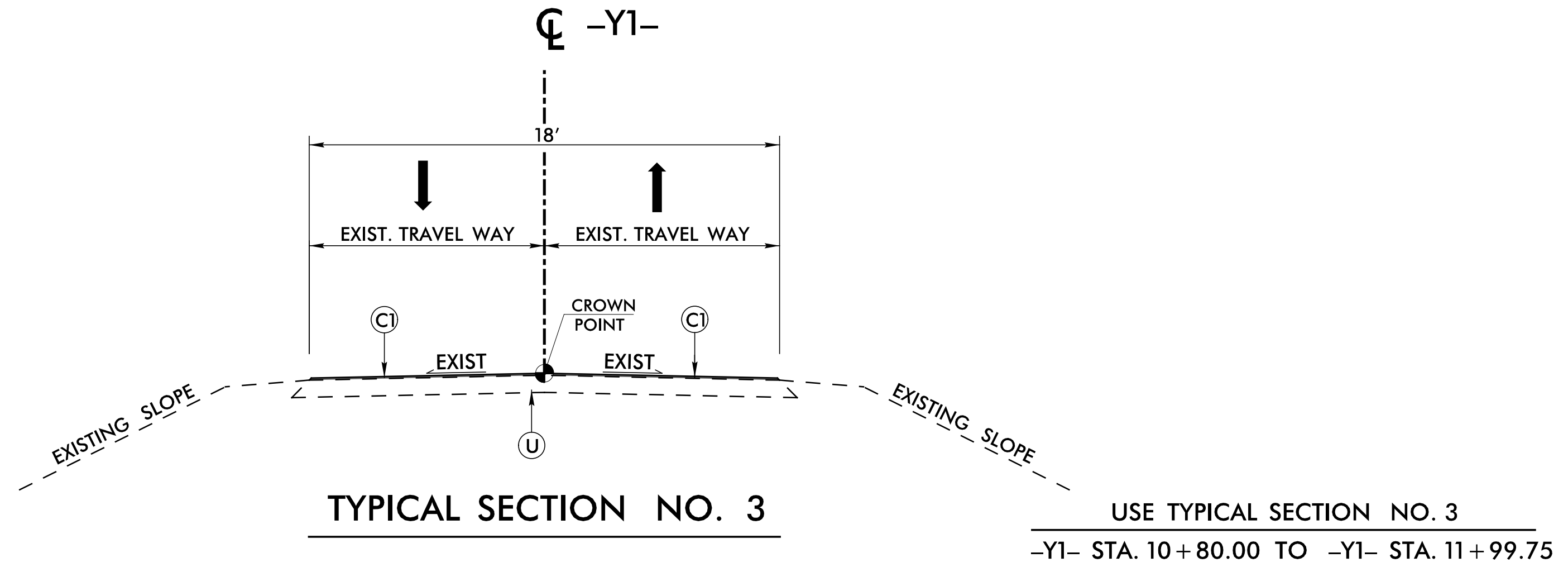
REVISIONS

9/20/2017  
 B4462.RDY\_PSH\_02A-1.dgn  
 BDF/ASE

PROJECT REFERENCE NO. B-4462	SHEET NO. 2A-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

**DOCUMENT NOT CONSIDERED FINAL  
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C1	1.25" SF9.5A
C2	2.5" SF9.5A
C3	VAR. SF9.5A
E1	4" B25.0B
T	EARTH MATERIAL
U	EXIST PAVEMENT



27-JUN-2017 10:48 S:\Contracts\Special Details\Standard Drawings\Division 8\862d01 862d03 862d01.dgn  
 Jhowerton AT USD-292595

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.		

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.		

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 26' BEFORE REACHING THE OBSTRUCTION AND CARRY THROUGHOUT ITS LENGTH. IF THE OFFSET IS LESS THAN 3'-6" USE CONCRETE BARRIER.

SECT. XX

SECT. YY

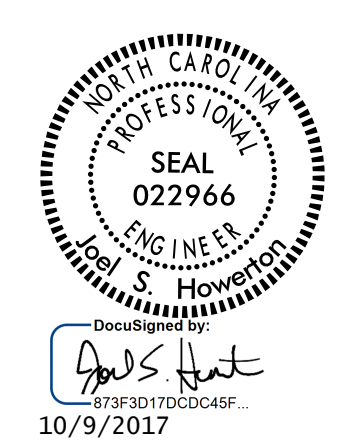
SECT. ZZ

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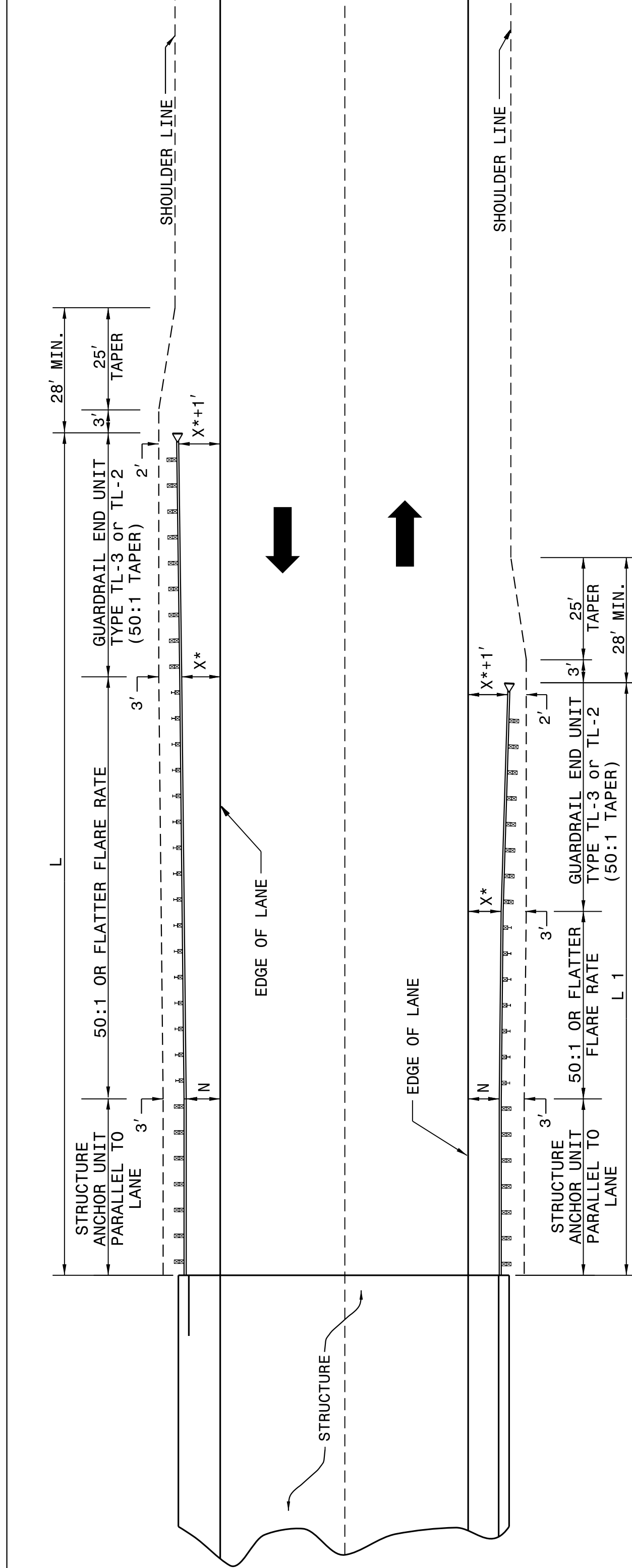


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ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

SHEET 4 OF 11  
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ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

SHEET 4 OF 11  
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STATE OF NORTH CAROLINA  
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**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 400-1000	DESIGN YEAR ADT OVER 2000	CURRENT YEAR ADT 400-1000
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

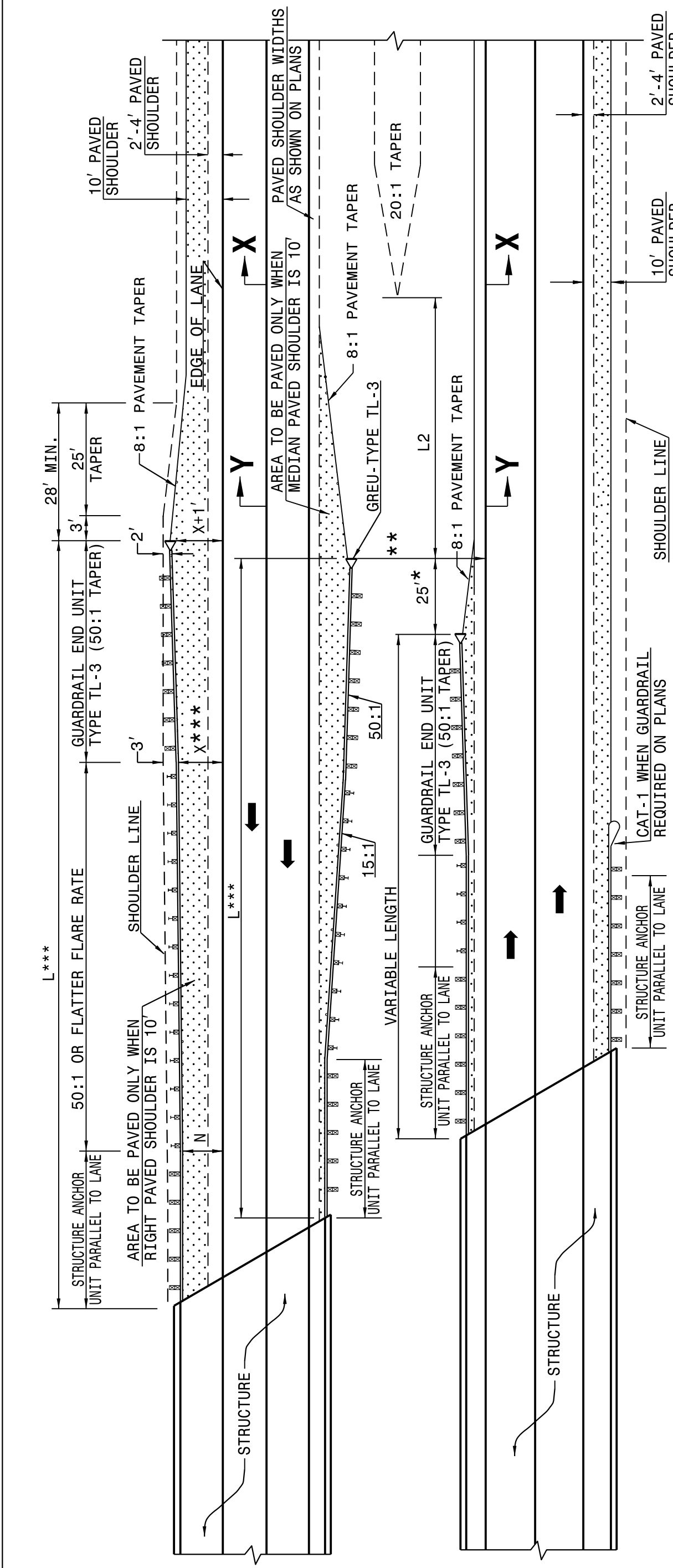
FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3  
FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

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

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ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

SHEET 3 OF 11  
**862D01**



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

**DETAIL OF GUARDRAIL APPROACHING DUAL LANE BRIDGES**

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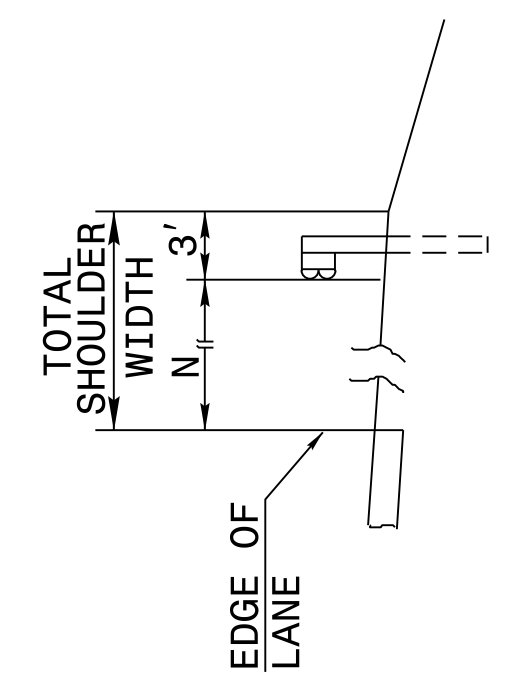
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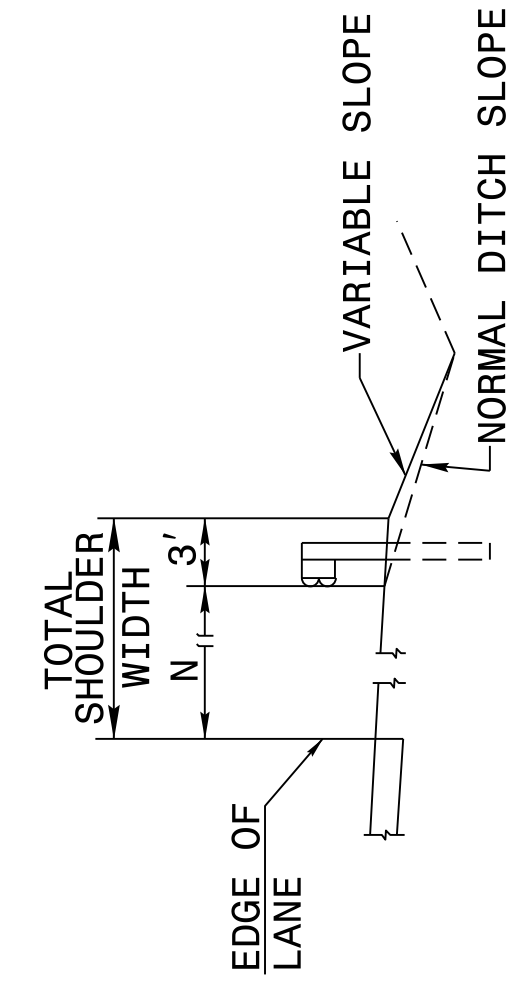
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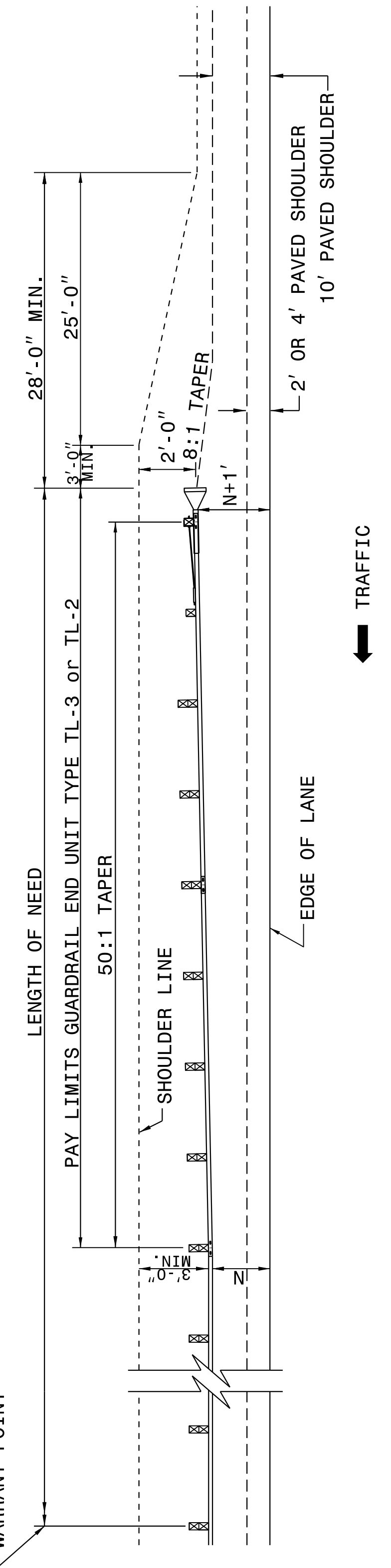


**FILL SECTION**



**CUT SECTION**

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



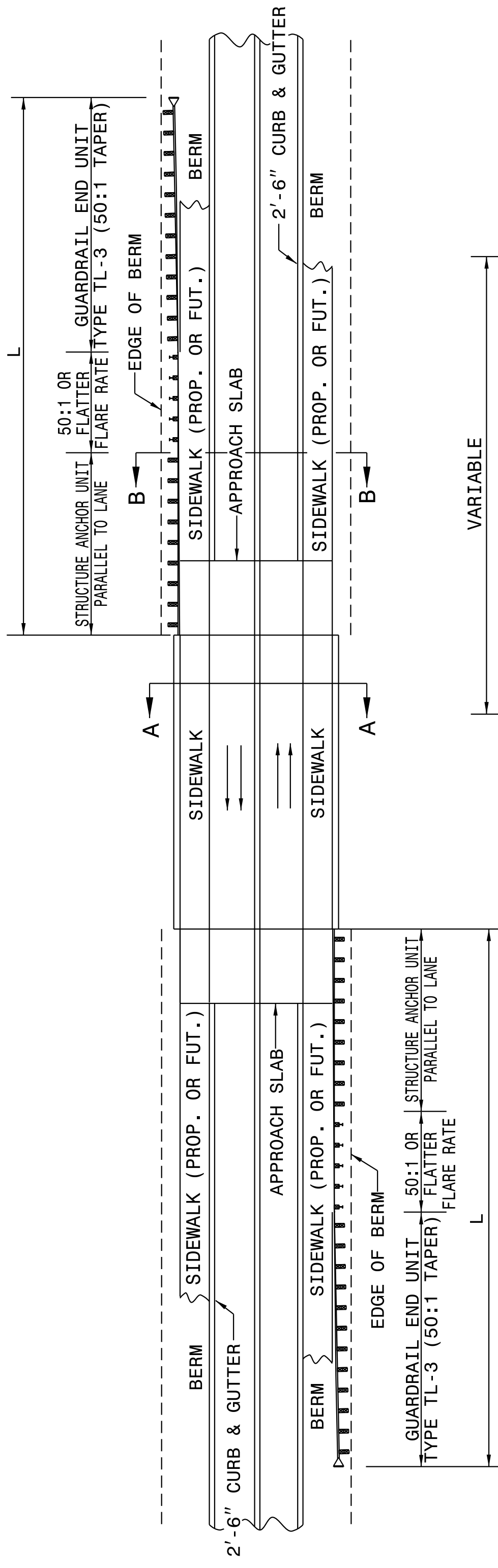
FOR POSTED SPEEDS ≥ 45mph USE GREU TYPE TL-3  
 FOR POSTED SPEEDS < 45mph USE GREU TYPE TL-2

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	
DESIGN SPEED (MPH)	"L"
40	150'
50	225'

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

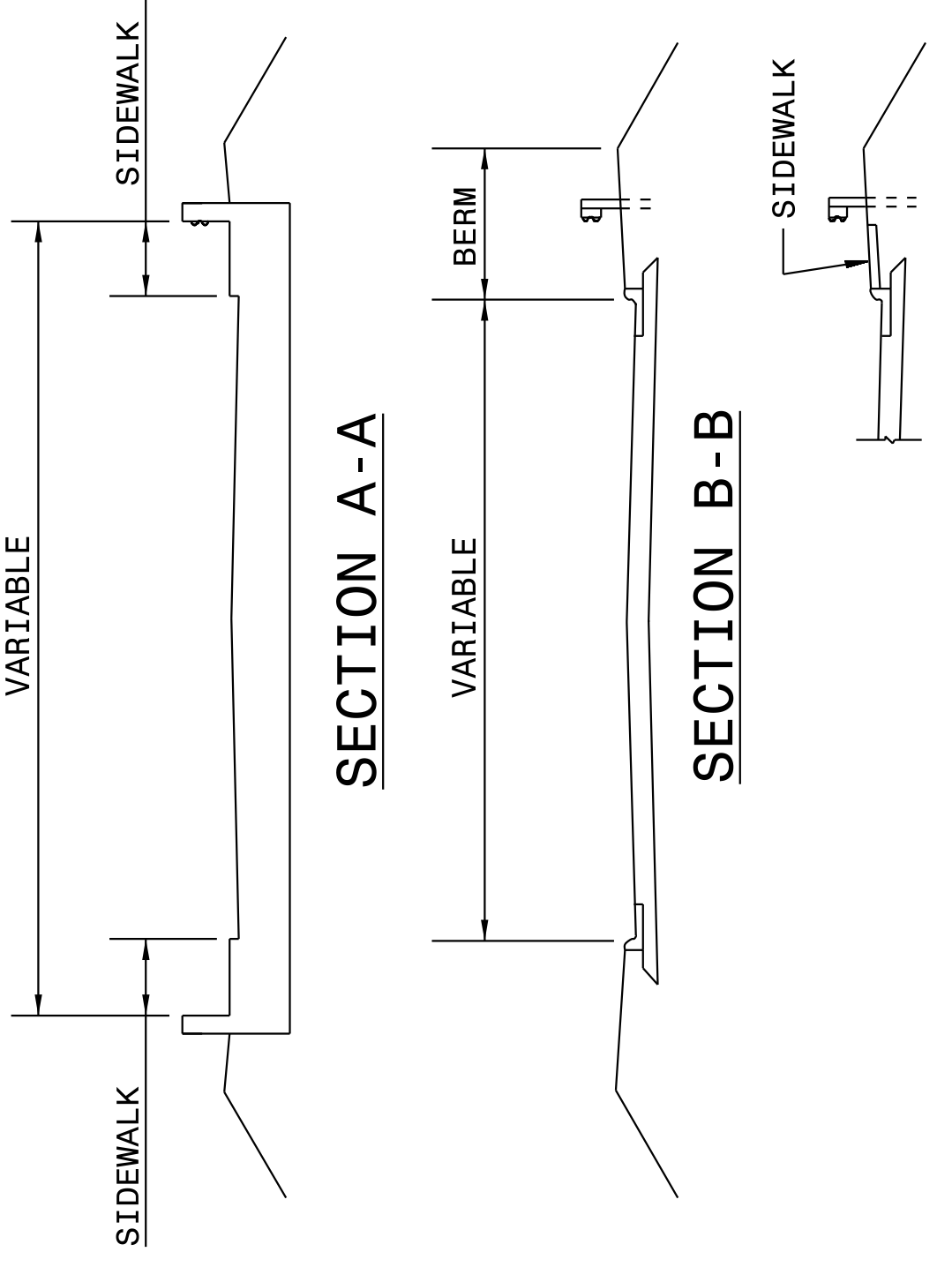
SEE STD. 862D03 FOR STRUCTURE ANCHOR UNITS.

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**

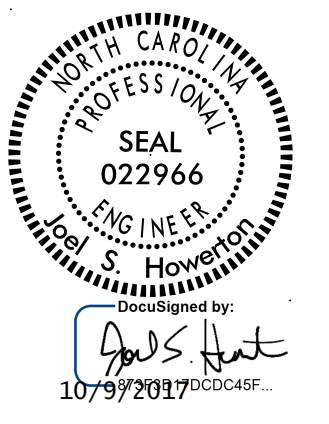


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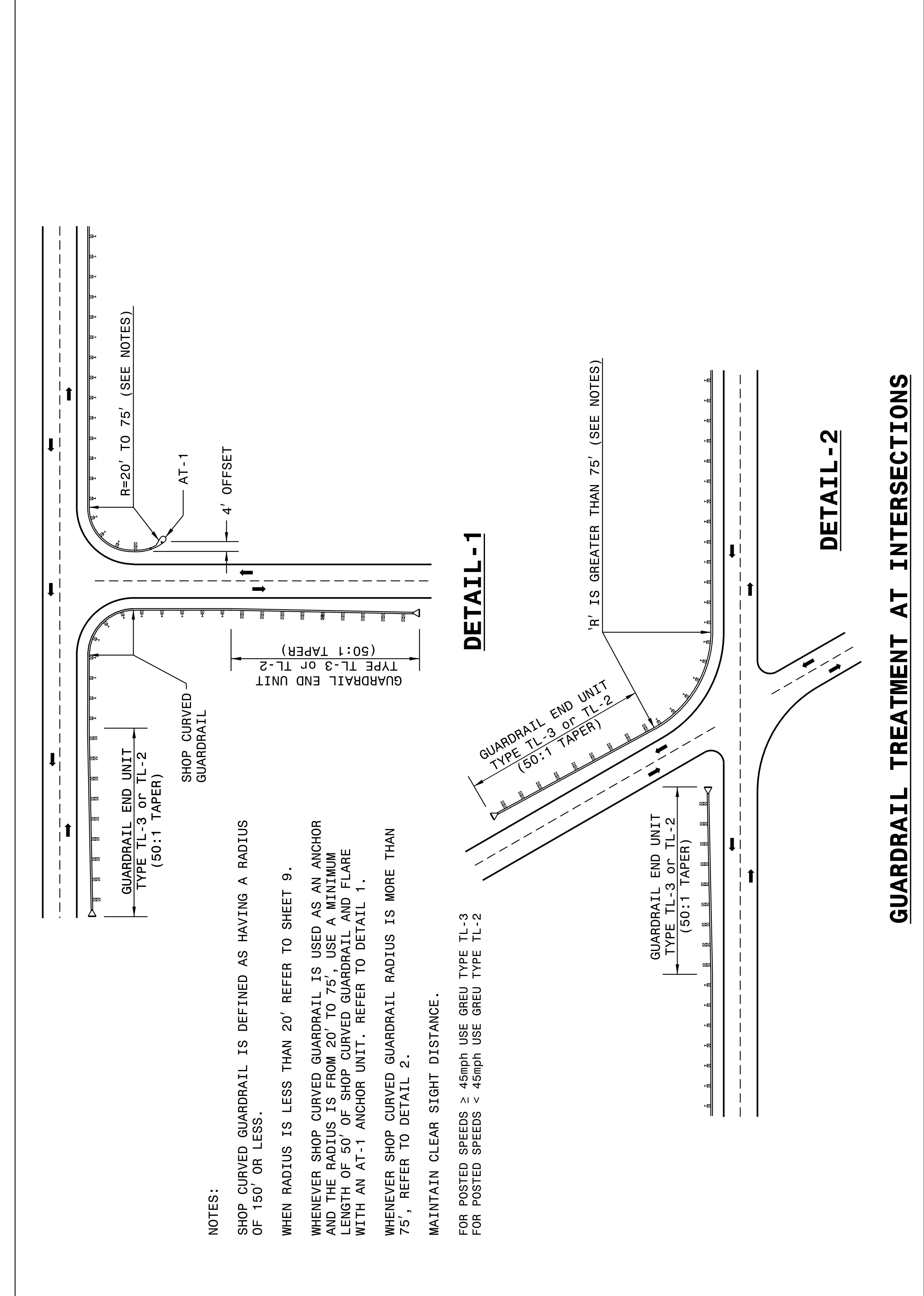


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ROADWAY DETAIL DRAWING FOR **GUARDRAIL PLACEMENT**

SHEET 8 OF 11 **862D01**



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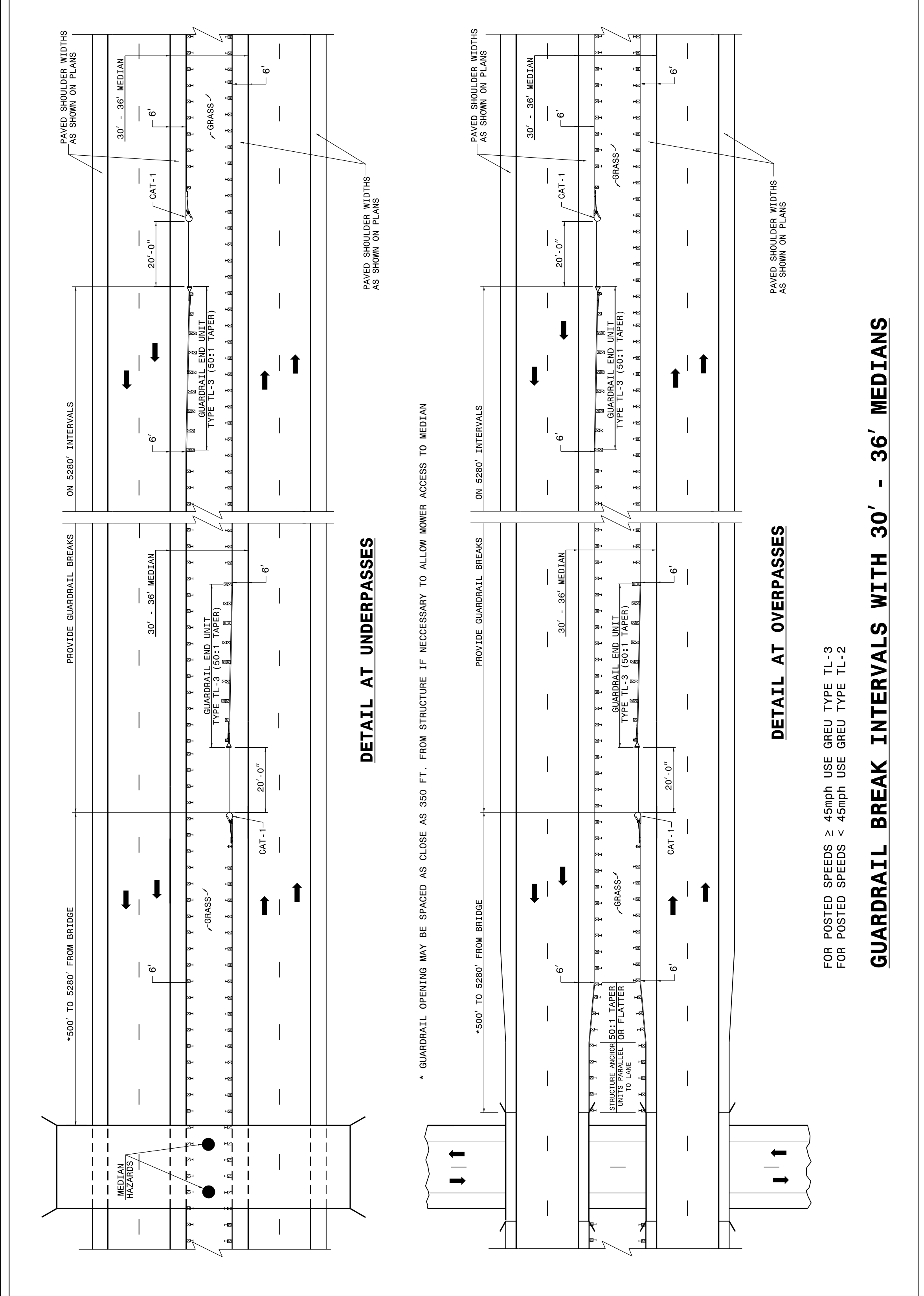
ROADWAY DETAIL DRAWING FOR **GUARDRAIL PLACEMENT**

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ROADWAY DETAIL DRAWING FOR **GUARDRAIL PLACEMENT**

SHEET 7 OF 11 **862D01**



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ROADWAY DETAIL DRAWING FOR **GUARDRAIL PLACEMENT**

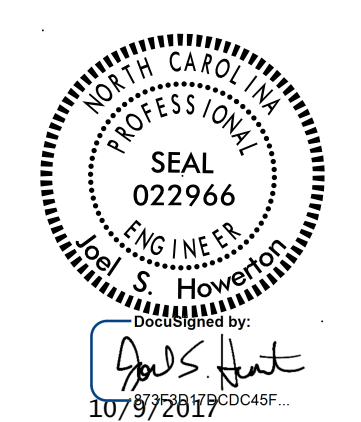
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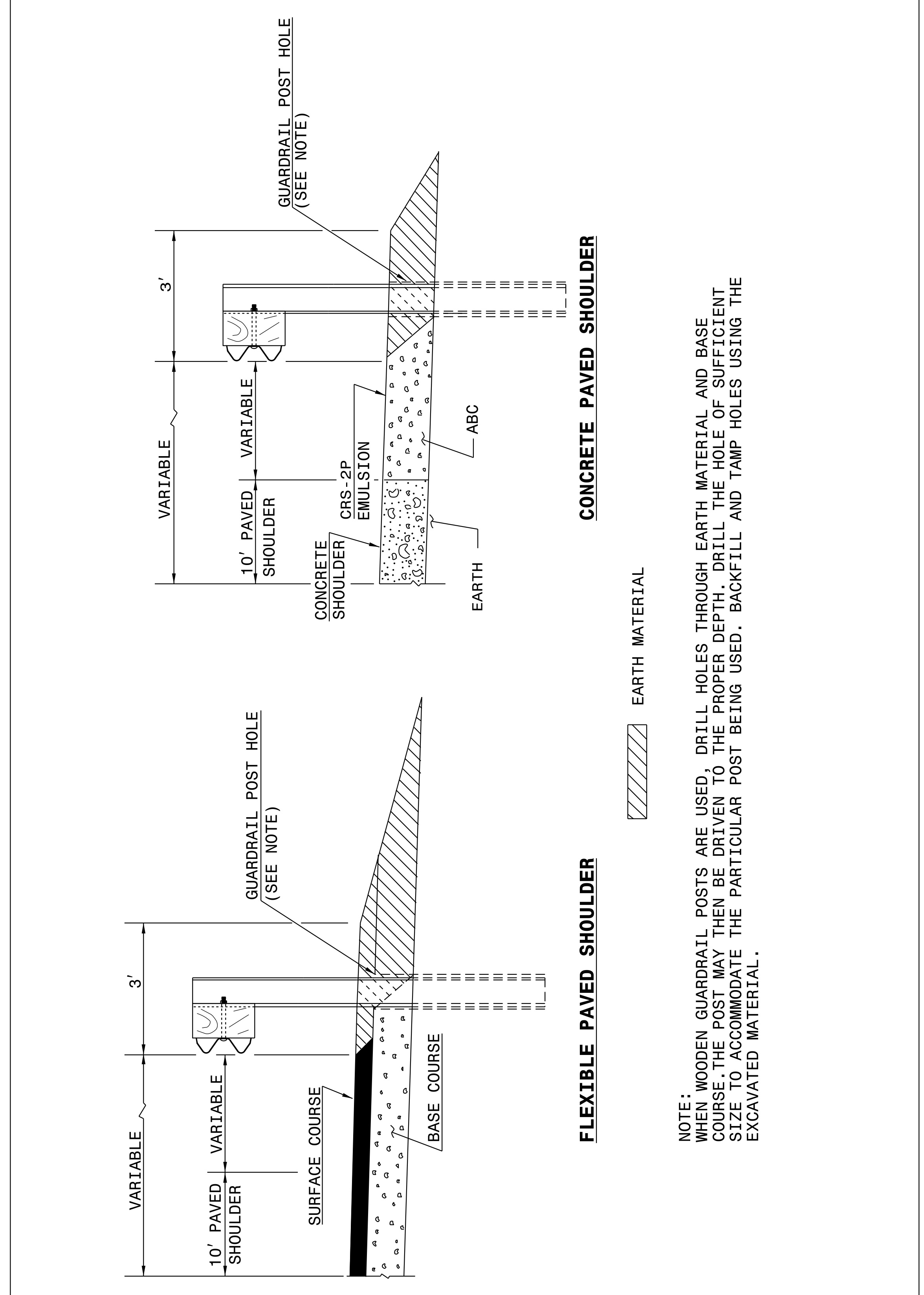
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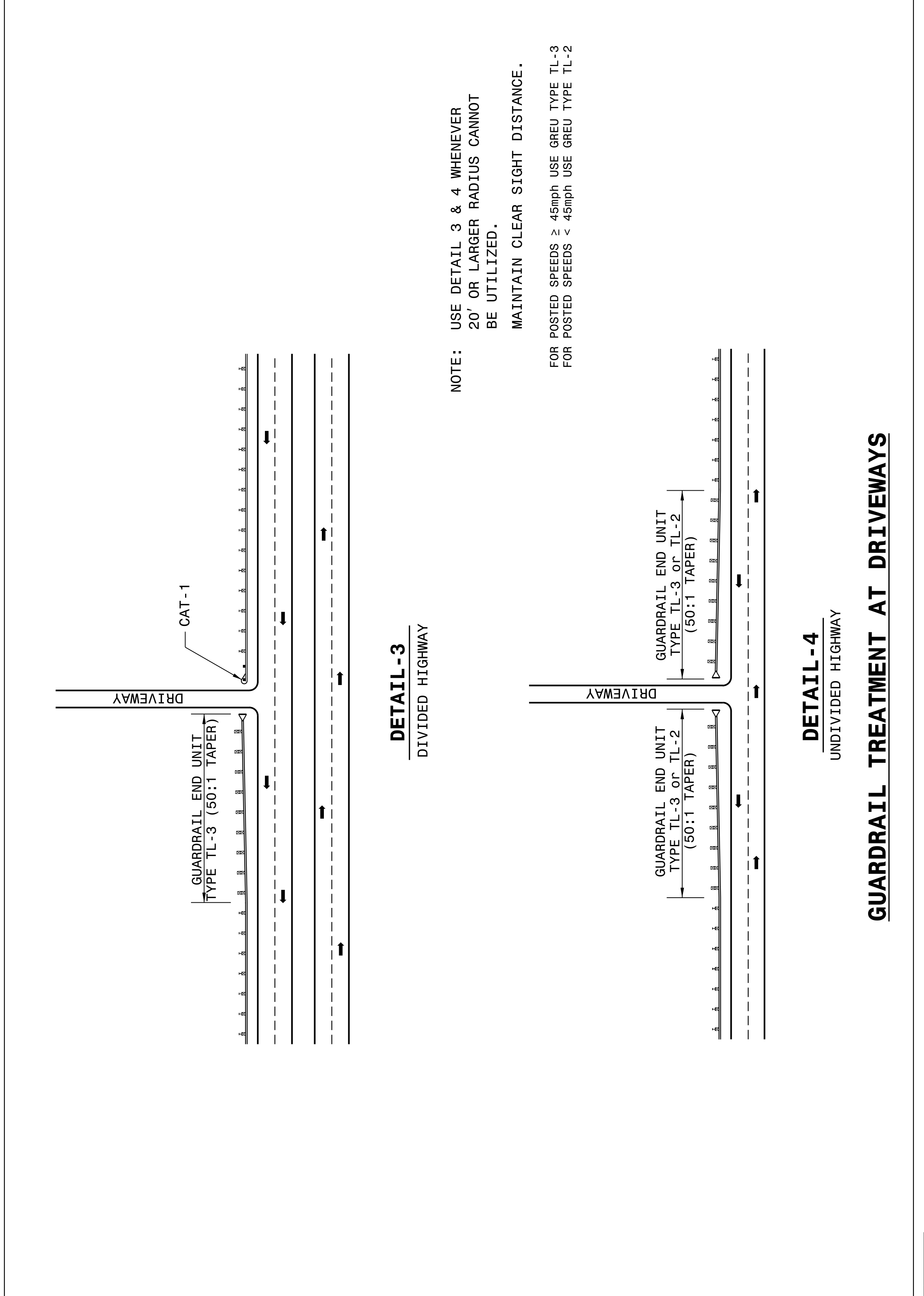


ENGLISH DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

SHEET 10 OF 11  
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ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**

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**CONCRETE PAVED SHOULDER**

**FLEXIBLE PAVED SHOULDER**

EARTH MATERIAL

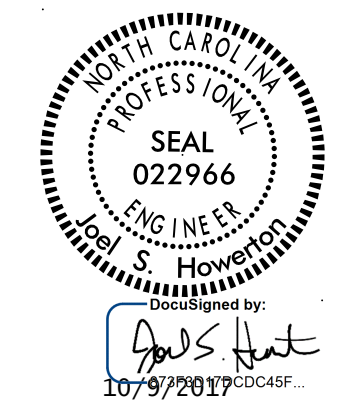
NOTE:  
WHEN WOODEN GUARDRAIL POSTS ARE USED, DRILL HOLES THROUGH EARTH MATERIAL AND BASE COURSE. THE POST MAY THEN BE DRIVEN TO THE PROPER DEPTH. DRILL THE HOLE OF SUFFICIENT SIZE TO ACCOMMODATE THE PARTICULAR POST BEING USED. BACKFILL AND TAMP HOLES USING THE EXCAVATED MATERIAL.

**DETAIL - 3**  
DIVIDED HIGHWAY

**DETAIL - 4**  
UNDIVIDED HIGHWAY  
**GUARDRAIL TREATMENT AT DRIVEWAYS**

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



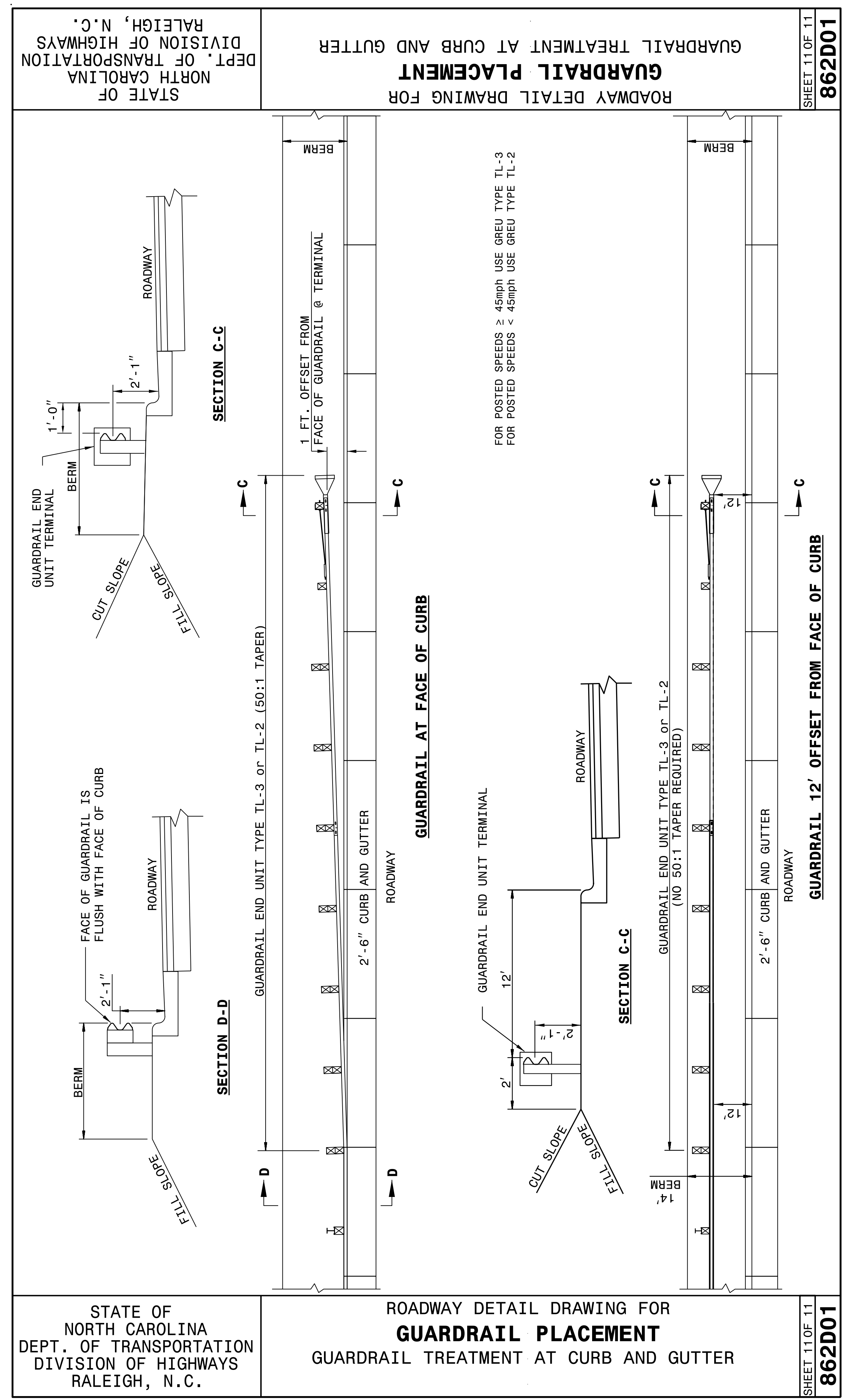
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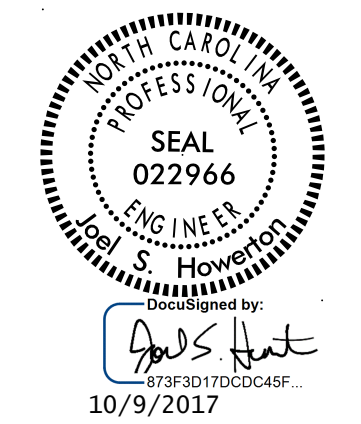
ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**  
GUARDRAIL TREATMENT AT CURB AND GUTTER

SHEET 11 OF 11  
**862D01**

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ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL PLACEMENT**  
GUARDRAIL TREATMENT AT CURB AND GUTTER

SHEET 11 OF 11  
**862D01**



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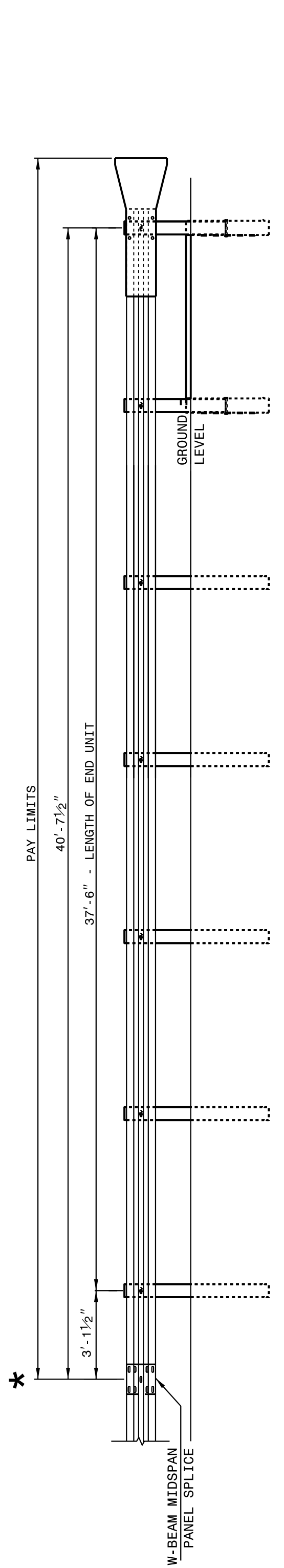
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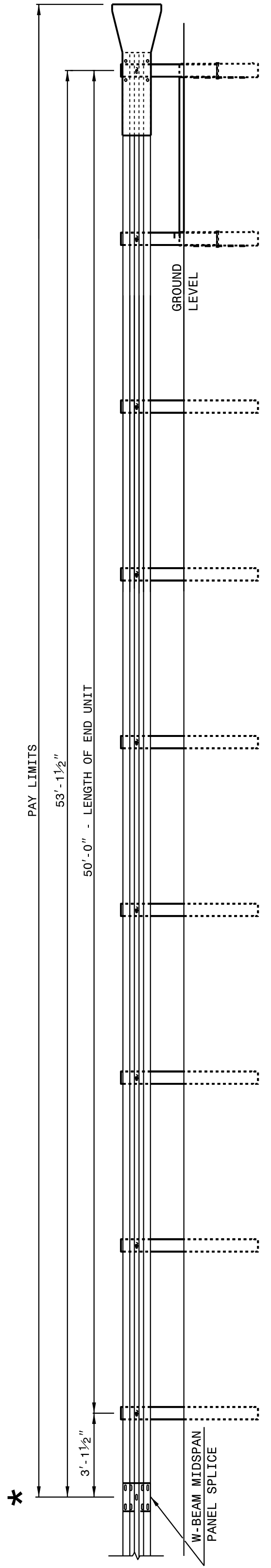
ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

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**

SHEET 2 OF 8  
**862D02**

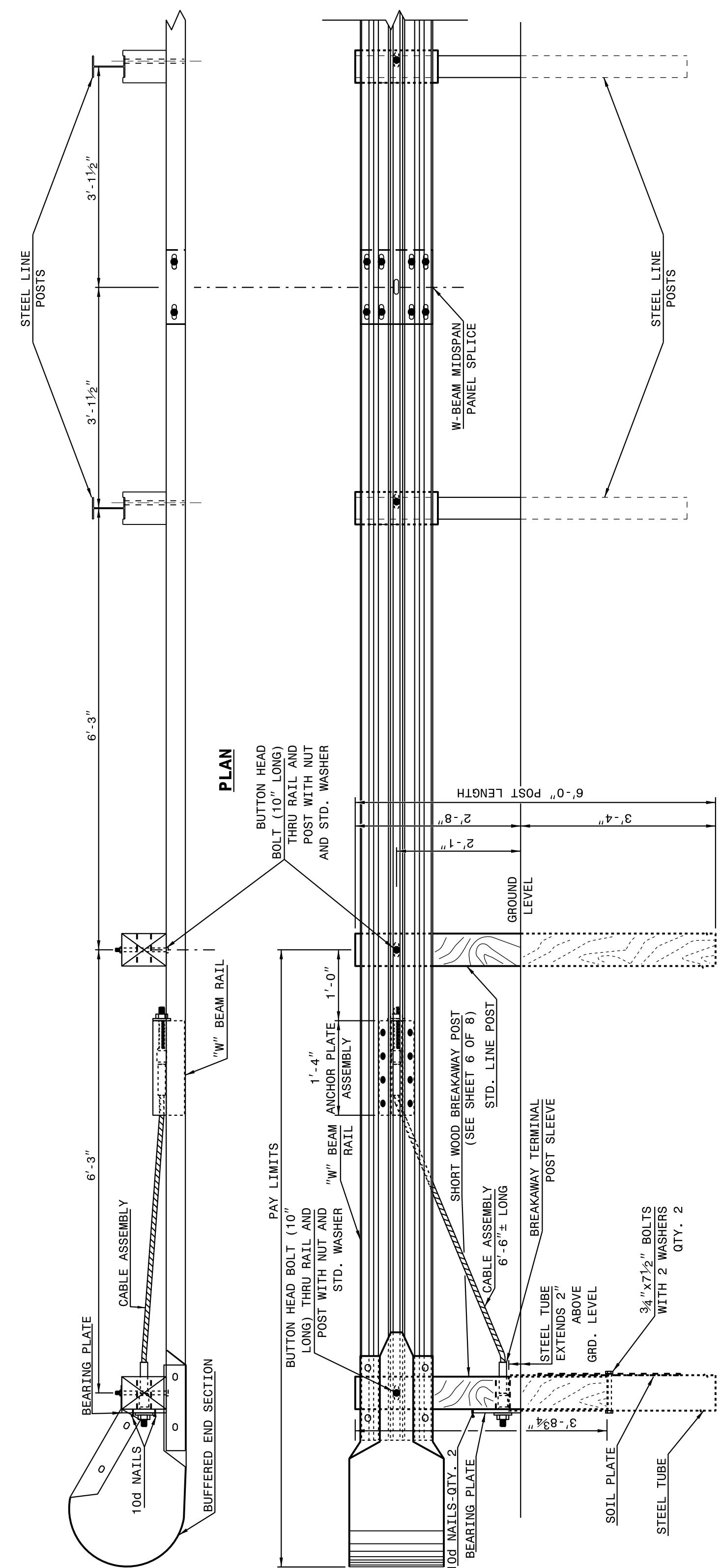
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ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

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ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 1 OF 8  
**862D02**



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

**ELEVATION**

**PLAN**

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ROADWAY DETAIL DRAWING FOR  
**GUARDRAIL INSTALLATION**

SHEET 1 OF 8  
**862D02**

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SYSTEM PARTS		
ROADWAY DETAIL DRAWING FOR <b>GUARDRAIL INSTALLATION</b>		
SHEET 6 OF 8 <b>862D02</b>		

STATE OF NORTH CAROLINA DEPT. OF TRANSPORTATION DIVISION OF HIGHWAYS RALEIGH, N.C.	ROADWAY DETAIL DRAWING FOR <b>GUARDRAIL INSTALLATION</b>	SHEET 5 OF 8 <b>862D02</b>
TYPICAL GUARDRAIL AND GUARDRAIL POST ALTERNATIVES		
NOTES: A - 5/8" DIA. BUTTON HEAD SPLICE BOLT 1 1/4" LONG (8 REG. PER SPLICE JOINT). B - 5/8" DIA. BUTTON HEAD BOLT 7 1/2" / 9" LONG WITH NUT FOR BOLTING 6" / 8" ROUTED OFFSET BLOCK TO STEEL POSTS. C - FIELD PUNCHING OF HOLES INTO GUARDRAIL AS DIRECTED BY THE ENGINEER.		
ROADWAY DETAIL DRAWING FOR <b>GUARDRAIL INSTALLATION</b>		
SHEET 5 OF 8 <b>862D02</b>		

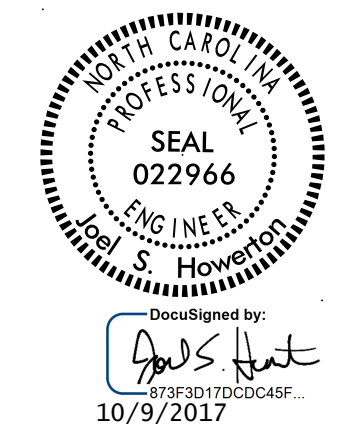
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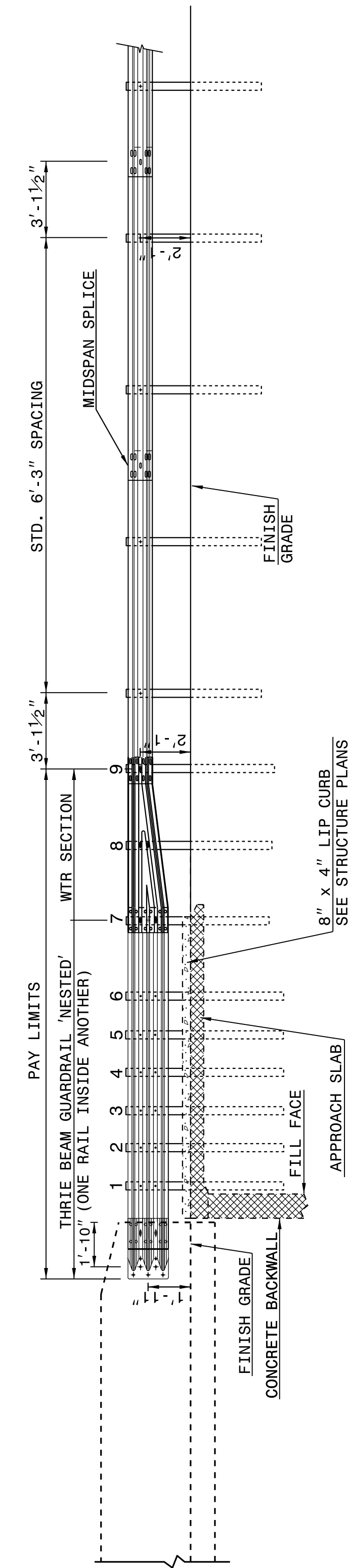
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**NOTE:**  
 \*\*POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.  
 \*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.  
 -SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.  
 -MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).  
 -LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.  
 -SEE SHEET 5 FOR POST SECTIONS 1 THRU 9.

ROADWAY DETAIL DRAWING FOR  
**STRUCTURE ANCHOR UNITS**  
 GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO  
 RAIL ON BRIDGE - SUB REGIONAL TIER

SHEET 2 OF 7  
**862D03**

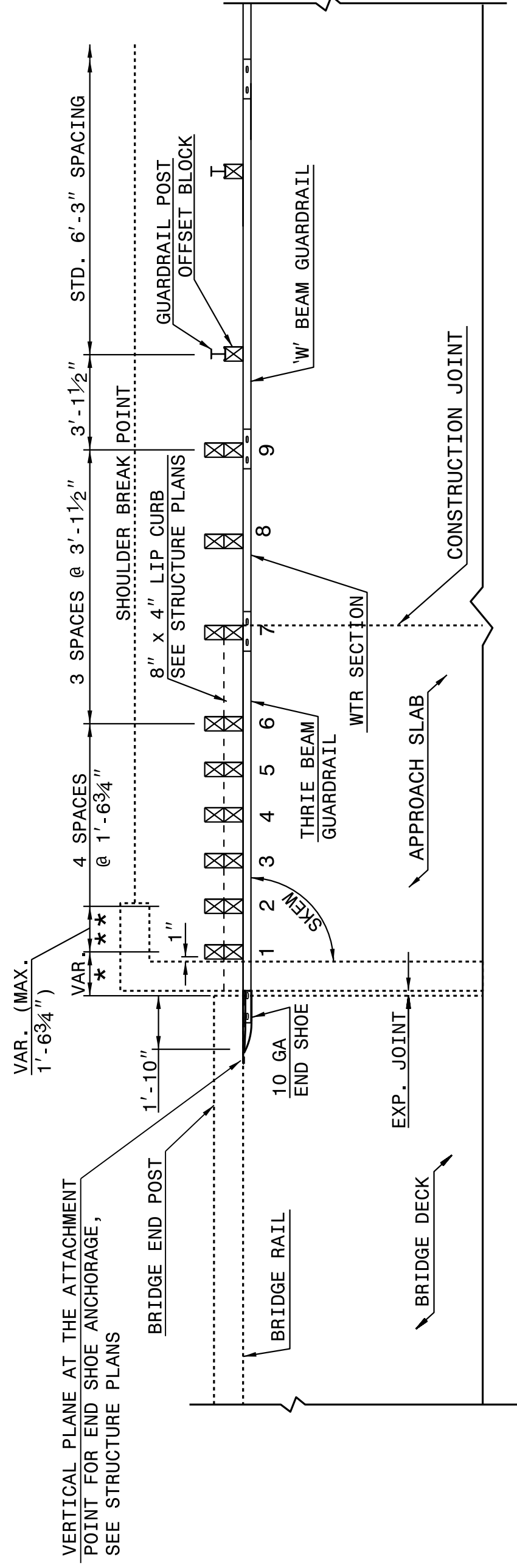
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ROADWAY DETAIL DRAWING FOR  
**STRUCTURE ANCHOR UNITS**  
 GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO  
 RAIL ON BRIDGE - SUB REGIONAL TIER

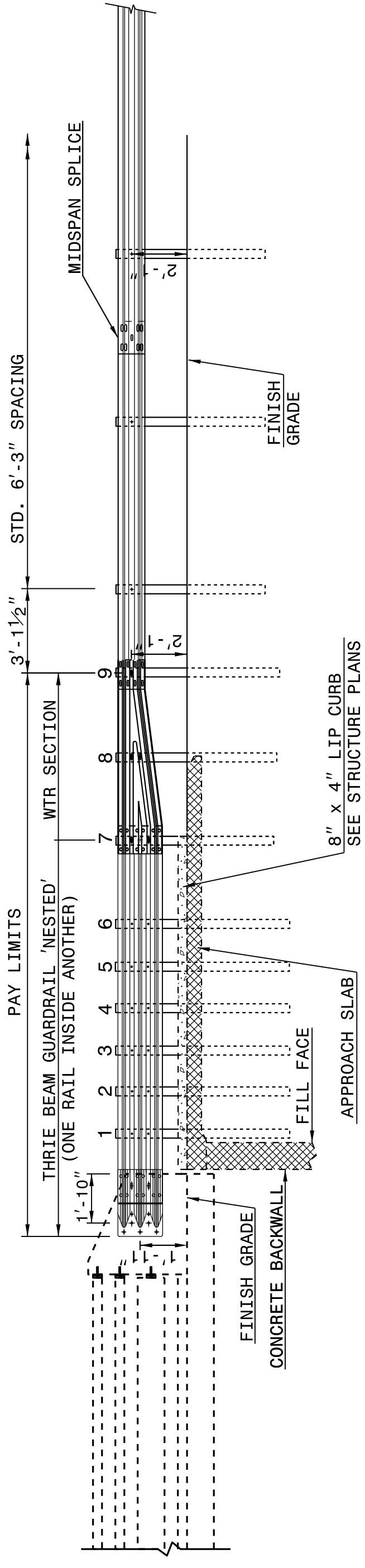
SHEET 2 OF 7  
**862D03**

**GUARDRAIL ANCHOR UNIT, TYPE III FOR ATTACHMENT TO  
 RAIL ON BRIDGE - SUB REGIONAL TIER**

PLAN VIEW



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**NOTE:**  
 \*\*POST NOT REQUIRED FOR SKEW ANGLES GREATER THAN 150° OR LESS THAN 30° UNLESS OTHERWISE DIRECTED BY THE ENGINEER.  
 \*THE DISTANCE FROM END OF BRIDGE RAIL TO CENTER LINE OF THE FIRST POST SHOULD BE 11½" IF CONCRETE BACKWALL IS NOT PRESENT.  
 -SHOULDER BERM GUTTER MUST BE INSTALLED TO THE LIMITS 8" x 4" LIP CURB IS SHOWN IF ANCHOR UNIT IS NOT ADJACENT TO AN APPROACH SLAB.  
 -MEASURE GUARDRAIL HEIGHT FROM THE TOP OF ADJACENT SURFACE (SHOULDER, BERM, OR GUTTER).  
 -LAP JOINTS IN THE DIRECTION OF TRAFFIC FLOW.  
 -SEE SHEET 5 FOR POST SECTIONS 1 THRU 9.

ROADWAY DETAIL DRAWING FOR  
**STRUCTURE ANCHOR UNITS**  
 GUARDRAIL ANCHOR UNIT, TYPE III  
 FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7  
**862D03**

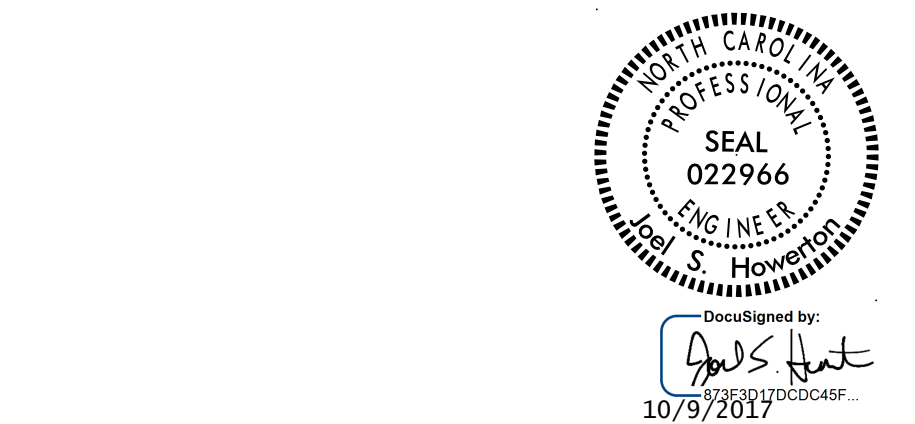
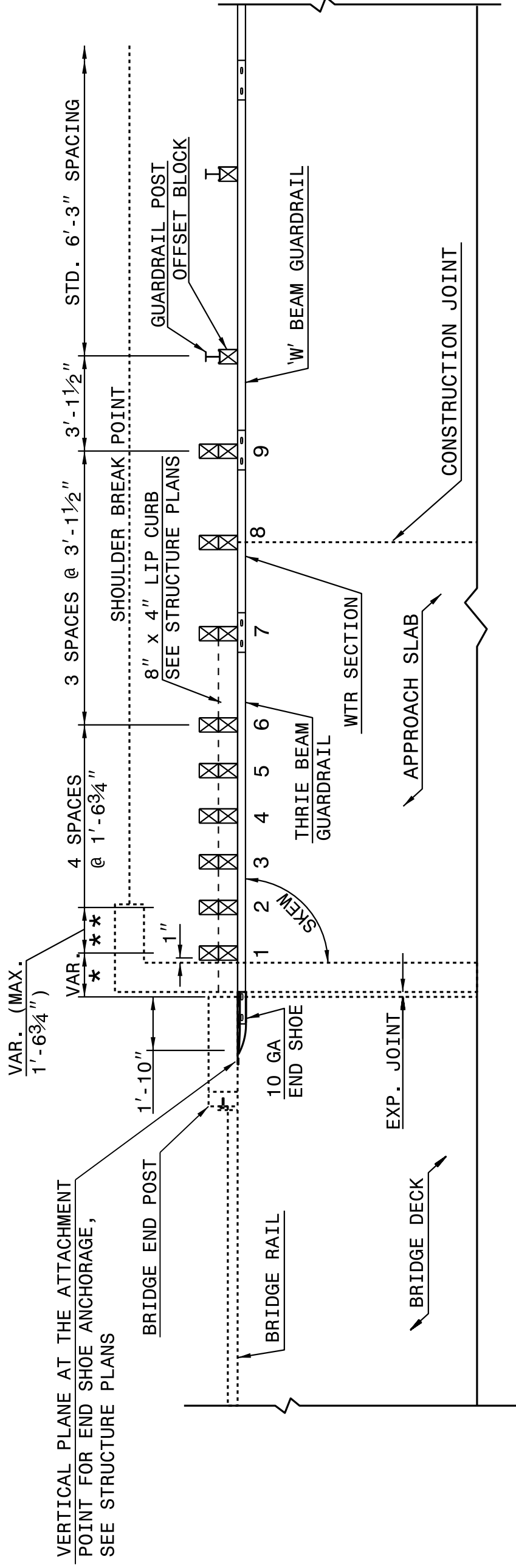
STATE OF NORTH CAROLINA  
 DEPT. OF TRANSPORTATION  
 DIVISION OF HIGHWAYS  
 RALEIGH, N.C.

ROADWAY DETAIL DRAWING FOR  
**STRUCTURE ANCHOR UNITS**  
 GUARDRAIL ANCHOR UNIT, TYPE III  
 FOR ATTACHMENT TO RAIL ON BRIDGE

SHEET 1 OF 7  
**862D03**

**GUARDRAIL ANCHOR UNIT, TYPE III  
 FOR ATTACHMENT TO RAIL ON BRIDGE**

PLAN VIEW



DOCUMENT NOT CONSIDERED FINAL  
 UNLESS ALL SIGNATURES COMPLETED

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

**SEE TITLE BLOCK**

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







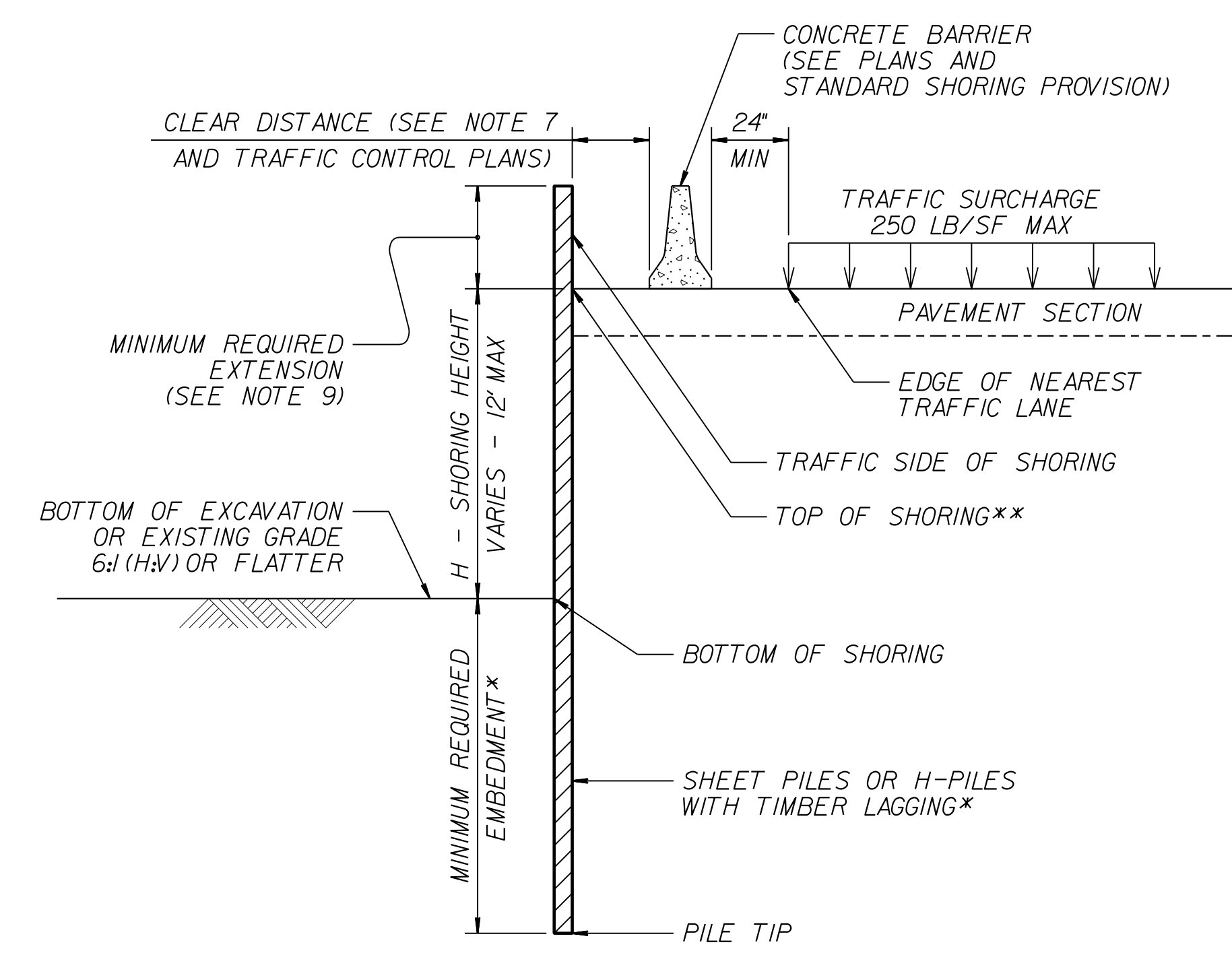
GROUNDWATER CONDITION (SEE NOTE 6)	H SHORING HEIGHT (FT)	SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT					SURCHARGE CASE WITH TRAFFIC IMPACT				
		SHEET PILES		H-PILES WITH TIMBER LAGGING			SHEET PILES		H-PILES WITH TIMBER LAGGING		
		MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)			MINIMUM REQUIRED EMBEDMENT (FT)	MINIMUM REQUIRED SECTION MODULUS (IN <sup>3</sup> /FT)	MINIMUM REQUIRED EMBEDMENT* (FT) (SEE NOTE 10)		
				HP 10x42	HP 12x53	HP 14x73			HP 10x42	HP 12x53	HP 14x73
GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP	< 6	11.5	4.5	11.5	11.5	11.5	16.0	12.0	13.0	13.0	13.0
	7	13.0	7.0	13.0	13.0	13.0	17.0	14.5	14.5	14.5	14.5
	8	15.0	10.0	--	15.0	15.0	18.0	17.0	--	15.5	15.5
	9	17.0	14.0	--	17.0	17.0	19.0	20.0	--	17.0	17.0
	10	18.5	19.5	--	--	18.5	20.0	23.5	--	--	18.5
	11	20.5	26.0	--	--	--	21.0	28.0	--	--	20.0
12	22.5	33.0	--	--	--	22.0	33.0	--	--	21.5	
GROUNDWATER ELEVATION BELOW PILE TIP	< 6	7.5	3.0	8.0	8.0	8.0	11.0	10.0	9.5	9.5	9.5
	7	8.5	4.5	9.5	9.5	9.5	12.0	12.0	10.5	10.5	10.5
	8	10.0	6.5	10.5	10.5	10.5	12.5	14.0	11.5	11.5	11.5
	9	11.0	9.5	--	12.0	12.0	13.5	16.5	--	12.5	12.5
	10	12.5	13.0	--	--	13.5	14.0	19.5	--	13.5	13.5
	11	13.5	17.0	--	--	14.5	15.0	22.5	--	--	14.5
12	15.0	21.5	--	--	16.0	16.0	25.5	--	--	15.5	

**MINIMUM REQUIRED EMBEDMENT AND SECTION MODULUS**

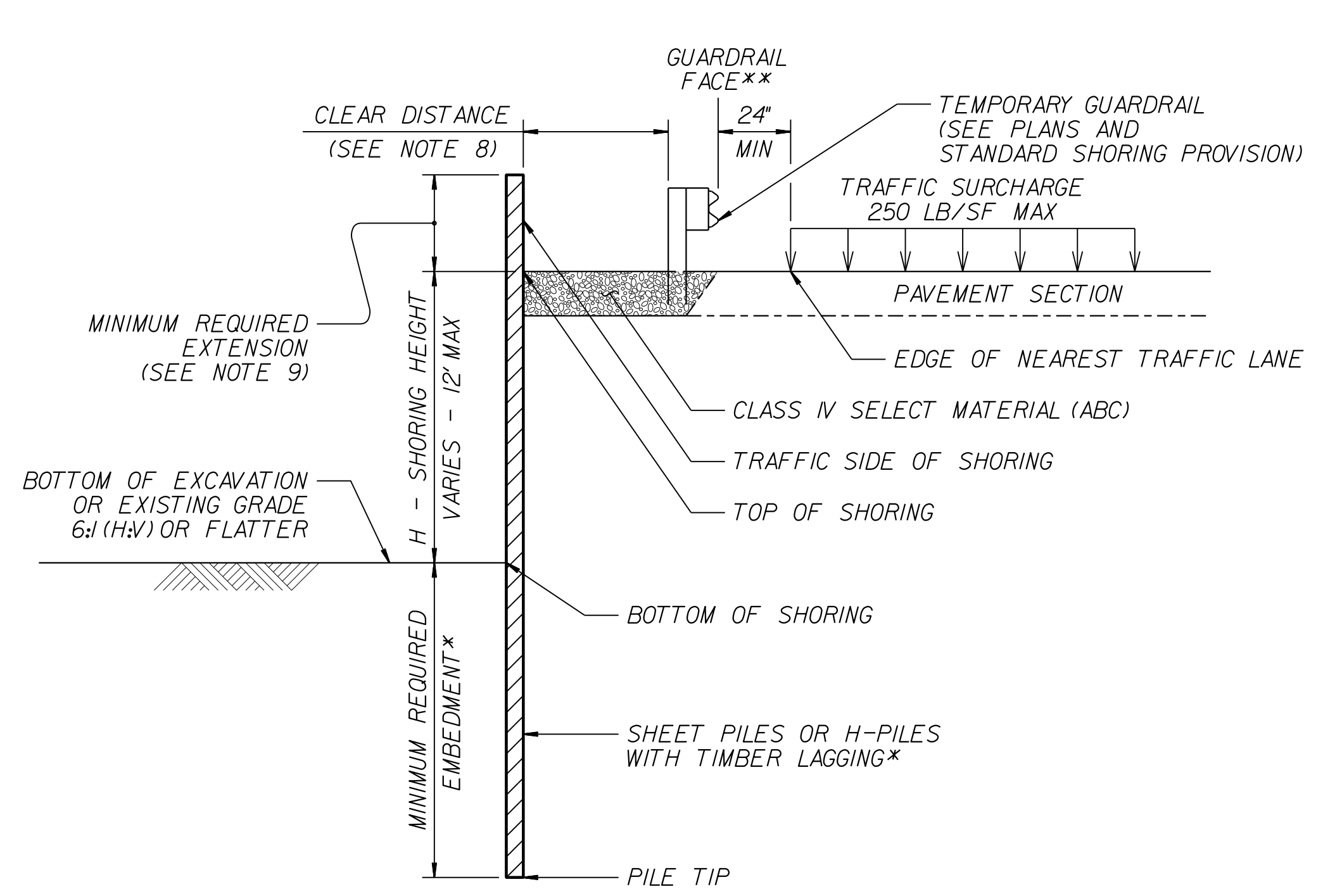
\*DO NOT USE H-PILES WITH TIMBER LAGGING FOR GROUNDWATER CONDITION, SHORING HEIGHT AND H-PILE SIZE SHOWN IF MINIMUM REQUIRED EMBEDMENT IS "--".

**NOTES:**

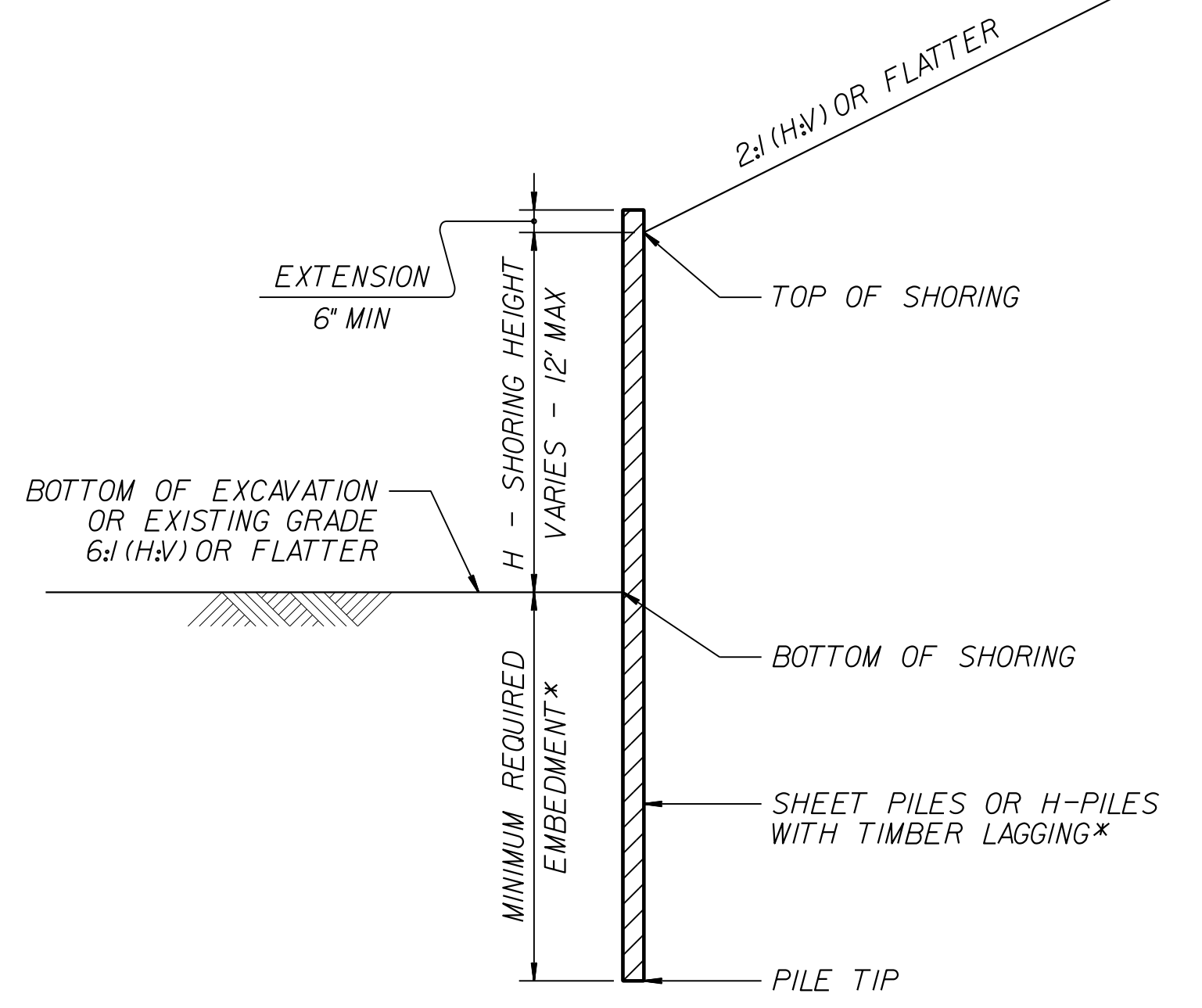
- AT THE CONTRACTOR'S OPTION, USE STANDARD TEMPORARY SHORING AS NOTED IN THE PLANS.
- FOR STANDARD TEMPORARY SHORING, SEE STANDARD SHORING PROVISION.
- STANDARD TEMPORARY SHORING IS BASED ON THE FOLLOWING IN-SITU ASSUMED SOIL PARAMETERS:  
UNIT WEIGHT,  $\gamma = 120$  LB/CF  
FRICTION ANGLE,  $\phi = 30$  DEGREES  
COHESION,  $c = 0$  LB/SF
- DO NOT USE STANDARD TEMPORARY SHORING IF ASSUMED SOIL PARAMETERS ARE NOT APPLICABLE.
- DO NOT USE STANDARD TEMPORARY SHORING WHEN VERY LOOSE OR SOFT SOIL OR MUCK IS WITHIN THE EMBEDMENT DEPTH.
- USE GROUNDWATER ELEVATION NOTED IN THE PLANS. IF NO GROUNDWATER ELEVATION IS SHOWN IN THE PLANS, USE "GROUNDWATER ELEVATION BETWEEN BOTTOM OF SHORING AND PILE TIP" FOR GROUNDWATER CONDITION. DO NOT USE STANDARD TEMPORARY SHORING IF GROUNDWATER IS ABOVE BOTTOM OF SHORING.
- AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN THE MINIMUM REQUIRED FOR CONCRETE BARRIER, SET BARRIER NEXT TO AND UP AGAINST TRAFFIC SIDE OF PILES AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
- AT THE CONTRACTOR'S OPTION OR IF AVAILABLE CLEAR DISTANCE IS LESS THAN 4' FOR TEMPORARY GUARDRAIL, ATTACH GUARDRAIL TO TRAFFIC SIDE OF PILES AS SHOWN IN THE PLANS AND USE "SURCHARGE CASE WITH TRAFFIC IMPACT".
- MINIMUM REQUIRED EXTENSION IS 6" FOR "SLOPE OR SURCHARGE CASE WITH NO TRAFFIC IMPACT" AND 32" FOR "SURCHARGE CASE WITH TRAFFIC IMPACT".
- MINIMUM REQUIRED EMBEDMENT FOR H-PILES WITH TIMBER LAGGING IS BASED ON DRIVEN H-PILES AT MAXIMUM 6' SPACING. AT THE CONTRACTOR'S OPTION, EMBEDMENT DEPTHS MAY BE REDUCED BY 25% FOR DRILLED-IN H-PILES.
- SUBMIT A "STANDARD TEMPORARY SHORING SELECTION FORM" AT LEAST 7 DAYS BEFORE STARTING TEMPORARY SHORING CONSTRUCTION. UP TO 3 SHORING LOCATIONS MAY BE INCLUDED ON EACH FORM. STANDARD SHORING SELECTION FORMS ARE AVAILABLE FROM:  
[connect.ncdot.gov/resources/Geological/Pages/Geotech\\_Forms\\_Details.aspx](http://connect.ncdot.gov/resources/Geological/Pages/Geotech_Forms_Details.aspx)
- CONTACT THE ENGINEER IF PILES DO NOT ATTAIN THE MINIMUM REQUIRED EMBEDMENT.



**CONCRETE BARRIER**  
\*\*TOP OF SHORING =  
EDGE OF PAVEMENT



**TEMPORARY GUARDRAIL**  
\*\*GUARDRAIL FACE =  
EDGE OF PAVEMENT



**STANDARD TEMPORARY SHORING**  
(SLOPE CASE)  
\*SEE TABLE ABOVE.

**STANDARD TEMPORARY SHORING**  
(SURCHARGE CASE)  
\*SEE TABLE ABOVE.



NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
  
**GEOTECHNICAL  
ENGINEERING UNIT**

STANDARD DETAIL NO. 1801.01

STANDARD  
TEMPORARY SHORING







COMPUTED BY: JCK DATE: 5/21/17  
 CHECKED BY: SCC DATE: 5/21/17

(2-16-16)

PROJECT NO.  
B-4462

SHEET NO.  
3G-1

**STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS**

**SUMMARY OF SUBSURFACE DRAINAGE**

LINE	Station	Station	Location LT/RT/CL	Drain Type* UD/BD/SD	LF
CONTINGENCY				SD	250
				<b>TOTAL LF:</b>	250

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

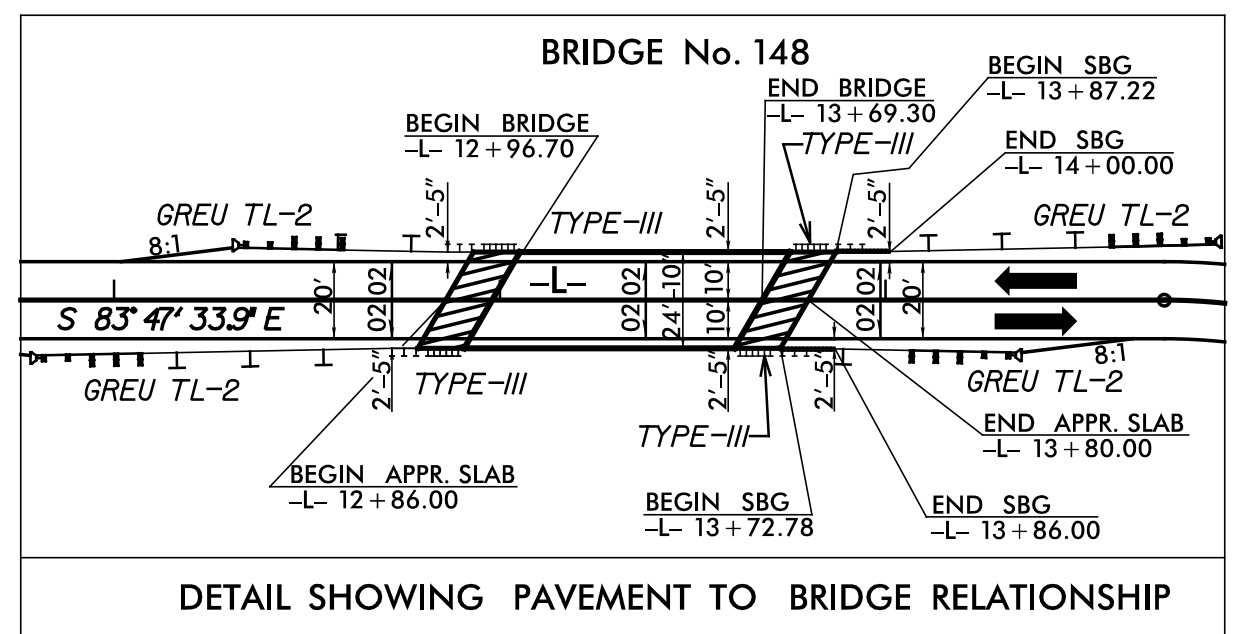
**SUMMARY OF AGGREGATE SUBGRADE/STABILIZATION**

LINE	Station	Station	Aggregate Type* ASU/AST	Aggregate Thickness INCHES	Shallow Undercut CY	Class IV Subgrade Stabilization TONS	Geotextile for Soil Stabilization SY	Stabilizer Aggregate TONS	Class IV Aggregate Stabilization TONS
CONTINGENCY			ASU		50	80	100		
					<b>TOTAL CY/TONS/SY:</b>	50	80	100**	0

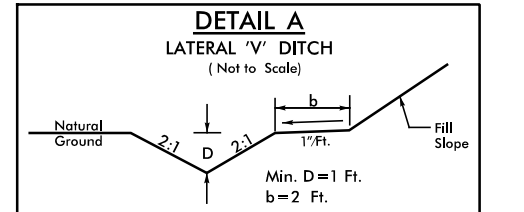
\*ASU = Aggregate Subgrade  
 \*AST = Aggregate Stabilization  
 \*\*Total square yards of "Geotextile for Soil Stabilization" is only the estimated quantity for ASU/AST and may only represent a portion of the geotextile quantity shown in the Item Sheets of the Proposal.

8/17/99

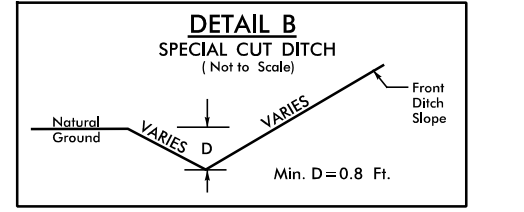
PROJECT REFERENCE NO. <b>B-4462</b>	SHEET NO. <b>4</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER <b>BRITAIN EASON</b> NORTH CAROLINA PROFESSIONAL SEAL 25523 10/23/2017	HYDRAULICS ENGINEER <b>DAVID B. PETTY</b> NORTH CAROLINA PROFESSIONAL SEAL 038697 10/23/2017
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



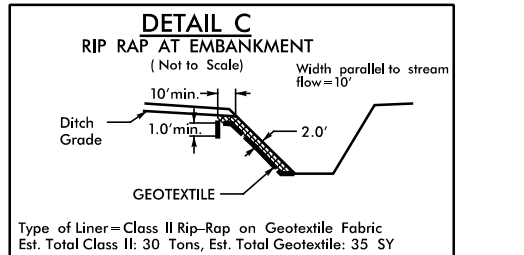
NOTE: DRAINAGE STRUCTURES 0401 & 0403 AND ASSOCIATED SBG MAY BE SHIFTED UP TO 10' AS NEEDED TO AVOID CONFLICT WITH GUARDRAIL POSTS.



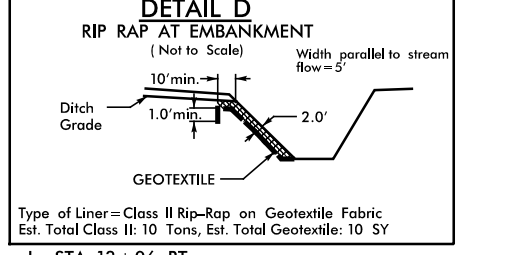
FROM -L- STA. 12+50 TO 13+06 RT  
EST. DDE: 40 CY  
FROM -L- STA. 13+36 TO 16+00 RT  
EST. DDE: 240 CY  
FROM -L- STA. 13+67 TO 16+08 LT  
EST. DDE: 50 CY  
(SEE DITCH GRADE SHEET 5)



FROM -L- STA. 16+42 TO 17+00 LT  
(SEE XSCS SHEET 3-4 & 3-7)  
(SEE DITCH GRADE SHEET 5)

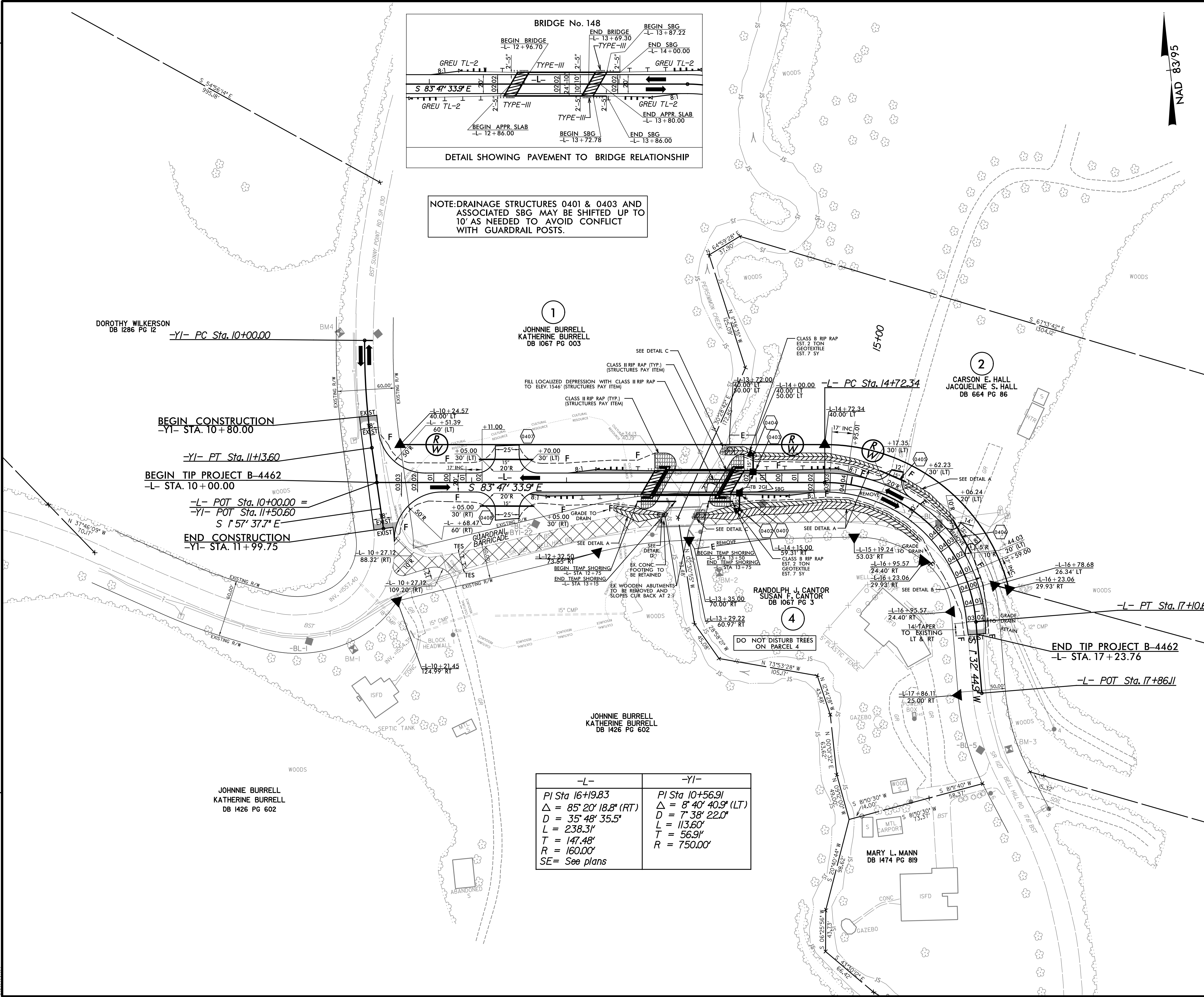


Type of Liner - Class II Rip-Rap on Geotextile Fabric  
Est. Total Class II: 30 Tons, Est. Total Geotextile: 35 SY



Type of Liner - Class II Rip-Rap on Geotextile Fabric  
Est. Total Class II: 10 Tons, Est. Total Geotextile: 10 SY

REVISIONS



-L-	-YI-
PI Sta 16+19.83	PI Sta 10+56.91
$\Delta = 85' 20'' 18.8'' (RT)$	$\Delta = 8' 40'' 40.9'' (LT)$
$D = 35' 48'' 35.5''$	$D = 7' 38'' 22.0''$
$L = 238.31'$	$L = 113.60'$
$T = 147.48'$	$T = 56.91'$
$R = 160.00'$	$R = 750.00'$
SE= See plans	

APPROACH SLAB  
 PAVEMENT REMOVAL  
 PAVED SHOULDER

ALL DRIVEWAY RADII = 10'  
 UNLESS OTHERWISE NOTED  
 SEE SHEET 5 FOR -L- PROFILE  
 SEE SHEET S-1 THRU S-13  
 FOR STRUCTURE PLANS

10/19/2017  
B34462.RDY\_PSH\_04.dgn

5/28/2017

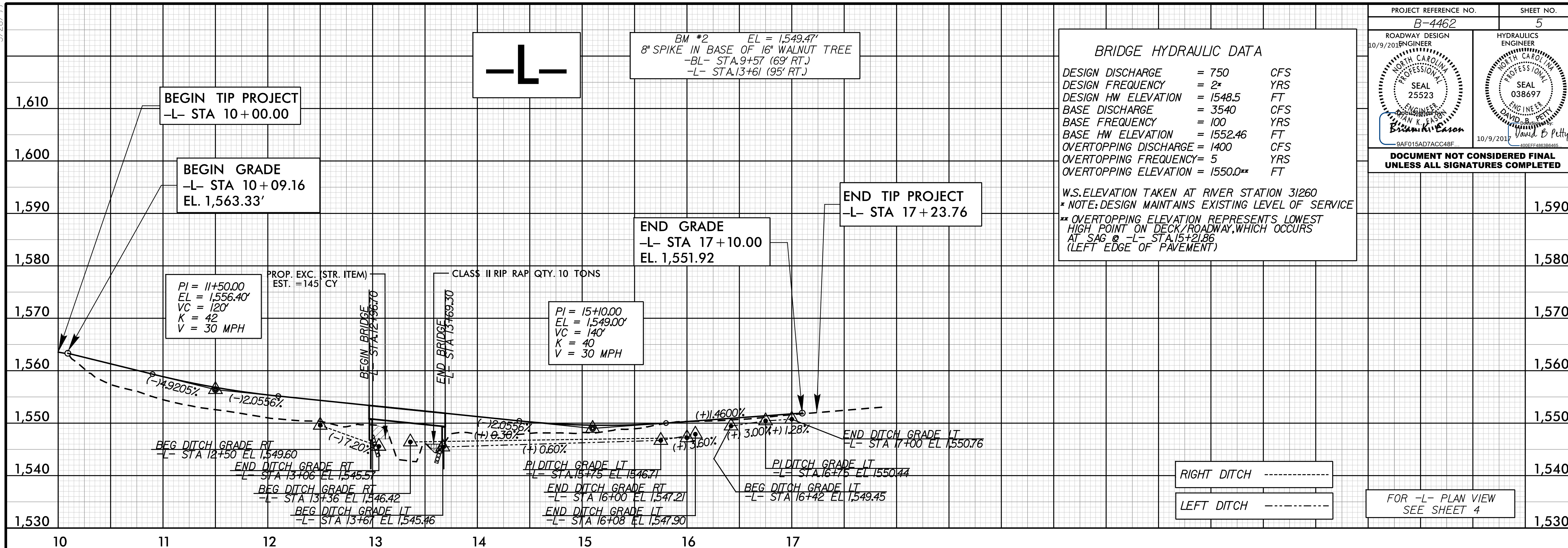
PROJECT REFERENCE NO. B-4462	SHEET NO. 5
ROADWAY DESIGN 10/9/2017 ENGINEER DAVID B. EASTON SEAL 25523 9AF015AD7ACC48F	HYDRAULICS ENGINEER DAVID B. PELTY SEAL 038697 10/9/2017 00FF483B8465

**BRIDGE HYDRAULIC DATA**

DESIGN DISCHARGE = 750 CFS  
DESIGN FREQUENCY = 2\* YRS  
DESIGN HW ELEVATION = 1548.5 FT  
BASE DISCHARGE = 3540 CFS  
BASE FREQUENCY = 100 YRS  
BASE HW ELEVATION = 1552.46 FT  
OVERTOPPING DISCHARGE = 1400 CFS  
OVERTOPPING FREQUENCY = 5 YRS  
OVERTOPPING ELEVATION = 1550.0\*\* FT

W.S.ELEVATION TAKEN AT RIVER STATION 31260  
\* NOTE: DESIGN MAINTAINS EXISTING LEVEL OF SERVICE  
\*\* OVERTOPPING ELEVATION REPRESENTS LOWEST HIGH POINT ON DECK/ROADWAY, WHICH OCCURS AT SAG @ -L- STA.15+21.86 (LEFT EDGE OF PAVEMENT)

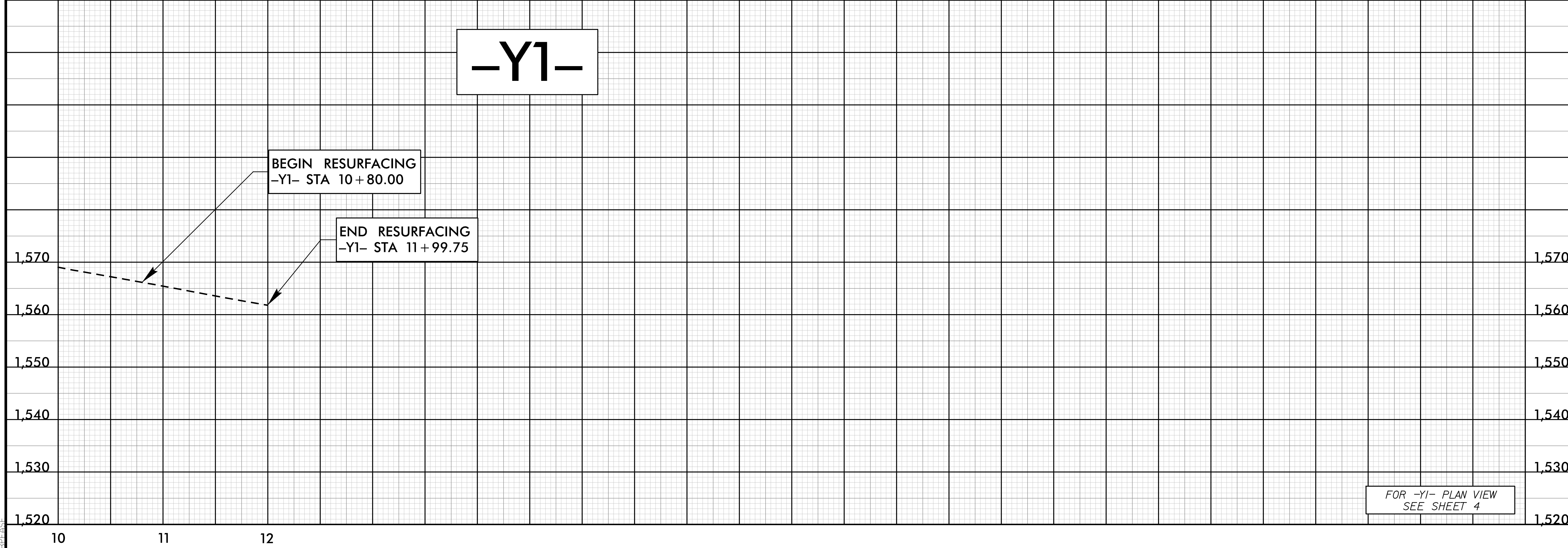
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



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

FOR -L- PLAN VIEW SEE SHEET 4

**-Y1-**



FOR -Y1- PLAN VIEW SEE SHEET 4

8/28/2017 8:42 AM PFL\_05.dgn